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Global Technical Training Services, Inc. Newsletter

The State of the Industry

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In May, FERC (***Federal Energy Regulatory Commission***) directed the electricity grid operators to plan new transmission infrastructure that can deliver more renewable energy and defend against extreme weather. With the passage of FERC Order 1920, FERC will require grid planners and transmission owners to look 20 years ahead at expected shifts in how electricity is produced and consider a range of long-term benefits to building and upgrading power lines, pulling states deeper into the issues around regional infrastructure. In addition, FERC passed Order 1977, which gives FERC the authority to grant permits to electric transmission lines in certain instances where the states have not acted first.

Sadly, politics is responsible for some of the delay associated with our interconnection woes, especially when long-distance power lines cross multiple states (***red and blue***). These orders seek to change federal and state approaches to regional planning that has made it harder to shift the nation to low-carbon technologies.

FERC Chairman Willie Phillips called both new rules (***Order 1920 & 1977***) “giant steps” for transmission policy - “the transmission planning and cost allocation rule cannot come fast enough.” Combined, these two new rules make the first significant FERC action on transmission policy in more than a decade. You may have noticed that we are already seeing movement brought about by passage of these rules with several of the ISO (***Independent System Operator***) organizations.

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

HIGHLIGHTS

Minority and Woman-Owned MWBE Business Enterprise

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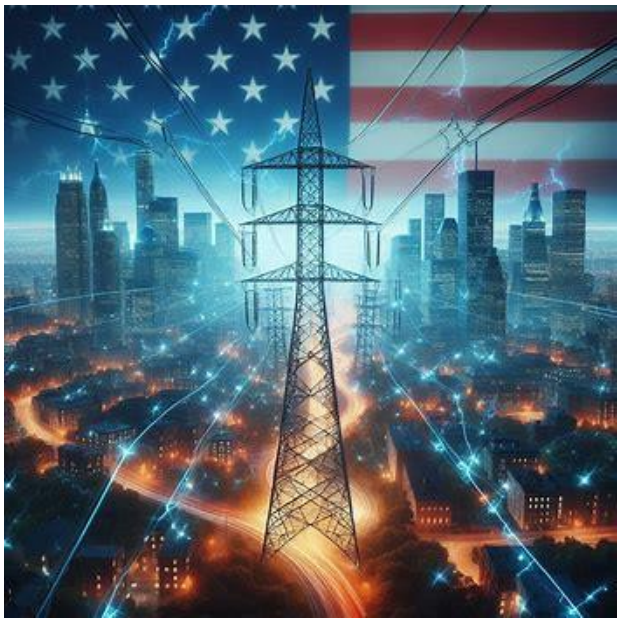
GRIP 2: $2.2 BILLION FOR 13 GW OF TRANSMISSION CAPACITY

The Grid Resilience and Innovation Partnerships (GRIP) program was a $10.5 billion (***about $32 per person in the US***) U.S. Department of Energy (DOE) program to enhance grid flexibility and improve the resilience of the power system against growing threats of extreme weather and climate change. The program was established as part of the Infrastructure Investment and Jobs Act (IIJA), also known as the Bipartisan Infrastructure Law, passed in 2021. GRIP designated funding for three rounds or phases through 2026:

- $2.5 billion in competitive grants for Utility and Industry Grid Resilience
- $3 billion for Smart Grid grants
- $5 billion for Grid Innovation.

In October 2023, the DOE unveiled 58 projects that would receive up to $3.5 billion to improve grid flexibility and resiliency. Recently, the second round of the GRIP program was announced. This time $2.2 billion will be invested in eight projects to bolster the nation's



power grid with nearly 13 GW (***gigawatts***) of new transmission capacity across 18 states. This investment will catalyze $10 billion in total public and private investments to support these eight projects, which will focus on building 600 miles of new transmission lines and reconductoring more than 400 miles of existing lines across 18 states. *(continued)*

Key Objectives of GRIP

1. Strengthening Grid Resilience: The primary goal is to improve the ability of the electric grid to withstand and recover from disruptions, including natural disasters like hurricanes, wildfires, and extreme weather events, as well as cyber-attacks and other man-made threats.

