



Global Technical Training Services, Inc. Newsletter



**The State of the Industry**

Sid Crouch, GTTSi Chief Technical Consultant

Although the United States is still the largest producer of nuclear energy in the world with 95 operational commercial nuclear plants counting Vogtle 3 & 4, this preeminence may soon to be outdone by China and others. While 440 nuclear power plant reactors are still operating worldwide, since 1950, 214 nuclear power plant reactors have been decommissioned, 31 of which in the U.S. Across the globe, 56 new nuclear reactors are planned for operation by 2030, adding 62,300 MW of electrical capacity worldwide. Twelve are scheduled for completion this year, with 8 more planned for service in 2025, 10 in 2026, eleven for 2027, 7 for 2028, 3 for 2029, and 5 in 2030. China ranks 1<sup>st</sup> for plants under construction with 27 underway which will give the country a total of 60 nuclear power plants. India is 2<sup>nd</sup> with plans for 7 more nuclear plants adding 5,900 MW of electrical capacity. While the U.S. has coasted with its nuclear energy production, China and Russia have moved onward, also exporting their technology. Our decline was by choice, as we had and still have the technical and financial resources to compete with Russia and China, but the political will to pursue nuclear was lacking despite its characteristic of **zero carbon emissions** and exemplary safety record. Today that sentiment has changed with billions of dollars touted for nuclear from the Biden administration and support of Republicans. It seems the U.S. dream for a nuclear renaissance rests with the generation of small modular reactors (**SMRs**). Nearly a dozen companies are developing SMRs, a fraction of the size of those at Vogtle. **It's time to get started.**

*I welcome your comments or questions - [sid.crouch@gttsi.com](mailto:sid.crouch@gttsi.com)*

Highlights

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Vegetation Management to Keep the Lights On

TVA and Their Move From Coal

Did You Know?

GTTSi Job Board Update



GTTSi  
 807 Bypass 123 – Suite 31  
 Seneca, SC 29678  
 864.882.3111  
[ginfo@gttsi.com](mailto:ginfo@gttsi.com)  
[www.gttsi.com](http://www.gttsi.com)

## UKRAINE MOVES FORWARD WITH NUCLEAR DESPITE RUSSION INVASION

Nuclear power has been a significant part of Ukraine's energy landscape for decades. The country has a total of 15 operating nuclear reactors in four different power plants, making it one of the largest nuclear energy producers in Europe. The most well-known of the Ukraine plants was the Chernobyl Nuclear Power Plant, infamous for the catastrophic accident in 1986, which remains the worst nuclear accident in history. However, it's essential to note that the other nuclear power plants in Ukraine have operated safely and continue to contribute to the country's energy needs. In 2021, with all 15 nuclear units operating, they supplied over 55% of Ukraine's total electricity requirements, 2<sup>nd</sup> highest in the world, behind only France. The current four stations in Ukraine are **Khmelnyskyi** (4 VVER Units. 2 Units are operating. Units 3&4 are under construction), **Rivne** (4 VVER Units), **South Ukraine** (4 VVER Units. 3 Units are operating,

Unit 4 was abandoned in 1989), and **Zaporizhzhia** (6 VVER Units. All are in Cold Shutdown). The VVER design is similar to the PWR design used in the U.S. The major difference is the fuel cladding. The VVER is ZrNb while the PWR is ZrSn. The fuel pellet for the VVER is a hollow design while the PWR is solid dog-boned pellet design, but their behavior is very similar.

Until the Russia invasion of the Ukraine, Energoatom (Ukrainian State Enterprise) was the operator of all four nuclear power stations in the Ukraine. Recently, the Ukraine's Energy Minister Herman Halushchenko announced that construction of a fifth unit at Khmelnytskyi was underway. Energoatom and Westinghouse will work together to build the first of a fleet of Westinghouse AP1000 design nuclear plants there. He went on to say, "This is a major geopolitical project of common *(continued)*



*Ukraine Nuclear Power Plants  
Image Credit: Bankwatch.org*

interest for Ukraine and the United States. The technologies that we will build and develop together will push Russians out of the European nuclear energy market ... through cooperation in the construction of a new type of reactor for Europe."

Khmelnitsky's first reactor was connected to the grid in 1987 but work on the other three reactors was halted in 1990 at a time when Unit 3 was 75% complete. Work on the second reactor restarted and the unit connected to the grid in 2004. Units 3 & 4 remain unfinished. The Ukrainian Cabinet recently drafted a law on the construction and completion of Units 3 & 4. Unit 3 is expected to be operational in two and a half years.

