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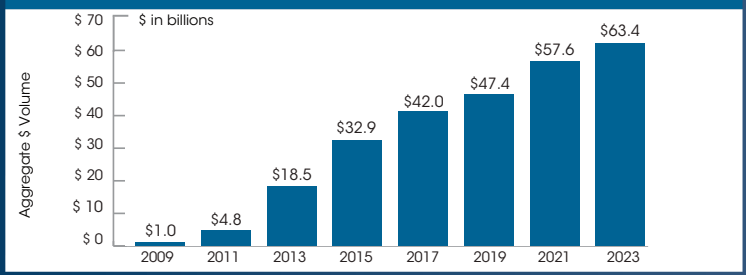

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Photographer Felix Navarro captured this image of Craig Jarchow, president and CEO of TG Natural Resources, at the company's Houston offices.


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Diamondback Scales Up Amid Consolidation Super Cycle

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If Diamondback Energy was wound up watching its peers get swallowed whole by supermajors at the end of last year, the Permian Basin pure-play picked the right time to strike.

Many long months in the making, Pioneer Natural Resources succumbed to Exxon Mobil's charms the same week in October that Hess Corp. accepted Chevron's advances. Two different companies, philosophies and basins, yes, but the message was the same: consolidation is back. Better buy or get bought.

And in mid-February, Diamondback uncoiled and displayed its prize: the prolific, legacy and privately held Permian pure-play Endeavor Resources.

In a $26 billion, mostly stock acquisition of Autry Stephens' wildly successful family business in the heart of the Permian, Diamondback pulled off a feat few dared to dream. Like Stephens, Diamondback's CEO Travis Stice is a Midland, Texas, native dedicated to his hometown. And indeed, that as much as anything else could've been part of the calculus that got this deal done. Stephens has spent decades saying no to would-be suitors before his health made running the company less palatable.

It's a king-making move for Diamondback.

"[Diamondback] sought to convince investors they are assembling a must-own Permian pure-play via the acquisition of Enveavor," said TD Cowen analyst David Deckelbaum. "Count us in the camp of convinced."

Cowen's model now has Diamondback generating big bucks with "a 10% free cash flow yield before leaning into synergies and added value unlocks such as midstream dedications, royalty drop downs and enhances locations."

Stifel analysts saw it, too, when they said the day the deal was announced that it positions Diamondback to one day compete for Pioneer Natural Resources' spot among the upper echelon of independents in the Permian—a group of four that individually exceeds the value of its closest peer group by some $20 billion.

But while widespread E&P M&A is creating a leaner, meaner sector, it's also poised to reshape the services sector. Natural synergies will reduce the rig count and, following suit, the contracts. But what that means for the services space remains to be seen. Our editorial team is in the midst of sorting it out and you'll be reading about it in coming editions of *Oil and Gas Investor*.

For now, Evercore ISI analysts anticipated in January the E&P consolidation trend will continue well into this year and include top-down "blockbuster roll-ups" of pure-plays into the large integrated firms, as well as bottom-up basin consolidation of "sponsor-backed and subscale E&Ps into ever larger entities."

All told, it makes for an E&P sector in North America dominated by fewer, larger and more liquid producers able to grow modestly and return capital to their investors, according to Evercore.

Consolidation within the services space tends to be good for the industry, helping companies maintain both pricing and earnings power. Evercore points to the offshore drilling industry as a key beneficiary: a tight rig supply and no newbuild cycle leaves room for higher use and day rates, said Evercore Senior Managing Director James West.

"In the pressure pumping sector the story is similar, as higher consolidation has resulted in a more disciplined industry, more focused on returns than market share," he said.

It's time for the strongest among the services sector to follow the E&Ps' lead: find fortifying prey and hunt. OGI

Selected US E&P market capitalization

Company	Ticker	Market Cap $/billion
ConocoPhillips	COP	$131
EOG Resources	EOG	$67
Pioneer Natural Resources	PXD	$54
Occidental Petroleum	OXY	$53
Diamondback Energy	FANG	$32
Devon Energy	DVN	$28
Coterra Energy	CTRA	$17
Marathon Oil	MRO	$14
Ovintiv	OVV	$12
Permian Resources	PR	$11
Apache Corp.	APA	$10
Antero Resources	AR	$7

Source: OGI staff on Feb. 16

DEON DAUGHERTY
EDITOR-IN-CHIEF

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CONFERENCE & EXPO
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ENERGY CAPITAL CONFERENCE
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I'd Like to Not Thank the Academy...

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There is a misconception among denizens of the oil patch that the general public is uneducated about their industry, and recent hysterics concerning climate change and the energy transition have turned the masses against them.

Nope, that's not it. Oh, there's pearl-clutching aplenty when climate-related traumatic weather events strike but, for the most part, the public's awareness of greenhouse gases is an abstract concept that flits through the collective consciousness briefly and infrequently, only momentarily distracting the population's focus from what really matters, i.e., Taylor Swift.

Fact is, the public has been well-educated about the industry for quite some time, just not in the way people in oil and gas would like. Hollywood branded oil barons as greedy long ago. Sometimes they were greedy and evil, but greedy/evil/purveyors of environmental doom is a fairly recent development.

The envelopes, please

To celebrate the Oscars this month, let's grab some popcorn, suspend our disbelief and see how unready for its close-up this industry really is.

Killers of the Flower Moon (2023)
Oil perception rating: G (greedy), E (evil) and R (racist).

The film by Martin Scorsese is the sole oil-themed nominee for Best Picture this year (an argument could be made for "Barbie" because of the role of hydrocarbons in the manufacture of plastic dolls, but that is a stretch and, anyway, too far downstream for *Oil and Gas Investor's* audience.)

Martin Scorsese

Robert De Niro

Based on real events, the film depicts how the discovery of oil on Osage Nation land in Oklahoma early in the 20th century made the Osage people rich but drew the envy of whites in the region. A white businessman, William Hale (Robert De Niro), recruits his nephew Ernest Burkhart (Leonardo DiCaprio) in his conspiracy to murder Osage landowners and seize their oil wealth.

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Burkhart marries Mollie Kyle (Lily Gladstone) and proceeds to do Hale's bidding in ensuring the murders of her family members to concentrate the headrights, or share in oil royalties, in her hands. Then he conspires with doctors to poison her. The FBI investigates and ends the Osage "reign of terror," but only after untold people are murdered.

Giant (1956)
Oil perception rating: G, R

In this sprawling classic by George Stevens that spans three decades, a high-spirited young woman named Leslie (Elizabeth Taylor) from the East marries cattle rancher Bick Benedict (Rock Hudson) and relocates to Texas. Ranch hand Jett Rink (James Dean in his third and last film) pines for Leslie and never quite absorbs the "Dude, I'm married" vibe she directs at him repeatedly.

When Bick's older sister Luz dies, she leaves a parcel of the family's massive Reata ranch to Jett, who turns down Bick's offer to buy it back and settles into a modest shack (yes, by shack standards, this one is modest) on the property. Then one day, just like "The Beverly Hillbillies," up through the ground came a-bubblin' crude.

Jett starts drilling and, like a cynical, nasty version of Jed Clampett, is suddenly a millionaire. He keeps drilling, builds an oil empire, and becomes a celebrated philanthropist and political power broker. But despite all that, he is a remarkably static character. Jett never gets over Leslie, never lets go of his resentment of Bick and never moves on from being a brawling, sloppy drunk.

Bick eventually relents and agrees to let Jett

Artist John Cerney created this plywood tribute to "Giant" in Marfa, Texas, where parts of the movie were filmed in 1955. From left to right: Rock Hudson's Bick Benedict character, the Reata mansion, James Dean as Jett Rink and Elizabeth Taylor as Leslie Benedict.

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drill on his land. The decision results in greater wealth for Bick but he's not comfortable with it. Bick gets favorable treatment in this movie because he prefers to be just a simple cowman who happens to live in a mansion on the largest ranch in Texas.

Like "Killers of the Flower Moon," the film also takes place in the 1920s, but in "Giant," the racism is directed at Mexican-Americans. In contrast to Jett, Bick is a dynamic character. He grows from intolerance to love for his Mexican daughter-in-law and mixed-race grandson, even engaging in fisticuffs with a bigoted scoundrel on their behalf.

The big, bad picture

Hollywood is not kind to oilmen. Jett may be wealthy, but even as a philanthropist, he remains a greedy and destructive bigot. Indeed, Jett Rink (J.R.) was the inspiration for Larry Hagman's character on "Dallas." Bick gets gentler treatment because, while he gained financially from oil royalties, he never identifies as an oilman.

These two films take place in the 1920s, so environmentalism doesn't creep into the story. Were "Giant" to be remade today, it's likely that one of Jett's poorly maintained pipelines would burst, allowing oil to seep into the water table and kill all of Bick's cattle.

The theme of the greedy, destructive oil tycoon runs through much of the cinema that touch on the industry. In "There Will Be Blood," based on Upton Sinclair's "Oil!" novel, Daniel Day-Lewis' Daniel Plainview character drinks, steals, murders, cheats, antagonizes, steals, emotionally abuses his adopted son and murders, though not necessarily in that order.

In "Deepwater Horizon," a BP manager (John Malkovich) overrides safety concerns to accelerate production on an offshore rig. The result is an explosion that kills 11 and spills enough crude into the Gulf of Mexico to rank as the worst oil disaster in U.S. history.

"Syriana," starring George Clooney, takes a different path. In this 2005 film, a progressive prince of a fictional Middle East emirate wants to leverage vast reserves of natural gas to propel his country into the 21st century. Naturally, the CIA and a group of Islamic fundamentalist zealots (literally) blow that up. Even when fossil fuels are depicted as a force for good, things end badly.

There are other examples, but you get the picture. Hollywood shows hydrocarbon extraction and the tensions that surround that activity as if that is an end unto itself. But oil's end-products that people use (gasoline, water bottles, Barbie dolls) are unseen.

To mangle a metaphor, we only see the sausage being made in these movies. We're never invited to lunch.

In the movies, the public never sees the full impact—good and bad—of the oil and gas industry. It just sees the bad, sometimes in grotesque form.

But that doesn't mean the public is uneducated about the oil industry. On the contrary, it has been carefully taught. OGJ

Hirs: LNG Plan is a Global Fail

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The Biden administration just paused the approval of new LNG export facilities in the name of reducing the nation's greenhouse gas (GHG) emissions. That is the wrong way to look at emissions. On a global basis, cutting LNG exports will only shift emissions from one country to another. And viewing LNG exports solely through the lens of climate is short-sighted at best, ignoring the other financial and strategic benefits reaped by sending U.S. LNG to our allies around the world.

LNG exports are a win-win-win in terms of U.S. economic gain, security gain and emissions gain.

The U.S. has become the largest producer and exporter of LNG to the global economy in recent years. Fracking opened up the way to develop the nation's massive natural gas reserves. The importance of this cannot be overstated. For more than a dozen years, fracking has provided a net gain to U.S. consumers of more than $100 billion per year, well over $1.5 trillion in total. Natural gas has displaced coal, decreasing the nation's GHG emissions since 1990 even as the nation's economy, measured by real GDP, has more than doubled.

In 2017, the U.S. became a net exporter of natural gas via pipelines and LNG. Most recently, LNG exports climbed to more than 14 Bcf per day, the Btu equivalent of more than 2.3 MMbbl/d. With LNG exports priced at $7.51/mcf, there is a major economic incentive for our allies to buy LNG instead of oil. As a result, the U.S. trade deficit is reduced by tens of billions of dollars each year.

But it is not just the economics and emissions at stake in this permitting "pause." The U.S. has effectively replaced Russia as the critical supplier of gas to Europe. The economic and strategic importance of this is immeasurable. The EU, and NATO, can no longer be held hostage by Russian controlled natural gas deliveries.

The market for LNG is global. The administration fails to appreciate that, as a consequence of its withholding LNG approvals, our allies will turn to other suppliers and other fuel sources. The likely result won't be good, either for the U.S. bottom line or for achieving global climate goals.

Climate activists have cheered the administration's decision by noting that LNG is not carbon neutral. It's not, but it's a far more climate-friendly source of energy than coal. Indeed, the administration should consider easier targets, such as U.S. coal exports.

Even before the Russian invasion, coal

"The administration fails to appreciate that, as a consequence of its withholding LNG approvals, our allies will turn to other suppliers and other fuel sources."

consumption across the EU was up as nuclear power plants were retired. Germany has restarted coal power plants that were first commissioned when East Germany was part of the Soviet bloc. India is already the primary destination for U.S. coal exports and has plans to commission more than 13,000 megawatts (MW) of new coal power plants this year. China, another destination for U.S. coal, added more than 47,000 MW of new coal power plants in 2023. The alternative to coal for India and China is LNG, but neither country will stop expanding their coal power plant fleets if reliable supplies of LNG are not available.

Only by expanding U.S. LNG output can we provide the certainty that customers are required to build new gas power plants.

A second target the administration should consider is "biomass," where current policies are at cross purposes. U.S. and EU policies together reward the deforestation of America and the wholesale destruction of the nation's greatest natural carbon storage resources. Thousands of square miles of old growth forests are reduced to wood pellets and shipped abroad so that policymakers can feel good about burning "green" fuel.

The result? Damage to the environment caused by releasing billions of tons of formerly sequestered carbon into the atmosphere while destroying an already operating carbon reduction system. Where is the net gain?

Until U.S. consumers directly reduce their greenhouse emissions by consuming less oil and gas, the administration's actions amount to nothing more than offshoring the production of these fuel resources—or worse, encouraging nations to burn more coal.

These one-off attacks on U.S. domestic suppliers of oil and gas—and LNG—will continue to be ineffective and counterproductive until the global community joins together in a concerted effort to cut GHG emissions. OGI

Belcher: Biden's LNG 'Pause' Will Have Huge Negative Impacts

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In election years, politicians make decisions that aren't in the best interest of their country, or the world, to satisfy special political constituencies.

Such is the case with President Joe Biden's announcement of a "pause" for new LNG export licenses to non-free trade agreement countries until a study is performed on the purported impacts of LNG exports on climate, the economy and national security. This announcement, made as an election year favor to environmentalists, is already having impacts on LNG projects, the United States' reputation as a reliable source of energy, and the long-term energy security of U.S. allies.

Reaction to the shortsighted announcement has been strong across the board. Predictably, oil and gas executives and trade groups announced their concern and disapproval. Shell CEO Wael Sawan warned it would "erode confidence" in the overall ability of industry to deliver LNG.

Republicans admonished the Biden administration for embarking on another "pause," the same term it previously used to significantly curtail federal oil and gas leasing and permitting, both onshore and offshore. That pause resulted in no federal OCS lease sales being held in 2022, the first year without an offshore lease sale since 1958, and finalization of the weakest-ever federal OCS oil and gas five-year leasing plan.

Some of the most vocal opposition to the pause has come from moderate Democrats. Ten House Democrats penned a letter asking Biden to "refocus" his policy on LNG exports, noting the role natural gas has played in replacing coal and reducing greenhouse gas emissions in the U.S. and in countries like India, which uses coal to produce 73% of its electricity.

Senate Democrats were even more forceful on the issue. Pennsylvania's Democratic Sens. Bob Casey and John Fetterman cited the potential for lost jobs in their state in their call for Biden's decision to be reversed. Sen. Joe Manchin (D-W.Va.) called it a political stunt, stating "If this pause is just another political ploy to pander to keep-it-in-the-ground climate activists at the expense of American workers, businesses and our allies in need, I will do everything in my power to end this pause immediately."

Conversely, environmental groups were so happy with the pause that they postponed a planned February sit-in at the U.S. Department of Energy (DOE) headquarters where they were set to demand an end to new LNG project approvals.

One reason cited by the administration for issuing the pause is the need for a better understanding of the impacts of LNG exports on U.S. natural gas and electricity prices. This, despite numerous studies and analyses indicating the impact to be minimal and finding that the benefits far outweigh those impacts.

> *"The problem with the Biden administration's strategy to tie LNG exports with rising energy prices is that he is now seen as embarking on another anti-U.S. energy policy that his opponents will use to blame him for energy prices that are already high and global instability."*

The problem with the Biden administration's strategy to tie LNG exports with rising energy prices is that he is now seen as embarking on another anti-U.S. energy policy that his opponents will use to blame him for energy prices that are already high and global instability.

While the pause does not impact projects that have already received export licenses, it does threaten at least a dozen project proposals that are in line for review at DOE. Those include several projects being planned in Louisiana by Commonwealth LNG, Energy Transfer and Venture Global.

The reputational damage that the Biden decision has caused is impossible to calculate. The pause was reportedly opposed by foreign policy-minded administration officials who warned that it would undermine the U.S. position globally as U.S allies in Europe and Asia remain dependent on future U.S. supplies to meet long-term energy demand and help achieve climate goals.

Just last year, following the Russian invasion of Ukraine, Biden promised our allies in Europe that the U.S. LNG industry would step up and help replace lost Russian supplies. Now, our allies watch in disbelief after the U.S. goes back on its word to satisfy fringe constituents in an election year. Foreign policy observers are calling it a gift to Putin. Absent a prompt course correction, Biden may live to regret it, both strategically and politically. OGJ

Watson: Implications of the LNG Pause

MONIQUE WATSON
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Monique Watson is a partner in the Washington, D.C., office of Vinson & Elkins, where she advises energy clients on legal and regulatory requirements, particularly in the area of oil and gas pipelines.

