

WORLD POWER SYSTEMS REVIEW

1 March 2022

15 February 2022

U.S. Department of Energy Awards \$5.7 Million for GE-Led Carbon Capture Technology Integration Project Targeting to Achieve 95% Reduction of Carbon Emissions

GE Gas Power today announced that the company's front-end engineering design (FEED) study "Retrofittable Advanced Combined Cycle Integration for Flexible Decarbonized Generation" will receive \$5,771,670 in federal funding from the U.S. Department of Energy's (DOE) Office of Fossil Energy and Carbon Management following successful completion of the award negotiation phase. This funding is focused on carbon capture, utilization, and storage (CCUS) for power generation applications with a goal of commercial deployment by 2030. GE Gas Power will work with Southern Company, Linde, BASF, and Kiewit to develop a detailed plan for integrating carbon capture technologies with a natural gas combined cycle plant to capture approximately 95 percent of carbon dioxide emissions generated.

The FEED study will be focused on Southern Company subsidiary Alabama Power's James M. Barry Electric Generating Plant, located in Bucks, Alabama, which is powered by two GE 7F.04 gas turbines, part of GE's 7F gas turbine fleet, the largest gas turbine fleet in North America. GE will research advanced technology and control concepts to integrate the combined cycle power plant with Linde's Gen 2 carbon capture solution based on BASF OASE® blue technology. The project will also include gas and steam turbine equipment enhancements to improve the carbon capture process, with a goal of reducing the impact of the carbon capture process on the power plant's output, performance, and equipment cost.

With the goals of reliability, load flexibility, and significant reduction in carbon emissions, this retrofitable solution can be applicable to other power plant sites and serve as a template for lowering carbon emissions across more than 1,500 F-Class gas turbines worldwide, which currently deliver up to approximately 280 gigawatts of electricity daily.

Due to the complexity of the integration of CCUS technologies into an existing natural gas power plant, this FEED study – a detailed blueprint and operating business guide - will represent a pre-requisite for future construction projects and it can accelerate commercial deployment of other projects. With proven expertise in natural gas combined cycle plant engineering, operability, and plant integration, GE will lead the full-scale integration of the study with the goal of preserving the attributes of a natural gas combined cycle plants that are critical to enable a renewable energy-based future including dispatchability, lower carbon intensity, high flexibility and reliability, and low capital cost.

"For the success of this study, the collaboration with Southern Company and Linde, BASF and Kiewit is crucial," said John Catillaz, Director of Decarbonization – Marketing, GE Gas Power. "To develop a sustainable and viable carbon capture solution integrated into the existing power plant, we will go beyond the scope of the study to consider the economics and the performance of the plant holistically, including a plan for the transportation and storage of the captured carbon dioxide emissions."

GE and Linde also announced today they signed an agreement in December 2021 to strengthen their existing cooperation with a specific focus on exploring carbon capture and storage opportunities in North America by leveraging GE's expertise in power generation technology and plant integration with Linde's experience with post combustion amine-based carbon capture processes. This agreement will also provide new opportunities for North America customers that operate GE gas turbines to pursue the adoption of CCUS technologies.

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BASF will provide OASE® blue technology. “OASE Blue was developed specifically for large-scale post-combustion capture (PCC) technology,” said Todd Spengeman, Business Director – Standard Amines & OASE® Gas Treating Excellence. “With low energy consumption and exceptionally flexible operating range is paramount technology for use in flue gas carbon capture from sources such as fossil power generation plants or steam turbines”.Kiewit will provide engineering procurement construction capabilities.

GE

<http://www.ge.com>

16 February 2022

Australia’s largest coal-fired power station, Eraring, to close in 2025, seven years early

The owner of Australia’s largest coal-fired power plant, the Eraring station on the shore of Lake Macquarie in New South Wales, has signalled it will close in 2025, seven years earlier than previously planned.

Origin Energy has given the Australian Energy Market Operator (Aemo) notice that will allow it to shut the 2,880MW black coal generator from August 2025. The company said its decision reflected “the rapidly changing conditions in the national electricity market, which are increasingly not well suited to traditional baseload power stations”. It is the latest in a series of early coal plant closure announcements prompted by the rapid rise of cheaper renewable energy, which reached more than 30% of grid generation last year and is forecast to hit at least 69% by 2030.

AGL last week announced it would bring forward the closure of the Bayswater generator in NSW from 2035 to no later than 2033, and its brown coal-fired Loy Yang A plant in Victoria from 2048 to 2045. EnergyAustralia’s Yallourn power plant, also in the Latrobe Valley, will shut in 2028 rather than 2032.

Origin’s chief executive, Frank Calabria, said the energy market was now “very different” from when Eraring began fully operating in 1984. The plant provides about a fifth of NSW’s electricity generation. “The reality is the economics of coal-fired power stations are being put under increasing, unsustainable pressure by cleaner and lower cost generation, including solar, wind and batteries,” he said in a statement.

Matt Kean, the NSW treasurer and energy minister, said he was disappointed by Origin’s decision and acknowledged the closure would cause problems for the grid if not replaced. He promised the state would build what he described as the “biggest battery in the southern hemisphere” in response.

