GTTSi

Minority Woman-Owned Enterprise

Serving the Nuclear Energy Industry since 1980

July 2022

July 2022 Newsletter

Individual Highlights:

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2020 BEST of the Upstate Greenville News

MWBE MINORITY AND WOMEN BUSINESS ENTERPRISE

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- ***Debbie Scott, Administration***
- ***Sid Crouch, Chief Technical Consultant***
- ***Ken Schaaf, NRC Exam Developer***

We the people of these United States, in order to form a more perfect Union, establish Justice, ensure domestic Tranquility, provide for the common Defense, promote general Welfare, and secure the Blessing of Liberty to ourselves and our Prosperity, do ordain and establish this Constitution for the United States of America.

Expect Limited Electric Supply This Summer

"Texas, California, and the Midwest see the potential for a difficult summer as demand will most likely exceed supply. Texas and California have already endured unseasonably high spring temperatures. It all boils down to the availability of natural gas, coal, and solar. According to analysts at the National Consumer Law Center, the problems of high prices and potential blackouts are intertwined in that they both have roots in the failure of the government, utilities, and grid operators to manage the risks tied to climate change and the transition to clean energy.

Several factors will limit electric power supply this summer. Comfort is going to be difficult, but if your utility has an operating nuclear power plant you will most likely be ok.

It all boils down to the availability of natural gas, coal, and solar.

The Midcontinent Independent System Operator (***MISO)*** expects firm resources "will be insufficient to cover the peak load of the summer months." They warn that emergency resources and non-firm energy imports "will be needed to maintain system reliability."

The Russian invasion of the Ukraine has complicated the availability of natural gas. And so, the U.S. has joined with other nations to backstop world markets with natural gas that otherwise would have been supplied by Russia.

However, both actions have impacted natural gas prices and its availability - natural gas spot prices measured at the Henry Hub are expected to average $7.83/MMBtu during the second quarter and climb to an average $8.59/MMBtu in the second half.

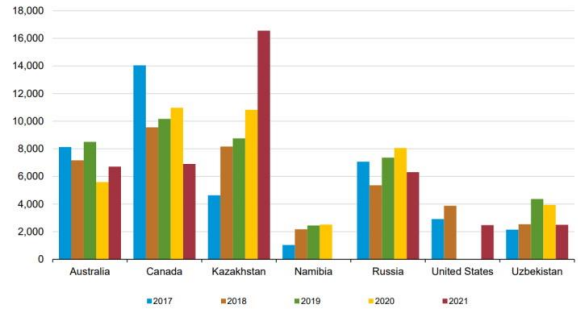
The EIA, the government's chief energy forecast agency, sees a 23% increase in LNG exports from 2021, which in turn impacts our storage of natural gas in the U.S. The EIA is forecasting natural gas inventories at the end of 2022 to be 9% below the five-year average. And if summer temperatures are hotter-than-normal, electricity demand could cause natural gas inventories to shrink even further, resulting in even higher prices.

By contrast, coal prices are much less, but they too are on the rise. In the past, economics drove the utilities to utilize natural gas-fired generation over coal-fired generation. This along with "green power initiatives" resulted in an acceleration of scrapping coal-fired units across the country. Now that coal is cheaper, the plants remaining are being asked to power full output, but the supply of coal is making this difficult. Since many of these plants were scrapped, the railroads didn't expand or improve their coal-hauling capacity which in turn, impacted coal deliveries. Although recent coal traffic has increased, the operating plants are working to rebuild their 90-day coal supply that was depleted in 2021 due to demand.

Martin Oberman , Surface Transportation Board chairman, blames the rail delivery problems on the railroads themselves, which cut employee by 29% (***~ 45,000 people***) over the past 6 years. "On too many parts of their networks, the railroads simply do not have a sufficient number of employees," Oberman said.

And last but not least, utility-scale solar development projects are being upended as the Commerce Department sorts through a complaint lodged in February by a domestic manufacturer that Chinese companies are dumping solar modules. This has resulted in the postponement and in some cases, scrapping projects. This will definitely affect supply in 2023 and will have some impact this year, as well.