The U.S. Energy Information Administration recently issued a report on the impact of LNG exports on the U.S. natural gas market, stating "the United States became the world's largest LNG exporter during the first half of 2022, when U.S. LNG exports averaged nearly 11.2 billion cubic feet per day."

Despite acknowledging the United States' LNG worldwide dominance, in January 2024, the Biden administration announced a "temporary pause on [the U.S. Department of Energy's] pending decisions on exports" of LNG to non-Free Trade Agreements countries until the DOE "can update the underlying analyses for authorizations."

DOE is undertaking a major review of the analysis it undertakes to determine when exports of LNG to non-FTA countries are in the public interest. This analysis will be subject to public comment once it is updated. (Ironically, with drone attacks and global conflicts changing by the day, there is an exception to the LNG pause for unanticipated and immediate national security emergencies.)

The U.S. has 14 FTAs with 20 countries that comprise about 40% of U.S. goods exports. That means there are far more non-FTA countries than FTA countries.

Potential implications

The Natural Gas Act provides the statutory regime that governs the "exportation of natural gas in foreign commerce." NGA section 3 prohibits any person from exporting natural gas to a foreign country without receiving authorization from the Federal Energy Regulatory Commission. FERC is responsible for "approv[ing] or deny[ing] an application for the siting, construction, expansion, or operation of an LNG terminal."

DOE has exclusive jurisdiction over authorizing exports of the LNG commodity by evaluating "whether authorizations for the export of LNG" to non-FTA countries "is consistent with the 'public interest.'" DOE's current LNG analyses "are roughly five years old." Exports to FTA countries are automatically deemed to be in the public interest.

Regulatory uncertainty

The historic consistency and predictability of the LNG application review process at FERC and DOE has facilitated the development of LNG since 2016. The DOE LNG pause, regardless of its alleged temporary duration, creates regulatory uncertainty for pending LNG projects and new LNG applications before FERC and DOE. And our allies worldwide, who depend on U.S. exports as they try to move away from hostile nation energy supplies, are equally uncertain about the goal of this pause.

At FERC, the LNG pause may impact projects in the pre-filing stage and pending LNG applications. Nonetheless, it has been reported that FERC will continue to evaluate and process LNG applications. While this sounds positive, FERC is down to three commissioners and Commissioner Allison Clements has announced that she is not seeking a second term after her term expires on June 30. If Clements leaves before one or more new commissioners is confirmed, FERC will be without a quorum and unable to act on LNG applications. This possibility of delay creates regulatory uncertainty for LNG applicants.

DOE's LNG pause, coupled with its April 2023 policy statement affirming the seven-year deadline for authorization holders to commence exports of LNG to non-FTA countries, demonstrates that LNG applicants are facing great regulatory uncertainty.

National security

The White House stated that "the U.S. remains unwavering in our commitment to supporting our allies around the world" and that the LNG export pause "will not impact" the U.S. from "supplying LNG to our allies in the near-term." Since 2023, roughly half of U.S. LNG exports went to Europe, and many of those countries are non-FTA countries.

Recognizing the importance of LNG domestically and worldwide, the Senate Energy and Natural Resources Committee held a hearing in February to examine DOE's LNG pause. Sen. Joe Manchin (D-W. Va.) stated that the United States' "first priority is ensuring that none of our exports harm U.S. families, businesses or our economy" and the U.S. also has "a responsibility to our allies and trading partners who may have no other choice but to turn to countries that don't share our values if they can't count on American support." He also expressed concern that "politicizing LNG exports is reckless and dangerous, and it could empower and enrich Russia, Qatar and Iran."

Critical questions remain. Will DOE's LNG pause result in limiting LNG exports to those applicants who have already received authority to export LNG to non-FTA countries? If so, will the existing LNG terminals be able to accommodate the increasing gas supply? Will DOE's LNG pause have negative impacts on other domestic end users or any positive impact on climate change? In the short term, DOE's pause creates regulatory and national security uncertainties both at home and abroad. OGI

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TG Natural Resources rides the LNG wave with Rockcliff deal amid shale consolidation boom.

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THE OGI INTERVIEW
Watch the video interview here:

Little-known Castleton Resources made a major statement in 2016 when it acquired the East Texas assets of Anadarko Petroleum for a cool $1 billion.

At the same time, but on the other side of the state, startup Rockcliff Energy II was positioning itself in the Permian Basin before eventually pivoting successfully to East Texas in the cheaper Haynesville Shale.

Together, the pair comprise a chunk of the firm now known as TG Natural Resources—a major Haynesville power player established when parent company Tokyo Gas acquired Castleton and then completed a roller coaster, 18-month courtship of Rockcliff with a $2.7 billion deal.

Despite weak natural gas prices and a sudden, so-called pause on new LNG infrastructure permitting by the Biden administration, the Haynesville is still booming. The ongoing LNG construction surge along the U.S. Gulf Coast is such that even election-year political posturing cannot slow it down.

The shale industry is rapidly consolidating amid healthy, stable crude oil prices from the Permian to the Williston Basin. But most of the natural gas dealmaking is happening in the Haynesville, where the proximity to LNG hubs is prized. Chesapeake Energy is building out its footprint, spending $7.4 billion on Southwestern Energy to create the nation's largest, pure-play gas producer.

"You're just a more valuable company with scale, and there's that staying power and cash flow," TG President and CEO Craig Jarchow, who previously led Castleton, told *Oil and Gas Investor*. "All the good things that come with scale, we realized with this transaction. And so, we're one of the biggest players in the Haynesville now."

What's old is new again in the 16-year-old Haynesville. The rock is hot—literally and metaphorically. The fractures are massive and the laterals are long. Chesapeake is on track to dominate the Haynesville once more, adding to the foundation laid by the late Aubrey McClendon, who led the company when it was among the first to pioneer the region. Japan is a newer player on the block, but the gas-deprived and eager Asian nation is growing a presence with TG and Osaka Gas-owned Sabine Oil & Gas.

The Haynesville region is producing about 13.6 Bcf/d of gas—down just a bit from the record highs of early 2023 despite much lower prices. Compare that to the 10 Bcf/d in 2011 when the Haynesville hit its first peak. After nearly quadrupling its output with the Rockcliff deal, TG now produces well more than 1.3 Bcf/d, trailing only Chesapeake and privately held Aethon Energy, and virtually even with the Jerry Jones-controlled Comstock Resources.

"We're ready to finally get excited about gas," Andrew Dittmar, senior vice president for Enverus Intelligence, told *OGI*. Pure-play gas' $6 billion represented a fraction of a record-breaking $192 billion worth of assets traded in upstream M&A last year. The Chesapeake-SWN deal alone has already surpassed the 2023 total for gas dealmaking.

The industry's bullishness on natural gas pricing remains strong even as values dipped below $2/MMBtu in early 2024. The rebound might take another year or so because new LNG facilities won't come online and increase demand until well into 2025.

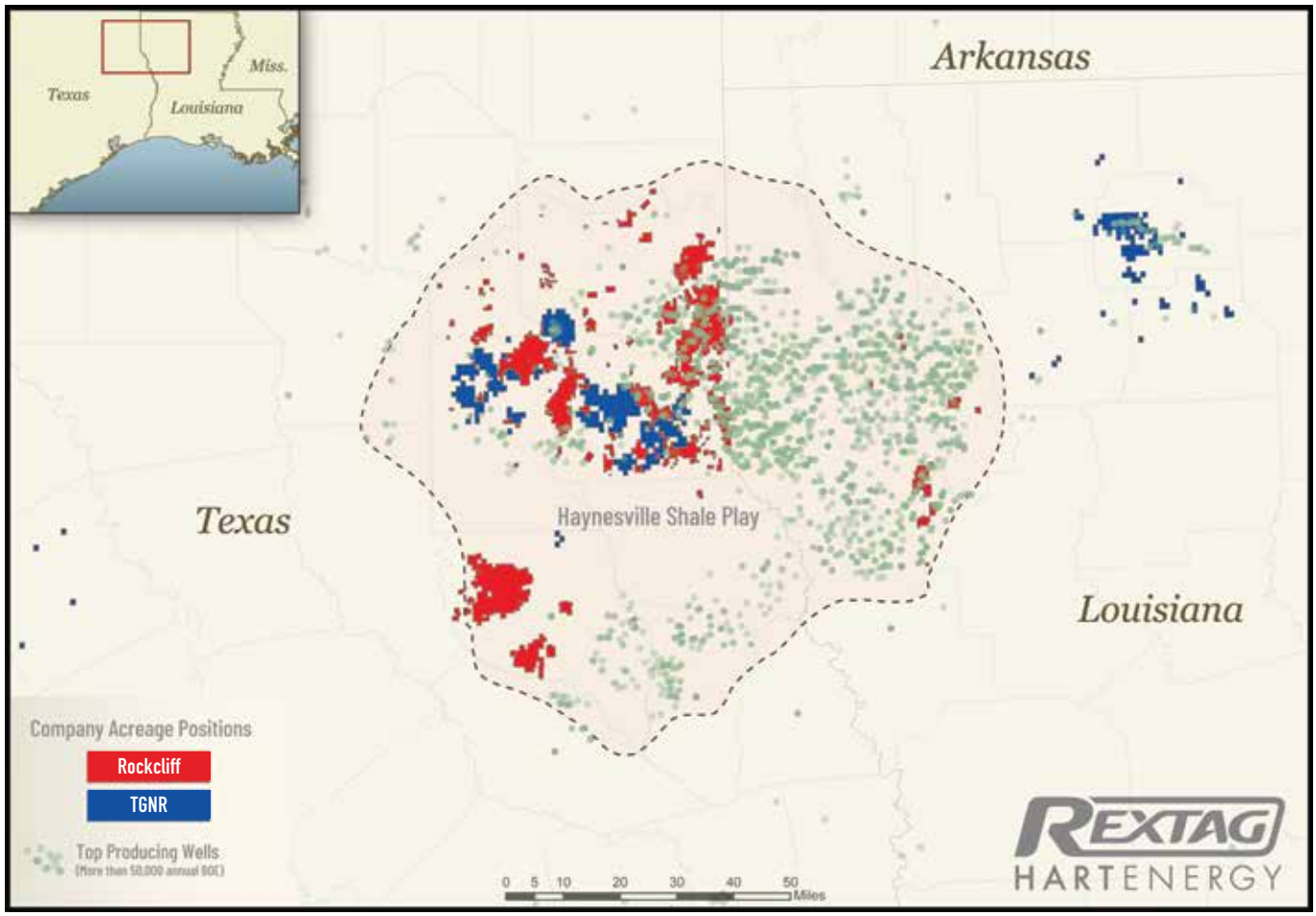
"We have to wait a little bit longer on pricing," Dittmar said. "But there's excitement around the Haynesville from playing that LNG story, and people are looking at deals there. The two kind of obvious ones happened very quickly with TG-Rockcliff and then the SWN-Chesapeake merger."

"You're just a more valuable company with scale, and there's that staying power and cash flow. All the good things that come with scale, we realized with this transaction. And so, we're one of the biggest players in the Haynesville now."

—**Craig Jarchow**, *President and CEO, TG Natural Resources*

Felix Navarro/Hart Energy

TG Natural Resources, Rockcliff positions in the Haynesville Shale



Happily ever after

The TG-Rockcliff tale is an 18-month courtship of international romance, war and a whirlwind reunion.

Or, maybe, it's just a story of two neighboring, natural partners teaming up once it became fiscally responsible and mutually beneficial.

But TG hopes the rest of its story is a happily-ever-after built on production consistency and LNG optionality.

TG can run a few drilling rigs: three on Rockcliff's acreage and one on TG's to scale up or down slightly as needed and without being forced into additional dealmaking or pivots, Jarchow said. Still, additional acquisitions or even entering other gassy basins will remain on the table, he said.

The two companies operated a combined five rigs for most of 2023 and TG can always scale back up, said Alex Gafford, senior energy analyst at East Daley Analytics. The beauty of the deal is the access to pipelines, primarily the Williams Cos. Trace system and its upcoming Louisiana Energy Gateway system, coupled with Tokyo Gas' fleet of 10 LNG carriers and the potential to invest more in U.S. LNG facilities, he said. The larger Appalachia Basin might be cheaper to drill, but that discount is offset by both the lack of takeaway capacity and Gulf Coast proximity.

"The acquisition not only enhances Tokyo Gas' portfolio, but also provides a natural hedge, allowing the company to navigate higher LNG costs during periods of increased U.S. natural gas prices by selling within the U.S. at strategic hubs like the Henry Hub and along the Gulf Coast," Gafford said.

That optionality, consistency and long-term thinking make up the Tokyo Gas mantra, Jarchow said, along with not being overly reactive to pricing swings.

"It'll be pretty steady. We're in it for the long term, and so our underwriting of the Rockcliff assets is where we would put three rigs on that asset, and that's enough to maintain production fairly flat for many, many years out," Jarchow said. "And we think that's the right approach here. We could put more rigs on it and accelerate it, but that just doesn't make sense to us right now."

Rocky roller coaster

That steady approach is what ultimately won Rockcliff for TG.

With Rockcliff approaching its eighth year of operating and private equity backer Quantum Capital Group ready to flip amid higher pricing, the decision was made in early 2022 to sell the pure-play Haynesville assets through a marketed auction process that began near summertime, said Rockcliff co-founder and CEO Alan Smith.

The initial problem was that—amid the earlier stages of the Russia invasion in Ukraine—prices unexpectedly were almost too high, hovering close to $10/MMBtu.

"All the public guys likely weren't going to touch it at that kind of price deck. No one wants to be accused of buying at the top," Smith told *OGI*. "So, I think most people chose to ultimately sit out of the process at that time, primarily just due to market timing, but there were a couple of entities that have a long-term view on gas and have an LNG mindset."

TG stood out by fourth-quarter 2022, Smith said. Having TG as an East Texas neighbor with a decent footprint made

> ***"The genius of the Rockcliff team was recognizing that very good rock actually resides in East Texas and close to the border with Louisiana."***
>
> —**Craig Jarchow,** ***President and CEO, TG Natural Resources***

Felix Navarro/Hart Energy

a lot of sense. "And with Japan short of gas, it just fit well with their global plans."

The next issue was Tokyo Gas' due diligence. By the time that front-end work was being completed, gas prices dropped pretty steeply in early 2023.

"The way that most Asian buyers work is they prefer to do a lot of the work and due diligence on the front end, and that takes quite a bit of time to get that done," Smith said. "By the time that we got to the point where it looked like we could close, natural gas prices were cratering and there became a value disconnect."

It was reported they were near a $4.6 billion sale, but Smith said that number was somewhat misinterpreted and the real price was not quite that high. "What got leaked out there was a top-line number, and did not include any adjustments for the hedges that were massively out of the money."

Instead, timing had inflicted a grievous blow on the potential deal, Jarchow acknowledged. It was admittedly "frustrating" for both sides, although they only blamed the macro environment.

"It was Rockcliff's feeling and our feeling that a year ago was not a good time to actually transact. So, … we mutually agreed to go separate ways and just wait things out and see what happens with the natural gas markets and M&A market and what's going on in the Haynesville," Jarchow said. "We reengaged just a few months ago, and we had the advantage of having done all the work."

When prices began to stabilize in the late summer and into early fall, TG and a few other potential bidders approached Rockcliff again, Smith said, and all of that previous due diligence suddenly became a positive.

"We got so far along the year before that, when TG came back to the table, we were able to negotiate a price that worked for everybody," Smith said. "They just needed to update all their due diligence that they had already done before, which was a pretty distinct advantage because they were so far down the road."

As Jarchow explained it, "Effectively all of that was done a year ago and we just needed to refresh all of that, which did take some time. But, once we agreed on a new price and agreed to move forward, things moved quite rapidly and we were able to get to close by the end of the year."

He and Smith both describe the $2.7 billion deal as a major win-win for all sides.

Rocky starts and stops

But the fuller story starts nearly a decade ago with the first iteration of Rockcliff and its private equity backer, Quantum.

Alan Smith came from Quantum plays to lead the new private producer in early 2015. Soon after, Rockcliff's asset in northern Louisiana was sold to Memorial Resource Development.

Smith's Rockcliff II in 2016 initially took aim at the Delaware Basin, and quickly made one deal by selling a proven tract to Marathon Oil.

"Acreage prices continued to escalate, and we just got blown out after that," Smith said. "So we bowed out of there

and retreated back to the Haynesville."

They targeted two core Haynesville assets in Louisiana being sold by Chesapeake, but Covey Park and Indigo Natural Resources also were eager buyers in 2017.

"We bid on both of them and they beat us, beat us pretty handily. So, then we retreated back to East Texas, and that's where we did all the mapping," Smith said. "We knew the state line was meaningless as to the geology, and we felt like that with the wells on the Texas side, most of them had been under-stimulated and certainly had not seen the longer laterals."

After some other swings and misses, Rockcliff finally took aim at Samson Resources.