Energoatom's CEO Petro Kotin said about the project, "Westinghouse is our reliable strategic partner: both in the development and loading of alternative fuel into the VVER reactors, and in the creation of a fuel production line in Ukraine and in the construction of new power units... during the war, we have not stopped, but on the contrary deepened and accelerated our cooperation.



*Energoatom CEO Petro Kotin  
Photo Credit: Energoatom.com*



*Westinghouse's AP1000 Reactors are currently operating near Waynesboro, Georgia at Plant Vogtle. The design is a two-loop pressurized water reactor that is touted as using a simplified, innovative, and effective approach to safety. Image Credit: SouthernNuclear.com*

Westinghouse Electric Company's President and CEO Patrick Fragman said, "We are opening a new stage, a new milestone in the cooperation between Westinghouse and Energoatom... Ukraine will get energy that is clean, affordable and with the use of economically feasible technologies. This project will also create many jobs during construction, operation, repairs and maintenance."

The US Ukrainian Ambassador Bridget Brink said the Ukraine needs more power facilities, especially with its current infrastructure being targeted by regular shelling. "I welcome the efforts and desire of the Government of Ukraine and the Ministry of Energy, Energoatom, in the direction of the development of nuclear power industry. These units at the Khmelnitsky NPP will be the first of nine using AP1000 technology, which are planned to be built in Ukraine together with Westinghouse." 🌐

## VEGETATION MANAGEMENT: A CRITICAL NEED TO KEEP THE LIGHTS ON

Vegetation management in the power industry refers to the planning and implementation of strategies to control vegetation growth around power lines, substations, and other electrical infrastructure. It's a crucial aspect of maintaining the reliability and safety of the power grid, keeping it capable of providing electricity to the community.

Over the last 30 years, lessons learned after multiple storms across the country have pointed to trees “as the leading cause of outages.” Utility vegetation management can maintain utility ROW (*right-of-way*) and control the growth of vegetation, thereby reducing the risk of outages, fires, and other disruptions and dangers to the communities that the utilities service.

There is ample evidence to prove that vegetation management improves reliability and reduces the system average interruption frequency index (*SAIFI*). Inspecting, pruning, and removing trees, branches, and other vegetation to maintain power line clearance is essential to safe operations. Trees may cause power outages whenever branches contact power lines, break and fall on lines, or when trees are blown over on to power lines during a storm. For the most part, mechanical control methods such as hand cutting, mowing, burning, stump grinding, and/or selective trimming are used to manage the vegetation.

Hand cutting consists of the mechanical cutting of target species using chain saws and brush saws. Target species are cut as close to the ground as practical.



*Photo Credit: LD Holland*

In Connecticut, the University of Connecticut conducted a statewide study comparing 13 years of pruning using an enhanced tree pruning program versus nearby untreated rights-of-way. The results showed that the pruning program areas had storm outage rates 35% to 180% lower than the untreated service areas.

Several years ago, Connexus Energy, Minnesota's largest member-owned electric cooperative, studied vegetation management from a different perspective. They analyzed the average number of outages per electrical circuit and found that “the number of vegetation-related outages per circuit increased by nearly 0.2 per year” on the circuits without pruning.

Researchers from the California Polytechnic State University, San Luis Obispo, recently recommended that the Golden State utilities ask for exemptions from the California (*continued*)

Environmental Quality Act, because they were convinced that utilities could mitigate wildfire risks through tactical vegetation management. The reminder comes as California wildfires, over the past decade, have set records for the largest, most deadly, and most destructive fires in the history of the United States. These fires have destroyed millions of acres of land, burned down hundreds of thousands of structures, and caused the deaths of humans, animals, and plants.

With that said, anyone who has ever led a utility vegetation management program has a story about the challenges they face in winning, keeping, or losing their funding. Leaders have to overcome hurdles to secure the money for optimal cycles of vegetation management. Then, once the funding is in place, the pressure to streamline and centralize how the utilities pay their vegetation contractors can lead to uncompetitive and less productive sole-source contracts. Finally, when utilities hit a cash crunch, vegetation management is one of the first places where funding is pulled back to fill the gaps in other parts of the utility's operation & maintenance budget.

In the long run, the decision to suspend, cut, or defer vegetation management usually results in costing the utilities more, as evidenced by a study published in the Journal of Arboriculture several years ago. More recently, a study conducted by Environmental Consultants, Inc. projected the impact of deferring tree pruning for line clearance increased by 20% for every year of postponement.

