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A weekly oil & gas newspaper based in Anchorage, Alaska

page Meet Alaska hears CCUS detailsthat could generate revenue for state

Week of March 26, 2023 • \$2.50

Minor changes to Pikka project approved by state DO&G

On March 16, Alaska's Division of Oil and Gas approved Oil Search (Alaska)'s March 7 request to amend the Pikka Development Project Phase 1 plan of operations.

Oil Search (Alaska), or OSA, a sub-

sidiary of Santos Ltd., provided the division with a project update and associated figures that reflect current Phase 1 activities in the Pikka unit. The project, which is located west of the central North Slope, was initially called the Nanushuk Development Project, which explains why each of the pad names begin with ND — ND-A, ND-B, and ND-C.



Also, note that the Phase 1 pad ND-B **KEVIN GALLAGHER** is located approximately 12 miles northeast of the community of Nuiqsut.

In its March 16 decision the division said the updates from OSA are a result of "incremental advancements in project design, construction methods, and operational requirements," noting OSA has adopted a scaled, or phased, approach strategy to project development, in which the first phase would provide the cash needed for subsequent phases.

Pikka Phase I has advanced through front end engineering and design, or FEED, and achieved a final investment decision for the project in August 2022.

Plan of operations activities include the following:

- Drill 43 horizontal wells at ND-B.
- -22 production wells
- -21 injector wells for enhanced oil recovery

• Drill one disposal well at ND-B to accommodate the Grind and Inject facility

• Install infield pipeline connecting ND-B to Nanushuk

see PIKKA PROJECT page 11

Oil prices, production down in state's Spring Revenue Forecast

Oil prices and oil production are both down, driving the Alaska Department of Revenue's Spring Revenue Forecast down for fiscal year 2023 and FY 2024 and beyond, compared to the Fall Revenue Forecast released in mid-

December. In December, unrestricted general rev-

In December, unrestricted general revenue — before transfer from the Permanent Fund Earnings Reserve — for FY 2023 was forecast at \$3.9 billion and \$3.4 billion



Demand fears ease

6 million barrel US gasoline supply drop boosts rally off bank panic lows

By STEVE SUTHERLIN

Petroleum News

Alaska North Slope crude gained ground March 22, up 95 cents to close at \$74.13. West Texas Intermediate and Brent lofted sharply into the close on dovish Federal Reserve comments, following a widely expected quarter point jump in the benchmark federal funds rate from 4.75% to 5%. WTI leapt \$1.57 to close at \$70.90 and Brent popped \$1.37 to close at \$76.69.

Prices were supported by a healthy, larger than expected draw on U.S gasoline and distillate fuel reserves.

Total motor gasoline inventories for the week ending March 17 decreased by 6.4 million barrels from the previous week, standing 4% below the The bank panic oil price swoon not only is speculative, but oil will hit \$140 a barrel by the end of the year, Andurand told the FT Commodities Global Summit in Lausanne, Switzerland.

five-year average for the time of year, the U.S. Energy Information Administration said in its March 22 report. Distillate fuel inventories fell by 3.3 million barrels for the period, to a level 9% below the five-year average for the time of year.

U.S. commercial crude inventories rose just 1.1 million barrels for the period to 481.2 million barrels, 8% above the five-year average for the time

see **OIL PRICES** page 9

EXPLORATION & PRODUCTION



Oil Search files Pikka Nanushuk pool rules, estimates 592-868 million barrels

By KRISTEN NELSON

Petroleum News

As Oil Search continues to move toward production at its Pikka unit on the North Slope, the company has applied to the Alaska Oil and Gas Conservation Commission for pool rules for the Nanushuk oil pool at Pikka.

Oil Search (Alaska) LLC, the Pikka unit operator, a subsidiary of Santos Ltd., submitted the March 6 pool rules application on behalf of itself and Repsol E&P USA LLC, the other working interest owner.

The company said that prior to beginning injection it will apply to AOGCC for an area injection order to authorize water-alternating-gas, WAG, for the proposed Nanushuk oil pool.

Oil Search said the area proposed for the Nanushuk pool rules coincides with the Pikka unit boundary.

"The Nanushuk Oil Reservoir does extend outside the unit boundary to the south and to the west of the Pikka Unit into leases operated by ConocoPhillips Alaska," Oil Search said, with the extent of the Nanushuk "proven by recent delineation wells drilled in those areas as well as recent seismic interpretations."

The Nanushuk Oil Pool is the accumulation between measured depths of 3,892 and 5,166 feet

for FY 2024.

The Spring Revenue Forecast, released March 23, forecasts unrestricted general revenue at \$3.6 billion for FY 2023 and \$2.7 billion for FY 2024, a drop of \$0.3 billion for FY 2023 and \$0.7 billion for FY 2024.

Both the ANS West Coast oil price and North Slope production are down from the fall forecast, and in that forecast they were down from the spring 2022 forecast.

In the current spring forecast, the ANS West Coast price for FY 2023 is \$85.25 per barrel, down \$3.20 per barrel, 3.6%, from a fall ANS West Coast price of \$88.45 per barrel. In FY 2022, the actual price averaged \$91.41 per barrel.

The FY 2024 price is now forecast at \$73 per barrel, down \$8, 9.9%, from a forecast of \$81 per barrel in the fall.

The forecast price is down from the spring forecast for the entire forecast period, through FY 2032.

On the production side, Alaska North Slope volumes are forecast lower for every fiscal year except one, FY 2031, for the

see SPRING FORECAST page 8

ALTERNATIVE ENERGY

REAP argues renewables

With prospect of gas imports, should Railbelt transition to renewable energy?

By ALAN BAILEY

For Petroleum News

A s part of a continuing debate over the future of the Alaska Railbelt electrical system, in a March 16 meeting of the House Energy Committee Chris Rose, executive director of Renewable Energy Alaska Project, made the case for using renewable energy power generation and moving away from the current dependence on natural gas fueled power.

Currently, much of the power generation in the southern sector of the Railbelt is provided by gas fueled generators, with the gas coming from oil and gas fields in the Cook Inlet. But, with uncertainty about the future availability of sufficient gas from the inlet, electric utilities are evaluating their future power supply options. In a Feb. 1 presentation to the Senate Resources Committee, the CEOs of the utilities said that total supplies of natural gas will likely fall below demand after 2027 and, after that point, it will probably become necessary to import liquefied natural gas to bolster local gas supplies.