"We'd been chasing Samson before it was in bankruptcy, [while it was] in bankruptcy, and then out of bankruptcy, and finally bought the entire East Texas package for $525 million," Smith said. "And then we were set. We had close to 200,000 total acres and off to the races we went."

Meanwhile, Jarchow was watching from the sidelines.

"The genius of the Rockcliff team was recognizing that very good rock actually resides in East Texas and close to the border with Louisiana," Jarchow said. "Then they proceeded to demonstrate that, given the right drilling and completion recipes, which they developed, this rock performs. The economics of this rock in East Texas rival that of the core of the core."

But, after almost eight years, a private equity-backed producer is typically ready to sell.

"It's like preparing a meal," Jarchow said. "You have to get all the parts together and cook 'em a little bit, and serve it when it's still hot, and that's what they did."

> ***"If we go into a new basin, we're going to make sure that we have the people in place so that we know where the skeletons are in the closet."***
>
> —**Craig Jarchow,** ***President and CEO, TG Natural Resources***

Hot and ready to ship overseas

The story of TG begins with Castleton Commodities International eyeing a reinvigorated Haynesville with its Castleton Resources subsidiary.

The $1 billion Anadarko deal in 2016 was the big needle mover.

But, arguably, the bigger but less pricy deal came six months later when Tokyo Gas decided to buy a 30% stake in Castleton Resources for a foothold in U.S. gas and LNG.

It was "highly unusual" for Tokyo Gas to buy in as an equity owner and not just take a working interest deal, Jarchow said.

"Most investors in upstream, particularly from Asia, preferred working interest deals. They didn't want you hedging on their behalf," Jarchow said. "And we convinced Tokyo Gas that, in the case of a working interest deal, among partners, you can have a winner and a loser. And, up to that point, seven years ago, just about every deal where the minority player took a working interest, particularly from Asia, that partner lost. Actually, it was 100%. And we said to Tokyo Gas, 'Well, why don't you come into the equity? Either we both win or we both lose. At least we're aligned.'"

And they agreed.

"Of course, when we first started out, like any good investor, they kept a very close eye on us. And the amount of diligence they did for that 30% investment was tremendous," Jarchow said with a laugh. "It was borderline extreme, but good for them."

From there, the deals kept coming.

In 2019, Castleton bought Shell's Haynesville assets from legacy BG for $150 million, and Tokyo Gas upped its stake to 46%.

In 2020, Castleton acquired Range Resource's Terryville acreage in North Louisiana for $245 million, and Tokyo Gas hiked its ownership to a majority 70%.

In 2021, the name change to TG Natural Resources became official and Tokyo Gas eventually took an ownership stake of just more than 90%.

A clear pattern was emerging with Tokyo Gas. And then the Rockcliff deal was by far the largest move for the Japanese utility giant.

"They've seen how the assets perform, they've seen how we perform, they're on our board. And with time, I think the familiarity and the trust has evolved. So, if you came into our office today, you would see that we operate like most every other upstream company," Jarchow said of Tokyo Gas. "They look to us to assess assets and operate the assets. But would they do that with a new team? I don't think so. It's a relationship that's been seven years in the making."

For his part, Jarchow is a Santa Barbara, Calif., native who fell in love with geophysics and plate tectonics as a teenager entering college.

He earned his doctorate from Stanford University and started with Amoco working the Gulf of Mexico. Then he moved on to Apache Corp.

But, after gaining expertise in operations and acquiring an MBA from MIT, he decided he needed financial mastery, as well, to advance into a CEO role. He joined First Reserve under William Macaulay just before the shale boom took off. Then he moved to a managing director and partner role at Pine Brook Partners under Howard Newman, continuing to learn from some of the PE energy pioneers.

That experience ultimately led him to the leadership role at Castleton in 2015.

LNG boom and pause

Now that TG and Rockcliff are wed, the true link moving forward for TG and the Haynesville overall is with LNG markets.

Spurred in part with much of the world's interest in avoiding any reliance on Russian gas, optimism was rising with the U.S. shipping nearly 14 Bcf/d in LNG around the world and the federal government having permitted enough projects to triple existing U.S. volumes.

Not all of what's been permitted will come online, but U.S. LNG capacity is expected to nearly double within the next few years from what's already approved.

Still, the industry is deeply concerned by the Biden administration's new decision to put a hold on additional LNG project permitting while the Department of Energy determines how to incorporate climate change threats and a risk of overbuilding into the approval equation.

"I think many of these LNG plants have already started, so the momentum is there. They will be completed. The economics still make sense, probably will continue to make sense," Jarchow said, arguing that any impacts are minimal—for now.

"But, one thing that this order will do is it will chill investment in future LNG facilities further out in the U.S. I would imagine that the Europeans are wondering about what this means for gas supply," he added. "If it happened once as an investor, you have to think, 'Well, it can happen again. And

do I want to invest a lot of money in an LNG facility? It costs a lot of money to get a plan to the permitting stage. Am I going to make that bet and incur the risk of, well, is this going to happen again?'"

Luciano Di Fiori, a partner at McKinsey & Company, said global gas markets are largely in balance for now, but oversupplies are expected in the coming years as the U.S. and Qatar bring on new LNG capacity. It might take almost a decade, but demand will eventually catch up and surpass supplies again if new infrastructure projects do not move forward.

"The ban today is fine because we don't expect to see a lot more projects coming online or going through FID in the next few years," Di Fiori told *OGI*. "But we would need some of those projects to get final investment decision in, say, five to six years so they can be ready when the market becomes shorter."

What's next?

For Quantum and Smith, they're already plotting out Rockcliff Energy III and whether to buy back into the Haynesville or look elsewhere in Texas or what touches Texas.

Tellurian just put its Haynesville assets in Louisiana up for sale, and new buying opportunities for Rockcliff, TG and others will arise.

But, for now, TG is focusing on integration and synergies. And that means removing a lot of equipment from the field for both cost savings and emissions reductions.

"We're very big on centralizing our facilities," Jarchow said. Instead of every well site having a separator, a compressor and tanks, TG connects them to flow to centralized facilities.

"It's a very big deal because it simplifies the well site. So, on our typical well site, all you have is the wellhead. Then, you have maybe a tank for injecting chemicals downhole to prevent corrosion, and you have the meters. But no other tanks, no separators, no compressors, and that simplifies things. And it allows us to have many more wells per lease operator than most of the companies because our well sites are just simpler."

For instance, TG eliminated 432 tanks just from Range's Terryville assets, he said. That equates to big environmental gains because it's eliminating potentially leaky equipment, including the pneumatic pumps and valves and thief hatches.

But TG certainly could look to scale up in the Haynesville or even evaluate other basins, Jarchow said. There's just not any rush or pressure. If Tokyo Gas wanted to grow without assuming much more risk, TG could always take on another investor or weigh an IPO.

TG is not interested in Appalachia because of its constraints and the TG team's lack of experience there, Jarchow said. But the firm might consider the Eagle Ford Shale, Midcontinent or even gassier portions of the Permian.

Any asset acquisition would have to be at least 60% dry gas for parent Tokyo Gas, he said. TG's current asset base is about 80% dry gas.

"If we go into a new basin, we're going to make sure that we have the people in place so that we know where the skeletons are in the closet," Jarchow said. "We have people very experienced in the Eagle Ford. We have people very experienced in the Permian, and very experienced in the Midcontinent. I think we know where the skeletons are in the closet." OGI

Industry reaction to President Joe Biden's LNG project freeze

"It's unfortunate, it's clearly more politically driven than fundamental, but I think we feel pretty good. It just makes us feel a little bit better about what we're doing on the LNG side, because of what we do have permitted. I think it's quite short-sighted in the short term. Hopefully, it will be fixed in the long term."

—**Ryan Lance**, *CEO, ConocoPhillips*

"We maintain that unnecessary future uncertainty undermines future allied energy, economic and, therefore, national security."

—**Max Pyziur**, *director - research programs (downstream, transportation fuels, natural gas & electricity), Energy Policy Research Foundation*

"The market has historically been over the last two years, especially with the war in Ukraine, structurally in balance. We have more demand on supply and that has created a little bit of attention on the energy markets globally, as well as some implications for pricing here in the U.S.

That being said, there's a lot of projects that are being built over the next three to four years that are going to come online and supply into the market and we believe there's more supply coming into the market. That demand will shift that market from being short to being long over supply for somewhere in the other five to 10 years. Then in 10 years, what happens is, demand continues to grow and we're going to go back to being short-supply.

We don't expect to see a lot more projects coming online or going through FID (final investment decision) in the next few years. But we would need some of those projects to get to a final investment decision in five to six years so they can be ready when the market becomes shorter."

—**Luciano de Fiori**, *partner, McKinsey and Co.*

► **LNG** PERMITS

The Pause That Depresses

Industry leaders worry that the DOE's suspension of approvals for LNG projects will persuade global customers to seek other suppliers, which would wreak havoc on energy security.

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President Joe Biden's pause on new LNG export certifications is not the victory against carbon emissions environmentalists think it is, said Nick Dell'Osso, president and CEO of Chesapeake Energy.

"When we think about putting a restriction on permitting on LNG exports in the United States, that doesn't mean that gas or other hydrocarbons won't show up to fill the energy needs that would otherwise come from the U.S., where we have good environmental controls," Dell'Osso said at NAPE's Energy Business Conference in February.

"Those energy needs will be met. Human beings will find access to energy as and where they can afford it."

A great deal of commentary on Biden's decision filled the corridors of NAPE in Houston. Two congressional hearings were held on the subject and many energy executives had a chance to criticize the decision at the conference, two weeks after the decision was formally announced.

White House moves on LNG

Biden formally paused approvals for new LNG export projects in late January, in a move that put the brakes on billions of dollars in development for energy companies.

The major move is a key win for environmentalists—and a huge source of frustration for natural gas players—as Biden agreed to have the Department of Energy factor impacts on climate change into LNG permitting. The decision plays into election year politics, with ripple effects lasting beyond 2024.

"During this period, we will take a hard look at the impacts of LNG exports on energy costs, America's energy security and our environment," Biden said in a statement. "This pause on new LNG approvals sees the climate crisis for what it is: the existential threat of our time."

The order calls for an assessment of LNG export deals with countries that do not have a free trade agreement with the U.S., as countries with an agreement are already approved by current law. However, the order effectively impacts all LNG export projects that have not yet received approval. LNG is a worldwide commodity frequently sold to countries without free trade agreements with the

Shutterstock

"The White House has gone out of its way to signal that the pause is a political ploy intended to get votes in an election year—it's all about politics, not economics."

—Sen. Joe Manchin, *D-W.Va.*

U.S., and LNG supplier-to-customer contracts are generally written at 20-year lengths.

DOE public interest analysis

It's not outrageous that the DOE is updating its guidelines, said Tom Sharp, director of permitting intelligence for Arbo, a firm that specializes in regulatory issues for energy infrastructure.

"Given how much has changed since the last time DOE took a hard look at their public interest analysis, it is not surprising they are revisiting it again," Sharp said. "Climate change during an election year certainly plays a role," but there are also considerations about national security, the impact on the domestic market and the role of gas in replacing coal.

The decision for a pause, however, was criticized as short-sighted by many in the industry.

"If we want to study, make additional studies, great, but let's not make decisions until those studies have come out," said Brigham McCown, senior fellow at the Hudson Institute, at a House subcommittee hearing on the decision.

The DOE's plan specifically calls for an initiation process to update assessments to decide if new LNG export authorization requests to non-Free Trade Agreement countries fit within the scope of the "public interest."

"[The] DOE must use the most complete, updated and robust analysis possible on market, economic, national security, environmental considerations, including current authorized exports compared to domestic supply, energy security, greenhouse gas emissions including carbon dioxide and methane, and other factors," the department said.

"Today's action will begin an update of this analysis, and until

CONTINUED ON PAGE 24

"The announcement from the Biden administration has sent shock waves across both sides of the capitol and both sides of the aisle. You see both Republicans and Democrats in a welcomed moment of bipartisanship urgently calling for Biden administration to undo this decision, a decision that will undoubtedly have a short, medium and long-term impact on our allies and our climate. Let's call this what it is. The Biden administration's decision was pure politics. The moratorium was made under the guise of updated research and a claim that we needed updated studies on the environmental and economic impact of U.S. LNG, but we all know what it really is and that's an election year stall designed to garner votes. The Biden administration is touting the moratorium as a win for climate. In reality, it is significantly a blow backwards towards climate."

—Toby Rice, *CEO, EQT Corp.*

"When you think about the pause in permitting that the Biden administration has announced—the things that we should be focused on from an energy policy standpoint, I have said it and continue to say it, are affordability, reliability and lower carbon. Those are the key features, and natural gas is the best answer.

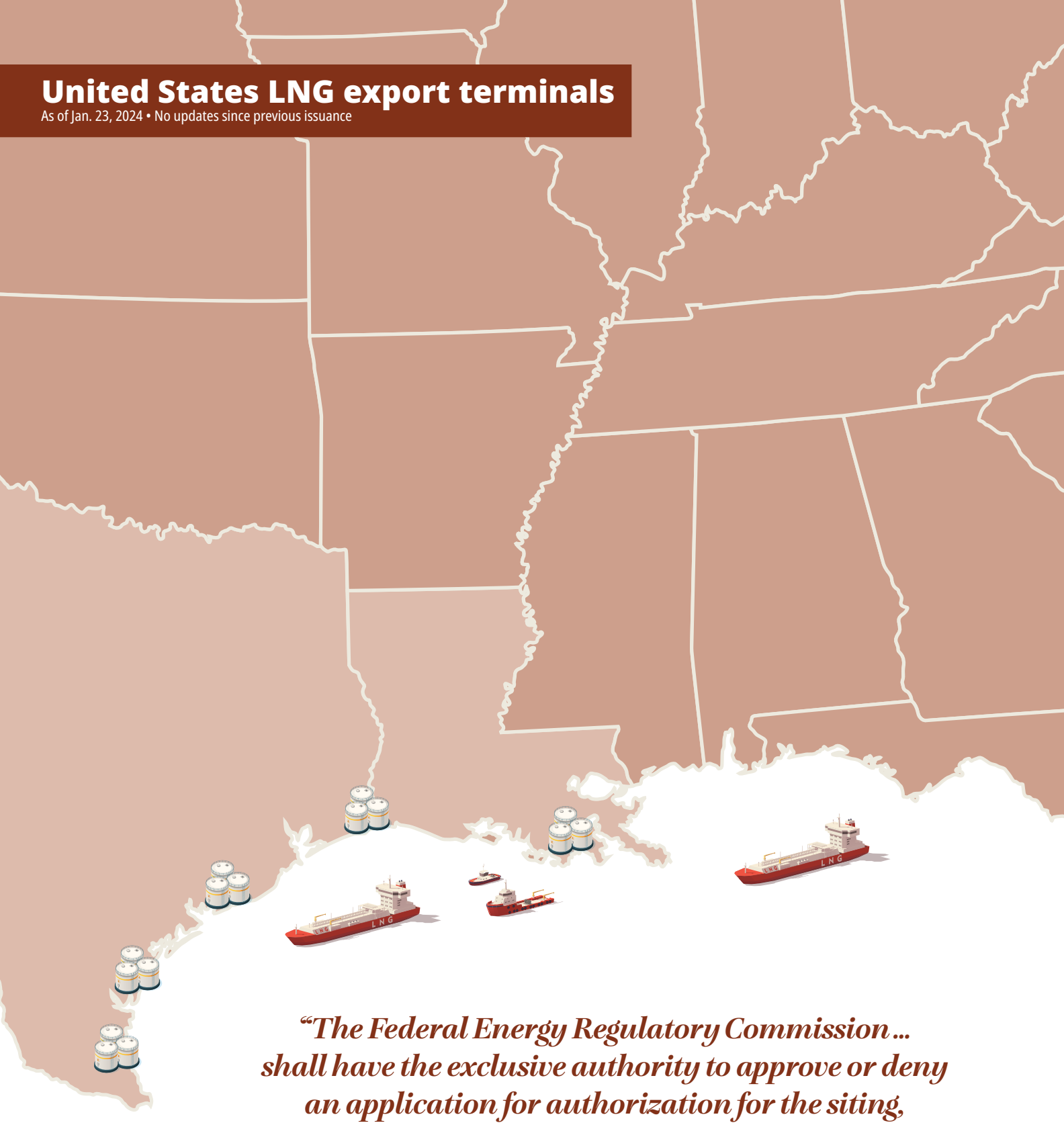
And so, when we talk about policy moves that restrict the flow of natural gas, restrict the ability to deliver natural gas to markets where we are short energy, where energy is not affordable and where there are alternative forms of energy being utilized that are much higher in carbon, you're just running counter to all of the logical things that energy policy should be focused on.

I think it's an unfortunate pause, but I also think that natural gas is the best answer to energy policy questions, and I'm confident that it will continue to rise as the most obvious solution."