2. Supporting Innovation: GRIP encourages the development and deployment of innovative technologies and solutions that can enhance grid performance, including advanced grid management systems, energy storage, renewable energy integration, and smart grid technologies.

3. Promoting Public-Private Partnerships: The program fosters collaboration between federal, state, and local governments, utilities, technology providers, and other stakeholders to implement projects that enhance grid resilience. Partnerships help leverage funding, expertise, and resources to accelerate grid modernization.

4. Improving Equity and Access: GRIP also focuses on ensuring that underserved and vulnerable communities benefit from investments in grid resilience. This includes addressing energy equity issues and ensuring that all regions have access to reliable and affordable electricity.

According to Energy Secretary Jennifer Granholm, "That's roughly six and a half Hoover Dams of power. When you combine these Group 2 investments with the ones from the first round, we'll be adding 50 GW of capacity to the nation's grid and over 1,000 miles of transmission lines."

This second round allocates most of the investment with these three projects:

- **East West Interconnector**
- **Advanced Conductor Technologies for California**
- **Infrastructure to Enable 4.8 GW of Offshore Wind**

The East West Interconnector allocates $700 million for the North Plains Connector Interregional Innovation Project (***NPCII***) in Montana and North Dakota. It is a 3-GW 415-mile High Voltage Direct Current (***up to 525 kV HVDC***) Transmission Line that would be the first HVDC project to connect three regional control entities: the Western Electricity Coordinating Council (***WECC***), the Midcontinent Independent System Operator (***MISO***), and the Southwest Power Pool (***SPP***). It is still in the planning and development phase, but approvals are expected in 2026, and the line operational as early as 2031.

The Advanced Conductor Technologies for California allocates $600 million to the CHARGE 2T (***California Harnessing Advanced Reliable Grid Enhancing Technologies for Transmission***) Project in California. This project plans to upgrade more than 400 miles of steel power lines across the CAISO (***California Independent System Technologies for Transmission)*** using advanced conductors that contain carbon

U.S. Energy Secretary Jennifer Granholm
Image Credit: Department of Energy

fiber and/or composite cores that will allow higher capacity and grid enhancement technologies that can reduce grid congestion. In addition, the project will reconductor "more than 100 miles of transmission lines" with advanced conductor technologies and significantly increase the state's system capacity to integrate more renewable energy onto the grid.

The Infrastructure to Enable 4.8 GW of Offshore Wind allocates $389 million to the Power Up New England Project, which features new and upgraded transmission points of interconnection in Southeast Massachusetts and Southeast Connecticut. This will unlock up to 4,800 MW of additional offshore wind and provide BESS (***Battery Energy Storage Systems***) in Southwest Connecticut and Northern Maine to enhance grid resilience and optimize delivery of renewable energy, strengthening the transmission system to support the delivery of higher loads of power from renewables, including nearby onshore wind turbines. In addition, $147 million will be awarded to support a multi-day energy storage system in Lincoln, Maine to deploy an 85-MW / 8,500 MWh Energy Storage Project utilizing iron-air technology which they claim can provide energy for up to 100 hours or just over four days.

COULD THE BELLEFONTE NUCLEAR PLANT ONE DAY PRODUCE POWER?

The Bellefonte Nuclear Plant is an unfinished nuclear power plant located in Hollywood, Alabama, along the Tennessee River. The plant was initially planned by the Tennessee Valley Authority (TVA) to consist of two pressurized water reactors, known as Bellefonte Units 1 and 2. The construction of these units began in the 1970s, but it was halted in the 1980s due to changing energy demand projections, rising costs, and a shift in the energy policy of TVA.

Now some believe that this discontinued power plant could soon be producing power.

The plant was said to be 85% complete when TVA halted construction in 1988. In May of 2016, almost 30 years after construction had stopped, the board of TVA voted to sell the Bellefonte nuclear power plant site, with its two partially built reactors, to the highest bidder. In August of 2023, seven years after voting to sell the 1400-acre riverfront plant site, the company reversed their decision with a plan to keep the plant for some other potential use. Their decision to pursue another use for the site is the latest twist in a saga of costly starts, stops, and changes that have cost TVA more than $6 billion in construction, financing, and maintenance costs over the past half century with no power output to show for it.