**GTTSi** is proud to be providing Human Performance Services for *Treeways*, a nationwide full-service vegetation management company that offers line clearing, storm

response, herbicide application, aerial trimming, and mowing services to help clear paths for critical infrastructure. These Human Performance (**HP**) Services consist of the following:

### Senior Leadership HP


- HP Simply Defined as Behaviors + Results = Performance (**B+R=P**)
- HP Principles (**5**)
- Prevention, Detection, Correction of Errors to Mitigate Events (**PDC**)
- Standards and Behaviors
- Risk Management / Drift
- Observations and Coaching - providing Instant Feedback and Consistent Reinforcement (**IF&CR**) of the Standards

### GF/Foreman HP Introduction

- HP Defined
- Observation and Coaching
- HP Principles (**5**)
- HP Fundamentals and Technique Introduction
  1. Job Briefs
  2. Communication Competence
  3. Verification Practices
  4. Procedure Use and Adherence
  5. Situational Awareness

### Crew Level Training and HP Field Application

- HP Principles
- WHY? **and** What's in It for Me?
  1. Job Briefs
  2. Communication Techniques
  3. Verification Practice Application
  4. Procedure Use and Adherence
  5. Situational Awareness

If you would like to learn more, please contact us a [ginfo@gttsi.com](mailto:ginfo@gttsi.com). 

## TVA CONTINUES MOVE FROM COAL-FIRED GENERATION

Tennessee Valley Authority (**TVA**) continues to move forward with their transition away from coal-fired power plant generation. The largest public power company in the United States currently operates only four coal-fired power plants (**Kingston, Cumberland, Gallatin, and Shawnee**) and by 2028, will be down to two. This is quite a difference from just 10 years ago, when over 50% of their total generation came from coal fired power plants.

TVA announced plans to retire their nine-unit 1.3-GW (gigawatts) Kingston Fossil Plant in 2027 and replace it with a 1.5-GW complex featuring a combined cycle gas turbine (CCGT) plant, aero-derivative turbines, 100 MW (megawatts) of battery storage, and up to 4 MW of solar generation.

In addition to Kingston, TVA has plans in motion to retire the two-unit 2.47 GW Cumberland Fossil Plant by 2028 - one unit by the end of 2026 and the second unit by the end of 2028. Before the first unit is retired, they will build a 1.45-GW CCGT to be in operation by 2026. Replacement generation for the second unit has been deferred to allow consideration for a broader range of replacement options.

No decisions have been made on retirement dates for Gallatin (975 MW coal – 4 units / 600 MW natural gas – 8 units) and Shawnee (1.75 GW coal – nine units). However, they are pursuing a first-of-its-kind pilot program at the Shawnee Fossil Plant in West Paducah, Kentucky, dubbed “Project Phoenix”. They plan to repurpose the 300-acre Shawnee site with up to 100 MW of solar generation to be online by the summer of 2028.



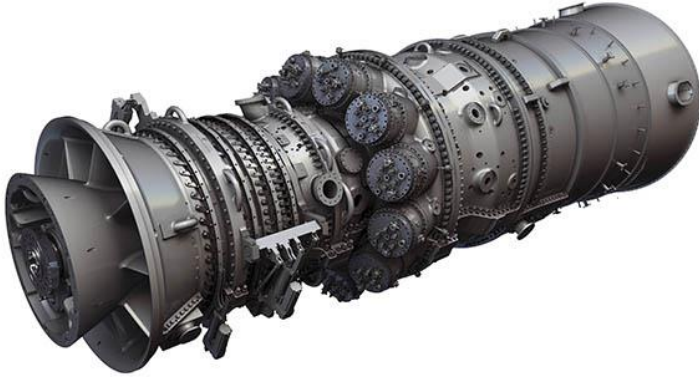
*Gallatin Fossil Plant  
Photo Credit: TVA.com*

Over the past year, TVA has added about 1.5 GW of new gas-fired generation. These include three combustion turbine units, a combined 750 MW, at the Colbert Combustion Turbine site in North Alabama. In December 2023, they added another 750 MW with three new units at the Paradise Combine Cycle Plant near Drakesboro, Kentucky. More gas units are slated to come online over the next few years. Along with the Cumberland CCGT, TVA plans to add 500 MW of peaking aero-derivative combustion turbines at Johnsonville in late 2024 and 300 MW of solar at Lawrence County and Shawnee by late 2028. 🌍

### **TVA's Generating Assets FY 2023**

- 3 Nuclear Sites
- 4 Coal-Fired Sites
- 29 Hydroelectric Sites
- 1 Pumped-Storage Site
- 9 Combustion Turbine Gas Sites
- 8 Combined Cycle Gas Sites
- 9 Solar Energy Sites
- 1 Diesel Generation Site