—Nick Dell'Osso, *president and CEO, Chesapeake Energy*

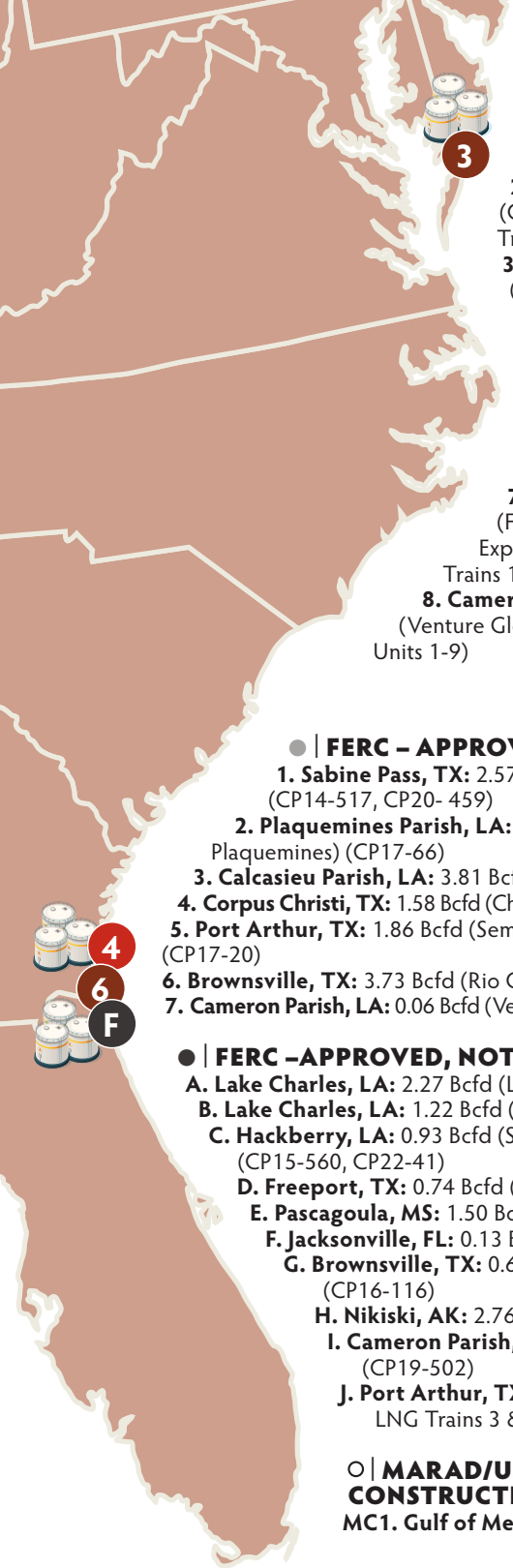
United States LNG export terminals

As of Jan. 23, 2024 • No updates since previous issuance



"The Federal Energy Regulatory Commission ... shall have the exclusive authority to approve or deny an application for authorization for the siting, construction, expansion, or operation of a facility to export natural gas from the United States to a foreign country or import natural gas from a foreign country, including an LNG terminal."

—Unlocking our Domestic LNG Potential Act of 2024, passed by the U.S. House of Representatives, which would limit the president's authority



● | FERC – EXISTING

1. Kenai, AK: 0.2 Bcfd (Trans-Foreland)
2. Sabine, LA: 4.55 Bcfd (Cheniere/Sabine Pass LNG – Trains 1-6)
3. Cove Point, MD: 0.79 Bcfd (Dominion–Cove Point LNG)
4. Corpus Christi, TX: 2.40 Bcfd (Cheniere – Corpus Christi LNG Trains 1-3)
5. Hackberry, LA: 2.06 Bcfd (Sempra–Cameron LNG, Trains 1-3)
6. Elba Island, GA: 0.35 Bcd (Southern LNG Company Units 1-10)
7. Freeport, TX: 2.38 Bcfd (Freeport LNG Dev/Freeport LNG Expansion/FLNG Liquefaction Trains 1-3)
8. Cameron Parish, LA: 1.70 Bcfd (Venture Global Calcasieu Pass Units 1-9)

● | FERC – APPROVED, UNDER CONSTRUCTION

1. Sabine Pass, TX: 2.57 Bcfd (ExxonMobil – Golden Pass) (CP14-517, CP20- 459)
2. Plaquemines Parish, LA: 3.32 Bcfd (Venture Global Plaquemines) (CP17-66)
3. Calcasieu Parish, LA: 3.81 Bcfd (Driftwood LNG) (CP17-117)
4. Corpus Christi, TX: 1.58 Bcfd (Cheniere Corpus Christi Stage III) (CP18-512)
5. Port Arthur, TX: 1.86 Bcfd (Sempra - Port Arthur LNG Trains 1 & 2) (CP17-20)
6. Brownsville, TX: 3.73 Bcfd (Rio Grande LNG – NextDecade) (CP16-454)
7. Cameron Parish, LA: 0.06 Bcfd (Venture Global Calcasieu Pass) (CP15-550)

● | FERC –APPROVED, NOT UNDER CONSTRUCTION

A. Lake Charles, LA: 2.27 Bcfd (Lake Charles LNG) (CP14-120)
B. Lake Charles, LA: 1.22 Bcfd (Magnolia LNG) (CP14-347)
C. Hackberry, LA: 0.93 Bcfd (Sempra -Cameron LNG Train 4) (CP15-560, CP22-41)
D. Freeport, TX: 0.74 Bcfd (Freeport LNG Dev Train 4) (CP17-470)
E. Pascagoula, MS: 1.50 Bcfd (Gulf LNG Liquefaction) (CP15-521)
F. Jacksonville, FL: 0.13 Bcf/d (Eagle LNG Partners) (CP17-41)
G. Brownsville, TX: 0.62 Bcfd(Texas LNG Brownsville) (CP16-116)
H. Nikiski, AK: 2.76 Bcfd (Alaska Gasline) (CP17-178)
I. Cameron Parish, LA: 1.21 Bcfd (Commonwealth LNG) (CP19-502)
J. Port Arthur, TX: 1.86 Bcfd(Sempra -Port Arthur LNG Trains 3 & 4) (CP20-55)

○ | MARAD/USCG–APPROVED, NOT UNDER CONSTRUCTION

MC1. Gulf of Mexico: 1.8 Bcfd(Delfin LNG)

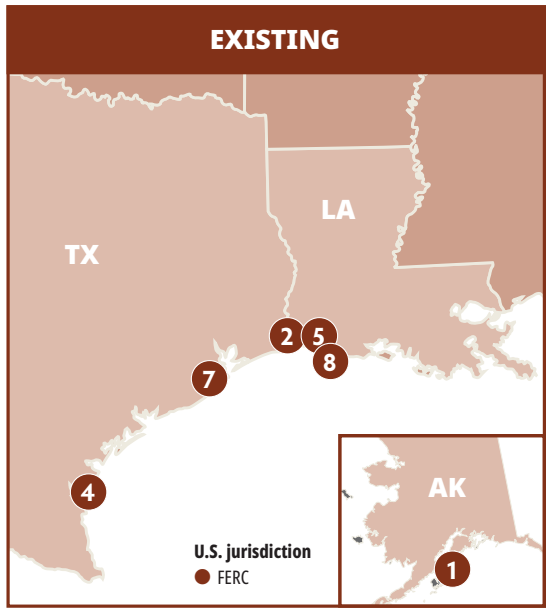
FERC – PROPOSED

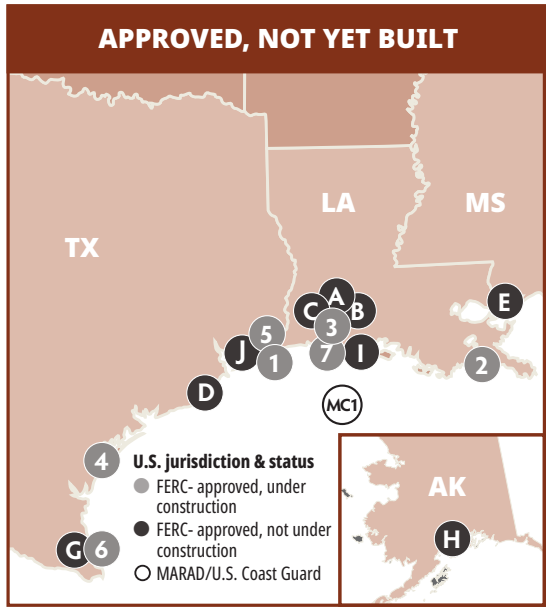
● | Pending applications:
1. Cameron Parish, LA: 3.96 Bcfd (Venture Global CP2 Blocks 1-9) (CP22-21)
2. Plaquemines Parish, LA: 0.45 Bcfd (Venture Global Plaquemines) (CP22-92)
3. Corpus Christi, TX: 0.45 Bcfd (CheniereCorpus Christi MidscaleTrains 8-9) (CP23-129)
4. Elba Island, GA: 0.06 Bcd (Elba Liquefaction Optimization Project) (CP23-375)

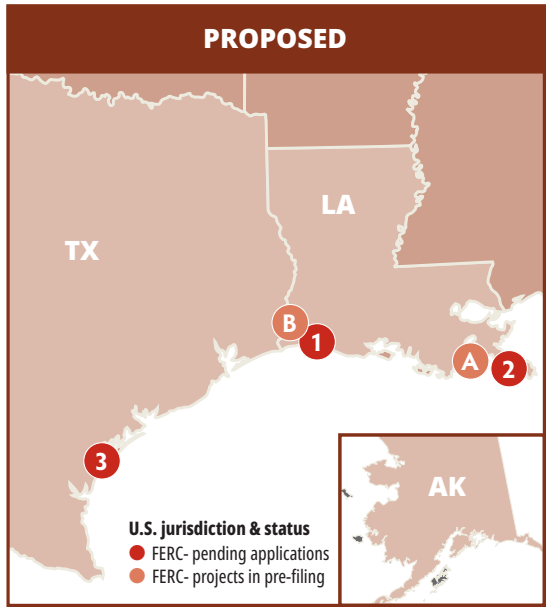
● | Projects in pre-filing:
A. Plaquemines Parish, LA: 2.76 Bcfd (Delta LNG -Venture Global) (PF19-4)
B. Sabine, LA: 0.9 Bcfd (Cheniere/Sabine Pass –Stage 5 Expansion) (PF23-2)

Source: Federal Energy Regulatory Commission

U.S. LNG export terminals







"The LNG pause [is] just another reminder that public policy matters. And, of course, we live in a world that's not just the U.S. The energy need is a given. So, if you pause LNG in the U.S., well, that energy is going to come from somewhere, and perhaps it'll come from Qatar instead of the U.S. or perhaps it'll come from other places that aren't so concerned about methane emissions. But it's going to come from somewhere because the demand is there.

If you look at the actual impact of that policy decision on LNG exports, it's relatively small and further out. If you look at the plants that are already online, those that are already approved and permitted, this order applies to those plants that are planned but not yet approved. And that's essentially the third tier of LNG plants. And those plants really weren't going to go live until 2027, 2028.

Now, one thing that this order will do is it will chill investment in future LNG facilities further out in the U.S. I would imagine that the Europeans are wondering about what this means for gas supply. So, there are investment and policy implications for this order but, near term, since a lot of these facilities have already been permitted, not a big effect.

If you're an investor and you're looking to invest in an LNG plant, and let's say that this order is only in effect for a year because of the election. If it happened once as an investor, you have to think, 'Well, it can happen again. And do I want to invest a lot of money in an LNG facility? It costs a lot of money to get a plan to the permitting stage. Am I going to make that bet and incur the risk of, well, is this going to happen again?' So, essentially, investors are going to want to get paid for taking that risk. That makes everything more expensive.

I think many of these plants have already started, so the momentum is there. They will be completed. The economics still make sense, probably will continue to make sense. And if you look at just the Gulf Coast—I'm not counting other places like Mexico or the East Coast, just the Gulf Coast [and] what's already been built and permitted—that's over 20 Bcf/d-plus. And we're up to about, on a good day, 14 Bcf/d of demand from those facilities. So, it is significant and it's a real positive because we have a lot of gas in the U.S. There's plenty to go around and, we, as an industry, have demonstrated that we can produce this gas at low cost and that benefits everybody. Eventually."

—Craig Jarchow, ***president and CEO, TG Natural Resources***

"When we think about putting a restriction on permitting on LNG export in the United States, that doesn't mean that gas or other hydrocarbons won't show up to fill the energy needs that would otherwise come from the U.S., where we have good environmental controls."

—Nick Dell'Osso, ***president and CEO, Chesapeake Energy***

updated, DOE will pause determinations on pending applications for export of LNG to non-Free Trade Agreement countries," the DOE said.

The U.S. has comprehensive free trade agreements with 20 countries, with the larger ones being Australia, Canada, Korea, Mexico and Singapore.

Missing from that list is Europe, which relied heavily on Russian energy imports, and which has been the main recipient of U.S. LNG imports in recent years. Over 60% of U.S. LNG exports went to Europe in 2023, according to the DOE. Also largely absent from the list under the Asia umbrella are China, India and other key Asian markets interested in importing LNG.

Jennifer Granholm

Appearing on CNBC, Energy Secretary Jennifer Granholm said the analysis would be done via U.S. National Laboratories and also would consider foreign policy and the energy security of allies.

Since making the decision, Granholm and other supporters have emphasized the order is a "temporary pause," followed by a comment period. Analysts predicted the pause would last at least until the November elections.

Sharp noted that the DOE has a difficult time ahead of it if the agency plans to conduct climate change impact assessments on individual plants.

"The impacts to climate change are global in nature," Sharp said. "The question is, where do you draw the line? At what point are the climate change impacts from a single proposed project significant enough to warrant not approving it? This is an exceedingly difficult question for the government to answer, given that arguably all additive emissions that contribute to climate change are significant."

Mixed internal opinions

Sen. Joe Manchin, (D-W.Va.), who's flirting with leaving the Democratic Party for a third-party presidential bid, held a hearing for the Senate Committee on Energy and Natural Resources to examine the decision.

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"If the Biden administration is trying to ban LNG exports, they're not doing a very good job, and that is because this is not a ban or a de facto ban either."

—Rep. Paul Tonko, *D-N.Y.*

"The White House has gone out of its way to signal that the pause is a political ploy intended to get votes in an election year—it's all about politics, not economics," Manchin said during the hearing. "Between the two statements issued by the White House announcing the pause, climate and environmental issues are mentioned more than 35 times. All combined, consumer costs,

"We're still pretty bullish on the overall gas macro. And what the Biden administration has done here is delaying permits on unpermitted LNG projects or those in the process of being permitted. It's hard to understand how they're going to accomplish their objectives of understanding the global impact when there is uncertainty around where all those cargoes will be delivered and, then, where they are delivered. It's going to be really hard to understand the overall climate impacts in those other countries.

It seems very much like a black box at the moment, and it'll be really interesting to see what happens in the election later this year. If we were to get an administration change, that could be solved pretty quickly. If we don't, then it's a fair point that there is some risk to some of the back half of the decade demand projections being impacted. But I think we're bullish enough that it certainly appears like a pretty good time to be thinking about gas and, in the near term, you've actually had a little bit of a pullback here, so that's not necessarily a terrible thing if you're on the buy side."

—Alan Smith, *co-founder, president and CEO, Rockcliff Energy*

"After Russia invaded Ukraine, the Biden administration made a pledge to the EU: 'The United States commits to maintaining an enabling regulatory environment with procedures to review and expeditiously act upon applications to permit any additional export LNG capacities...' (Biden's) announcement does not keep faith with that pledge. The administration effectively paused U.S. LNG export decisions in mid-2022, and in July 2023, just six months ago, concluded that it had a robust 'multi-factor public interest analysis.' There is substantial European interest in additional U.S. LNG contracts as evidenced by the numerous deals inked in recent months. That interest won't dissipate during a formal 'pause' in U.S. government decision-making to conduct more studies."

—Fred H. Hutchison, *president and CEO, LNG Allies*

Over the past few years, the U.S. has leveraged its natural gas production to counterbalance Russia's influence, particularly in the European Union. However, today's announcement marks a setback to the significant work of the U.S. oil and gas industry, driven by what appears to be a misguided effort to cater to entities opposing our industry. With Russian analysts claiming Russia will successfully produce 200 million tons of LNG annually and lead the world in LNG exports in the next five to 10 years, it is vital that U.S. natural gas producers, including those in Texas, are able to continue scaling energy output to lessen global dependence on adversarial nations."

—**Ed Longanecker**, *president, Texas Independent Producers & Royalty Owners Association*

"Pausing U.S. LNG export permits will have detrimental effects on the U.S., the Gulf Coast and our allies, disrupting a crucial global energy source that offers stability and affordability. This decision also puts a pause to billions of dollars in investments along the Gulf Coast.

Ordinary citizens in the U.S. and Europe will bear the costs of arbitrarily forfeiting a competitive market advantage to countries like Russia, a major LNG exporter. While Europe primarily imports LNG from the U.S., it still receives a substantial amount from Russia, which will undoubtedly exploit the decision.

Moreover, tens of thousands of jobs and billions in wages along the Gulf Coast are tied to the growth of LNG facilities. The benefits of domestic LNG growth is bolstered by the fact that, according to Carnegie Mellon University, switching all U.S. coal plants to natural gas would substantially reduce sulfur dioxide and nitrogen oxide emissions and reduce national healthcare costs by $20-$50 billion annually. The U.S. stands to transfer these benefits to the rest of the world through the displacement of coal with U.S. LNG."