Uranium Prices and Demand Continue to Increase



"According to the US Energy Information Administration, the "vast majority", ~95%, of uranium delivered in the USA in 2021 was of foreign origin (as illustrated above). U.S. nuclear power plants purchased a total of 46.7 million pounds of uranium during 2021 - about 28% of the world's uranium requirements in 2021. Uranium inventory held by US brokers and traders has grown for the second consecutive year and has almost tripled since 2019."

Based on the Energy Information Administration's (***EIA***) latest uranium report, owners and operators of U.S. nuclear power plants purchased a total of 46.7 million pounds of uranium during 2021 - about 28% of the world's uranium requirements in 2021. Nearly 95% was provided by foreign sources, with Kazakhstan accounting for 35%, followed by Canada at 14.8%, Australia at 14.4%, Russia at 13.5% and others at 17% total.

Approximately 19% of the uranium purchased for the U.S. in 2021 was under spot contracts at a weighted-average price of USD 30.56 per pound. The remaining 81% was purchased under long-term contracts at a weighted-average price of USD 34.71 per pound.

Uranium prices have experienced serious ups and downs over the past couple of years. The price per pound, rose more than 40% between mid-March and late May 2020, then it spiked more than 60% between August and September last year, and most recently increased another 40%-plus between February and April earlier this year. After bottoming out, just last week at $46.50 per pound, uranium prices have rebounded by 6% to $49.25 based on the latest spot price.

As you can see, the 2021 prices were really a bargain compared to the current pricing.

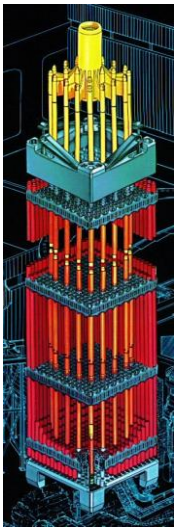
Contracted deliveries under existing purchase contracts for 2022-2031 of 180 million pounds U3O8, and unfilled uranium market requirements of 182 million pounds for the same period represent maximum anticipated market requirements of 362 million pounds U3O8 over the next 10 years for US owners and operators.

US commercial uranium inventories - including inventories owned by plant owners and operators, brokers, converters, enrichers, fabricators, producers, and traders - were 141.7 million pounds U3O8 at the end of 2021. This is up 8% from the 131 million pounds at the end of 2020. The majority of this inventory - 108.5 million pounds, 76% - is held by power plant owners and operators, with nearly 18% held by brokers and traders, and just under 6% held by convertors, enrichers, fabricators, and producers.

This is the third year-on-year increase in inventory held by US brokers and traders, growing from 9.4 million pounds at the end of 2019 to 18.3 million pounds in 2020 to 25.2 million pounds at the end of 2021.

With oil, coal, and natural gas prices climbing, nuclear power plant electrical generation is much cheaper at the present. But continued increases in uranium costs could decrease this margin. Especially, since sanctions on Russian exports of uranium have the potential to keep uranium prices rising due to curtailed supplies -- Russia is the source for about 14% of the uranium going to U.S. nuclear reactors, and 20% to the European Union's nuclear reactors.

While increased nuclear energy production seems like a no-brainer -- since it decreases production of greenhouse gases and increases energy independence from Russia -- nuclear power plant production depends largely on political will and public support, both of which have been historically lacking, but seem to be moving in favor.



Illinois to Transition 5 Coal-Fired Plants to Energy Storage Facilities

"Five Illinois coal-fired power plants being retired to begin energy storage operations in 2025. Funding for this conversion, $280.5 million over ten years, is coming from Illinois' "Coal-to-Solar Energy Storage Grant Program," which in part incentivizes companies to install energy storage at the sites of former coal plants. NRG Energy will receive a combined $158.4 million to build two energy storage projects (72 MW's each), and Vistra will receive a combined $122.1 million to build three energy storage projects (37 MW's each)."

The Illinois' Department of Commerce and Economic Opportunity (***DCEO***) has announced $280.5 million in funding over ten years for five of its coal plants to begin energy storage operations in 2025.

These five plants are currently closed or in the process of ending their coal-fired operations.

