




April 2021 Newsletter



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Federal Energy Regulatory Commission Closes Resilience Docket



“FERC votes 4 to 1, to close the “resilience docket”. It had been opened in 2018 after the Department of Energy released an NOPR (Notice of Proposed Rule Making) in 2017 that would have required full recovery of the costs of fuel by secure generation units frequently relied upon to make our grid reliable and resilient. What this meant in everyday language was that power plants that had a 90-day fuel supply on-site — such as, coal, nuclear, and hydro — would be guaranteed “full recovery of their costs” at a “fair rate of return”. Chairman, Richard Glick said, the “resilience docket” grew out of a politically charged effort to prop up particular resources that were losing market share, which is simply not the way to ensure resilience of the grid.”

In spite of the rolling blackouts and outages recently experienced, including the Texas winter storm Uri, the Federal Energy Regulatory Commission (*FERC*) has decided to close their “resilience docket” with a 4 to 1 vote.

The “resilience docket” was opened in 2018 after the Department of Energy released an NOPR (*Notice of Proposed Rule Making*) in 2017 that would require full recovery of fuel costs by secure generation units frequently relied upon to make our grid reliable and resilient.

What this meant in everyday language was that power plants that had a 90-day fuel supply on-site — such as, coal, nuclear, and hydro — would be guaranteed “full recovery of their costs” at a “fair rate of return”.

Well, this NOPR stirred up a hornet’s nest and 11 energy trade groups made up of renewable energy, oil and gas, consumers, rural electric co-ops, and natural gas energy companies filed legal motions urging FERC to consider the industry’s input before making a decision on whether or not to move forward with the proposed rule.

Ultimately, FERC decided (*unanimously*) to reject adoption of the NOPR in 2018, and instead, they opened a “resilience docket”, kicking the problem back to the grid operators.



The current FERC Chairman, Richard Glick (*pictured above*), was named by President Biden to replace James Danly as Chairman on January 21, 2021.

He was originally nominated to FERC by President Trump in August 2017 and he was confirmed by the Senate on November 2, 2017. Therefore, it was unnecessary for President Biden to require Senate confirmation for his appointment as Chairman. Chairman Glick’s term goes through June 2022.

Commissioner Neil Chatterjee, formerly the FERC Chairman before James Danly, was the sole dissent on the 4 to 1 vote. He argued that the “resilience docket” was precisely the right place to examine

these and other reliability issues associated with our electric grid.

“We are failing the American people by kicking this can further down the road in the middle of a crisis affecting millions of Americans”, and Chatterjee went on to say, “If this proceeding, with the substantial record that has been developed, isn’t the correct vehicle for a serious and honest look at resilience, please tell me what is.”

However, the other commissioners did not agree and said the “resilience docket” was unproductive, and a more regional approach might be a more effective way to address these issues.

Chairman Glick added, that terminating the “resilience docket” had nothing to do with what has been going on in Texas and elsewhere due to the winter storm, Uri. Instead, the “resilience docket” grew out of a politically charged effort to prop up particular resources that were losing market share, which is simply not the way to ensure resilience of the grid.

Granholm Joins President Biden’s Cabinet as the DOE Secretary



“The Senate confirmed former Michigan Governor, Jennifer Granholm, as the Department of Energy (DOE) Secretary. Only the 2nd woman to ever serve as the Energy Secretary, she joins the President’s Cabinet as one of the leaders in his efforts to build a green economy for the U.S. During her confirmation hearings, she assured lawmakers that creating jobs was her top priority – and Biden’s – and pushed her plans to embrace new wind and solar technologies.”

The Senate recently confirmed President Biden’s choice for Energy Secretary, former Michigan Governor, Jennifer Granholm (pictured above).

She is only the second woman to serve as the Department of Energy (DOE) Secretary and joins the President’s Cabinet (pictured below) as one of the leaders in his efforts to build a green economy for the U.S.



Ms. Granholm served two terms as governor in a state dominated by the auto industry and devastated by the 2008 recession. During her tenure, as Governor, she promoted clean energy technologies, such as electric vehicles and battery manufacturing, as an answer for the jobs lost as the U.S. transitioned away from oil, coal, and other fossil fuels.