High and volatile LNG pricing

Rose expressed REAP's disagreement with this position, saying that LNG in the Pacific market is much more expensive than Cook Inlet gas and that the LNG pricing is highly volatile. The result

see **RENEWABLE ENERGY** page 12

• FINANCE & ECONOMY

EIA annual sees CO2 reduction through 2050

Renewable generating capacity grows in all regions; US to remain net exporter of petroleum products, natural gas, through 2050

By KRISTEN NELSON

Petroleum News

The U.S. Energy Information Administration has released its Annual Energy Outlook 2023, which covers through 2050.

In its March 16 press release the agency said projections in AEO2023 show that by 2030, energy-related CO2 emissions in the U.S. will drop by 25% to 38% below what they were in 2005, and by 2050, be 17% below the 2022 annual outlook reference case. EIA contributed that drop to effects of the Inflation Reduction Act, "energy technology costs and performance updates, a changed macroeconomic outlook, and other factors."

EIA said the projected CO2 reductions are driven by increased electrification, high equipment efficiency and deployment of renewables in the electric sector, although the emissions reductions are limited by long-term growth in U.S. transportation and industrial activity.

"With policy changes over the last year and continued technology innovation, we expect to see significant shifts in energy production and use over the next 30 years," said EIA Administrator Joe DeCarolis. "The resulting projections for energy-related CO2 emissions are most sensitive to our assumptions regarding economic growth and the cost of zero-carbon generation technology."

In its highlights, EIA said all regions of the U.S. see

growth in renewable generating capacity, "supported by growth in installed battery capacity."

Petroleum products

EIA said the U.S. will remain a net exporter of petroleum products and natural gas through 2050 in all the cases AEO2023 considered.

(In addition to its reference case, **JOE DECAROLIS** the AEO2023 looks at high and low

oil price cases, high and low oil and gas supply cases, high and low zero-carbon technology cost cases, high and low economic growth cases and economic growth and zero-carbon technology cost combination cases.)

Key drivers for oil and gas are that international demand remains high, while domestic consumption grows slowly or decreases.

"In all cases, we project that the United States will remain a net exporter of petroleum products through 2050," EIA said, with the most exports occurring in the high oil price case.

In the high oil price case, EIA said, U.S. crude oil imports decline but then increase starting in 2030 as domestic crude oil production changes. High oil prices initially push up domestic crude production, but "crude oil production begins to fall after 2030 because wells are drilled increasingly close



to one another, resulting in well productivity decline," with production falling and wells eventually becoming unprofitable.

Crude oil prices will be driven by global market balances, "primarily international supply and demand factors," EIA said.

In the reference case, Brent oil reaches \$101 per barrel, in 2022 dollars, by 2050.

In the high oil price case, Brent reaches \$190 per barrel by 2050; in the low oil price case, Brent reaches \$51 per barrel.

High and low supply cases

Compared to the reference case, EIA said, the high oil and gas supply case assumes that for U.S. tight oil, tight gas or shale gas, ultimate recovery is 50% higher. "Similarly, this case assumes that undiscovered resources in Alaska and the offshore Lower 48 states are 50% greater than assumed in the Reference case."

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Congratulations ConocoPhillips!

We congratulate ConocoPhillips on the Department of the Interior's Record of Decision on the Willow project, adopting the three core pads detailed in the Bureau of Land Management's preferred Alternative E.

"This was the right decision for Alaska and our nation," said Ryan Lance, ConocoPhillips chairman and CEO. "Willow fits within the Biden Administration's priorities on environmental and social justice, facilitating the energy transition and enhancing our energy security all while creating good union jobs and providing benefits to Alaska Native communities."



Ryan Lance

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EXPLORATION & PRODUCTION

AOGCC permits Paxton 12 at Ninilchik

The Alaska Oil and Gas Conservation Commission has approved a spacing exception for and issued a drilling permit for the Paxton 12 development gas well in the Ninilchik unit.

Hilcorp Alaska, the unit operator, received an approval March 6 from the Alaska Department of Natural Resources' Division of Oil and Gas for an amendment to its Ninilchik unit plan of development for Paxton 12, Pearl 10 and Pearl 11. The division said Hilcorp planned to spud the first well around March 1.

The commission approved the spacing exception and issued the drilling permit for Paxton 12 on March 15.

In approving the spacing exception the commission said Paxton 12 targets unproved Beluga and Tyonek formation reserves in the Pearl undefined gas pool and in the Ninilchik Beluga/Tyonek pool. It said the drilling objectives cannot be reached by conforming to statewide spacing exception regulations "because of the narrow, discontinuous, and lenticular nature of the reservoir sands and their most prospective locations on the subsurface structure."

Hilcorp received permission to expand the Pearl pad from the division in early March, following approval last August to expand the Paxton pad. The pads are at the southern end of the Ninilchik unit on the Kenai Peninsula.

-KRISTEN NELSON



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EXPLORATION & PRODUCTION

US rotary drill rig count up 8 to 754

By KRISTEN NELSON

Petroleum News

he Baker Hughes' U.S. rotary L drilling rig count was up by eight for the week ending March 17 to 754, and up 91 from a count of 663 for the same period a year ago. This is only the second time in the past eight weeks that the count has increased. The high so far this year was 771 on Jan. 20. The high for 2022 was a count of 784 rigs at the beginning of December.

When the count dropped to 244 in mid-August 2020, it was the lowest the domestic rotary rig count had been since the Houston based oilfield services company began issuing weekly U.S. numbers in 1944.

Prior to 2020, the low was 404 rigs in May 2016. The count peaked at 4,530 in 1981.

The count was in the low 790s at the beginning of 2020 prior to the COVID-19 pandemic, where it remained through mid-March, when it began to fall, dropping below what had been the historic low in early May with a count of 374 and continuing to drop through the third week of August 2020 when it gained back 10 rigs.

The March 17 count includes 589 rigs targeting oil, down one from the previous week and up 65 from 524 a year ago, with 162 rigs targeting natural gas, up nine from the previous week and up 25 from 137 a year ago, and three miscellaneous rigs, unchanged from the previous week and up by two from a year ago.

Forty-seven of the rigs reported March 17 were drilling directional wells, 692 were drilling horizontal wells and 15 were drilling vertical wells.

Alaska rig count unchanged

Texas (371) was up by five rigs from the previous week.

New Mexico (106) was up by three rigs

Pennsylvania (24) and West Virginia (16) were each up by two rigs.