## DID YOU KNOW?



*GE Vernova's 7HA Gas Turbine  
Image Credit: GEVernova.com*

This month, the Environmental Protection Agency denied an industry petition to remove stationary combustion turbines from their list of hazardous air pollutants (HAP) under the Clean Air Act. This means no change for 1,015 stationary combustion turbines at 310 facilities, located at power plants, compressor stations, and chemical plants. The EPA stated that they are denying the petition “based on the EPA's determination that the petition is incomplete and because we have found that the submitted information is inadequate to determine that no source in the category emits HAP in quantities that may cause a lifetime risk of cancer greater than 1-in-1 million to the individual in the population who is most exposed to emissions of such pollutants from the source.”

The Tennessee Valley Authority (TVA) is a federally owned corporation in the United States created as part of President Franklin D. Roosevelt's New Deal initiatives during the Great Depression. President Roosevelt signed the TVA Act on May 18, 1933, to address a range of issues in the Tennessee Valley region, including poverty, flood control, and economic development. One of the TVA's most significant functions is the generation and distribution of electricity. It operates numerous hydroelectric dams along the Tennessee River and its tributaries, as well as coal-fired and nuclear power plants. TVA is one of the largest producers of electricity in the United States, serving millions of customers across seven states in the southeastern United States.



*President Franklin D. Roosevelt signs the TVA Act  
Photo Credit: TVA.com*



*Hitachi Generator Step Up Transformer  
Photo Credit: Hitachi-tds.com*

Demand for transformers and electrical equipment has grown at an unprecedented rate and Hitachi Energy is making investments to bolster their transformer production. Last year Hitachi announced a \$3 billion investment in the electrification of the energy system and this April announced an additional \$1.5 billion to expand their transformer production capacity by 2027. Hitachi is also planning a \$180 million investment for a 30,000 square-foot facility in Finland, in addition to their previously announced \$30 million expansion of their facility in Germany. Hitachi also plan for additional investments in Europe, the Americas, and Asia to meet the growing demand for power and distribution transformers.

**MAY 2024**

GTTSi  
807 Bypass 123 – Suite 31  
Seneca, SC 29678  
Phone: 864.882.3111  
Fax: 864.882.1026  
[ginfo@gttsi.com](mailto:ginfo@gttsi.com)

Marshalla Schile  
President  
Phone: 864.882.3111  
[marshalla.schile@gttsi.com](mailto:marshalla.schile@gttsi.com)

Clay Schile  
Vice-President  
Phone: 864.882.3111  
[clay.schile@gttsi.com](mailto:clay.schile@gttsi.com)

Chrissy Mulay  
Technical Staffing Manager  
Phone: 864.506.4647  
[chrissy.mulay@gttsi.com](mailto:chrissy.mulay@gttsi.com)

Lisa Peach  
Technical Staffing Specialist  
Phone: 864.360.7554  
[lisa.peach@gttsi.com](mailto:lisa.peach@gttsi.com)

Debbie Scott  
Administration  
Phone: 864.882.3111  
[debbie.scott@gttsi.com](mailto:debbie.scott@gttsi.com)

Sid Crouch  
Chief Technical Consultant  
Phone: 843.861.0431  
[sid.crouch@gttsi.com](mailto:sid.crouch@gttsi.com)

LD Holland  
Senior Human Performance  
Consultant  
Phone: 864.882.3111  
[ginfo@gttsi.com](mailto:ginfo@gttsi.com)

Scott Poteet  
NRC Exam Developer  
Phone: 864.882.3111  
[ginfo@gttsi.com](mailto:ginfo@gttsi.com)

## GTTSi Job Board

GTTSi has been providing professional services to the energy and nuclear industry since 1980. We are an MWBE (*minority woman-owned business enterprise*) and have served over 80% of the US commercial nuclear facilities, 8 Federal agencies and prime contractors, and one foreign government. If you are qualified and interested in any of the job opportunities listed below, please contact us at [ginfo@gttsi.com](mailto:ginfo@gttsi.com) or call **864.882.3111**.



- **BWR SRO Instructor, Cooper Nuclear Plant**
- **Transmission Line & Substation Engineer, Juno Beach, FL**
- **Battery Energy Storage Engineer, Juno Beach, FL**
- **Tie Line Routing Supervisor, Remote**
- **Lead Project Estimator, Juno Beach**
- **Solar Project Management Consultant, Juno Beach, FL**

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**P.O. Box 307  
Hartsville, SC 29550-0307**

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STREET ADDRESS  
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