—**Erik Milito**, *president, National Ocean Industries Association*

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Ukrainian soldiers fire a Howitzer toward Russian positions near Bakhmut, Ukraine, in March 2023. The war upended Western Europe's reliance on Russian piped natural gas.

energy security and helping our allies are mentioned less than half as much."

Democratic supporters of the pause said it's a necessary procedure given the massive growth of LNG exports.

"If the Biden administration is trying to ban LNG exports, they're not doing a very good job, and that is because this is not a ban or a de facto ban either," said Rep. Paul Tonko (D-N.Y.). "It's an acknowledgement that export approvals have grown tremendously in recent years, meaning an increasing share of total U.S. production is being earmarked for export. I believe the responsible force of action is to take a breath and see if additional exports would continue to be in the public interest."

Filling Russian energy voids

The DOE's announcement came as U.S. LNG exporters were eying further growth in years ahead after arguably helping to settle three years of energy market volatility that spanned from the start of the COVID-19 pandemic in 2020 through the aftermath of the Russian invasion of Ukraine in early 2022.

These events forced world leaders to rethink and prioritize energy security, even if that meant delaying decarbonization goals, as was the case in Germany and other countries that turned to coal.

Ongoing heightened uncertainties continue to favor U.S. LNG exporters and boosted interest in the build-out of U.S.-based liquefaction facilities, as well as gasification facilities around the world.

The U.S. currently exports roughly around 14 Bcf/d of LNG, according to the DOE. The U.S. also exports another 5 Bcf/d to 6 Bcf/d of piped natural gas to Mexico; a number of Mexican-based liquefaction facilities will use U.S. gas to anchor a boom in that country's LNG exports.

To date, approximately 48 Bcf/d in total authorizations for LNG exports have been approved by the DOE, which is around 3.4 times the current export capacity, the DOE said, reiterating that the temporary pause on pending applications doesn't affect exports that have already been authorized.

"Within this decade, another 12 Bcf/d of U.S. export capacity already authorized and under construction will come online—enabling exports to nearly double and putting the U.S. on track to exceed the export

"In the short term for facilities coming online 2024 through '26, there is no impact. They're either under construction or already have the requisite DOE approval."

—**Jack Weixel,** ***senior director, East Daley Analytics***

"This is a signal that is going to chill investments."

—**Toby Rice,** ***CEO, EQT***

capacity of any other country by more than 50%, even taking into account planned global LNG expansion capacity," the DOE said.

Granholm said the pause would not affect projects that have already gained government approval. One project that would be affected is Venture Global's Calcasieu Pass 2 LNG project, which was slated to begin production in 2025, and would be the largest LNG export facility in the U.S.

Effects on LNG market

Analysts predicted the move would have not have an immediate effect on the LNG market.

"In the short term for facilities coming online 2024 through '26, there is no impact," said Jack Weixel, senior director of East Daley Analytics. "They're either under construction or already have the requisite DOE approval."

Securities firm TD Cowen did not see an immediate boost happening for LNG facilities that are already operational.

"LNG equities currently operating may not see an increase in replacement value given forecast oversupply through 2028 and global queue of proposed projects; unsanctioned projects with government approvals could benefit as FID probability increases," the firm reported in an analysis.

However, the decision could affect the overall growth environment for LNG exports, Weixel said. The pause essentially announced that natural gas supply is further subjected to U.S. political processes.

Industry and environmentalists respond

"This is a signal that is going to chill investments," Toby Rice, CEO of EQT, told the House subcommittee. "I was in Europe last week, and we have to have many conversations to reassure our allies that they will be able to depend on America to deliver the energy security that they've relied on in the past."

Alternatively, environmentalists praised the announcement as a major win against climate change and for communities affected by the LNG projects.

"This announcement from the Biden administration is truly monumental for our communities," said Roishetta Ozane, director of the Vessel Project. "As someone who has witnessed the devastating impacts of fossil fuel extractive industries, I am filled with hope and gratitude for this important step towards justice." OGJ

"The Biden administration's freeze on all new LNG projects in the name of climate wokeism is the latest example of their myopic foreign policy decisions and will embolden bad actors like Russia and China to fill the void. As multiple wars rage and global threats continue to emerge, this bureaucratic decision abandons our friends and allies, jeopardizes our national security and threatens our energy industry."

—**Sen. John Cornyn** ***(R-Texas)***

"President Biden's 'pause' on new LNG export approvals sends the worst possible message to our allies and the world at the worst possible time. American LNG creates jobs and revenues at home, reduces emissions and increases security in countries who purchase from us, and provides an alternative to Russia, which is surely celebrating this news. The past two years have proven how beneficial U.S. LNG is for everyone but global autocrats, but the president and his administration have put politics over policy and are carelessly throwing it all away."

—**Sen. Lisa Murkowski** ***(R-Alaska)***

"With this decision, President Biden is continuing to place his environmental donors over the American people. A delay of a decision on CP2 until after the November 2024 presidential election could spare President Biden from criticism from environmentalists, but it will likely wreak havoc on markets and the energy security of our allies who may question the reliability of the United States as a secure energy supplier."

—**Thomas Pyle,** ***president, American Energy Alliance***

Excelerate Energy's CEO Kobos Bullish on US LNG

In a world rattled by instability, his company offers a measure of energy security to natural gas users via its fleet of FSRUs.

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Excelerate Energy President and CEO Steven Kobos sat down with Pietro D. Pitts, Hart Energy's international managing editor, in February at the company's headquarters in The Woodlands, Texas, north of Houston, to talk about issues spanning President Joe Biden's recent deal to pause approvals for new U.S. export facilities, the energy trilemma and why Kobos is bullish on the U.S. as a secure energy supplier.

Kobos, whose company has offices in Abu Dhabi and Dubai, UAE; Antwerp, Belgium; Boston; Buenos Aires, Argentina; Chattogram and Dhaka in Bangladesh; Doha, Qatar; Helsinki; Manila; Rio de Janeiro; Singapore; and Washington, D.C., owns 10 floating storage and regasification units (FSRUs) or 20% of the global supply of the asset class.

The company is a major player in the flexible LNG market and its recent agreement with QatarEnergy to supply LNG to Bangladesh is just one among deals with countries including UAE, Finland, Germany and others.

Pietro D. Pitts: How do you see the LNG market reacting to Biden's decision to pause approvals for new liquefaction plants?
Steven Kobos: I would say, near term, we have a structurally tight LNG market and in terms of 2024-2025, I don't see a lot of impact on it. I think we're going to continue to be impacted by variables, whether those are cold winters, drought or abundant rainfall in Brazil, or economic activity. So, those are going to continue to be the main drivers of the market over the near term and intermediate term.

We're still looking at more than 200 million tonnes of LNG coming online between 2024 and 2029. It's a healthy increase, which is going to do good things for the overall balance. We think it's going to be helpful for us. People already know that will make LNG more affordable in parts of the world that need it to be affordable.

So, this pause [announced by Biden] will impact [the market] down the road. But the main drivers on intermediate LNG we see remaining as they were, that the war has already done what the war was going to do, which is to point out the need for energy security, prompt people to take final investment decisions (FIDs) they might not otherwise have taken. And so, in some respects, prices solving for prices and increasing supply that the world needs.

PDP: In 2023, you told me that China was the outlier for that year. What's your call for 2024? Is it still China, what's going on in the Gaza Strip or something else?
SK: Near term, it is going to be what? There will always will be unexpected events. In a structurally tight market ... we continue to see unanticipated things. We saw the unanticipated disruption of the Balticconnector pipeline between Estonia and Finland that further heightened everyone's need for energy security. It actually showed how great it was to put this flexible floating import infrastructure in place because, had the Finns not acted as quickly as they did to be prepared for unexpected events, that would've been a really major disruption. [But] because they have the foresight, they're managing it quite well. The outliers near-term in a tight market remain unanticipated events and, in a world of increasing disorder, you can't discount those risks and certainly that's how policymakers feel now.

PDP: In the immediate aftermath of Biden's announcement, how do you envision OECD countries and their continued shift away from coal?
SK: I think there was a lot of talk about that in August 2022 when we were at the height of the impacts on spot prices. As some markets were pushed out of those markets, we think those markets have already learned the lessons from that. They've understood that they can already afford LNG if they contract for it on a different basis. If they move long term, they can also see the coming production resulting from the war and the FIDs that flowed from it. So that's why I was just in

"The outliers near-term in a tight market remain unanticipated events and, in a world of increasing disorder, you can't discount those risks and certainly that's how policymakers feel now."

—**Steven Kobos,** ***president and CEO, Excelerate Energy***

Doha signing up a deal. We have signed deals to sell down into Bangladesh for 15 years. You're seeing deals announced into India and other Global South markets. We think that the Global South non-OECD countries are learning the lessons of how they need to rebalance their portfolio to ensure energy security through energy affordability.

PDP: While your deal related to Bangladesh with QatarEnergy is interesting, the interesting part of that deal, which starts in January 2026, is that Excelerate is moving the cargo. Could you talk more about that role?

SK: Our focus is on our infrastructure, and we've always tried to use our infrastructure to provide whatever services the sovereigns or markets or customers we serve have. And more often than not, what they need are molecules. So, if we can, we're going to try to obviously increase the return above what we would have as a pure infrastructure player by adding some sort of rateable uplift to that. Last year, we signed some U.S. volumes for 0.7 million tons with Venture Global, and this is another million tons to our portfolio. [Regarding] Venture Global, we have absolute confidence in [them] and think they are a reliable supplier for us. Again, our focus is always going to be on using our existing infrastructure and using it to deliver volumes for our customers.

I'm just very excited that QatarEnergy recognizes that we are a suitable counterparty, and the important role that we have in opening up LNG into these markets that are of interest to suppliers. For me, I appreciated the ratification of where we've come as a company and what the impact we're having around the world.

Excelerate Energy's FSRU fleet

FSRU vessel	LNG capacity (cubic meters)
Excelsior	138,000
Excellence	138,000
Summit LNG	138,000
Explorer	150,900
Express	150,900
Exquisite	150,900
Expedient	150,900
Exemplar	150,900
Experience	173,400
Excelerate Sequoia	173,400

Source: Excelerate Energy

PDP: How important is the Qatar market for Excelerate?

SK: We flow in excess of 10% of Qatar's current production across our fleet of FSRUs, no insignificant sum. I think that, in itself, has shown that they understand the operational reputation of Excelerate and our operational excellence. This is the first purchase from them of long-term LNG cargos.

PDP: What's the best mix of shipping terms when it comes to free-on-board (FOB) and delivered ex ship (DES).

What's the biggest advantage between those?

SK: I believe we announced that our Qatari deals will be DES. We have FOB out of the U.S. So, we think our portfolio is best served with a balance.

With regards to the second question, we have good flexibility in what we need and with this last announcement we are focused on getting more volumes through our infrastructure into Bangladesh. For example, we just modified the FSRU that those volumes would be delivered through to get a 20% increase in capacity. The customer wanted it so we promptly looked at what we could do to enhance throughput and now we're going to help them by delivering the volumes through that enhanced throughput of our infrastructure.

PDP: Are you seeing the Asians and Europeans changing their preferences for spot versus long-term contracts?

SK: In terms of the length, we're looking at projects in Asia with durations over [15 years]. Obviously, it's going to be a function of what sort of infrastructure is put in and what you need to marry to that infrastructure that you're putting in. That's the beauty of this flexible LNG. It's going to vary by market and what's important to them is affordability. And if affordability is the biggest problem, like you saw with non-OECD, then by all means lock in long-term volumes. If flexibility and a need to scale renewables and have a balancer is your biggest priority, then take some long-term FIDs as Europe has and then know that you can access the market as needed to supplement that.

I don't think there's one supply solution that's appropriate for any market. And then you add in some markets that we serve like Brazil with 65%-70% hydro power generation and where you either have adequate rainfall or you do not. And so that impacts the decisions that you make for that year. So, I think everyone is placed so differently in terms of climate, their ability to afford a particular strategy, that what we want is to be an indispensable provider of energy security that will allow those policymakers to make the appropriate choices for them for their market.

PDP: Are you seeing more countries approaching Excelerate to talk about the flexible LNG option or in

general to explore why they should even consider it?
SK: Absolutely. Going back to the Balticconnector, [and] the disruption of multiple subsea pipelines around the world. [With] increasing disorder, I guarantee you all sovereigns are focused on what their energy security looks like, how they can backstop it, and where they can get an insurance policy. And the good thing about this flexible LNG infrastructure and offering some type of integrated solution is it's fast, it's affordable, it's cheap insurance. And if you have a more robust energy system, but you still want the security of knowing that you're not going to face brownouts, you're not going to face outages, it's incredibly cheap insurance. So, the interest is sky high.

PDP: Talking about providing cheap insurance, what does Excelerate's fleet look like and are there plans to expand it as demand grows?
SK: We have 10 FSRUs right now, [and] those were all built by DaeWoo Shipbuilding & Marine Engineering [since rebranded as Hanwha Ocean Co.]. We have one under construction at Hyundai, [and] we're evaluating another new building. Global supply is roughly around 50 units, so we have 20% of the global supply of the asset class. We're bullish on it, we want more, but we also look at other forms of infrastructure that might allow us to solve different energy security issues for countries and markets that need our services.

PDP: What's an example of other forms of infrastructure?
SK: That could be breaking bulk and delivering smaller parcels into markets, distributing gas throughout a market, [or] that could be floating storage units (FSUs) with a different regas solution. We're just looking at a variety of solutions and again, no two markets are the same. No two transportation systems within markets are the same. No two weather environments are the same. So we pride ourselves on flexibility and being nimble.

PDP: At the top of the LNG market, we have the U.S., Qatar and Australia but there are also other markets and potential ones like Argentina, Canada or Mexico. How do you see the LNG supply market?
SK: I would say a few things. I mean, first, we think the world needs more LNG—200 million tonnes is a good start. But let's face it, there are huge swaths of the world's population that need more energy, more power and need a better standard of living. That's what energy security means for those countries and they deserve it. And LNG is a critical means of providing that badly needed service. There needs to be more supply brought online by reliable suppliers.

You've named the U.S. as a reliable supplier. Qatar has an outstanding track record since inception of being a reliable supplier, and Australia as well. The world needs reliable suppliers to come to the table with more volumes of this critical commodity that is necessary for bringing as much stability and prosperity to a world facing increasing disorder. So, we believe that passionately.

PDP: How do you view Mexico as an up-and-coming LNG supplier? Their push, of course, will come through the use of U.S. feed gas.
SK: Everything's going to be a matter of price, contract terms, everything else. Obviously, we will be looking at a portfolio which, on balance, provides the maximum benefit for our customers and for our shareholders. I could not be more pleased that we have built our portfolio around the U.S. and Qatar to date, because we feel very good about that being a bedrock to build upon.

PDP: Everybody seems to be talking about Mexico and potential there for them to join the LNG exporters club. Any thoughts on that market?
SK: I think that's going to be very good for Mexico, very good for the world if they can bring on some of that. They have certain geographic advantages and I hope [those plants] will come online.

PDP: As a company that provides flexible LNG solutions, how do you view the energy transition and the push toward cleaner energies?
SK: We embrace it. We think we are an invaluable ally to it. Again, how can a market have such a success like Brazil with its hydro power, without a backstop, without a scaling? How can you have the comfort to scale wind without fear that goes back to the European wind droughts of October 2021? I mean, in order to rely and lean as heavily on renewables, LNG is again going to be essential for giving markets the comfort to scale to whatever level they want.

And when you look at even the most aggressive scenarios out to 2040 and 2050, no matter those that take the most aggressive scaling of renewable assumptions on new technologies, all of them only meet Paris [Agreement] targets if there is an increase in natural gas throughout that timeframe. I think we're a critical part of the mix and we are an indispensable energy company because we are focused on opening those markets downstream so that benefits can be distributed further throughout the globe.

PDP: Talking about Paris, what are your emissions reduction goals or targets?
SK: I'm pleased that we launched our initial sustainability report this year. We were always looking at ways to optimize the energy consumption, the emissions of our fleet, new technologies, all of that. So, I can say that the focus on sustainability is part of who we are and a focus on optimizing that fleet.

PDP: If you had a crystal ball and could look to 2050 or 2075, how important do you think LNG is going to be at that point? Where could it be in terms of the world's energy matrix?
SK: I think we all hope there are improvements in technologies and everything else, but if we are talking 2075 or later, it depends upon what type of a world we're talking about then. What's the population going to be and the standard of living for that larger population? The standard of living is ultimately a function of energy consumption. Gross domestic product (GDP) and energy consumption and power generation go almost in lockstep.

So, what we need on the crystal ball is what we are going to be able to do for this world and for its people. I do think that LNG and natural gas through those timelines will still be a relevant bridge as new technologies continue to come on.

PDP: After Russia's invasion of Ukraine in early 2022, the world began to be super focused on energy security. Is that something that will continue for some time into the future? What could change that?
SK: I suppose the great thing about LNG is, you're not dependent upon one neighbor, and so I think LNG is the critical solution to energy security needs. No, people are not going to forget about a need for energy. I don't think anyone is going to put themselves in the position they may have before where they were left with no alternatives and had to scramble. It remains critical to leaders [around the world].