Colorado (19) and Oklahoma (62)

see RIG COUNT page 5



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FINANCE & ECONOMY Alaska's carbon future: CCUS potential

State taking steps to support carbon capture, utilization and storage on state lands; Legislature hearing bills to set up program

By STEVE SUTHERLIN

Petroleum News

Federal legislation has added incentives to entities that are considering facilities for carbon capture, utilization and storage, or CCUS. Section 45Q of the Unites States Internal Revenue Code provides a tax credit for CO2 storage.

The state of Alaska is responding, with legislation under development in Juneau to allow the Department of Natural

Resources to implement leasing of state lands for carbon capture and utilization projects.

Carbon capture refers to the taking of flue gas or exhaust gas from processes, powerplants, natural gas processing, coal JOHN BOYLE plants and concen-



trating the carbon as a very pure form of CO2, according to Justin Freeman, Coffman Engineering VP carbon capture, utilization, and storage, and hydrogen.

Another source of CO2 is direct air capture, scrubbing the CO2 out of the atmosphere, Freeman said in a panel discussion March 17 at Meet Alaska 2023 in Anchorage.

The CO2 is then transported and either injected into geological formations that are saline aquifers — meaning that the water is high in salinity and doesn't have a beneficial use — or putting it into oil fields as a mechanism to extract more oil, he said.

The CO2 can also be injected into depleted oil and gas fields - not actually extracting additional minerals, just using the depleted core space to sequester CO2, Freeman said, adding, "The other component of that is that you can use CO2 as a feedstock for other industrial processes."

CO2 is used in synthetic jet fuels and can be combined with hydrogen in concrete to increase the properties of the concrete while also sequestering the CO2 in building products, Freeman sad.

Alaska's carbon potential

continued from page 4 **RIG COUNT**

were each up by a single rig.

Gov. Mike Dunleavy has taken notice

of Alaska's carbon potential and its potential to create new economic opportunity and monetize resources that heretofore have not been monetized, said Alaska Commissioner of Natural Resources John Boyle.

Dunleavy "thought it made sense for us to be involved in this space and be proactive," Boyle said, adding that Dunleavy recognized that there are a number of companies in Alaska that are interested in pursuing carbon capture utilization and storage as a means to help achieve net zero targets.

"As it relates to carbon capture utilization and storage, the state owns, in most of the areas in the state, the most productive or conducive geologic basins for sequestering carbon," Boyle said. "Our Alaska Supreme Court has held that the empty core space under the ground is a mineral resource of the state, that means that if the state enables companies to move forward and sequester carbon underground, 25% of the revenue that the state would derive from that activity actually accrues to our permanent fund, as well as shunting revenues into our general fund."

"In essence, it really creates a lot of exciting opportunities for the state," he said.

State officials have also watched many Alaska Native corporations successfully implement carbon offset projects on their lands, Boyle said.

"We're really looking at alternatives and options that will enable us to manage our forests better that might enable us to increase opportunities for the forest products industry, while at the same time taking advantage of the economic incentives of 45Q credits and otherwise to implement carbon offset projects on our forested lands to realize more value there."

US Carbon activity on the rise

Halliburton is seeing a large increase in activity in North America with interest in carbon sequestration projects from the capture side all the way through to the sequestration side, said Rick Mauro, Halliburton, CCS segment lead for North America land.

"All the majors are currently active in looking at these types of projects, drilling stratigraphic wells to give them information to see whether or not their targets will actually accept the CO2 that they want to inject permanently, and looking at depleted fields," he said. "From California to Ohio we've looked at projects."

Besides the oil and gas companies, specific CCUS companies are looking to develop projects themselves, Mauro said. There is increasing activity in the Eastern Hemisphere, with active projects in Australia and the UK.

There is 40 million tons capacity of carbon capture, storage and utilization projects currently operating in the United States, Freeman told conference attendees.

A major refinery on the West Coast would generate about 4 million tons of emissions — including all the collective emissions of the facility, Freeman said. Therefore, the current CCUS industry would account for about 10 major refineries.

A lot of that capacity today is geared towards taking geologically sourced CO2, transporting it cross country in 5,000 miles of existing CO2 pipelines in the U.S. and injection to get oil out of the ground, he said.

Freeman said Shell has a successful joint venture with Chevron to treat heavy oil, using reformer process CO2 extraction, and injection into saline aquifers.

Natural gas processing has been successful, like ExxonMobil Sheep's Creek in Wyoming, he said.

"As part of the natural gas processing they bring up CO2 with natural gas," Freeman said. "CO2 is injected in oil fields."

A Petro Nova coal plant extraction project — heavily funded by the Department of Energy — didn't work so well, he said.

"Most of the projects to date that have been able to be financeable that have been able to clear the hurdle been tied back to enhanced oil recovery," Freeman said.

"There are now more than 100 million tons of development projects that are in queue that are moving forward — the U.S. is being a leader in in that because of the tax credits — and a lot of projects being done in the Asia pacific area; China is very much onto this," he said. "The Europeans and Northern Lights are doing an offshore injection where they're coordinating across the entire European Union to create the base infrastructure to transport that CO2 by ship to these central facilities and inject in the North Sea."

There are hundreds of projects that are in various stages of development, which are forecast to more than double world

see CCUS POTENTIAL page 7



Ohio (11) was down by three rigs week over week.

Louisiana (57) was down by two rigs and Wyoming (19) was down one rig.

Rig counts in other states were unchanged from the previous week: Alaska (10), California (2), North Dakota (41) and Utah (11).

Baker Hughes shows Alaska with 10 rotary rigs active March 17, unchanged from the previous week and up by two from a year ago, when the state's rig count stood at eight. Nine of the Alaska rigs were onshore, down by one from the previous week, and one rig working offshore, an increase of one.

The rig count in the Permian, the most active basin in the country, was up by seven from the previous week at 350 and up by 34 from 316 a year ago. ●

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ENVIRONMENT & SAFETY



This winter's Arctic sea ice maximum extent was 5.64 million square miles.

Arctic sea ice reaches maximum extent

The Arctic sea ice has probably reached its maximum extent for this winter, the National Snow and Ice Data Center has reported. This year's maximum of 5.64 million square miles, attained on March 6, was the fifth lowest maximum since satellite records began in 1979, NSIDC said. The maximum was 398,000 square miles below the average maximum of 6.04 million square miles observed between 1981 and 2010, and 81,000 square miles larger than the lowest maximum recorded - that lowest maximum of 5.56 million square miles was observed on March 7, 2017. This year's maximum was recorded six days earlier than the average date for the maximums in earlier years.