Called the “Waratah super battery”, it would have a 700MW/1400MW hour capacity, and would be initially funded through a new Transmission Acceleration Facility promised to “fast-track the delivery of critical transmission infrastructure”. He said the state’s electricity infrastructure roadmap, supporting a number of new renewable energy zones, would receive an additional \$84m funding and another \$47.5m would be spent on pumped hydro storage.“I’m absolutely confident that [the battery] will be done in time in 2025 to put downward pressure on electricity prices and ... ensure that we can give the lights on,” Kean said.The federal energy and emissions reduction minister, Angus Taylor, said Origin’s announcement was “bitterly disappointing for all energy users” who “rely on affordable, reliable energy to prosper”, the plant’s 400 workers and the Lake Macquarie community. He said the “early and sudden closure” would leave a “considerable gap in reliable generation” and could cause a spike in electricity prices.

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Aemo's chief executive, Daniel Westerman, said planned additional capacity, including new transmission and the battery announced by the NSW government, meant the state would have access to enough electricity generation to meet its energy security target when Eraring closed. "This announcement also reaffirms the need for timely development of transmission projects," he said. But Bruce Mountain, a director of the Victoria Energy Policy Centre, said the early exit of Eraring was "a real call to arms for the NSW government", and estimated the state would need 4400MW of new wind or 6200MW of solar capacity to replace it. That would mean accelerating the rollout of rooftop solar, household battery storage, large-scale renewables and transmission links into Newcastle, Sydney and Wollongong, he said.

Calabria said Origin had consulted extensively with the NSW government before the announcement, and believed "mechanisms are now in place" to guide future investment in supply to "more than compensate" for Eraring's closure. It would participate in NSW's renewable electricity roadmap process – promised to support 12GW of clean energy and 2GW of storage – as it looked to install a battery with a capacity of up to 700MW at the site, he said.

The NSW government argues there is significant interest in building the renewable energy generation and support capacity needed. Earlier this week, Kean said investors had expressed in building more than \$100bn of capacity in a new renewable energy zone in the state's Hunter Valley region.

Aemo last year released a draft integrated system plan – an "optimal development path" for the grid – that suggested the country's coal-fired power plants were likely to shut at almost triple the pace that was then expected. It expected a ninefold increase in large-scale wind and solar capacity and a trebling of the "firm" energy capacity that can be dispatched whenever required. The Greens Leader, Adam Bandt, said the Eraring announcement showed "why Australia urgently needs a credible climate and energy plan".

Calabria said Origin had reserved \$240m for the restoration and rehabilitation of the Eraring site, based on an expected closure date of 2032. That would continue to be reviewed, with the timing in part dependent on investment in a potential battery and an ash dam at the site.

The Guardian
<http://www.theguardian.com>

16 February 2022

Refurbishment of third Darlington reactor starts

The Darlington units are being refurbished in a CAD12.8 billion (USD10.1 billion) project that will enable the station to operate for an additional 30 years. The work involves disassembling the defuelled and isolated reactors, removing the components of the 480 fuel channels including feeder tubes, end fittings, pressure tubes and calandria tubes.

It also includes detailed inspections of the inside of the calandria and the holes through which fuel channels are fed and secured. These are carried out before reassembling the reactors. Project execution began, after extensive planning, in October 2016. The first refurbished unit, unit 2, was returned to service in June 2020 and, following a short delay related to the COVID-19 pandemic, work on unit 3 began in September 2020.

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The disassembly phase of the refurbishment of unit 3 was completed in late October last year and it is now in the reassembly phase. The refurbishment of unit 3 is due to be completed early in 2024.

With the start of work on unit 1, for the first time on the project, two units are being refurbished simultaneously. Work on unit 1 is scheduled for completion in the second quarter of 2025. Work on unit 4, the final unit to be refurbished, is scheduled to begin in the third quarter of 2023. OPG said the overall project remains on track for completion by the end of 2026.

"Refurbishing Darlington Nuclear Generating Station is key to OPG's Climate Change Plan," said Ken Hartwick, OPG President and CEO. "This safe clean energy workhorse generates over 20% of Ontario's electricity without greenhouse gas or carbon emissions each year. Thanks to this mid-life overhaul, Darlington will continue to cleanly power Ontario's homes, hospitals and businesses for decades to come."

According to an independent report by the Conference Board of Canada, the Darlington refurbishment project is expected to generate a total of CAD89.9 billion in economic benefits for Ontario, create 14,200 jobs per year, and increase the province's GDP by an average of CAD1.40 for every dollar spent.

World Nuclear News

<http://www.world-nuclear-news.org>

17 February 2022

Work begins on world's second largest PV system on a stadium roof

German football club SC Freiburg has announced that a 2.4MW rooftop solar array is currently under construction on the roof of its Europa-Park stadium. Swiss solar manufacturer Meyer Burger Technology has provided its heterojunction panels for the project, which is the world's second largest PV system built on a stadium roof to date.

The project was selected in a tender for commercial PV projects recently held by the German federal network agency and will be developed by Badenova Wärmeplus, SC Freiburg's energy and environmental partner. Around 6,000 high-performance solar modules from Meyer Burger will be installed on a 15,000m² roof area. Badenova Wärmeplus is investing around €2.3 million in the system, which it will operate over a 20-year period.