The funding come from Illinois' "Coal-to-Solar Energy Storage Grant Program," which in part incentivizes companies to install energy storage at the sites of former coal plants.

NRG Energy will receive a combined $158.4 million to build two energy storage projects, each 72 MW in size, at the Waukegan and Will County coal-fired power plant sites. Waukegan's Unit 7& 8 (***600 MW***) and Will County's Unit 4 (***599 MW***) are expected to retire in 2022 – these are the last of the coal-fired units at those respective plants, as the other units were retired years ago.

The other three coal plants are owned by Vistra subsidiaries. They'll receive a combined $122.1 million to build three energy storage projects, each 37 MW in size, at Joppa, Havana, and Edwards coal-fired power plant sites.

Vistra plans to retire Joppa coal-fired power plant (***1000 MW***) in 2022 (***pictured on the left***), as part of a revised agreement to settle a complaint brought by the Sierra Club in 2018. The complaint to the Illinois Pollution Control Board alleged environmental violations prior to Vistra's ownership.

The E.D. Edwards Units 2 (***280 MW***) and Unit 3 (***360 MW***) planned for retirement by the end of the year (***pictured below***).

Edwards Unit 1 (***136 MW***) was retired in December 2015. The Havana (***434 MW***) plant was retired in late-2019.

"When it comes to Illinois' clean energy future, this initiative will help deliver on the progress our residents deserve," said Illinois Governor JB Pritzker.

The grant program is part of Illinois' Climate & Equitable Jobs Act (CEJA) passed in 2021 and aimed at moving the state toward 100% clean energy by 2050. The first payments would be issued in 2025 when the energy storage sites are expected to be commercially operational.

In order to qualify for grant money, the plants must have burned coal, have a generating capacity of at least 150 MW and commit to hiring a diverse workforce.

DCEO is overseeing the energy storage component of the grant program, while the Illinois Power Agency (IPA) will oversee a program to incentivize the production of solar energy and co-located energy storage.

DCEO is also in the process of implementing several workforce training programs, grants for communities impacted by the energy transition, and programs to support historically underrepresented contractors in the green energy space.

DOE Delinquent in Removing Los Alamos TRU Waste from Texas

"The Texas Commission on Environmental Quality is threatening enforcement action against the Department of Energy for failing to meet its obligations in removing containers of transuranic radioactive waste at their Waste Control Specialists' Federal Waste Facility in West Texas. Reminiscent of a 6-year battle between South Carolina and the United States over removal of 9.5 metric tons of weapons-grade plutonium relocated at SRS (Savannah River Site) in the early 2000s, resulting in payment to S.C. of $600 million and DOE's obligation to remove the plutonium by 2037."

The Texas Commission on Environmental Quality (***TCEQ***) is threatening enforcement action against the Department of Energy (***DOE***) for failing to meet its obligations in removing containers of transuranic waste (***TRU***) that are currently in temporary storage at the Waste Control Specialists' (***WCS***) Federal Waste Facility in West Texas.

Toby Baker, executive director of the TCEQ, said in a letter made public on June 1, that the DOE has yet to come up with a plan to remove 74 standard waste boxes of TRU waste that were shipped from Los Alamos National Laboratory to the WCS facility in 2014. The waste was to be disposed of at the Waste Isolation Pilot Plant (***WIPP***) in New Mexico but was diverted to the WCS site after operations at WIPP were suspended because of the February 2014 radiological release at the underground repository.

Under the agreement, signed by the DOE and TCEQ in 2015, the DOE was to remove the TRU (***Transuranic Radioactive***) waste from the WCS site for shipment out of Texas once the WIPP resumed normal waste disposal operations. WIPP was able to resume disposal operations in January 2017 after the facility was remediated and stricter waste controls put in place.

Some of the LANL (***Los Alamos National Laboratory***) waste boxes that were shipped to WCS, however, were found to be similar to the waste drum that breached at WIPP, and those boxes no longer meet Department of Transportation shipping requirements or WIPP waste acceptance criteria.