During her confirmation hearings, she assured lawmakers that creating

jobs was her top priority – and Biden’s – and pushed her plans to embrace new wind and solar technologies.

“We cannot leave our people behind. In West Virginia, and in other fossil fuel states, there is an opportunity for us to specialize in the technologies that reduce carbon emissions, to make those technologies here, to put people to work here, and to look at other ways to diversify. We can buy electric car batteries from Asia, or we can make them in America, we can install wind turbines from Denmark, or we can make them in America”, Granholm told the senators.

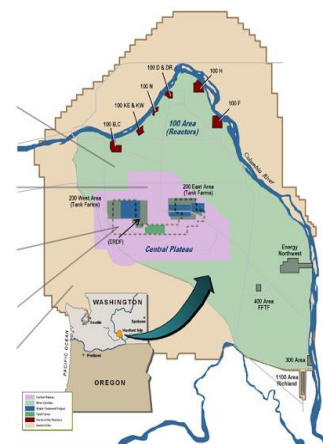
West Virginia Senator, Joe Manchin, Chairman of the Senate Energy and Natural Resources Committee, said Granholm has the leadership skills, vision and compassion needed at the Energy Department to “develop innovative solutions for the climate challenge” while preserving jobs. She is committed to working every day “to ensure that we don’t leave any workers behind as we move towards a cleaner energy future”.

However, others like Wyoming Senator, John Barrasso, who also sits on the Senate Energy and Natural Resources Committee, said Biden “seems to want to pull the plug on American energy dominance. So, I cannot in good conscience vote to approve his nominee for

secretary of energy”.

Just one day after Granholm’s confirmation, the Biden administration received a letter from Washington state - signed by leaders of Washington state, the Yakama Nation, the Natural Resources Defense Council, and the Hanford Challenge and Columbia Riverkeeper. They were asking the Biden administration to overturn a 2019 DOE Administration Rule that allowed less stringent standards for the cleanup of “high level radioactive waste” at the Hanford DOE Site.

They pointed out in their letter that these less stringent standards could “lay the groundwork for the DOE to abandon significant amounts of radioactive waste at the Hanford Site that sit precipitously close to the Columbia River” and they fear could result in a long-term risk to the residents of the Pacific Northwest and the natural resources critical to the region.



U.S. Small Modular Reactor Design Update – Xe 100 HTGR



“An American private nuclear reactor and fuel design engineering company, X-energy, has developed a Generation IV SMR that is high-temperature gas-cooled. The Xe-100 is a pebble-bed design and planned to be smaller, simpler, and safer than the larger nuclear plants operating today. The pebble bed high temperature gas-cooled reactor design has been around since 1944. The Xe-100 will use 20% enriched TRISO uranium fuel to generate 200 MWt (megawatts thermal) and about 80 MWe (megawatts electric).”

X-energy, an American private nuclear reactor and fuel design engineering company, has developed a Generation IV SMR (**small modular reactor**) that is high-temperature gas-cooled – HGTR (**artist conception above**).

In January 2016, X-energy was awarded a 5-year \$53M Department of Energy (DOE) Advanced Reactor Concept Cooperative Agreement (ARCCA) award to further advance their reactor design.

In 2019, they received funding from the DOD (Department of Defense) to further their development on a small military reactor for use at forward bases.

And in October 2020, in accordance with ARDP (Advanced Reactor Demonstration Program), X-energy was one of two awardees (**the other TerraPower**) selected to receive \$80M to build a demonstration plant to be operational within seven years.

In addition, the DOE selected X-energy to

deliver a commercial TRISO fuel fabrication facility and a four-module version of its Xe-100 HGTR, which the company plans to site at Energy Northwest’s Columbia nuclear plant site - DOE said they will invest \$1.23B in this X-energy project over a seven-year period.

The Xe-100 HGTR SMR design is ~80 MWe (**scalable to a 320 MWe four-pack**) / 200 MWt (**megawatts thermal**) and uses TRISO (**tristructural isotropic**) particle fuel. This carbon-free power source can be used for “baseload” or “load-follow”, and if needed it could also provide a source of industrial process heat.