PDP: How is the LNG market in South America and, specifically, the Southern Cone region taking shape?
SK: Let's talk about Brazil. I am pleased we have two long-term leases of infrastructure to Petrobras in Brazil and we're very

With a global supply of FSRU's roughly around 50 units, Excelerate Energy has 20% of the supply of the asset class at 10 vessels. And they're bullish on getting more, says Steven Kobos, president and CEO.

Excelerate Energy

pleased about that. Petrobras signed another 10-year deal with us in October and I believe Petrobras is one of the most professional and reputable international oil companies in the world. And again, this is an example of people recognizing our reliability, our operational excellence, the role we play in global LNG. And I love nothing better than being ratified by Petrobras. We've been in Brazil since around 2012. They know our standards, they know our level of governance, they know our level of transparency and we're just thrilled to have Petrobras sign yet another long-term deal with us. Obviously, Brazil will have greater connectivity and exploit its [pre-salt] resources in the fullness of time. That is inevitable. We're there to provide whatever services we can that will most help a market on its path to an energy transition and developing their own markets.

In the Southern Cone, obviously there's some interconnectivity between those markets and energy security is not just when someone invades or disrupts, it's also when you have an unexpected decline in production and transmission from a neighbor as well. You do see that coming out of Bolivia. I think that the impact on energy security in the Southern Cone has been overshadowed by energy security tied to actual armed conflicts in other parts of the world.

PDP: Argentina is a market that uses flexible LNG, despite the country boasting massive shale reserves in the Vaca Muerta formation. How do you see that market progressing as it eyes building its own LNG export facilities?

SK: We've been in Argentina for years and what's amazing about it is the amount of money that they have saved by using LNG and not burning diesel. Also, since that was largely a displacement of diesel and fuel oil story, it had a significant impact on overall emissions within Argentina. So, when I think about what we offer to people, that's part of it.

Another thing is being flexible. As they build and expand their pipeline network, of course they should be able to greatly optimize Vaca Muerta. It makes sense. Those are expensive projects, obviously. They do take time and, in the meantime, we're there to provide service for them. They have a very balanced, very efficient energy system that otherwise they would not [have] if they were dependent upon Bolivia and did not have this optionality—things would be very dark down there. I think in many respects it's a case study of affordability, and an energy transition or sustainability story, and energy security. If you look at our history there, all those components of the trilemma are really there, and how we impact each of them… I think of [Argentina] as being kind of a poster child for that.

PDP: In South America and around the world, what is something you look for in terms of new markets?

SK: I don't want to speak to a particular market, but we'll certainly look for adjacencies to the role we have. I think we have shown our strong suit of being able to work in local markets, put boots on the ground and hire local employees. We will always have our eye on adjacencies, whether that's supplying into or facilitating downstream distribution within a market from their own resources or in partnering with them in other ways.

PDP: What would be your final remarks about the LNG industry and the opportunities and challenges over the short-term?

SK: I do think we all recognize that LNG is important for the world. I do think the case will be made that it is for the good of energy security. The U.S. was able to step up and support our allies in a pinch. It's fantastic that we had those capabilities and I hope we will always have the capabilities to step up and support people who have been left in the lurch by unreliable providers of energy like Russia. OGJ

Gushing, Ohio: EOG Joins Ascent, Encino in Top Oil Wells

EOG's latest wells in its new Ohio oil play are rolling into state public records, while Ascent Resources and Encino Energy are reporting the biggest producers. All three are landing 3-milers. Some are 3.5 miles.

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More details have emerged about EOG Resources' newest Ohio four-well test pad, Timberwolf CBN16, which churned out 180,000 bbl of oil in its first 37 days online, along with 580 MMcf of gas and NGL.

EOG's re-entry to Ohio exploration after a false start in the 2010s has reignited interest in oil-window opportunities in the state's Utica Shale, which has successfully produced from its gas-weighted phase.

In the three-section unit, one of the wells, Timberwolf #8A, made 50,341 bbl during the timespan for an average of 1,360 bbl/d, according to state and other data. Located in Carroll County, it also surfaced 161 MMcf of solution gas, or about 4.4 MMcf/d.

East of Malvern, Ohio, the pad began production this past summer from the Point Pleasant limestone/shale formation underlying the Utica at about 7,000 ft. The pad's first 37-day average was 4,855 bbl/d; the per-well average was 1,214 bbl/d.

Timberwolf is along the eastern edge of the volatile-oil fairway at its intersection with the wet-gas phase. Results from another new pad—Xavier in Harrison County with seven wells permitted—are expected to be released by the state in March. Xavier also is at the volatile oil/wet gas intersection, along with other new EOG wells: Brookfield, Rose and Brown.

Ohio's Department of Natural Resources (ODNR) places NGLs in the gas-stream column in its data. "The oil column only shows oil," said Gregg Miller, ODNR analyst. "All of the methane and wet gases are in the gas column. We do not have a breakout of the NGL components."

EOG reported in November that the four-well Timberwolf pad's mix was 55% oil, 30% NGL and 15% gas.

Volatile oil's gravity is more than 40° API with gas/oil ratios of 2,000 scf/bbl to 3,300 scf/bbl. Condensate's gravity is between 40° API and 60° API. Wet gas or rich gas contains more ethane and less methane. In each, the difference becomes apparent at the wellhead where temperature and pressure result in molecules separating from or "falling out of" the stream.

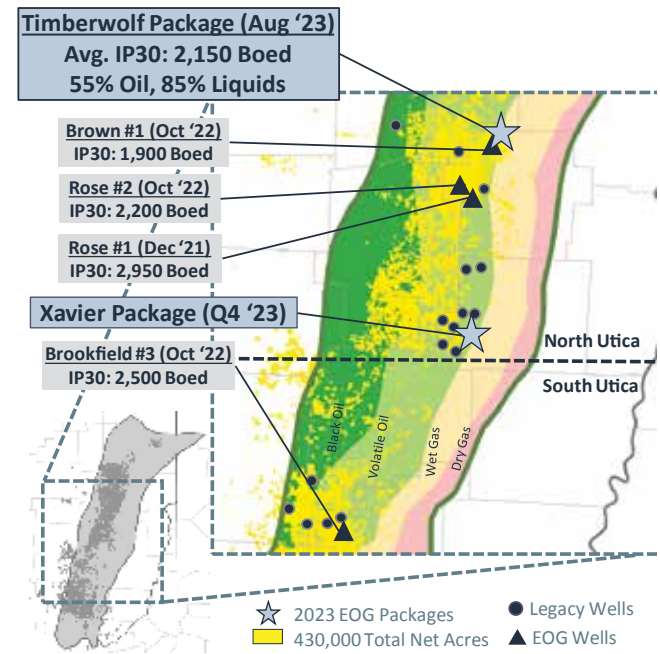
Delineating west—not yet

Billy Helms, EOG president, told Goldman Sachs energy conference attendees in early January the

Jefferson County in eastern Ohio is attracting attention from producers such as Northern Oil & Gas.

Shutterstock

New Ohio EOG wells



Source: EOG Resources

Timberwolf wells are "definitely in the volatile oil window. So the oil gravity is less than 50. I want to say it's 48 gravity oil."

The four Timberwolf wells were on 1,000-ft spacing. The Xavier wells will be at 800 ft, according to EOG comments in its November earnings call.

Ezra Yacob, EOG chairman and CEO, acknowledged at a BofA Securities' energy conference in November that Timberwolf's 1,000-ft spacing is "a little bit conservative for how tight that rock is." But EOG is only testing its play for now. "We're still continuing to work on the delineation," he said.

Costs haven't been disclosed. "We're still in the early stages … in learning in this play. We've got a lot of room for operational efficiency gains," Jeff Leitzell, EOG's COO, said in the earnings call. But expectations are that the play will have a sub-$5 finding and development cost.

Also, EOG hasn't drilled on the western side of its volatile oil fairway—where it approaches the black oil window—primarily because "we had good quality seismic data over on the east side of it when we were first starting out," Leitzell said.

Once optimal well spacing is determined, "we'll be able to kind of step out more to the west, and … we do expect it to get oilier," he added.

EOG has pulled 48 new-drill permits since January 2020, according to ODNR records. In addition to Xavier, upcoming pads are Shadow (seven wells) in Carroll County, and in Noble County, Sable (four wells) and White Rhino (four wells).

EOG will have one full-time rig at work on its acreage this year,

it reported; in 2023, it had one rig drilling half-time.

The company has 430,000 acres in Ohio—more than 90% held by production (HBP)—and owns 130,000 minerals acres in a roughly 140-mile north-south trend. The leasehold and minerals were reportedly bought in 2022 from Encino Energy and Artex Energy Group for some $500 million, according to Craig Davis, senior technical adviser for M&A advisory firm Energy Advisors Group (EAG).

Update: Year-old EOG wells

Meanwhile, an EOG well in Noble County, Brookfield NBK15 #3A located east of Belle Valley, that came online in fourth-quarter 2022, averaged 1,148 bbl/d its first 77 days, and produced 184,665 bbl in its first 350 days, according to the updated ODNR records.

The 350-day average was 528 bbl/d.

Third-quarter production in 2023 averaged 194 bbl/d. Solution gas averaged 2.8 MMcfe/d in its first 77 days. The 350-day total was 900 MMcfe.

Another EOG well, Rose 0816 #2H in Carroll County, produced 106,623 bbl in its first 335 days online for an average of 318 bbl/d through Sept. 30. Third-quarter output was 151 bbl/d. Northwest of Dellroy, the well made an average of 629 bbl/d during its first two months.

Meanwhile, the neighboring Rose 0801 #1H—about 300 ft south of the #2H—has relatively underperformed, producing 45,548 bbl its first 426 days for an average of 107 bbl/d. Third-quarter production was 68 bbl/d.

EOG's Brown 2117 #1H in Carroll County, about a half-mile southwest of the Timberwolf pad, was put back online in the third quarter, producing 24,195 bbl in 37 days or an average of 654 bbl/d. It first went online in the fourth-quarter of 2022, making 11,438 bbl in 18 days.

Ascent Resources: The biggest oil wells

Ascent Resources holds Ohio's top 2023 oil-well production rank through the third quarter with its Lavada RCH GR #2H in Guernsey County, according to ODNR data.

The well, east of Lore City, came online in fourth-quarter 2022 with 1,531 bbl/d from a 16,040-ft. lateral. It surfaced 366,092 bbl in its first 349 days online, along with 1.35 Bcf of solution gas. In the third quarter, it was making 572 bbl/d.

Its companion well, Lavada #4H, made 302,468 bbl in its first 349 days online.

Ascent held the top eight oil wells in 2023 quarterly rankings through the third quarter. Its newly minted six-well Jackalope WSG GR pad produced more than 500,000 bbl in the first three quarters of 2023 while online for only a combined 386 days, averaging 64 days each.

In Guernsey County, west of Londonderry, Jackalopes' two longest-online wells—Jackalope South #4H and Jackalope Southeast #6H—made 116,582 bbl and 118,809 bbl, respectively, in the first quarter in their first 74 days. Jackalope #6H has a 15,075-ft lateral.

Meanwhile, Ascent is primarily focused on being Ohio's top gas producer, making 919 Bcf in the four quarters ending June 30, 2023. EAP was No. 2 with 395 Bcf, followed closely by Gulfport Energy with 317 Bcf.

Ascent operates the second-most wells in Ohio with 849, while Gulfport, Antero Resources and Southwestern Energy hold some 900 combined, according to state data.

Backed by First Reserve and The Energy & Minerals Group, Ascent produces 2.2 Bcfe/d from its 357,000 net Ohio acres that include 80,000 mineral acres. It had four rigs running in the fourth quarter, according to EAG.

Its acreage was bought beginning in 2015 from Hess, Carrizo Oil & Gas, CNX Resources and others. Another purchase, for $270 million, is focused in Belmont County. The seller was Exxon Mobil.

Encino's 3.5-milers

Coming in at No. 9 among top Ohio oil wells of 2023, Encino Energy's EAP Ohio was crushing it in Harrison and Carroll counties.

Encino's newest pad, Stocker, east of Dennison in Harrison County, produced 520,321 bbl from four wells in its first six months online, beginning in the second quarter.

The first 182-day average per well was 715 bbl/d, or 2,859 bbl/d for the entire four-well pad.

Operating the most wells in Ohio with 977 per state data, Encino also added four wells to its vintage 2020 one-well Williams CR MON pad in Carroll County. The new wells made 1.22 MMbbl their first 363 days online through the third quarter, or an average of 840 bbl/d per well. Solution gas totaled 6.3 Bcf.

Williams #5H has an 18,049-ft lateral, according to EAG. It came on with 127,688 bbl its first 92 days online. Williams #205H, with a 17,924-ft lateral, surfaced 124,257 bbl in its first 92 days.

Encino is Ohio's top oil producer, making 12.7 MMbbl in the four quarters that ended June 30, according to ODNR data; Ascent was No. 2 with 6.9 MMbbl. In third place was Utica Resource with 1.5 MMbbl.

Tim Parker, Encino chief technical officer, said at Hart Energy's DUG Appalachia conference in November that the Utica's oilier fairway "has better margins" than the basin's dry gas window. And it also "means that we aren't subject to bumping up against [basin pipeline] export capacity limits.

"So, the oil play makes a great deal of sense for us," Parker added. "Not only do we have the scale to do it, but the economics are really compelling."

Encino has been shifting its drilling focus to growth in the liquids window, he said. "When you have economics of the magnitude that we do, we want more of it."

Encino had three rigs running in the fourth quarter: one in the dry-gas window; one for volatile oil; and one for wet gas, according to EAG.

Formed in 2017 with backing from Canadian pension-fund manager CPPIB, Encino bought Chesapeake Energy's Ohio property for $1.9 billion in 2018. The deal came with 938,000 net acres (1.4 million gross, 85% HBP), of which Chesapeake had called 320,000 "core acres," according to EAG.

It included 642 MMcfe/d, primarily gas. Proved reserves were 2.9 Tcfe.

Utica Resource, INR, NOG

Also ranking in the Top 100 is Utica Resource Operating, first at No. 32 with a Guernsey County well, Stillion #9H, that surfaced 77,202 bbl in the second quarter. Utica Resource contributed nine wells to Ohio's Top 100 of 2023's first three quarters.

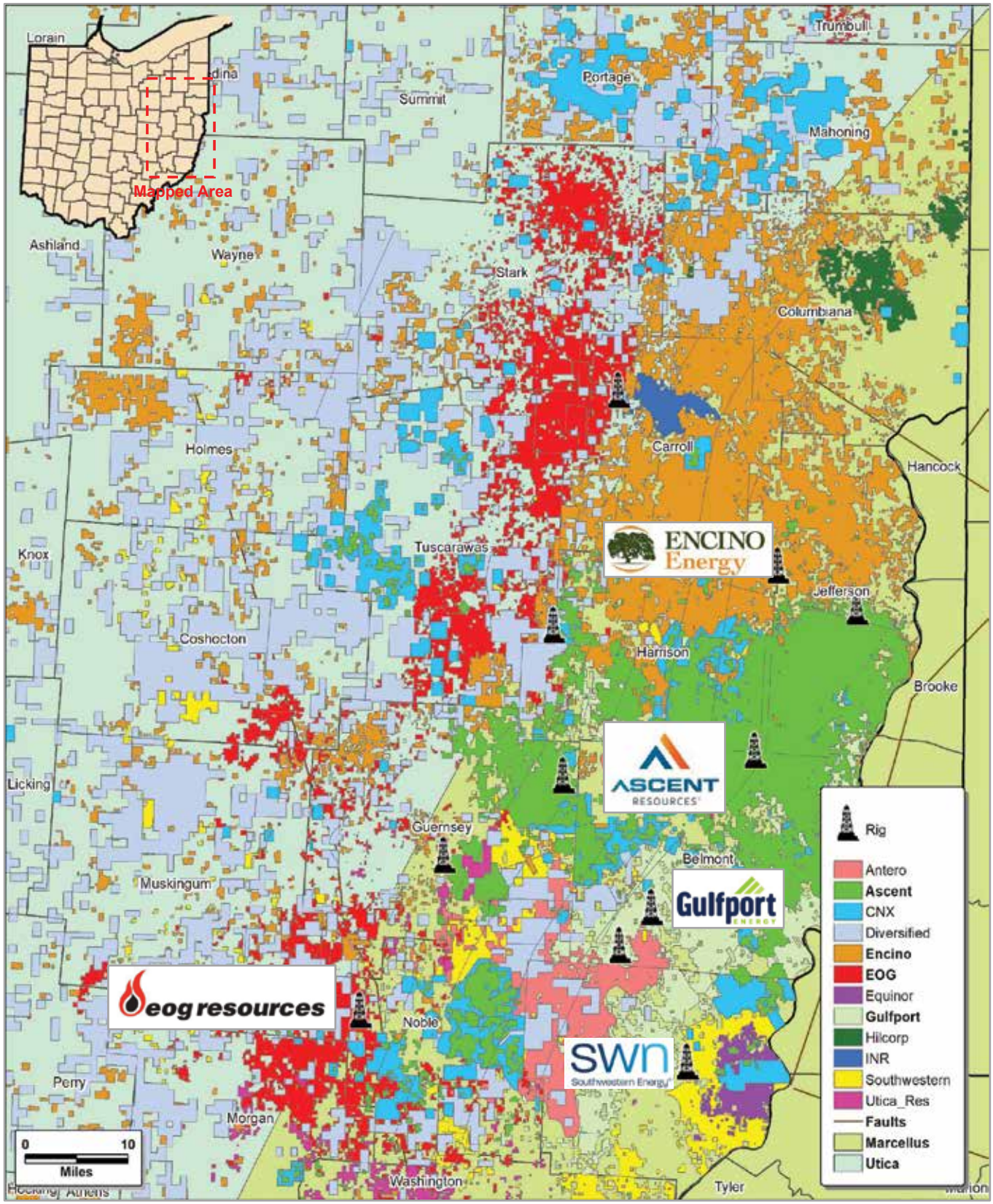
Meanwhile, Infinity Natural Resources took two positions, first at No. 87 with its Goebler #10H in Carroll County that produced 54,170 bbl in the first quarter.