"In order to meet the high sustainability standards of the city of Freiburg and the sports club, as well as our own standards, we consciously rely on high-performance modules that are manufactured in Germany," said Badenova board member Heinz-Werner Hölscher.

pv-magazine

<http://www.pv-magazine.com>

17 February 2022

Comienza la obra del Salto de Chira, primer gran sistema de almacenamiento energético en Canarias

La central hidroeléctrica de bombeo (CHB) reversible de Salto de Chira comienza su construcción en Gran Canaria. Se trata del primer gran proyecto de almacenamiento energético masivo en Canarias para la operación del sistema eléctrico, aportando una mayor seguridad de suministro e incrementando la integración de energías renovables.

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El Gobierno de Canarias, el Ministerio para la Transición Ecológica y el Reto Demográfico, el Cabildo de Gran Canaria, Red Eléctrica de España y los ayuntamientos de Mogán y de San Bartolomé de Tirajana, han participado hoy en un acto conmemorativo del arranque de las obras que durarán 70 meses. Así, con este hito culmina la tramitación administrativa iniciada en octubre de 2016.

El acto se ha celebrado en la sede de la Institución Ferial de Canarias y ha reunido a la vicepresidenta tercera del Gobierno y ministra para la Transición Ecológica y el Reto Demográfico, Teresa Ribera, al presidente de Canarias, Ángel Victor Torres, al presidente del Cabildo de Gran Canaria, Antonio Morales, a la presidenta de Red Eléctrica de España (REE), Beatriz Corredor, a las alcaldesas y alcaldes de Gran Canaria, a parlamentarios nacionales y autonómicos, así como a una amplia representación empresarial y social, de la universidad, de asociaciones civiles y comunidades de regantes y de la industria de Gran Canaria y de Canarias.

La vicepresidenta tercera del Gobierno y ministra de Transición Ecológica y Reto Demográfico, Teresa Ribera, ha destacado que “el proyecto Salto de Chira es un gran ejemplo del camino que debemos recorrer para seguir impulsando un modelo de energías limpias, baratas y eficientes. El almacenamiento va a ser una de las piezas clave de la transición energética, tanto por su contribución a la electrificación como por su capacidad para dotar a las energías renovables de gestionabilidad, algo especialmente importante en sistemas no interconectados como son las Islas. Es en ese punto donde el Salto Chira va a representar un gran avance, mejorando la garantía de suministro, la seguridad del sistema eléctrico y la penetración renovable. Con proyectos como este, y la apuesta decidida por las renovables, la descarbonización y la reducción de la dependencia energética, conseguiremos unas islas 100% sostenibles en los próximos años”.

Para el presidente de Canarias, Ángel Victor Torres, “este feliz día será recordado como un punto de inflexión para el futuro de Gran Canaria y de Canarias en su conjunto. Porque esta central supone un avance para la consecución de muchos de los objetivos fundamentales de la Agenda Canarias de Desarrollo Sostenible 2030. Hoy, Salto de Chira da el paso decisivo para ser una realidad tras un proceso que no ha estado exento de complejidades, por su envergadura y por su carácter innovador. Pero todo esfuerzo merece la pena si es para materializar las aspiraciones de la Agenda, de la Declaración de Emergencia Climática y de la futura Ley de Cambio Climático y Transición Energética, que contempla la descarbonización de las Islas en el año 2040. Ese es el camino que empieza a recorrer Salto de Chira, una instalación esencial para lograr la soberanía energética de Canarias y para aminorar los efectos del cambio climático”.

Por su parte, el presidente del Cabildo de Gran Canaria, Antonio Morales, ha destacado que “hoy celebramos no solo el comienzo de una gran obra, sino el inicio de un nuevo tiempo largamente esperado: la garantía de que un modelo de ecoisla es posible y de que podremos legar a las próximas generaciones una tierra que estamos obligados a proteger. Salto de Chira es una herramienta imprescindible para hacer posible un modelo de progreso ecosocial que garantice nuestra supervivencia”.

En su intervención, la presidenta de REE, Beatriz Corredor, ha resaltado que “Red Eléctrica pondrá en servicio Salto de Chira en cumplimiento del mandato legal que en 2013 otorgó al operador del sistema la responsabilidad de estas instalaciones de bombeo en los sistemas no peninsulares” y ha puesto de manifiesto que la central será “un instrumento al servicio de la sociedad grancanaria y una herramienta de almacenamiento de todos y para todos”.

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En el acto conmemorativo han participado también las alcaldesas de Mogán, Onalia Bueno, y la de San Bartolomé, Concepción Narváez, municipios ambos que acogerán las futuras instalaciones. Bueno ha subrayado que el proyecto “mejorará la calidad de vida de los vecinos y vecinas del Barranco de Arguineguín porque impulsará la diversificación económica, mejorando a su vez las comunicaciones y las oportunidades de inserción laboral”. Por su parte, Narváez, ha destacado que “cambiar el modelo energético actual es algo urgente que no podemos aplazar a otras generaciones. Uno de nuestros grandes desafíos debe ser generar los instrumentos para el almacenamiento de las energías limpias que hoy generamos”.

La central de Salto de Chira, declarada de interés general por el Gobierno de Canarias, aprovecha la existencia de dos grandes embalses (las presas de Chira y de Soria) situados en el interior de la isla para construir entre ambos la central hidroeléctrica de bombeo de 200 MW (equivalente aproximadamente al 36% de la punta de demanda de Gran Canaria) y 3,5GWh de almacenamiento. Además, incluye una estación desalinizadora de agua de mar y las obras marinas asociadas, así como las instalaciones necesarias para su conexión a la red de transporte.