This winter, for the second year in a row, the ice extent was well below average in the Gulf of St. Lawrence. There were also below average extents in the Bering Sea, the Sea of Okhotsk, the Barents Sea and the Labrador Sea. On the other hand, the

see ICE EXTENT page 8

EXPLORATION & PRODUCTION

Division OKs wells at Beluga River K pad

Two grass roots wells to be drilled, additional infrastructure OK'd; pad expansion approved last year following exploratory well

By KRISTEN NELSON

Petroleum News

he Alaska Department of Natural Resources' Division of Oil and Gas has approved a lease plan of operations amendment for two grass roots wells and associated infrastructure at the Beluga River unit K pad.

In the March 20 decision the division said Hilcorp Alaska, the Beluga River unit operator, requested authorization to drill two grass roots wells on K pad. The wells will produce from a state subsurface lease.

"The project will include installation of associated tie-in infrastructure including gas flowlines, electrical instrumentation, well cellars, and conductors," the division said, with all activities occurring on the existing K pad and tying into existing gas production infrastructure on the pad.

K pad is on the west side of Cook Inlet, some 2 miles west of the mouth of the Beluga River, the division said.

Hilcorp took over as operator at Beluga River in 2016 and holds a 33.33% interest. The majority interest in the field, 66.67%, is held by Chugach Electric Association.

K pad expansion

Hilcorp filed to expand K pad last year by adding some 4.5 acres to the existing pad. Additional infrastructure was also planned.

"This project is necessary to support additional resource development within BRU," Hilcorp told the division when it applied for the pad expansion. It said additional wells would be drilled in 2023, with the expansion necessary to provide "the space necessary to accommodate drilling rig access to development targets while also allowing safe access and uninterrupted facility operations."

That expansion was approved in August. In addition to expanding the pad, it was to be connected to existing highline



power via an overhead powerline.

Infrastructure added included a compressor package and a communications tower.

The current approval includes the two grass roots wells and "installation of associated tie-in infrastructure including gas flowlines, electrical instrumentation, well cellars, and conductors."

Hilcorp had drilled an exploration well, BRU 223-24, from K pad in 2021. That well was completed in late 2021 and Alaska Oil and Gas Conservation Commission records show it came online in December from the Sterling-Beluga gas pool.

Producing since 1968

Regular production began from the Beluga field in 1968 from the Sterling and Beluga formations, peaking in 2004.

When AOGCC issued pool rules for Beluga River in 2022 it said the Sterling-Beluga gas pool "was unexpectedly discovered by Standard Oil Company of California's" Beluga River 1 exploratory well which was drilled to 16,429 feet measured and true vertical depth in a search for oil at a deeper objective near the center of the present-day unit. The commission said the well blew out in April 1962 while circulating at 3,240 feet measured depth after drilling a portion of the upper Sterling. That well was drilled in 1962 and the company announced a significant gas discovery, before completing and shutting in the well.

Four additional wells drilled between 1962 and 1964 delineated the field.

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continued from page 2 **EIA OUTLOOK**

In the low oil and gas supply case the assumption is that "the estimated ultimate recovery per well for tight oil, tight gas, or shale gas in the United States; the undiscovered resources in Alaska and the offshore Lower 48 states; and rates of technological improvement are all 50% lower than assumed in the Reference case."

Natural gas consumption

Domestically, "electrification is displacing combustion fuels in the demand sectors," EIA said. "As electricity generation shifts to using more renewable and battery sources, domestic natural gas consumption for electricity generation is likely to decrease by 2050 relative to 2022, which contrasts with relatively stable growth over the past decade."

The industrial and electric power sectors consume more gas domestically than any other sectors, with consumption in those sectors sensitive to changes in the agency's side cases. In the low oil and gas supply case, by 2050 natural gas consumption diverges by 14% in the low oil and gas supply case compared to the reference case, and by 18% in he high supply case.

"Natural gas consumption remains below the peak in 2022, at nearly 12 trillion cubic feet, through 2050" in most cases, EIA said.

U.S. natural gas production continues to grow if economic, supply and oil price assumptions are favorable, increasing by 15% from 2022 to 2050 in the reference case, with consumption dropping 6% from its 2022 peak, and domestic production outpacing domestic consumption in all cases except the low oil and gas supply case and the low oil price case.

EIA said that in some of the cases, "exports to satisfy growing international demand for natural gas encourage growth in domestic natural gas production," with a significant portion of natural gas production growth due to LNG export demand, and international demand for LNG exports increasing production particularly in areas with better access to terminals.

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LAND & LEASING

DNR extends Narwhal comment period

On March 15 the Alaska Department of Natural Resources' Division of Oil and Gas issued a public notice of an application by Anchorage-based Narwhal LLC to expand the West Harrison Bay Unit, saying that the 30-day public comment period has been extended from March 23 to April 6.

The proposed West Harrison Bay Unit expansion includes all leases currently in the West Harrison Bay Unit, totaling approximately 81,000 acres, and an additional 10 Narwhal leases, totaling 60,114 acres for a combined total of 141,114 acres.

The unit is technically operated by Shell Offshore Inc. but the company has not wanted to operate in Alaska and has unsuccessfully been seeking a partner or buyer to operate the unit.

In its application Narwhal argued that unit expansion promotes earlier exploratory drilling as Narwhal has already applied for the federal permits necessary to drill in the 2023-2024 winter season.

Exploration leading to development and production sooner rather than later benefits Shell, Narwhal and the state of Alaska, Narwhal said.

Narwhal's plan of exploration calls for completing at least two exploration wells to evaluate the Nanushuk formation.

Pending ongoing analysis of geophysical data, one of the exploration wells may be drilled deeper to evaluate the Torok formation.

Preliminary field activities will be conducted this summer to support project permitting, planning, and engineering for the winter drilling program.

See related story in the March 12 issue of Petroleum News, titled "SOA to referee?"

—KAY CASHMAN

continued from page 5 **CCUS POTENTIAL**

capacity of today by the end of the decade, Freeman said.

Four bills in legislative hopper

In Alaska, there is a House bill and a Senate bill related to carbon offset projects on state lands, and there is a House bill and a Senate bill related to carbon capture and utilization projects, Boyle said.

"The bills lay out a broad statutory framework that would give the state flexibility to regulate and encourage carbon capture utilization and storage projects in the state."