Alabama State Senate Majority Leader Steve Livingston (***R-Scottsboro***) is one person who believes the site could soon produce power. This is supported by TVA President Jeff Lyash saying in an interview after a board meeting, "What's changed is that our load growth and power demand is growing fairly rapidly and land use and permitting is much more difficult. If you have an existing site like Bellefonte that has water, transmission, rail and highway access, it's a great asset for future building to support our system needs. Bellefonte could be a site for new small modular nuclear reactors TVA is looking to build across the Valley." But he stressed that "we don't go into this with a particular technology in mind. It could be energy storage, solar, or an energy or hydrogen complex." *(continued)*

TVA's Bellefonte Nuclear Plant Facts

Location: Hollywood, Alabama, near Scottsboro, on the Tennessee River

Owner: Tennessee Valley Authority

Construction Start:
1974 for Unit 1
1975 for Unit 2

Reactor: Pressurized Water Reactors

Capacity: Each unit was designed for a capacity of ~ 1,260 megawatts.

Senator Livingston said, “TVA is looking at some sort of power generation out there in the future, it may be what they would classify as small modular nuclear reactors, SMRs. We'd love to see some combination of something happen out there. They're a little bit behind the curve ball.”

TVA is a federally owned corporation that provides electricity to about 10 million people through local power companies and direct industrial customers. They operate in the southeastern United States, serving parts of Tennessee, Alabama, Mississippi, Kentucky, Georgia, North Carolina, and Virginia. The possibility of using their existing site for power production is evidence of the growing need for more electricity and electricity that is reliable. Just in December 2022, TVA implemented rolling blackouts for the first time in TVA’s nearly 90-year history due to a severe winter storm that brought extremely cold temperatures across the region. The cold snap led to an extraordinary increase in electricity demand as people used more energy to heat their homes and businesses. To stabilize the grid and prevent more severe, uncontrolled outages, TVA implemented rolling blackouts, which involved temporarily cutting power to different areas on a rotating basis, usually for about 15-30 minutes at a time. TVA spokesman Scott Fielder confirmed that TVA was looking at ways to utilize the Bellefonte site, but no decisions have been made, including “any potential generation at the site.”

Whatever TVA decides to do with the site, it will have a huge impact for the area.

Bellefonte Nuclear Power Plant Site
Image Credit: TVA

CARBON MANAGEMENT HAS MADE PROGRESS. HOW MUCH MORE IS IN REACH?

It has been two years since the passage of the Inflation Reduction Act and the 45Q Tax Credit, the foundational policy for the deployment of carbon management. This tax credit incentivized carbon capture as it provided a credit on a per-ton basis for capture of carbon from emitting facilities or directly from the air and then permanently stored or reused for “useful products”.

Today, there are nearly 200 announced projects in the US; dozens of Class VI well permits are under review at the Environmental Protection Agency. Together, these leading indicators show that more carbon capture and removal projects should be coming online in a variety of sectors throughout the remainder of the decade.

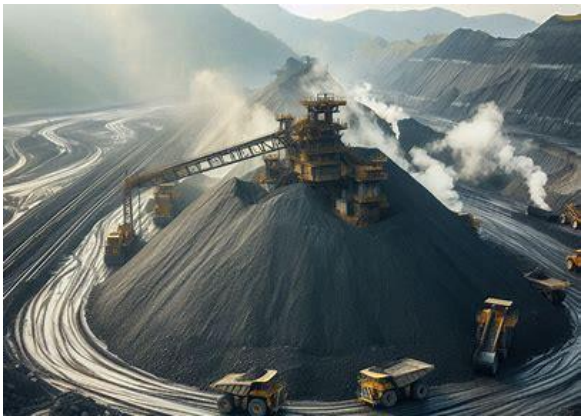
The Department of Energy, energy company executives, and others in the value chain of carbon management have gained valuable experience and confidence in the technology, as compared to a few years ago. Although the DOE has made progress on funding from the Bipartisan Infrastructure Law, with projects spanning from carbon capture demonstrations at power and industrial facilities to large-scale direct air capture hubs and carbon storage demonstrations, carbon management still faces headwinds such as project costs and permitting.

Due to inflation about half of the credit value from the IRA has already been consumed. Therefore, we can expect fewer carbon management projects than anticipated to come online – meaning less emission mitigation and removal, which limits the achievement of our climate goals.