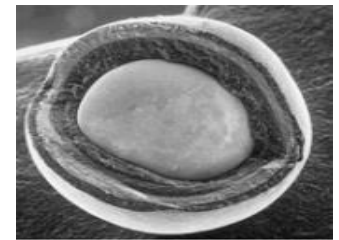
Energy Northwest is an independent joint operating agency of Washington state, owning and operating a mixture of hydro, solar and wind electrical power plants, as well as the Columbia nuclear power plant.

Energy Northwest is also a partner with TerraPower and X-energy’s ARDP applications. Energy Northwest is excited about what this cooperative agreement signifies and Greg Cullen, Energy Northwest’s vice president for energy services and development, said. “As a clean energy leader, we believe X-energy’s innovative carbon-free technology will be an invaluable asset to meeting the state’s clean energy goals.”

In addition, the X-energy design has been presented to the Canadian Nuclear Safety Commission and it is 1 of only 3 grid-scale SMR designs selected by Ontario Power Generation (OPG) to advance their engineering and design work. OPG is seriously considering the installation of an SMR at their Darlington site as early as 2028.

The Xe-100 design is a pebble-bed HGTR SMR - planned to be smaller, simpler, and safer when it is compared to conventional nuclear designs. Pebble bed HGTR reactors were first proposed in 1944.

The Xe-100 will use Uranium spherical fuel particles or pebbles. These particles or pebbles are of the TRISO fuel design (**pictured below**) at an enrichment of 20%. This 0.845 mm TRISO fuel particle is cracked open to illustrate the multiple layers coating the spherical fuel kernel.



Using this high enrichment will allow much longer periods between refueling, when compared with current nuclear plants in the U.S.

Texas Power Crisis Deepens – No Water, Bankruptcy, & Unpaid Bills



“The Electric Reliability Council of Texas reports that Texas energy companies have failed to pay over \$345 million for electricity and other services incurred during last month’s winter storm Uri. The Texas electricity market was thrown into turmoil as 48% of its generating plants went offline. This resulted in dramatic increases for the cost of electricity, as much as 10 times the normal rates – reaching \$9,000 per megawatt hour (mw-hr) with \$25,000 per mw-hr service fees.”

The Electric Reliability Council of Texas (**ERCOT**) has reported that Texas energy companies have failed to pay over \$345 million for electricity and other services incurred during last month’s winter storm Uri.



Texas is a deregulated state, so their electricity rates are open to the spot market and ERCOT acts as a clearinghouse, collecting cash from marketers that buy power, and sending it to the companies that furnish electricity to their grid.

So, when this latest winter storm hit Texas, the electricity market was thrown into turmoil as 48% of its generating plants went offline.



This resulted in dramatic increases for the cost of electricity, as much as 10 times the normal rates –

reaching \$9,000 per megawatt hour (**mw-hr**) with \$25,000 service fees.

These charges drove one provider, Brazos Electric Power Cooperative, Inc. into bankruptcy - the state’s largest and oldest power wholesale firm. They filed for bankruptcy citing an \$1.8 billion debt - underscoring the financial stress that power marketers and utilities are facing.

In all, electricity prices on the state’s wholesale market soared by \$47 billion over the five-day period when cold weather drove up the demand and generating plants went offline.

ERCOT claims electricity providers have skipped out on the \$2.46 billion in power and service charges, as they have applied \$800 million from collateral, and some additional funds from other accounts to reduce the cumulative shortfall to \$1.66 billion. ERCOT did not disclose which companies have failed to pay but said they will begin naming firms and the amounts they owe in the future.

Analysts believe Texas could cut about \$2 billion off the debt-burden facing municipal utilities, marketers, and generators by 1) getting the Public Utility Commission (**PUC**) to reduce some of its fees and 2) have the Texas Governor apply a portion of the state’s emergency fund to cover some of the

charges.

Spokeswoman for Governor Greg Abbott - Renae Eze - declined to comment on the bankruptcy filing by Brazo’s Electric Cooperative or on the proposal that the PUC could roll back some of the fees that skyrocketed during the blackout. However, she said that Governor Abbott is monitoring the situation “as ERCOT and their financial advisers work to ensure that the ability to provide electricity is not interrupted”.

ERCOT has already taken some action, ousting their chief executive, Bill Magness, with a 60-day termination notice. But this occurred after DeAnn Walker, head of the PUC resigned and just a few days after 7 of 15 ERCOT board members resigned - including those who were criticized for not living in Texas.