One bill authorizes the Alaska Oil and Gas Conservation Commission to make an application with the EPA to enable the state to permit and regulate the development of carbon injection wells.

"Part of the bill creates the framework for leasing state lands for companies interested in doing exploration work as it relates to carbon sequestration, and a lot of those regulations are modeled off of our existing oil and gas leasing framework so there could be competitive bids," he said. "There are requirements for those parties to come in and do a certain amount to work in order to firm up their rights to that lease acreage and ultimately the state could permit that entity to inject carbon under the ground."

For the state, there would be revenues coming in from the leasing side of things and there would also be fees charged to these entities per ton of carbon injected into the reservoirs, he said. A share would be put into a fund that the state would administer for monitoring operators and meeting its own obligations. Once a carbon developer is finished injecting carbon dioxide into the ground there would be a least a minimum 10-year period to monitor it to make sure the plume is stabilized, and that it's not migrating and is contained within the geologic field, Boyle said. There is a process for the developer to apply to the state and at some point the ownership of CO2 under the ground, and the liability for the sequestered CO2 would eventually transfer from the project developer to the state.



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continued from page 1 SPRING FORECAST

forecast period shown, which ends in FY 2032. Non-ANS volumes, Cook Inlet, are also down from the fall forecast through FY 2032.

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the fall forecast.

General Fund (UGF) revenue forecast ANS production is now forecast to average 485,200 barrels per day, down 6,500 before accounting for the transfer from the bpd, 1.3%, from a fall forecast of 491,700 Permanent Fund, has been reduced by \$246 bpd. For FY 2024, ANS is forecast at million for FY 2023 and \$679 million for 496,400 bpd, down 7,200 bpd, 1.4%, from FY 2024. In addition, reductions to the revenue forecast have been made for years "Driven by this lower outlook for oil beyond FY 2024," Revenue Commissioner price and production, the Unrestricted Adam Crum said in a letter to the governor accompanying the spring forecast.

> The forecast said: "projected UGF revenue has been decreased by \$246 million, driven by a \$295 million decrease in expected petroleum revenue" for FY 2023, while projected FY 2024 revenue "has been decreased by \$679 million, driven by a \$657 million decrease in expected petroleum revenue."

> Total revenue for FY 2022 was an estimated \$8.6 billion from all sources, the forecast said, a decrease of \$21.1 billion in total revenue from FY 2021. "FY 2021 represented the highest total revenue in state history, driven by strong investment returns and one-time federal funding," the forecast said. "In FY 2022, increased petroleum revenue and continued large federal inflows were more than offset by losses in investments."

Petroleum revenue

There are four components to petroleum



"Driven by this lower outlook for oil price and production, the Unrestricted General Fund (UGF) revenue forecast before accounting for the transfer from the Permanent Fund, has been reduced by \$246 million for FY 2023 and \$679 million for FY 2024. In addition, reductions to the revenue forecast have been made for years beyond FY 2024," Revenue Commissioner Adam Crum said in a letter to the governor accompanying the spring forecast.

revenue - production tax, royalties, property tax and corporate income tax — with four elements critical in the determination of those records, the forecast said: price, production, lease expenditures and transportation costs.

In forecasting oil prices, future market projections are used for as many years as available and then adjusted going forward to increase with inflation.

Unrestricted petroleum revenue, which was \$3,480.9 million in FY 2022, is forecast at \$3,085 million in FY 2023, \$2,204.3 million in FY 2024, \$2,006.8 million in FY 2025, and below \$2,000 million for the years out to FY 2032.

"The oil production forecast balances projected declines in production of existing fields with incremental production from new fields and new developments," the forecast said, and noted that there are several new fields in the planning and development process which are expected to contribute to production in the forecast period.

ANS production in this forecast period peaks at 549,200 bpd in FY 2028 (Pikka is forecast to come online in 2026).

Allowable oil and gas lease expenditures - reflecting work at existing fields as well as work to bring new fields online ---were estimated at \$4.2 billion statewide in FY 2022, with \$3.9 billion of that on the North Slope. "Allowable lease expenditures are expected to increase for FY 2023 to \$5.4 billion statewide, including \$5.1 billion of spending on the North Slope," and are expected to remain above \$5.5 billion per year for the remainder of the forecast period.

Transportation costs for North Slope oil averaged \$9.77 per barrel in FY 2022, the forecast said, and are expected to average \$9.86 for FY 2023 and \$9.61 for FY 2024. -KRISTEN NELSON

> Contact Kristen Nelson at knelson@petroleumnews.com

continued from page 6

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Greenland Sea saw an above average extent, NSIDC said.

According to a recent article in the Barents Observer, scientists in the Norwegian Meteorological Institute have determined that Arctic air temperatures over the northern Barents Sea have increased by 5C over the past 20 years, making this the fastest warming region on Earth. A senior scientist in the institute said that the region has been warming 2% to 2.5% faster than the average rate of temperature rise across the Arctic, and at five to seven times the rate of the global average.

The scientists attribute the high rate of warming to a major reduction in sea ice cover, especially during the fall and winter. -ALAN BAILEY

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continued from page 1

OIL PRICES

of year.

ANS vaulted \$1.55 March 21 to close at \$73.17, continuing to claw back losses incurred during a banking panic involving Silicon Valley Bank and Credit Suisse that gripped financial markets in the United States and Europe, and roiled risk markets beginning March 10. WTI leapt \$1.69 March 21 to close at \$69.33 and Brent jumped \$1.53 to close at \$75.32.

ANS rose 78 cents March 20 to close at \$71.62, as WTI rose 90 cents to close at \$67.64 and Brent rose 82 cents to close at \$73.79.

ANS experienced a Wednesday to Wednesday lift of \$2.43 from its close of \$71.70 March 15 to \$74.13 March 22.

ANS dropped \$1.39 March 17, while WTI plunged \$1.61 to close at \$66.74 and Brent plunged \$1.73 to close at \$72.97.

Prices rose March 16, with ANS up 52 cents to close at \$72.23, WTI up \$74 cents to close at \$68.35 and Brent up a dollar to \$74.70.

Dollar slides on bank bailout move

At the March 22 Fed press session, Fed Chairman Powell in prepared remarks said the actions the Fed has taken to provide liquidity to the troubled venture capitalrelated banks "demonstrate that depositors' savings and the banking system are safe."

On March 19, the Fed announced an "enhancement in currency swap lines," to relieve stress in global dollar liquidity, Brian Rich said in Pro Perspectives March 20.