El agua será un elemento esencial para el funcionamiento de la nueva infraestructura, pero también es un recurso escaso en el archipiélago. Por eso, el Salto de Chira garantizará el caudal necesario en los embalses para el funcionamiento de la central a través de la planta desaladora de agua que se instalará en Arguineguín, para cumplir con su objetivo de almacenar energía.

REE

<http://www.ree.es>

17 February 2022

Bill Gates' VC investment firm leads US\$50m injection into thermal energy storage startup

Thermal storage startup Antora Energy has raised US\$50 million from a group of investment firms including Bill Gates' Breakthrough Energy Ventures to accelerate the development of its heat-based carbon block energy storage system for heavy industry. The investment is being provided by Breakthrough, Lowercarbon Capital, Shell Ventures, BHP Ventures, Grok Ventures, Trust Ventures, Overture VC, Impact Science Ventures, and existing investor Fifty Years VC. Antora says the money, which follows US\$5 million of grants from US government bodies in 2020, will help the company “build out their first customer-sited projects and speed up hiring.”

The California-based firm's technology works by absorbing electricity from wind and solar into heat blocks of carbon. These are heated to as much as 2000°C. The carbon blocks can then provide heat, by heating up tubes containing steam or hot air, or they can even generate electricity from their glow being directed onto modified solar PV modules, the company has claimed.

Antora says these two discharge modes are operated completely independently. In a recent Medium article, the company's CEO Andrew Ponec wrote that thermal beats all other storage types it looked at in its early stages – hydrogen, batteries, gravitational storage, compressed air, flywheels – by virtue of being cheap, simple and infinitely scalable. He claims that carbon blocks are amongst the cheapest storage materials in the world and that the firm has a ‘world-record-breaking solid-state heat engine that converts radiant heat into electricity with only a few micrometres of material and no moving parts’, solving thermal

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storage's two main problems. He also reckons carbon blocks have the same energy density as lithium-ion batteries.

In an interview in January, Ponec said that Antora has a workhorse prototype system of a few hundred KWh but was 'working hard' on a delivering a 100MWh pilot system to Wellhead Electric, a developer of natural gas, solar and storage plants in California. The company is targeting heavy industry which is the single-largest source of carbon emissions at 30% and has found it difficult to decarbonise due to high heat and power requirements. One example is steel production, which requires temperatures of about 1,500°C.

"Our investors look at this and see a US\$1 trillion/year opportunity. We look at it and see a 10 gigaton/year opportunity," he said.

This fundraising round is the largest seen in the space since EnergyNest secured €110m (US\$130m) in April last year for its similar technology based around concrete, as reported by Energy-storage.news. In fact, the nascent thermal energy storage space comprises a variety of materials upon which solutions have been based. US startup Malta Inc uses a molten salt-based storage solution, Swedish group Azelio's is based around aluminium while Scotland-based Sunamp uses a phase change material (PCM) for its proprietary technology, albeit that one is a lower temperature storage tech aimed primarily at the residential hot water heating market.

Energy Storage News
<https://www.energy-storage.new>

18 February 2022

Montalto di Castro thermal plant to be repurposed for solar tracker production

Comal's Tracker Sun Hunter factory will be located in an area of over 30,000m² that is no longer used for the Montalto di Castro plant's energy activities, with an intended output of trackers to support a photovoltaic energy production of up to 1GW per year. The aim is to produce fully local trackers to replace the currently imported products, and thereby contribute to the growth of the national renewable energy supply chain.

At maximum output, the plant, for which preparatory works are set to get underway in the early months of the year, will employ up to 70 workers at maximum output, including the possibility of re-employment of personnel linked to the decommissioning of thermoelectric plants in the region. The Montalto di Castro plant is at the centre of a major redevelopment, which will see the creation of a new energy hub comprised of initiatives in the energy sector, developed by Enel, and new business solutions developed by third parties.

The initiative is part of the Enel Group's broader commitment to the redevelopment of disused power plant sites, based on a strategy prioritising the leveraging of existing structures and the integration of new renewable generation and storage systems, combined with new business projects in different areas.

The demolition of decommissioned oil-fired units is underway at the Montalto di Castro site. In parallel, Enel has started the authorisation process to construct a 10MW solar PV plant and instal around 245MW of energy storage on the site.

In line with Italy's National Integrated Energy and Climate Plan and to support the country's exit from coal, renovated turbogas plants which have been made more efficient will remain in operation at the facility. Comal, like Montalto di Castro, is headquartered in the Lazio region, with its PV plant in the Montalto di Castro industrial zone.

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Solar trackers allow photovoltaic panels to orient themselves and follow the sun throughout the day. Comal's Sun Hunter tracker is a horizontal single-axis system that can be adapted to different PV configurations.

Smart Energy International
<http://www.smart-energy.com>

18 February 2022

California project launched to cover a network of canals with solar panels, in a first of its kind project designed to preserve water and generate electricity at the same time

A California-based water and power utility plans to cover water canals in solar panels, in a first-of-its-kind project to preserve water and generate electricity. Turlock Irrigation District (TID), from Turlock was given a \$20 million grant by the state of California for a limited proof-of-concept trial, known as Project Nexus.

The solar panels will be placed over two segments of the 4,000 miles of delivery canals, that take water from the Sierra Nevada mountains and northern parts of California to reservoirs, lakes, hydropower plants and farms elsewhere in the state. As these canals are open access, they allow some of the water to evaporate, which is presenting a problem for a state already struggling with limited water supplies. Project Nexus will cover segments in Stanislaus County near Modesto, producing enough power for 100,000 homes, with work due to start this fall and finish in 2024.