Both Walker and Magness were sharply criticized by state lawmakers about the widespread power outages, that left more than 4 million Texans without electricity during a week-long period. The blackouts, also led to a water crisis— “hundreds of thousands” of residents are still without water, or are they are under “boil water” notices – and has been blamed for more than 40 deaths due to homes without heat in temperatures far below freezing.

Did You Know?



“That Greta Thunberg, the 18-year-old Swedish climate activist, recently said that the U.S.

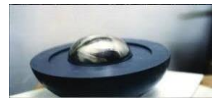
President's new climate plans are incompatible with the actions required to limit the global temperature increase to less than 1.5 degrees Celsius - a key global warming goal set by the Paris Climate Conference. She went on to say, that since the current administration is claiming that the climate crisis is an existential threat, then why are they not treating it that way? Instead, they are treating it as a political problem.

Treating it as a crisis is the first step, she added.”



1 MW BESS supports 164 homes

That according to the Solar Energy Industries Association one megawatt (MW) of battery energy storage can provide enough power to service 164 homes. Therefore, a 100 MW BESS (battery energy storage system) could support 16,400 homes. **That support could have provided a significant benefit to Texas during their latest winter storm, Uri.**



LANL to produce 30 plutonium pits per year

That Los Alamos National Laboratory (LANL) has signed a 10-year lease on two buildings in Santa Fe, N.M., where it will relocate hundreds of administrative workers from its main campus. The lab hired an additional 1,000 workers last year and expects to add 1,200 more this year as it prepares to begin producing at least 30 plutonium cores per year by 2026.



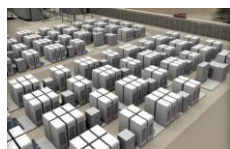
Texas grid suffered a loss of 52.3 GW of their 107.5 GW total installed capacity

That ERCOT has reported that the Texas grid suffered a loss of 1,796 generating or energy storage outages or derates, as winter storm Uri bore down on the state in mid-February. This resulted in a loss of 48.6% of the state's generation capabilities - **52.3 GW of their 107.5 GW total installed capacity - at the highest point.** The bulk (783) of the generation losses were from natural gas and wind (767). **Most of the wind losses were in west Texas and in the Panhandle, while most of the gas plant losses were in the southeast** as the grid operator recorded a new winter peak of 69,222 MW at 7:06 p.m. on Sunday, February 14, 2021.



Vineyard Wind, an 800-MW offshore wind project expected to be operational in 2023

That the U.S. Dept. of the Interior's Bureau of Ocean Energy Management (BOEM), the federal agency in charge of U.S. offshore energy management said it has completed the final environmental analysis for a proposed 800-MW offshore wind project, paving the way for the nation's first commercial-scale development of its kind to move forward. **Vineyard Wind**, a joint venture between Avangrid Renewables, a division of Spain's Iberdrola, and Denmark's Copenhagen Infrastructure Partners, will be located 15 miles off the Massachusetts coast. **The project is expected to reach financial close later this year and enter commercial operation in 2023.**



Energy storage installations grew nearly 200% in 2020 – another 7,000 MW's is expected by 2025

That energy storage installations grew nearly 200% in 2020. Overall, nearly 1,500 MW (megawatts) of capacity and 3,500 MWh (megawatt hours) in new storage was added and brought online – 62% of this new energy storage was brought online in just the last three months of 2020. Residential storage added about 14% - 90 MW. **The energy storage market is forecast to add 7,000 MW by 2025. Front-of-meter installation is expected to account for 85% of the energy storage added annually, as utilities deploy large-scale projects to help balance out intermittent renewable energy growth.** The U.S. installed 3,115 MWh of storage from 2013-2019, and that total was exceeded in just one year – 2020.

Tesla/Gambit Energy Storage - Building 100MW BESS Texas Project



“Tesla has always been more than a car company. Its official mission is to “accelerate the world’s transition to sustainable energy”. And providing utility-scale batteries, needed to store the electricity produced by wind and solar, is a step moving in that direction. The Tesla Powerpack and Megapack were designed with utility customers in mind – for example, the 2017 BESS project in South Australia. It sits adjacent to a wind farm and can store surplus electricity generated on gusty nights for daytime demand. At the time, this project was built - 100MW project – it was the largest BESS project in the world.”