"In times of uncertainty, global banks tend to scramble

for U.S. dollars, to meet dollar-denominated liabilities," Rich said. "And just as the Fed did in the Global Financial Crisis, they have to give these banks access to dollars, to avert a collapse in global banking."

"That's what they did yesterday, and they did so quickly by giving global central banks likely unlimited access to dollars," he said.

Rich said the action would likely result in a weaker dollar, and by March 22 the dollar had fallen, supporting the rise in oil prices. Stocks went up, commodities went up and market-determined interest rates went down.

OPEC+ to continue production cuts

The Organization of the Petroleum Exporting Countries and its allied exporting countries will likely hold to previous plans on output cuts of 2 million barrels per day until the end of the year, even after the banking crisis sent crude prices plunging, three delegates told Reuters as per a March 22 report.

Russian Deputy Prime Minister Alexander Novak said March 21 that Moscow will continue with a 500,000 barrel per day production cut it announced in February, lasting until the end of June.

"This is only a unilateral cut of Russia," a delegate said, adding, "No changes for the group until the end of year."

A third delegate said the oil prices rout was related to speculation in the financial market, not market fundamentals.

Pierre Andurand of Andurand Capital agreed. The bank panic oil price swoon not only is speculative, but oil will hit \$140 a barrel by the end of the year, Andurand told the FT Commodities Global Summit in Lausanne, Switzerland.

Eventually, electric vehicles will sap gasoline demand

The Organization of the Petroleum Exporting Countries and its allied exporting countries will likely hold to previous plans on output cuts of 2 million barrels per day until the end of the year, even after the banking crisis sent crude prices plunging, three delegates told Reuters as per a March 22 report.

and cause oil demand growth to slow in the coming years and demand will peak around 2030, Andurand said.

"Even when we peak, oil demand won't fall down so fast," he said. "We will reach peak demand towards 110 million barrels per day and then a slow decline from there." Warren Buffet is bullish on oil as well.

In March Buffett took advantage of six-month lows to acquire another 13 million shares in Occidental for \$800 million, Forbes reported March 21.

With the purchases, Berkshire Hathaway's equity stake in Oxy rises to 23%, worth \$12.5 billion, Forbes said.

Berkshire also holds warrants to buy some 9% of the company for \$5 billion, plus \$10 billion of preferred stock, which pays \$200 million in dividends per quarter.

President Joe Biden — after selling off more than 250 million barrels from the Strategic Petroleum Reserve to lower gasoline prices — should be in the market for oil as well. Biden promised to refill the SPR when prices went below \$70.

That target has been reached, but as of March 17, crude in the SPR remains at 371.6 million barrels, unchanged from the previous week, the EIA reported. \bullet

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Petroleum

Coffman engineer reaches 30-year career milestone

Coffman Engineers Inc. said March 16 that it is pleased to announce a 30-year career milestone for fire protection engineering Principal Robert Bigtas, PE, FSPE. Since 1992, he has been a trailblazer as a fire protection engineer having successfully executed over \$80 million in services in the Pacific.

Pacific Region Managing Principal John Thielst said, "Robert's career is marked by his dedication to this profession, his loyalty to clients, and Coffman. We congratulate him on this significant milestone and look forward to his leadership for many years to come."

Over Bigtas' 30-year career, his depth of technical knowledge, passion, and client relationships has led to trusted partnerships with the local architectural and engineering communities as well as the U.S. Navy, U.S. Army Corps of Engineers and Air Force. Bigtas has worked on more than 80% of all military bases in the Indo-Pacific and completed services on more than 90% of all military facilities in Guam.

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His dedication and experience is celebrated by clients and colleagues across the industry:

"Congratulations Robert on making 30 years! It's been a pleasure working with you these last 20+ years," Kendall Ellingwood III, AIA, LEED AP, Design Partners Inc.

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"I can always rely on him for thorough, up-to-date, and accurate information. Robert, congratulations on a great 30 years. Please keep going. We need you to keep us all at our best," Francis T. Hino, PE, HDR.

"As the Prime, it is 'reassuring' knowing that our clients and government engineers are familiar with Robert professionally and respect his fire protection experience and knowledge. Thanks for teaching engineering to us architects, but most of all, mahalo for being a true

friend," Warren Nakamura, WTN.

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with Petroleum News

continued from page 1 **POOL RULES**

or 3,785 feet true vertical depth subsea and 4,985 feet TVDSS in the Qugruk 3 well, the company said.

The Pikka working interest owners plan to form a separate participating area for Nanushuk oil within the unit, Oil Search said, but "the intent of the pool rules and AIO (area injection order) application will be to align development strategies and minimize waste across the Pikka Unit boundary and any future expansion acreage."

Project development

The final investment decision for the project was made in the third quarter of 2022, followed by pool rules submission in the first quarter of 2023 with drilling operations slated to begin in the second quarter of 2023, facilities installation to begin in 2023 and first oil production targeted for the second quarter of 2026, Oil Search said.

Out of more than 20 known penetrations of the Nanushuk, there is flow test data from six wells and Nanushuk core from four wells. Wells and associated sidetracks important to delineation of the Nanushuk within Pikka are the Qugruk 3, Qugruk 3A, Qugruk 7, Qugruk 301, Qugruk 8, Qugruk 9, Qugruk 9A, Fiord 2, Fiord 3, Pikka B and Pikka C.

Within the Pikka unit, some 15 miles long and 3 miles wide, the company said "Nanushuk fluid samples were collected from nine wellbores and Alpine fluid samples were collected from two wellbores.'

Initial development will be only from the Nanushuk oil pool.

Phased development

Oil Search said the Nanushuk oil pool development will be "completed in discrete phases to apply knowledge gained from previous phases and improve recovery."

Most wells will have lengths of 3,000 to 8,000 feet within the reservoir.

The current development plan for the project includes the Nanushuk Processing Facility or NPF; Nanushuk phase 1 drill site B and future drill sites A and C; the Nanushuk Operations Pad; infield pipelines, import and export pipelines; infield and access roads; and a tie-in pad at ConocoPhillips' Central Processing Facility 2. A new seawater treatment pad will be built at Oliktok Point.

Multiphase fluids will be processed at the NPF and sales oil exported to Kuparuk Transportation common carrier pipeline for delivery to the trans-Alaska pipeline.

"The produced water separated at the NPF will initially be disposed into the Ivishak disposal zone and then after sufficient volume is available, will be delivered to the drill sites and injected into the producing formation," Oil Search said.

part of the full development plan will be "unmanned and require minimal operator presence for daily operations," with data gathering and routing done remotely from the main field control room, the company said.