If it were to be rolled out to all 4,000 miles of canals, it could save up to 63 billion gallons of water per year, enough to meet the needs of two million people, and generate an estimated 13 gigawatts of power - a sixth of California's usage.



California is locked in a drought, with the first two months of 2022 set to be the driest January and February since records began. 'There's no precipitation forecast through the remainder of February. And there's very little precipitation in the long-range forecast for March,' said Erik Ekdahl, a deputy director with the State Water Resources Control Board. 'All this is pointing to, again, some pretty dire conditions statewide for drought.' Rainfall totals

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have hit a plateau at half the yearly average for the state, despite record-breaking storms in October and December.

So, to battle the chronic water shortage, universities, firms and institutions are turning to every possible source of water, and method to preserve water.

The team behind Project Nexus say it should improve water quality, reduce vegetative growth in the canals and reduce water evaporation in canals. They say this provides a double whammy solution, providing a space for solar panels that could cover thousands of miles, while protecting the water underneath. The water also acts to keep the solar panels cool, which will preserve them, and make them more efficient at gathering sunlight and turning it into electricity.

It is inspired by the practice of agrivoltaics, where solar panels are raised over farmland, allowing the agricultural activity to continue underneath, panels gather electricity, and shade from the panels protecting from the strong sunlight. Constructing solar panels over irrigation canals is a first in the nation project, and while it won't solve the water shortage problems completely, it is an example of the level of solution required to deal with increasingly scarce water in California. The researcher also found there would be a financial benefit to shading the canals, that would outweigh the cost of installing them, and running a cable support structure.

A recent study found the drought devastating the southwestern US and parts of Mexico over the last two decades is the worst in at least 1,200 years. Researchers with Nature Climate Change analyzed tree ring patterns, which delineate soil moisture levels over periods of time, to conclude that the current megadrought is worse than one that hit the region in the late 1500s and is the most severe since one in 800 AD. The study, which analyzed a region stretching from southern Montana to northern Mexico and from the Pacific Ocean to the Rocky Mountains, found that human-caused global heating accounts for more than 40% of the severity of the dry spell.

"The turn-of-the-21st-century drought would not be on a megadrought trajectory without anthropogenic climate change," reads the study, led by Park Williams, an associate professor at the University of California in Los Angeles.

Daily Mail

<http://www.dailymail.co.uk>

18 February 2022

Plant Vogtle hits new delays; costs surge near \$30B

Southern Co. yesterday announced another delay for its long-troubled nuclear construction project in Georgia, edging its costs closer to the \$30 billion mark. The setback could now push the startup date for Plant Vogtle's first reactor until early 2023 and move the date for the second one to later that year. The costs for Plant Vogtle's two reactors have now risen to the point that Southern should absorb every dollar instead of sharing that burden with the other developers — and passing it on to customers.

Plant Vogtle's latest move highlights the nuclear industry's chief troubles with building large, baseload reactors: safety and cost. To be clear, Southern executives have blamed this new hiccup on paperwork, saying that workers were gathering it to send to federal safety regulators and noticed critical inspection records were missing or incomplete. The pile of missing or incomplete documents added up to a delay of three to six months, Southern said. That additional time is costing \$920 million.

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“We’re a little frustrated with the latest developments,” Southern Co. CEO Tom Fanning said yesterday in an interview. “[The first unit] is on the doorstep of loading fuel and going into service.” Fanning talked of “great momentum” at the construction site since November. He said the company was looking forward to receiving the Nuclear Regulatory Commission’s permission to load fuel rods into the reactor, the last major step before it can start producing electricity. But workers realized “tens of thousands” of critical documents were missing, leading to a three-month backlog, Fanning said. Officials have cut that time down by 30 percent, he added. “We’re fixing that part of the ‘paper’ process,” he told E&E News.

Vogtle started for one reason and is being finished for another. The reactors were supposed to be the answer for baseload electricity as coal was falling out of favor, natural gas prices were high and renewables were in their nascent stages. Now, the gigantic reactors could offer 2,200 megawatts of emission-free baseload electricity as Southern and the nation shift away from fossil fuels.

“When we build this thing, get it in service ... we’re going to be proud of it for decades to come,” Fanning said during a conference call with Wall Street analysts during the company’s fourth-quarter earnings presentation yesterday. “We look forward to getting the project behind us and getting into 2024.”

Major construction on Vogtle began in 2012 with a \$14 billion price tag and expected startup dates of 2016 and 2017. A series of contractor delays, a litany of rework, problems with finishing individual tasks on time and the bankruptcy of reactor designer Westinghouse Electric Co. LLC have doubled the project’s costs. Given the project’s troubles combined with how close the first unit was to producing electricity, analysts on yesterday’s call expressed frustration.

“I know you knew all along that the paperwork and the [paperwork] trail of that was super-important,” said Steve Fleishman, an analyst with Wolfe Research LLC. “Can you give us a little flavor to what has gone on here; obviously it was something you were very focused on from the beginning.” Fanning agreed, again saying he and others were frustrated.

Vogtle is the lone nuclear construction project in the U.S. and involves the first set of reactors to be built from scratch in decades. While the reactor design was supposed to be a template for dozens of others, it isn’t — and Southern is having to wade through a whole new construction and regulatory process on its own.