Entering the 2023 ranking at No. 99 was EOG's Brookfield #3A with first-quarter production of 50,694 bbl, followed by its Timberwolf #8A with 50,341 bbl in the third quarter at No. 100.

Non-operating producer Northern Oil & Gas is buying into the Utica/Point Pleasant's gas-weighted fairway in Ohio's Jefferson, Harrison, Belmont and Monroe counties. The percentage of interest, seller and purchase price were not disclosed.

The non-op interest is mostly in wells operated by Ascent,

Current Ohio operations



Source: Energy Advisors Group

according to EAG.

The deal comes with some 23 MMcf/d net; a small amount of liquids; 0.8 net producing wells; and 1.7 net wells underway.

"We've always had a strong gas play, and we've continued to have a strong gas play," Rob Brundrett, president, Ohio Oil & Gas Association, said at DUG Appalachia.

But the state's oil production is rocketing. Between first-quarter 2022 and second-quarter 2023, output increased 51%, he said.

In second-quarter 2023, the state produced 6.9 MMbbl. That compares with second-quarter 2022 production of 4.9 MMbbl, according to ODNR. OGJ

Vitol: Saudis to Quit Supply Cuts

International trader also predicts that oil demand will peak in the early 2030s.

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Frustration over the lack of cooperation in oil production cutbacks will lead Saudi Arabia to hike production in the second half of the year, Vitol predicts.

Global oil demand will begin to peak in the 2030s, international trader Vitol predicts. Nearer term, Saudi Arabia's going to give up on supply cuts beginning in the second half of 2024.

"We were talking about 'peak supply' 20 years ago pre-shale," Ben Marshall, Americas president and CEO of Vitol, told oil producers, financiers and investors at the annual Private Capital Conference in Houston hosted by the Independent Petroleum Association of America (IPAA). "And now the big talk is 'When does demand peak?'"

Vitol's analysis shows it will begin "kind of in the early 2030s," Marshall said. But, he added, it's important to see where it will peak and which hydrocarbon products. These "are all very different."

In the West, "any way you look at it, the Western world is going to be declining in hydrocarbon demand." That's not in energy demand overall, but in hydrocarbon demand, he added.

"The rest of the world is still going to be growing and we still think it's going to be growing for the next 10 [to] 15 years," he said.

When looking at Vitol projections through 2038, "you actually still have the same level of hydrocarbon demand as you do in 2023. So, we see it growing for a while, but we see it tailing for a while, too."

What the shape of the tail looks like is something the world will have to grapple with, he added.

So why would Vitol continue to invest in hydrocarbons? Marshall said the Swiss energy and commodities company sees growth for a while "and even when it tails, it's going to take a long time to really drift off again."

One unknown is the pace of uptake of alternative energies. It's "a challenging thing to project at this time."

But it's become clear already that the energy transition is "a lot harder than many realized or perhaps wanted it to be," he said.

Where Vitol sees an opportunity is in how much money is being invested (or not invested) to produce hydrocarbons, and what the actual

"And now the big talk is 'When does demand peak?'"

—**Ben Marshall,** ***Americas president and CEO, Vitol***

real demand for hydrocarbons is going to be for some time, Marshall said.

Among Vitol's investments worldwide, which include Pakistan's largest used-car dealership, it funded Midland Basin-focused Vencer Energy in 2020 and sold it to Civitas Resources for $2.1 billion in 2023.

Its newer start-up is Delaware Basin-focused VTX Energy, funded in 2022.

Marshall told oil and gas producers that Vitol is "very happy with the investments that we made and looking to do more."

Saudi cuts cutback

As for Saudi-led OPEC+ cuts, "we know it's bringing a lot of financial duress to Saudi Arabia and there's a lot of frustration inside of Saudi Arabia because … they're the only ones really abiding by their quota."

Vitol expects the Saudis to give up after this June. "The market is really just being held up by the Saudis."

Either oil reaches more than $80/bbl or more—what the Saudi government needs to fund itself—or "the Saudis are going to start to lose patience."

Brent's mid-$70s "does not fund their dreams, fund their plans, fund their vision," he said.

Saudi Arabia also isn't making any money on the 2 MMbbl/d in production it has curtailed. "When [the Saudis] reach a breaking point, we know what they can do … just flood the market."

That's unlikely, "but their frustration is growing higher and higher by the day because the current situation doesn't work for them. The prices are $10 to $15 lower than they really need and they're the guys that are also taking big haircuts."

The situation was seemingly inevitable, Marshall added. The "voluntary cuts" that began in fourth-quarter 2022, "you can almost dismiss them out of hand."

OPEC members aren't complying. "People weren't abiding by their 'obligatory' cuts. We sure as heck aren't going to abide by voluntary cuts."

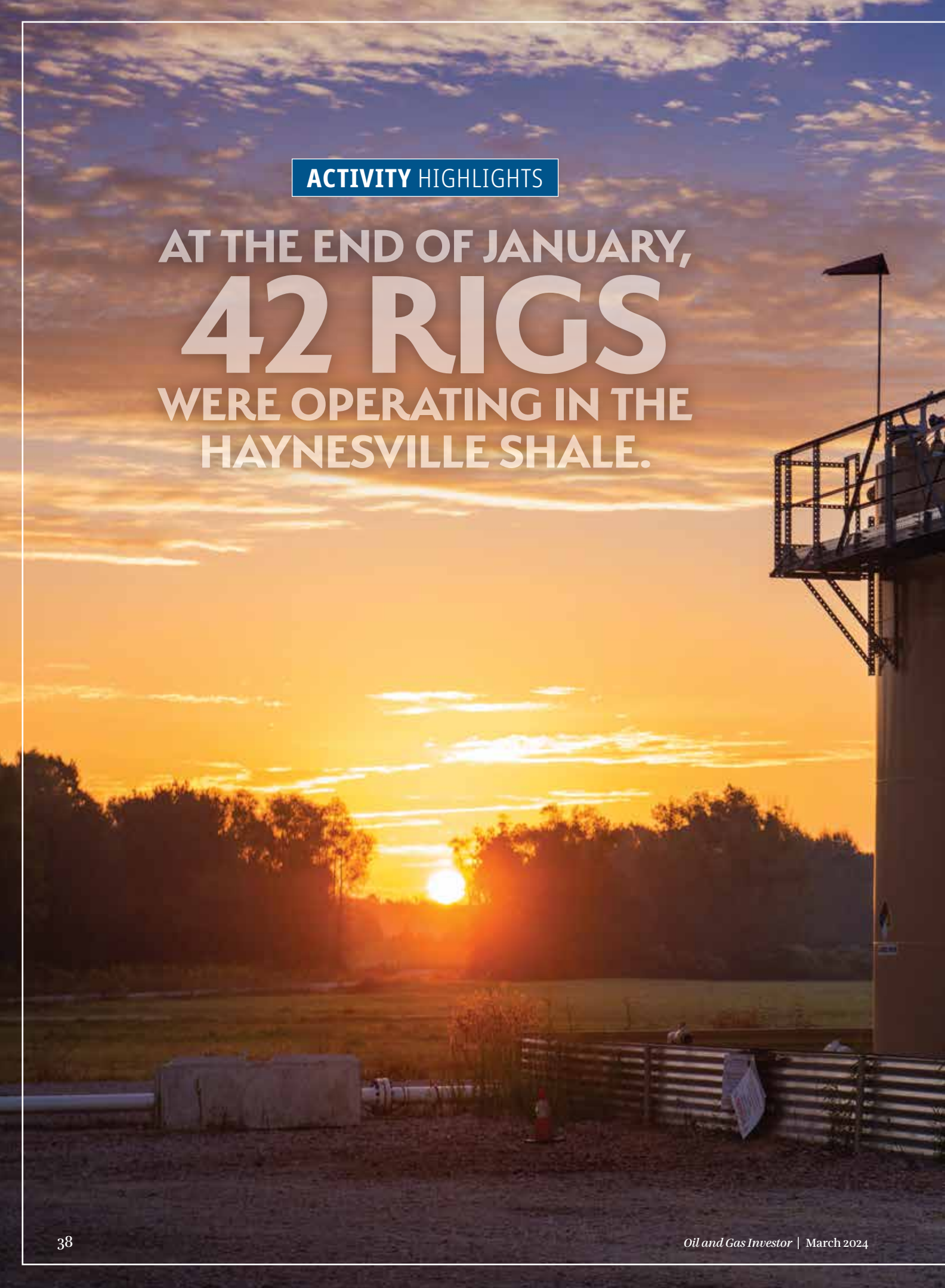
Meanwhile, Russia's production is unchanged—even under sanctions, he said. "They've been exporting the exact same amount of crude as before," Marshall said.

An alliance is at work among Russia, China and Iran, he added.

"There's a divide growing politically that's part of the energy sector as well, which is kind of North, South and East versus West. And it's just growing deeper and deeper." OGJ

ACTIVITY HIGHLIGHTS

AT THE END OF JANUARY, 42 RIGS WERE OPERATING IN THE HAYNESVILLE SHALE.



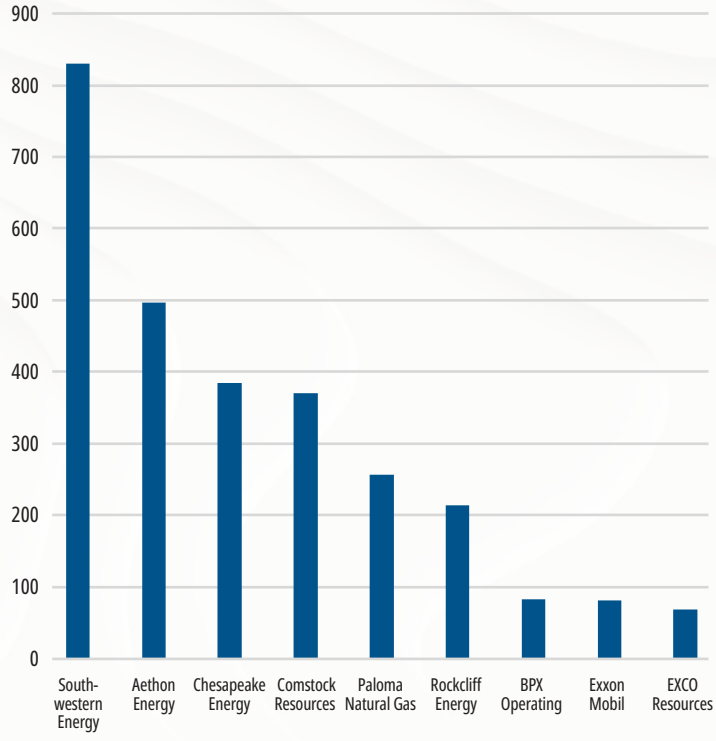
Southwestern Energy

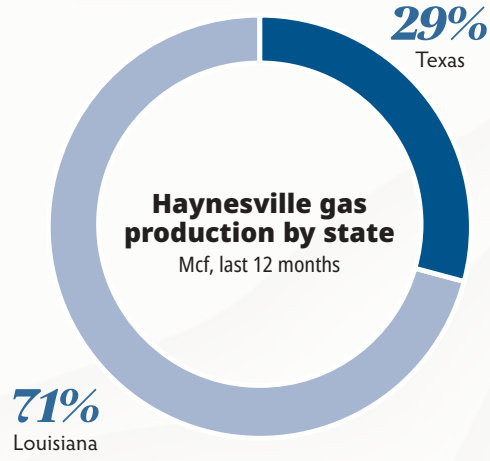
FOCUS ON: HAYNESVILLE SHALE

The Haynesville Shale is the third most prolific natural gas play in the U.S. after Appalachia and the Permian Basin.

Haynesville top operators

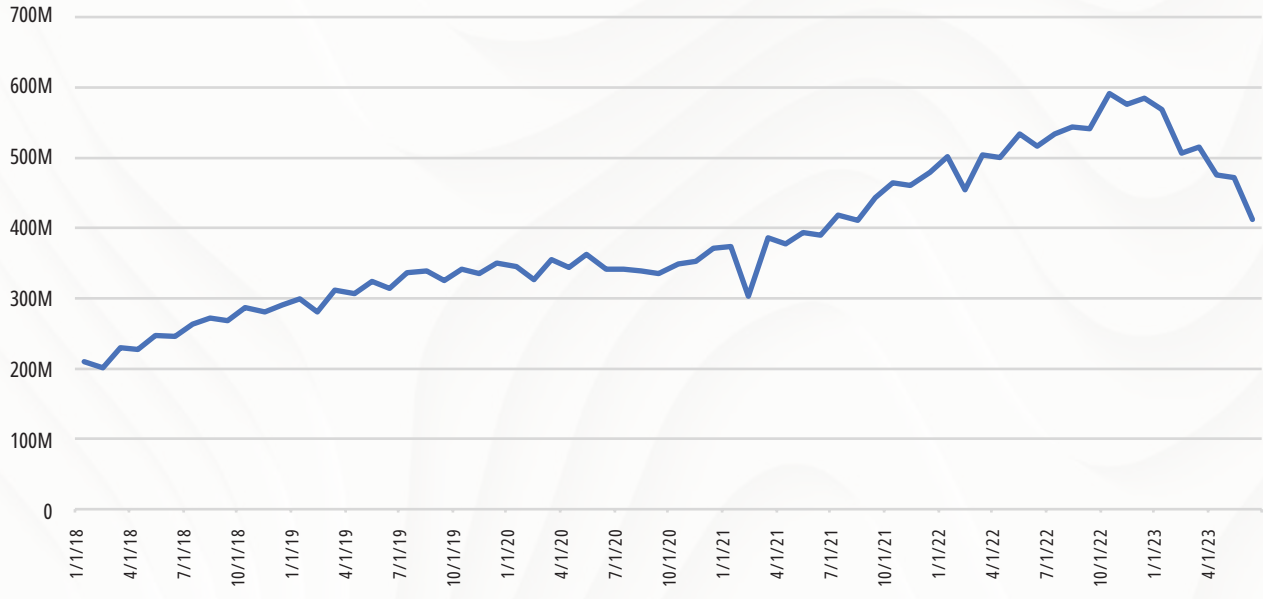
(gas production, Mcf, last 12 months)





Haynesville Shale gas production

(monthly, Mcf)



Source: Rextag

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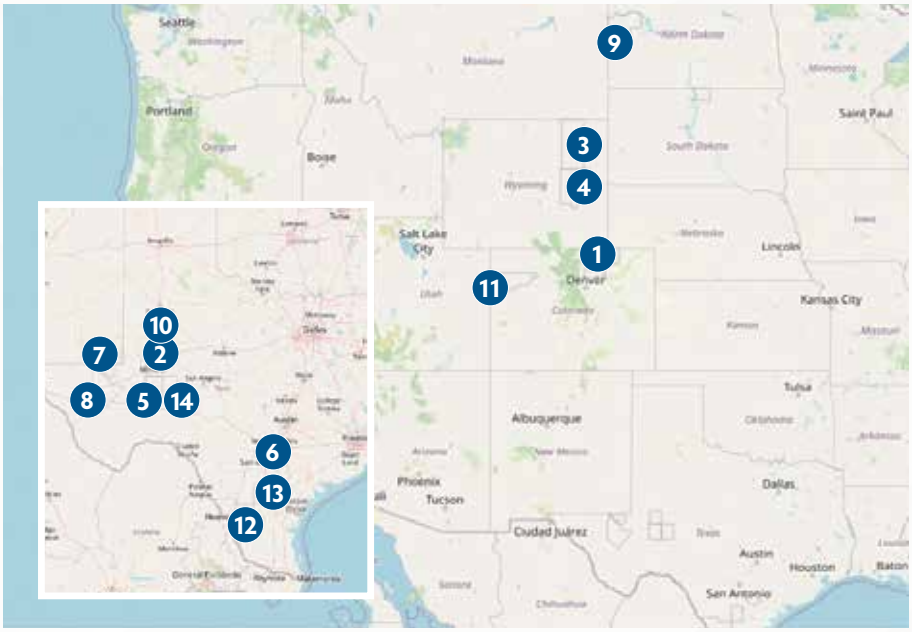
PERMITS

While the Permian Basin and Eagle Ford Shale continue to dominate, well permit approvals in the Denver-Julesberg, Uinta-Piceance, Powder River and Williston basins have surged in the last month.