Drill sites are designed for 40-50 wells on 20-foot centers, with 44 wells planned initially for the Nanushuk B drill site.

Facilities at the NDB drill site will include: gas lift, water injection and gas injection lateral piping and headers; multiphase metering; production heating and chemical injection equipment; and instrumentation, control and communication equipment.

Production from drill sites will be separated into wet oil, gas and water streams at the NPF.

"Gas separated from oil in the separation train is processed and compressed primarily for artificial lift and reinjection," the company said. Produced water separated from the stream will be disposed of or reinjected into the reservoir for pressure maintenance and waterflood, with seawater injection pumps used for injecting seawater into the reservoir for pressure maintenance and waterflood.

OOIP, recovery estimates

Original oil in place, OOIP, is estimated in a range from 2,297 million to 2,814 million barrels "for the development planned from the NDB (Nanushuk drill site B) and additional drill sites," Oil Search said.

"The crude oil viscosity and initial pressure requires adoption of a secondary recovery mechanism to obtain an economic production profile," the company said. "WAG injection will be implemented as the main improved recovery process as it has been widely used on the North Slope with consistent success."

Primary recovery is estimated to recover less than 7% of the OOIP, 161 million to 253 million barrels.

Primary recovery plus waterflood is estimated to recover 23%, 532 million to 718 million barrels.

By adding gas injection — miscible or immiscible - recovery is estimated to total 26-29%, 592 million to 868 million barrels.

"Resource recovery for floods is heavily dependent on injection throughput, waterflood recovery efficiency, and gas injection recovery efficiency," the company said.

Oil Search said development of the Nanushuk oil pool is expected to use horizontal wells, with initial producer to injector spacing of 1,800 feet and adjustment possible based on long-term production from initial wells.

Lateral reach will be as far as 31,000 feet from current drill site locations, the company said, and may reach farther depending on the location of any additional drill sites and available technologies. "Unlike more typical multi-zone or multi-layer fields on the North Slope, the NOP represents a single hydrocarbon accumulation. Production from a single pool minimizes profile modifications and well work will focus on maintenance within existing wellbore an (paraffin/scale removal) that does not require a sundry," Oil Search said in discussing well work operations and necessary AOGCC approvals for those operations. The commission has scheduled a public hearing for April 18 at 10 a.m. at its Anchorage offices. The call-in information is 907-202-7104 conference ID: 665 332 079#. •



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Produced gas will be compressed and dehydrated at the NPF and used as fuel gas and for injection. "Fuel gas may be imported from outside the Pikka Unit to preserve indigenous gas for enhanced oil recovery injection," the company said.

Nanushuk injection wells will be water alternating gas, or WAG, injection wells.

Facilities

Oil Search said the decision to begin development from the Nanushuk B gravel drill site was based on the ability "to target the NOP from that surface location and due to the ability to use infrastructure already established to process and transport oil to Pump Station #1."

The initial drill site and others that are

Contact Kristen Nelson at knelson@petroleumnews.com



continued from page 1 **PIKKA PROJECT**

(Pikka) Processing Facility, or NPF, with the following revised diameters:

-Multi-phase: 24 inch

-Sea Water (water inject): 10 inch

-Gas Lift: 6 inch

• Construct an 80-foot telecommunications tower at ND-B.

• Updated schedule:

—Construct ice roads and pads for gravel and pipeline construction Jan. 6, 2023, to May 31, 2026.

—Construct boat launch road and pad and a portion of the ND-A infield road Jan. 6, 2023, to May 31, 2026.

—Construct pipelines Nov. 1, 2023, to May 31, 2023 —Drilling at ND-B May 15, 2023, until complete as opposed to starting drilling in April

-Construction of ND-A and ND-C in the future

-Operations Oct. 1, 2025, to life of field

—First oil expected in 2026

Latest reserve numbers

Santos' Feb. 14, 2023, Annual Reserves & Resource Statement reported that 165 million barrels of oil equivalent 2P reserves were added in Alaska following the sanction of Pikka Phase 1 in August.

"The final investment decision on the Pikka Phase 1

project in Alaska in 2022," Santos said, "commercialized 165 mmboe of 2C resources to 2P reserves. ...This was more than offset by increases in Alaska contingent resources outside the Pikka Phase 1 area attributable to new well data, including the Mitquq and Stirrup discovery wells, seismic reprocessing and integrated reservoir studies."

This increase was Santos' share of the reserves, which represents 51% versus Repsol's 49% share.

In its share of 2C reserves as of Dec. 31, 2022, Santos lists Alaska as having 438 million barrels of crude oil; again this is Santos' share.

In its explanation of abbreviations used in the Feb. 14 report, Santos said 1P means proved reserves and 2P is proved plus probable reserves.

The company also said "consistent application of Santos' disciplined operating model continued to deliver reserves additions in its offshore assets, especially Alaska."

Accelerate first oil

Santos' final investment decision for Phase 1 of the Pikka oil project is estimated to cost US\$2.6 billion, with Santos and Repsol each to pay approximately \$1.3B each. The final investment decision was part of a Santos press release on Aug. 17.

Pikka Phase 1 is expected to produce 80,000 barrels a day, with output reaching that level shortly after startup.

In a Santos Investor Day briefing in Adelaide on Nov. 8, OSA President Bruce Dingeman said the Alaska team is looking for "opportunities to accelerate" first oil; in other words, to begin oil production earlier than mid-2026, which is the timeline OSA gave the Regulatory Commission of Alaska on Sept. 16.

Dingeman said OSA had just mobilized its first camp, a 185-bed camp, to Pikka and was starting to drill well cellars.

On March 19, 2021, Dingeman said the company was looking at "value engineering and changing our concept to squeeze further costs out of it while maximizing recovery and production benefits. That's resulted in us being able to lower our breakeven costs from \$45 to sub-\$40 (per barrel). This includes a 10% rate of return in that number, so that makes it more resilient" to lower oil prices.

Nanushuk first

The Nanushuk formation forms part of the Brookian sequence, the youngest and shallowest of the major North Slope petroleum bearing rock sequences.

Although rocks of the Brookian are found across the entire North Slope, the Nanushuk is found mainly west of the central North Slope.