Baker noted in his letter, that the department submitted a draft plan with the commission for handling the LANL waste on April 1 of this year. However, the plan only addresses the unloading and storage of the waste after it is removed from the Federal Waste Facility, with no indication of when and how the waste will be shipped off-site. "The DOE's draft plan is not a plan to expedite the removal of the remaining LANL TRU waste in 2022. In fact, it does not address removing the waste from Texas at all," Baker wrote.

Baker also noted, that the TCEQ has extended the deadline for removing the TRU waste several times, in order to give the DOE enough time to finalize a plan for removing the waste. The latest extension ended on May 31 - "The DOE must remove the LANL TRU waste from the Waste Control Specialists site in Andrews County, Texas, and transport it out of Texas no later than May 31, 2022, or else the TCEQ will initiate additional enforcement actions against the DOE," the letter states.

The Nuclear Regulatory Commission issued an order in 2014 allowing the WCS to store the LANL TRU waste at its facility until 2016. Since then, the NRC has extended that two-year deadline three times, and is currently considering another request to further extend the storage period until December 2024. The waste cannot be shipped from the WCS site because it doesn't meet current DOT shipping requirements. So, the WCS is seeking NRC approval for a modification that will allow the company to move the LANL waste to a special purpose facility, at its site, for examination, testing, and preparation for off-site shipment.

This is reminiscent of a 6-year litigation battle between S.C. and the DOE related to 9.5 metric tons of weapons-grade plutonium relocated at SRS (***Savannah River Site***) in the early 2000's – finally settled in 2020 for $600 million with the DOE still obligated to remove the plutonium by 2037.

Did You Know?

"That the U.S. Women in Nuclear organization is having their 2022 Conference is Richmond, VA July 24-27. This organization is made of women and men who work in the nuclear energy and technology fields around the United States. Their vision is aimed at positioning the U.S. for the future of nuclear energy and technology through the advancement of women. If you are interested in attending, just go online to www.winus.org ***become a member if not one already and register for this global event. As many as 100 countries will be represented."***

100MW Sunflower Solar Station located in the Mississippi Delta in Sunflower County (1000 acres), utilizes single-axis trackers, and features 272,000 solar PV modules.

That the ***100MW Sunflower Solar Station is now in operation and it is the largest operating solar farm in Mississippi?*** *Located in the Mississippi Delta, on approximately 1,000 acres in Sunflower County, utilizing single-axis trackers and features 272,000 solar PV modules, and it is connected with Entergy's transmission grid in Ruleville, Mississippi.* ***Entergy Mississippi CEO Haley Fisackerly said the project serves as a "hedge against rising natural gas prices" while incentivizing corporations with renewable energy goals to locate in Mississippi.*** *The utility aims to replace some aging natural gas plants with 1,000 MW of renewable energy over the next five years.* ***The project, which began in 2018, was a majority Mississippi project as Mississippi-based Attala Steel supplied 2,475 tons of steel for the foundations and A-1 Kendrick Fence Company, also located within the state, installed the perimeter fence, and more than half of the labor hours that supported the project's construction were sourced locally.***

Explosion at the Texas Freeport LNG facility will cut exports for at least 3 weeks – lowering prices in the US but raising them in Europe - $26.50 per MBTU's

That ***the explosion at the Texas Freeport LNG (liquified natural gas) export facility will cut exports for at least three weeks.*** This facility has the capacity to ship ~15 million tons of LNG per year. This loss briefly lowered prices for natural gas in the US but raised them in Europe - Dutch futures rose 6.3% to the equivalent of $26.50 per million British thermal units. ***Almost one-fifth of all overseas shipments of LNG from the US were exported via the Freeport terminal last month.*** The US sent nearly three-quarters of its LNG to Europe in the first four months of the year, with the region now getting almost half of its LNG supplies from across the Atlantic. Some European countries have been attempting to wean themselves off Russian gas due to the invasion of Ukraine, but they still remain dependent on it in the short term.