Developers learned of Vogtle’s new cost and schedule on Sunday. The schedule increase now requires the electric companies to officially vote whether the project should keep going, based on a 2018 agreement. Southern subsidiary Georgia Power Co. has already agreed to move forward, Fanning said yesterday. The other owners — Oglethorpe Power Corp., the Municipal Electric Authority of Georgia and Dalton Utilities — are going through their separate governance processes. They must decide by March 8.

“Oglethorpe Power and its members are deeply invested in the success of the nuclear units that will provide 60-80 years of emission-free energy, and we do not expect the project to be stopped,” the electric utility said in a statement. “However, before we cast our vote, we will take the time to fully digest and analyze a budget increase of this significance. Anything less would be a disservice to our member-consumers.”

There is a separate dispute over money, however. At issue is that 2018 ownership agreement, which states that Southern and Georgia Power will take on more risk should Vogtle’s construction costs rise above certain thresholds. Now, Southern and the owners do

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not agree on two things: whether they've reached that monetary benchmark that would let the other developers tender a portion of their ownership share in megawatts in exchange for not paying anymore for Vogtle, and how much Covid-19-related costs played a role. Southern executives said nothing other than an agreement hadn't been reached. "We still have a difference of opinion," said Dan Tucker, Southern's chief financial officer.

Southern's Georgia Power unit wrote off \$920 million for costs associated with Vogtle. This includes \$480 million of the electric company's share of increased costs as well as \$440 million of incremental costs that the utility is expecting to pay. But it may wind up paying another \$460 million, depending on the outcome of what Oglethorpe and the other utilities decide to do. While Georgia Power customers have been bearing the brunt of Vogtle's costs, Southern said in a regulatory filing that won't be the case with these costs.

"The incremental costs associated with these provisions will not be recovered from retail customers," said the document, filed with the U.S. Securities and Exchange Commission. This is the second public cost dispute between Southern and the public power utilities. The first was when the costs jumped \$2.1 billion, leaving Vogtle's future hanging in the balance while the utilities hashed out a new cost-sharing agreement.

Analysts also asked Southern executives how much next-generation reactors will come into play. Fanning said that he prefers molten salt chloride fast reactors. Southern is building a small experimental nuclear reactor in Idaho using technology from TerraPower, a company backed by Microsoft Corp. co-founder Bill Gates. The company is likely eyeing the 2035-2040 time frame to add such reactors to its power grid, should they be developed and built to scale before then. They are cost-competitive with natural gas combined with carbon-capture technologies, Fanning said.

E&E News

<http://www.eenews.net>

21 February 2022

Reindeer herders push to reclaim land from Norway wind farms

Norway's blustery Fosen peninsula is a long way from anywhere, its mountains sustaining the Indigenous Sami and their reindeer for centuries. These same peaks are vital to the kingdom's wind energy plans, and native herder Lena Haugen says her people pay the price. Snaking through the snowy terrain are dozens of sky-high wind turbines, built on Sami land by state-controlled Fosen Vind. When the machines came, the reindeer left, spooked by the cacophony of construction and the whoosh of spinning blades.

For the Sami, that migration threatened a core part of their culture and subsistence economy. So, they pushed back, and last year the nation's highest court sided with them, ruling that 151 turbines in traditional grazing patches violate the Samis' human rights under international law. Haugen and her people want the machines torn down, but they still whir. The new government — which has promised to make Norway a leader in respecting Indigenous rights and to foster green industries for achieving carbon neutrality by 2050 — says it's researching solutions.

"We did win in the Supreme Court, but as long as nothing is done as the verdict says, we will never be heard," Haugen, 27, said. "There is no victory. It is quite clear that Norway does not value the Indigenous population very highly."

The case is a bellwether for wind power in this oil-dependent nation, which needs to supplement vast hydropower resources if it wants to reduce emissions and prep for the electrification of everything.

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Norway is an electricity exporter, but that surplus could evaporate by 2026, opening a lane for wind installations. The gusty North Sea is right there, and the coastline is the world's second-longest after Canada's. Yet the onshore industry is faltering, and this ruling won't help. Authorities haven't issued permits since April 2019, partly because of public concerns about the blight on pristine lands, and the government is considering taxing onshore production to essentially fund bonuses for communities hosting turbines.

Reverberations may be felt beyond the borders, as well, since the outcome could inspire limits on exploiting Indigenous lands in the name of combating climate change, a practice derided by activists as green colonialism. Fosen Vind, controlled by state-owned Statkraft AS, built six wind farms in the region with a combined capacity of 1,057 megawatts, making it one of Europe's biggest onshore projects. The two biggest, in Roan and Storheia, use land where the Samis have grazing rights.

During the process to determine how much compensation Fosen Vind would pay, the herders argued that their Indigenous rights were being violated, and they would only accept disassembly and repatriation.

After the case ping-ponged through lower courts, Norway's Supreme Court ruled in October that the two farms breached the UN Covenant on Civil and Political Rights, specifically Article 27 stating that minorities shouldn't be denied the right "to enjoy their own culture." Disrupting the reindeer husbandry "without satisfactory mitigation measures" does just that, so the turbines' permits are invalid, the court said. But that's different than declaring them illegal, so the government doesn't have to order the machines dismantled.