Permitting carbon management transport and storage systems is just too slow and complicated. This causes delays which ultimately result in more cost, risking project financing and delaying the progress of announced projects – some of which will not be completed.

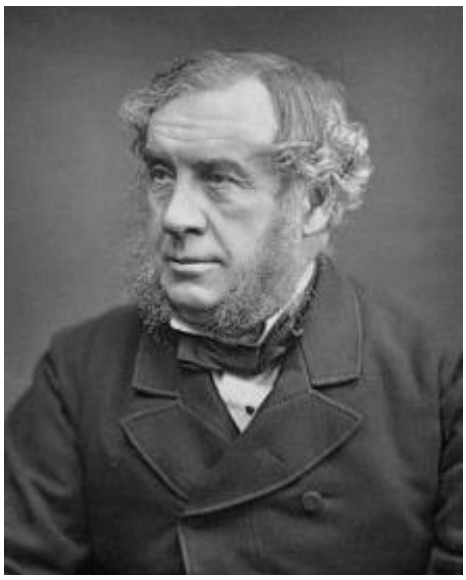
Additional policies are needed to reach wide-scale deployment and unless we see significant cost reduction and faster permitting, the deployment of these technologies will continue to be limited unless Congress decides to provide more investment into this technology. Carbon management was one of the main ingredients in achieving our 2050 climate goals. Without it these goals may be out of reach.

DID YOU KNOW?



Our nation's coal stockpiles are at their highest levels, 138 million short tons at the end of May, since the start of the COVID pandemic. Most coal consumption occurs during the summer or winter, and U.S. coal-fired power plants usually increase their stockpiles in the spring to prepare for summer power demand. Most coal-fired facilities typically keep at least a two-month supply of coal in reserve, making them one of the most reliable backup sources of power for our electric grid.

Fuel cells are not some novel new technology. Sir William Robert Grove, a Welsh chemist and physicist, is credited with their invention in the late 1830s. A fuel cell makes electricity from fuel and air, but instead of burning the fuel to make heat to drive a mechanical generator, the fuel and air react electrochemically, without combustion. No pollutants are created, the fuel cell is relatively quiet, and it requires little maintenance or a large operational staff. Fuel cells can be configured in stacks of individual cells connected in series and produce between 250 kW and 400 kW of power per stack. Combining multiple stacks, they can scale up to a specific site's energy needs making them suitable for use at universities, hospitals, and data centers. For example, a 15-MW fuel cell sits right in the middle of downtown Bridgeport, Connecticut, and it is considered a "good neighbor".



Sir William Robert Grove
Image Credit: Wikipedia

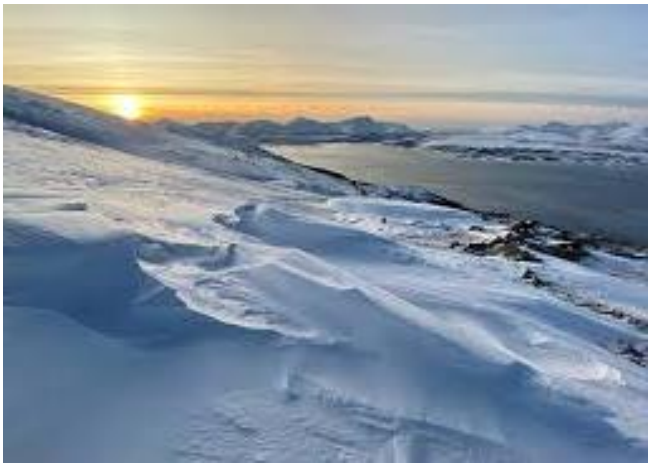


Image Credit: Discover Magazine

A "Mercury Bomb" is waiting to explode in the Arctic! In the Arctic, mercury has been absorbed by the plants, which eventually become part of the soil as the plants die and decay. Over thousands of years, this mercury-laden soil had been frozen into the permafrost, but now this permafrost is thawing and mercury is being released into the environment at a greater rate than in the past. This toxic metal poses a significant environmental and health risk to roughly five million people living in the Arctic region, more than three million of whom reside in areas where permafrost is expected to completely disappear by 2050.

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