Over the past several years we have had various articles about “battery energy storage”.

Due to the recent power crisis in Texas, battery energy storage has become a major topic of discussion, once again.

At present, the U.S. has about 24.6 gigawatts (GW) of energy storage capacity – only 2.3% of our total grid capacity. And 95% of this energy storage is pumped storage hydro not battery energy storage.

However, battery energy storage has grown dramatically - just last year it grew by 476 MW (megawatts) in just the 3rd quarter, a 240% increase from the previous quarter.

A recent report from the University of California, Berkeley indicates that a shift to renewable power will require 150 GW of battery energy storage to achieve a 90% clean energy grid by 2035.

While each battery technology has its own pros and cons, lithium-ion batteries have seen the fastest growth and cost declines, thanks in part to the proliferation of electric vehicles. Both lithium-ion and flow batteries are

projected to decrease in the coming years.

The average cost for “utility-scale” battery energy storage has rapidly decreased from \$2,152 per kilowatt-hour (kWh) in 2015 to \$625/kWh in 2018 and in 2020, a 4-hour battery energy storage system, ranges in cost from \$144/kW-hr to \$293/kWh and by 2050 it is expected to be from \$88/kW-hr to \$219/kW-hr.

A lithium-ion based battery energy storage system (BESS), rated for two hours at rated power, will have an AC round-trip efficiency (RTE) of 75 to 85%. However, a system rated for 30 minutes may only have an efficiency in the 65 to 75% range. Of course, the smaller 30-minute battery will have a lower initial cost. All batteries are generally more efficient and have a longer lifetime when they are operated at longer discharge periods.

NOTE: Round Trip Efficiency / RTE (%) is the ratio of the amount of energy which has been discharged from the battery divided by the amount of energy needed to recharge the battery. RTE is always less than 100% and it is specified as DC RTE when discussing ONLY the battery, but it is referred to AC RTE when discussing the complete systems. AC RTE is calculated as the DC RTE times the square of the inverter efficiency.

Over time all lithium batteries degrade, and a replenishment, replacement, and disposal

strategy is necessary when designing a system for a 20-year operating life.

One of Tesla’s subsidiaries, Gambit Energy Storage, has been quietly building this 100MW BESS project in a small Texas town, just south of Houston - Angleton, Texas. When completed it should be able to support power for ~16,400 homes. It is located at a site that sits adjacent to a 138 kV Texas-New Mexico Power substation.

In their effort to keep the project as low key as possible, workers at the site have kept the equipment under cover (***see the picture above***) and discouraged onlookers.



However, a Tesla logo was seen on a worker’s hard hat, like the one ***pictured above***, and public documents have confirmed the company’s role in the project.

In addition, the project is registered with ERCOT (Electric Reliability Council of Texas) and Warren Lasher, senior director of system planning for ERCOT, said the project has a proposed commercial operation date of June 1, 2021.



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Meet GTTSi employee – Ms. Latia Gary, a certified ASQ Manager of Quality / Organized Excellence, with a BS degree in Electrical Engineering and a master's degree in Business Administration.

Latia has been working at the Vogtle Site in Georgia on the Vogtle Expansion Project for 3 years as Quality Assessment – Lead.

In this position, she performs construction surveillance and audits to verify that the work meets site contract requirements and industry regulations – i.e., ASME, NQA-1 and 10CFR50 Appendix B.

In addition, Latia is responsible for the group's surveillance schedule and at times, she provides guidance associated with the surveillance activities. At times, Latia has lead group training on ASME and various design criteria, as her specialty includes procurement of product / services and ASME design requirements.

Other accomplishments for Ms. Gary include her work with Westinghouse for their Quality, Environmental, Health and Safety Department – writing and maintaining quality procurement documents utilized by suppliers of safety related and non-safety related components in the U.S. and China.

Latia is a “bone-fide” professional and a very valuable team member. Her willingness to go the extra mile always leads to something good and we pride ourselves in working with employees, like YOU - emphasizing teamwork, dedicated to quality, getting the job done right the first time, every time, and helping GTTSi to grow as a valuable supplier to our clients.

We thank you for your service and we are so proud to recognize you as one of our valued employees.

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