Statkraft, Europe's biggest producer of renewable energy, is applying for new licenses, a process likely to take years. Fosen Vind is proposing various studies of the reindeer husbandry, but the herders aren't on board, Chief Executive Officer Tom Kristian Larsen said in an interview. TronderEnergi AS, which now controls the Roan farm, said that the government approved continued operations after the supreme court ruling while mitigation measures are being worked on.

Bloomberg
<http://www.bloomberg.com>

21 February 2022

Ethiopia's mega-dam starts generating electricity

Ethiopia started generating electricity for the first time from its Grand Ethiopian Renaissance Dam (GERD) on Sunday 20 February 2022. The controversial GERD project is Africa's largest hydroelectric project with an output of 5000MW and was inaugurated by Ethiopia's Prime Minister Abiy Ahmed. According to Aljazeera, Abiy and a group of high-ranking officials toured the power generation station before initiating production.

In a statement at the inauguration, the prime minister emphasised the importance of the dam to his country's economic growth and stressed that his country did not wish to harm the interests of neighbours.

Abiy said: "Ethiopia's main interest is to bring light to 60% of the population who is suffering in darkness, to save the labour of our mothers who are carrying wood on their backs in order to get energy. As you can see, this water will generate energy while flowing as it previously flowed to Sudan and Egypt, unlike the rumours that say the Ethiopian people and government are damming the water to starve Egypt and Sudan."

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Positioned on the Nile River, neighbouring countries, Sudan and Egypt are concerned the hydro project will cause severe water shortages downstream as Ethiopia diverts Nile water to fill a vast reservoir behind the dam. Ethiopian plant operators are reluctant to commit to an exact amount of water required to ensure the dam's proper functioning, a fact that has made both Sudan and Egypt concerned about their own water and irrigation interests. Thus far negotiations have failed to yield an agreement that satisfies all parties. Despite this, no further discussions were conducted at the 35th African Union Summit, held 5-6 February at AU headquarters in Addis Ababa. The event focused primarily on security issues and the recent military coups in Africa.

Power Engineering International
<http://www.powerengineeringint.com>

22 February 2022

Microgrids Are Becoming Essential for the Military

The military will be relying on microgrids. That's an order from the top. Just look at the Marine Corps. Air Station near San Diego: Raytheon and the National Renewable Energy Laboratory developed its microgrid — one in which solar panels and landfill gas generate the electricity that is harnessed by a battery storage system. The goal is resiliency — to bounce back as soon as possible from a power loss. If there is an outage, the base also needs to keep the lights on for at least 14 days.

The microgrid is leveraging distributed energy resources, including 1.3 megawatts of solar photovoltaics, 3.2 MW of converted landfill methane gas, and 6.45 MW of diesel and natural gas generation. Its microgrid control system and operations center can disconnect from the electricity network and rely entirely on the distributed energy resources.

“If the utility power goes off, the military base does not want all the computers to have a glitch,” says Chuck Wells chief technology officer and founder of PXiSE Energy Solutions in San Diego, in an interview with Environmental Leader. “They want to run their microgrid and not use a backup diesel generator. We can seamlessly generate power in island mode — off the grid — and do so without the lights blinking on and off.”

Outages can cost billions in lost economic opportunity. But in the military world, those blackouts can cost lives — if the setup is on the battlefield. There, platforms with solar panels are combined with battery storage. The two provide the fuel needed to run operations.

Microgrids are working in unison with onsite generation and battery storage. They provide replacement power in the event the lights go out. But they can also prevent the use of diesel-fired generators whose fumes can tip off the enemy during combat. As for the Marine Corps. Air Station, it sought to be economical, reliable, and technically feasible, says Wells. That is, the military base wanted to know if relying on renewable power would be cost-effective and whether it could deliver critical loads for weeks at a time during an outage.

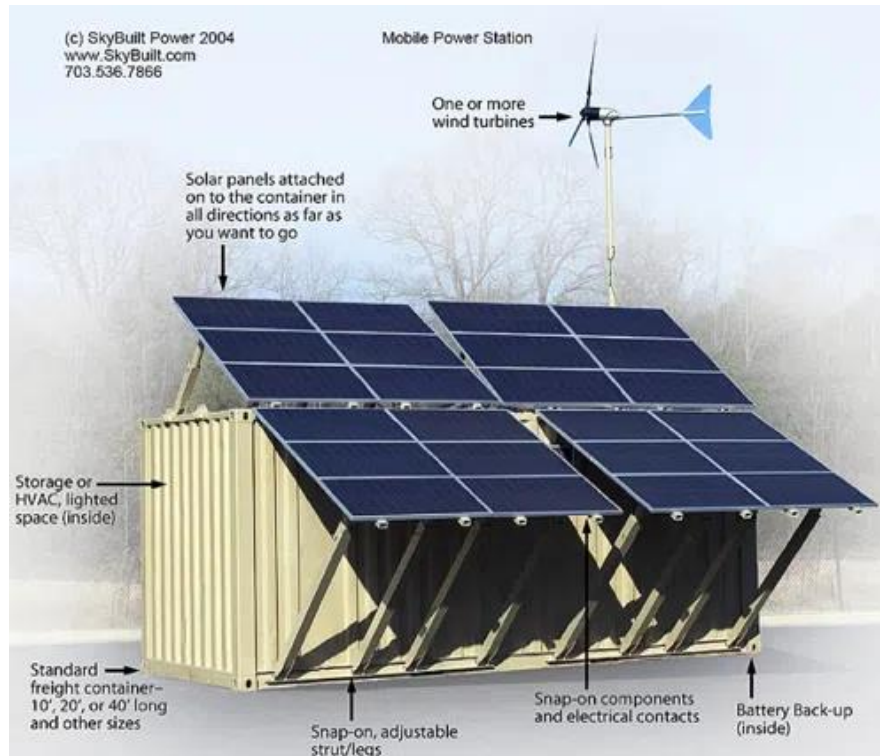
The microgrid controls the load at the meter, he says. That means the military base can calculate its energy needs and the amount of available electricity before deciding which sections of the facility should get prioritized. A microgrid controller deals with the intermittency issue caused by renewables. During a recent heatwave that swept through southern California, the microgrid performed as advertised. Not only was it able to power on, but it also had extra electricity that it shared with the neighboring community.