Bad news floods into California. State regulators ordered the city of San Francisco and scores of San Joaquin Valley farmers to stop pulling water from Valley rivers

That ***more bad news floods into California****? State regulators ordered the city of San Francisco and scores of San Joaquin Valley farmers to stop pulling water from Valley rivers, the latest sign of California's drought worsening.* ***The board made similar moves last August, but this is early June, a troubling indicator of the severity of the drought, now in its third year.*** The rainy season is over, and the Sierra Nevada snowpack is effectively gone – "there is no more snow to melt" - the state can't expect any relief for its parched reservoirs until fall. Meanwhile, new figures released by the state board show that urban Californians remain largely indifferent to Governor Gavin Newsom's call for 15% voluntary water conservation. The board said per-capita urban water consumption in April fell by 7% compared to a year earlier — and was 17% higher when compared with April 2020. All told, Californians have reduced consumption by just 2% since the governor called for savings last summer.

900MW rPlus Hydro Pump Storage Project Planned for Wyoming

Estimated to cost $2.5 Billion, rPlus Hydro seeks approval for a 900 MW Pump Storage Project, located ~30 miles outside Rawlins, Wyoming. It will include:

- ***one new reservoir (~1000 feet above the Seminoe Reservoir)***
- ***underground tunnels***
- ***underground powerhouse***
- ***intake-outlet structure in the Seminoe Reservoir (pictured above)***
- ***a new transmission line connected to PacifiCorp's existing Aeolus Substation near Medicine Bow, Wyoming."***

rPlus Hydro is seeking approval to develop a 900 MW pump storage project, located ~30 miles outside Rawlins, Wyoming.

This energy storage project would be the state's first pumped hydro storage project and estimated to cost ~$2.5 billion.

The proposed project includes one new reservoir, underground tunnels, and an underground powerhouse, with an intake-outlet structure in the Seminoe Reservoir (***pictured above***), and a new transmission line. The new reservoir will be located ~1,000 feet above the Semione Reservoir, around two miles east of the Seminoe Dam (***pictured below is the artist conception of the new reservoir***).

Energy for pumping, and power generated by the project, will be delivered through a 30-mile transmission line that connects with PacifiCorp's existing Aeolus Substation near Medicine Bow, Wyoming (***pictured below***).

rPlus Hydro submitted their license application to state and federal authorities this June for the Seminoe Pumped Storage Project. The license application officially opens a multi-year study and approval process that includes engineering designs, environmental assessments, and community engagement. After a 90-day review period, rPlus Hydro will need to submit a final license application to the Federal Energy Regulatory Commission (***FERC***), which must include additional data collection, impact analysis, and opportunities for public input.

Construction could be underway as early as 2025, pending FERC and other approvals, and is expected to take approximately four years.

In October 2021, it was reported that rPlus Hydro chose engineering firm, Stantec to conduct a detailed feasibility study for the Seminoe Project.

Stantec Inc. is an international professional services company in design and consulting industry. Founded in 1954, as D.R. Stanley Associates in Edmonton, Alberta.

Stantec will identify and analyze the alternative intake and outlet structure types and identify the location and type of upper reservoir to complete the pumped storage scheme.

Additionally, Stantec will plan and perform a geotechnical investigation to support the feasibility design of the underground facilities, identify the pump-generating equipment, identify routing for the transmission line to a nearby grid interconnection, evaluate project constructability, and provide an opinion on probable construction cost.

To date, pumped storage is currently the largest form of energy storage utilized for the U.S. grid, accounting for about 95% of the country's utility-scale energy storage capacity.

GTTSi President – Marshalla Schile

Meet Marshalla Schile - President of GTTSi – an experienced veteran of the power industry.

She holds a PhD in Mechanical Engineering with more than 26 years of experience - working for companies including General Electric and Pratt & Whitney, in roles including gas turbine combustion design and development, aeroderivative products, and customer applications and requisition engineering.

In addition, her experience includes engineering talent development where she fostered engineering and technical development of a 50,000+ member engineering organization.

Her experience, leadership, and vision has already infused positive changes – instituting organizational best practices, streamlining services, and injecting a creative management style - stimulating innovation and a renewed zeal for the future.

Should you find yourself in close proximity to Seneca, South Carolina … please stop by and visit. We would love to share with you our vision for the future and how GTTSi can help lead our industry's transition to the future.

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