Initially Pikka Phase 1 drilling from ND-B will target the Nanushuk reservoir. But the Alpine and Kuparuk



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continued from page 1 **RENEWABLE ENERGY**

would be a sharp increase in the cost of Railbelt electricity coupled with volatile electricity pricing, Rose said. Moreover, with increasing prices for natural gas in Southcentral Alaska, the cost of using gas for heating buildings would also increase.

Rising prices for electricity in the Railbelt would also adversely impact electricity costs in rural Alaska, given that the power cost equalization program that provides state funding assistance for rural energy is in part indexed to the cost of electricity in the Railbelt, Rose said.

Rather than importing LNG, the Railbelt electrical system should move towards the use of renewable energy sources such as wind and solar energy,

continued from page 11 **PIKKA PROJECT**

sands are secondary targets.

Net zero project

In its Aug. 17 press release, Santos said Pikka Phase 1 has "strong fundamentals, is located in a world-class oil producing province with significant existing infrastructure, has low unabated emissions intensity and is supported by key stakeholders, including the State of Alaska, the North Slope Borough, the landowner company Kuukpik Corporation and the Arctic Slope Regional Corporation (ASRC)."

Taking an FID, or final investment decision, on Pikka Phase 1 is "consistent with Santos' goal of achieving netzero (scope 1 and 2, equity share) by 2040," Santos said in the Aug. 17 press

Photo courtesy of N. Hamlin

Rose said. The cost of renewable energy has dropped dramatically in recent years — wind and solar energy are now both cheaper than gas fueled power, even in the Lower 48, where gas prices are significantly lower than in Southcentral Alaska, Rose said. Over the past 10 years the price of solar has dropped 90%, the cost of wind has come down 70% and the cost of batteries, used to regulate the varying renewable energy, has dropped 70%, he said.

And renewable energy has stable and predictable pricing, given that much of the cost emanates from the amortization of construction costs.

A renewable portfolio standard

Rose favors the use of a renewable portfolio standard to drive the buildup of renewable energy deployment. An RPS

release.

Santos said it is "committed to delivering a net-zero project (scope 1 and 2, equity share) and has entered into Memorandums of Understanding with Alaska Native corporations to deliver carbon offset projects, including a "strategic alliance with ASRC Energy Services, a wholly-owned subsidiary of ASRC, on leading technology development for carbon solutions in the Arctic."

"Santos has emission reduction plans to achieve scope 1 and 2 net-zero emissions by 2040 and in-line with that commitment, Pikka will be a net-zero project," Santos Managing Director and Chief Executive Officer Kevin Gallagher said.

—KAY CASHMAN

Contact Kay Cashman at publisher@petroleumnews.com sets targets for the increases in renewable energy use, with penalties for the utilities if those targets are not met. At this point 31 states have renewable portfolio standards, Rose said. Last year Gov. Dunleavy introduced a bill to the state Legislature for creating an RPS, with a target of raising renewable energy use from its current level of 15% of total generation to a level of 80% by 2040. Senate Bill 101, currently in the Legislature, proposes an RPS with a requirement for electricity utilities in the state to have at least 25% renewable power by Dec. 31, 2027; 55% renewable power by Dec. 31, 2035; and 80% renewable power by Dec. 31, 2040.

Rose said that the National Renewable Energy Laboratory has conducted a study into the practicalities of achieving the proposed Alaska RPS goals and has found that the goals are achievable. NREL is still conducting a study into the potential cost of meeting the goals. However, consulting company Analysis North has estimated a capital cost of \$3.2 billion to achieve the 80% renewables target using the NREL model. That capital cost would potentially save around \$6.7 billion in natural gas purchases, Rose said. However, NREL in its model assumed that transmission system upgrades and battery installations needed for the renewables would be required, regardless of whether the power generation moves away from natural gas.

Renewable energy intermittency

A critical issue for the widespread implementation of wind and solar energy is the intermittency of these energy sources — wind power, for example, varies in response to the fluctuating strength of the wind. Electricity utilities must have the means of compensating for these fluctuations, to maintain a stable voltage and frequency in the electrical system. And the possibility of drops in renewable power output raises questions over the risks of power outages.

During the Senate Resources meeting, Tony Izzo, chief executive officer of Matanuska Electric Association, said that his utility would need to retain significant gas fired power generation to ensure electricity supply reliability as the amount of renewable energy increases.

In the House Energy meeting Rose argued that supply reliability can be maintained through the use of industrial scale batteries to balance supply variations. Homer Electric recently installed a major new battery system in its network, while Chugach Electric Association and Golden Valley Electric Association are in the process of obtaining similar systems for their networks. It is also possible that more batteries will be needed within an RPS's 17-year timeframe for achieving 80% renewable use, Rose commented.

The other issue relating to power supply reliability is a plan that the utilities are proposing for upgrading the Railbelt transmission system. The concept is to significantly increase the power carrying capacity of the system and to eliminate single points of failure in the system. As previously reported by Petroleum News, the utilities are applying to the Department of Energy for funding assistance for the upgrades, under the terms of the DOE's Grid Resilience and Innovation Partnership.

Upgrades to the transmission system could enable more sharing of power across the system, thus enabling more smoothing out of power generation variations across the region, Rose said. For example, wind power from the Fairbanks region could help the Anchorage region when there is no wind in Anchorage, and vice versa, he said.

The Railbelt Reliability Council

Another significant factor feeding into the future of Railbelt electricity supplies is the recent RCA certification of the Railbelt Reliability Council as the electric reliability organization for the Railbelt high-voltage electrical system. The RRC is in the process of establishing its organization and of seeking RCA approval for its initial budget and tariff. The RRC will maintain and mandate reliability standards for the Railbelt's high voltage electrical system; administer rules for open access to the transmission grid; and conduct Railbelt-wide system planning.

Clearly the future use of renewable energy will become a key factor in system planning. Moreover, open access to the grid will significantly improve the economics of the implementation of renewable systems by independent power producers, Rose said. Under the current arrangements each utility owning some sector of the grid charges its own fees for transmitting power across its sector, thus resulting in the pancaking of transmission fees for power transmitted over long distances across the system. Open access to the grid would probably involve a single "postage stamp" rate for any use of the transmission system. And while the utilities tend not to have room on their balance sheets for the construction of new power generation facilities, the independent power producers that typically build renewable energy systems can obtain the capital and take the associated financial risks, Rose said. Moreover, the development of renewable energy systems would use local resources and create local jobs, rather than exporting millions of dollars from the economy to pay for imported LNG.



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"The era of really affordable renewables is here," Rose said. ●

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