Consider the US Army Garrison Bavaria in Germany, which is home to about 40,000 soldiers and civilians and is the largest military installation outside the United States: the

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goal is to improve energy security and resilience. The base also wants to reduce its dependency on the local utility and foreign energy resources while also using more green energy. The US Army Base Longare in Italy has similar objectives. It wants to increase its use of renewable generation and battery storage — in a cost-effective way. Moreover, those distributed assets will hook up with a microgrid that is expected to operate in “island mode” for a sustained period.



“A properly configured microgrid offers absolutely critical resiliency to military installations,” says Adib Nasle, chief executive of San Diego-based Xendee, in a release. “Additionally, self-sufficiency in the field offers energy security to operational bases as well as the ability to maintain mission readiness even when the local power is knocked out in the entire region.” The US military has said it would introduce microgrids to its more than 130 bases globally by 2035. Already, the armed forces have microgrids at bases in Alabama, North Carolina, and Massachusetts.

Both the navy and army have said that their campuses should operate off-grid for two weeks by 2025. The army and its partners are therefore investing in onsite renewable generation, large-scale battery storage, and microgrids, says the United States Army Climate Strategy report. Specifically, the analysis says that the army will pursue enough renewable energy generation and battery storage capacity “to self-sustain its critical missions on all its installations by 2040.” To that end, the army says that it buys \$740 million of electricity each year from the grid. While it says that it has decreased its greenhouse gas emissions by 20% since 2008, the army also says that it can do more to green the grid.

Microgrids may be a perfect fit for the military — an organization that relies on a continuous flow of power at its training facilities and in the field. It’s about being prepared for battle and staying alive. If those mini-grids are good enough for the military, they may also be essential for commercial and industrial users — an order that they may also follow.

Environment+Energy Leader
<http://www.environmentalleader.com>

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Nuclear exit: Federal energy regulator raises concerns for energy security

A prematurely-published report from Belgium's Commission for Electricity and Gas Regulation (CREG) that appeared only briefly on the federal energy regulator's website on Friday calls into question whether the country's energy supply can withstand the closure of its nuclear power plants.

According to the non-final version of the CREG report, the planned gas power stations will be insufficient, raising doubts about the already-divisive nuclear phase-out, VRT reports. The report also called into question calculations made by Elia Group, which manages the high voltage distribution of electricity in the country. CREG and Elia are crucial players in the plan to phase out Belgium's nuclear power, but CREG's leaked report claims that Elia's calculations are incomplete and as a result have errors.

CREG did deduce from figures presented that there will be a need for one or two additional gas-fired power plants in 2026, on top of the two currently planned, in order to meet energy demand without the nuclear reactors.

"The parameters in the Grid Operator Report lead to an additional need for at least one, possibly two, large CCGT units, on top of the 2 CCGT units (Vilvoorde and Awirs) that were already contracted in the 2021 auction," the report says.

The report isn't the first to call into question the wisdom of abandoning nuclear power. Researchers associated with the University of Antwerp published their own report warning that doing so could put energy supplies under pressure and further increase the price of electricity, though their findings were heavily criticised by others in the energy sector.

The report from CREG contained the word "error" 21 times, and pointed out major discrepancies with Elia's figures. In one sentence, CREG stated that they believe "the preparation of the Network Operator's Report was at the very least careless."

They also said that the Grid Operator Report, "as published by Elia on 23 December 2021, contains too many errors." The regulator acknowledged the premature publication of the report and said that the finalised version "will be published as soon as Elia has provided additional information." Elia says the process is still ongoing, and the company will not comment at this time.

The Brussels Times

<http://www.brusselstimes.com>

24 February 2022

Largest US offshore wind lease auction attracts \$1.5B in bids and counting

The Bureau of Ocean Energy Management's (BOEM) largest leasing auction for rights to offshore wind development attracted nearly \$1.54 billion in bids on Wednesday for six areas with an estimated potential for 5,600 to 7,000 MW of development, depending on the efficiency of the turbines.

BOEM said 14 bidders participated in the first day of the auction, from a total of 25 eligible bidders. BOEM did not identify the bidders, but eligible bidders include Avangrid Renewables, PSEG Renewable Generation, Equinor Wind US, and subsidiaries of EDF Renewables, BP and Shell. Provisional winners will be announced following the end of the auction.

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The auction, focused on federal waters in the New York Bight, continues on Thursday morning for the sixth lease area. It is the first of seven BOEM auctions planned by President Joe Biden.

Utility Dive
<http://www.utilitydive.com>