Permitted wells by county

	County	Well Count
1	Weld, Colo.	63
2	Midland, Texas	54
3	Campbell, Wyo.	47
4	Converse, Wyo.	44
5	Upton, Texas	40
6	Karnes, Texas	39
7	Loving, Texas	37
8	Reeves, Texas	35
9	McKenzie, N.D.	26
10	Martin, Texas	25
11	Rio Blanco, Colo.	23
12	Webb, Texas	20
13	McMullen, Texas	19
14	Reagan, Texas	19



Permitted wells by operator

Operator	Well Count
Anshutz Operating	71
Pioneer Natural Resources	43
DE IV Operating	29
ConocoPhillips	26
Caerus Oil and Gas	22
Chevron	19
Verdad Resources	18
EOG Resources	18
Incline Operating	17

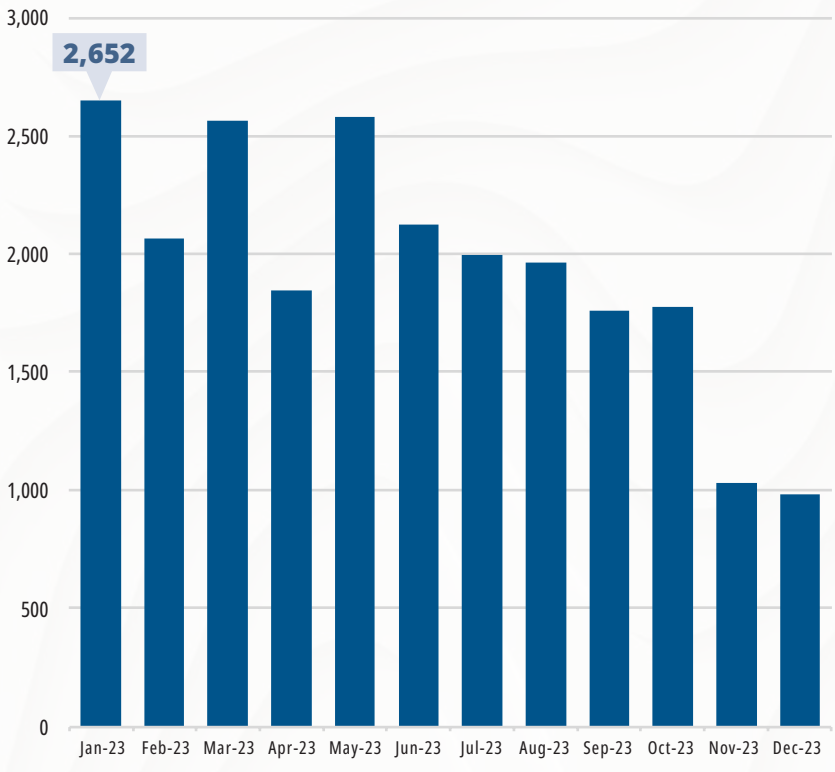
Permitted wells by state

State	Well Count
Texas	466
Wyoming	109
Colorado	99
North Dakota	47
Louisiana	18
Oklahoma	17

Source: Rextag

U.S. permits issued

(monthly, 2023)



Diamondback-Endeavor: The New Super Independent

The merger of two of the Permian's top oil producers creates an E&P with market cap north of $50 billion.

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Analysts anticipate the $26 billion merger between Diamondback Energy and Endeavor Energy will elevate it into a class of massive, public independent E&Ps in the Permian Basin.

The tie-up between Diamondback and Endeavor Energy Resources, two of the top oil producers in the prolific Permian Basin, is expected to create an oil and gas company with a market value of more than $50 billion. The deal also further reduces an already tight market for E&Ps scouring the Permian for inventory.

Diamondback's cash-and-stock bid to acquire Endeavor Energy is also the largest buyout of a private upstream company ever tracked by Enverus Intelligence Research, Senior Vice President Andrew Dittmar said.

The merger "creates an entity that will compete on day one for [Pioneer Natural Resources] market cap (~$54 billion)," analysts at Stifel reported.

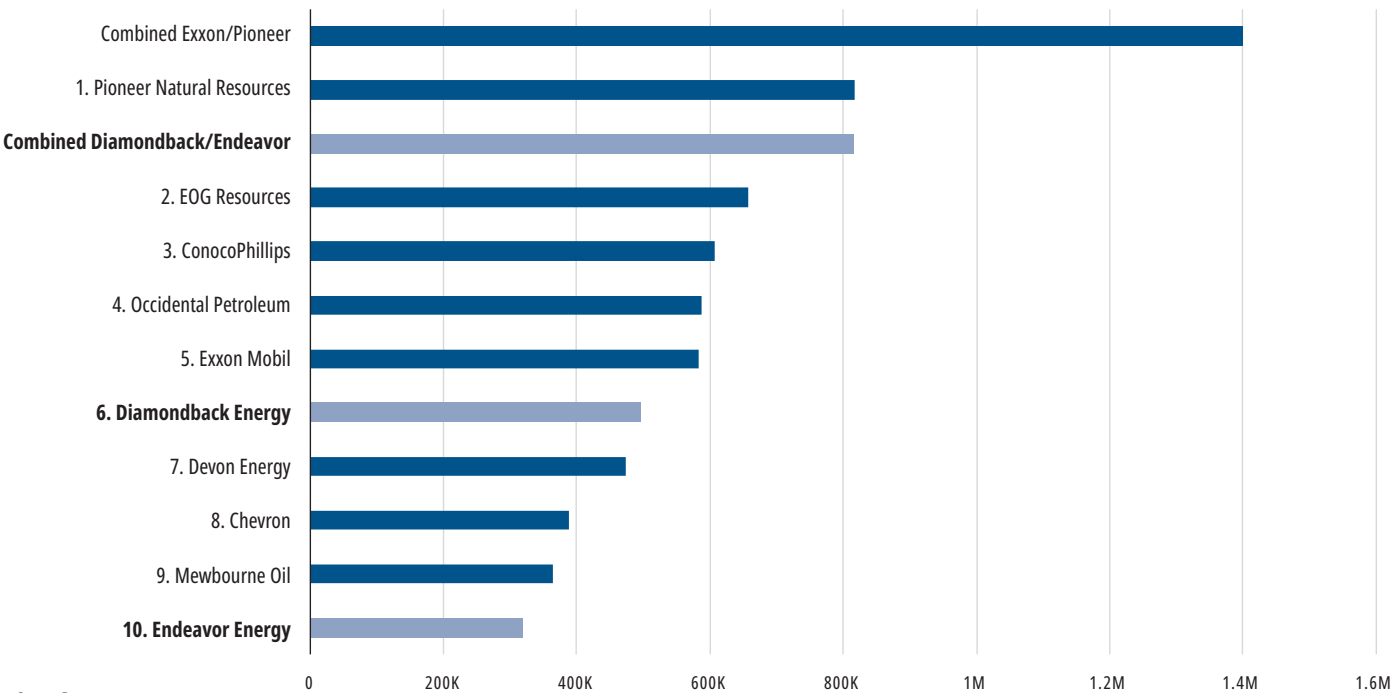
The combination could place Diamondback into an elite group of super-independent E&Ps, a nebulously defined group that often includes the likes of EOG Resources (with a market cap of about $65 billion), Pioneer Natural Resources ($54 billion) and Occidental Petroleum ($52 billion).

It's already a small group, and it's getting smaller: Texas-based supermajor Exxon Mobil inked an eye-popping $65 billion acquisition of Pioneer last fall.

"With Pioneer Natural Resources set to be folded into Exxon Mobil, Diamondback will be the standard bearer for Permian pure-plays and will have an enviable combination of scale, remaining inventory quality and operational execution," Dittmar said.

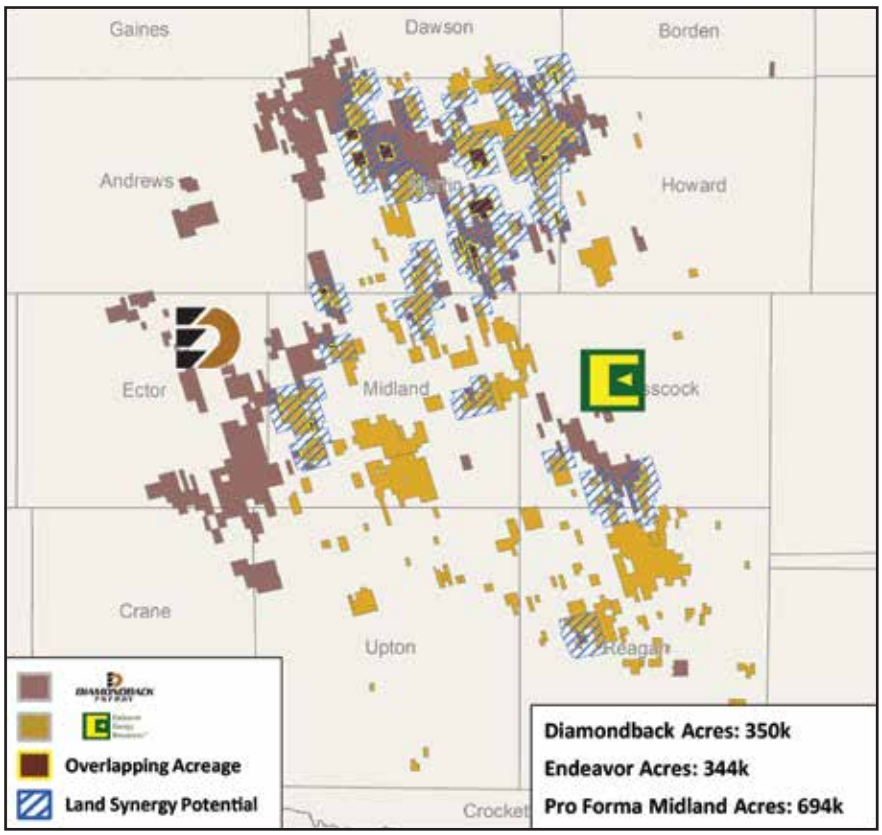
Once closed, the Endeavor acquisition would vault Diamondback's market value ahead of the other large majors in its peer group, including Hess Corp. (with a market cap of $44 billion), Devon Energy ($30 billion), Coterra Energy ($20 billion) and Marathon Oil ($13.3 billion).

Top 10 Permian Basin operators
Gross operated production, boe/d, Q2 2023



Source: Enverus

World-class assets in a world-class basin

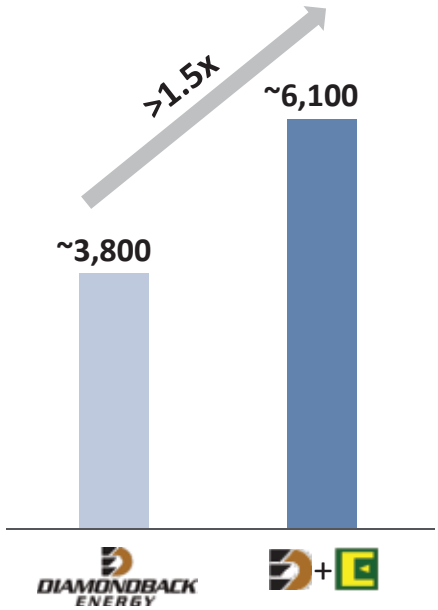


Source: Diamondback Energy

Best-in-class core inventory quality and depth

(<$40 WTI break evens)

Transaction extends duration of high quality inventory development while maintaining status quo base production decline



Permian prowl

Travis Stice, Diamondback chairman and CEO, called Endeavor "the highest quality private oil company in the United States" during a conference call with analysts.

Diamondback's portfolio includes about 494,000 acres spread across the Permian, the nation's top oil-producing basin. Around 70% of the company's acreage is held within the Permian's Midland Basin.

Founded by wildcatter Autry Stephens, Endeavor developed one of the most coveted acreage positions in the core of the Midland.

Endeavor's long history is part of what makes the private E&P such an attractive target for M&A, Dittmar said.

"Endeavor was able to secure what is now among the most valuable acreage in the Permian well before the shale boom came around and is one of the few acquisition targets that improves the quality of Diamondback's portfolio," he said.

After merging with Endeavor, Diamondback's pro forma oil production will grow to 468,000 bbl/d (816,000 boe/d) from 273,000 bbl/d (463,000 boe/d).

The company's total Permian acreage will grow to around 838,000 net acres.

Based on Endeavor's 344,000 net Midland acres and roughly 2,300 core drilling locations, Diamondback's purchase price shakes out to around $31,200 per acre and $4.7 million per location, TD Cowen managing director David Deckelbaum reported.

Diamondback's Endeavor deal "screens attractive relative to implied valuations" of other recent deals inked in the Permian—including Exxon's acquisition of Pioneer ($38,000/acre; $4.4 million/location) and Occidental's $12 billion acquisition of CrownRock ($56,000/acre; $4.8 million/location), per TD Cowen analysis.

Chopping block watch

The Permian Basin has seen a wave of consolidation as E&Ps big and small search for drilling inventory depth and high-quality rock.

A scarcity-fueled M&A deluge culminated in $192 billion of upstream transactions in 2023, according to Enverus analysis.

Because of the record amount of upstream consolidation, the list of potential M&A targets in the Permian is getting leaner.

"While there are a handful of potential public company tie-ups, the next wave of Permian dealmaking will likely need to be driven by non-core asset sales from the big buyers," Dittmar said.

Speaking during the company's call with analysts, Diamondback CFO Kaes Van't Hof said the E&P doesn't feel forced to sell off any of its portfolio. But Diamondback envisions eventually making some non-core asset sales to reduce debt more quickly.

"We still have some significant JV [joint venture] interests," he said. "Clearly, the Delaware Basin is going to get less capital as a percentage of total than it did previously. But again, we're not a forced seller."

Diamondback's Delaware Basin acreage is one part of its portfolio that could hit the chopping block for a sale, Dittmar said. Analysts had similar thoughts about the new Midland Basin acreage that Delaware-focused Permian Resources gained through the $4.5 billion acquisition of Earthstone Energy last year. OGJ

With NuStar Deal, Sunoco Gains Permian Foothold

Energy Transfer subsidiary's $7.3 billion purchase could face pushback from regulators.

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Energy Transfer-controlled Sunoco's acquisition of NuStar Energy expands the large fuel distribution business with greater scale, but also branches out Sunoco into the crude oil midstream space with a strong Permian Basin footprint.

Sunoco agreed in January to acquire NuStar in an all-equity deal valued at $7.3 billion with debt. The deal prices NuStar at nearly $3 billion, not counting debt.

Because of NuStar's sizable crude oil business, the MLP merger seemingly makes it only a matter of time before parent Energy Transfer decides to roll up Sunoco, including NuStar, in the continued consolidation of MLPs, said Hinds Howard, portfolio manager at CBRE Investment Management.

"These are [crude] assets that make more sense with Energy Transfer," Howard told Hart Energy. "I think, over time, it will happen. These [NuStar] assets moving to Sunoco make a roll-up make more sense."

Howard said Energy Transfer attempted to directly acquire NuStar in the past, and that the Sunoco units likely offered the "best currency" to get the deal across the finish line.

Because Energy Transfer is an oil and gas giant with the third-largest market cap of North American midstream players, the deal could face more regulatory scrutiny.

But Scott Grischow, Sunoco's treasurer and senior vice president of finance, said in an analyst call that the partnership is optimistic the deal will face few hurdles by the Federal Trade Commission.

"If you take a look at the combined assets of our organization, they're very complementary in that there's very little geographic or market overlap that you may typically see in mergers that have historically been of interest to the commission," Grischow said.

NuStar founder Bill Greehey stepped down from the chairman role in late 2022, so maybe the timing was right to sell, according to analysts.

"NuStar is a really stable and mature MLP," Howard said.

Amid an ongoing wave of MLP mergers and rollups in recent years, the deal leaves the industry with only 13 notable remaining MLPs, Howard said. Sunoco and NuStar combine the seventh and eighth-largest MLPs by market cap.

Permian power and more

NuStar's Permian crude oil system currently moves about 540,000 bbl/d, according to NuStar, helping take crude volumes to refining and export hubs, including along the Texas Gulf Coast and Louisiana.

But crude oil still makes up less than half of NuStar's overall business.

NuStar has approximately 9,500 miles of pipeline and 63 terminal and storage facilities that hold and distribute crude oil, refined products, renewable fuels, ammonia and specialty liquids. The combined system counts 49 MMbbl of storage capacity at its facilities in North America.

Sunoco executives said they expect the deal to be 10% accretive to distributable cash flow per LP unit by the third year after closing. The partnership anticipates realizing at least $150 million in cost-saving synergies by that point.

Sunoco said it has secured a $1.6 billion bridge term loan to refinance NuStar's high-cost floating rate capital. NuStar's market cap closed on Jan. 19 at $2.27 billion. Sunoco said the implied premium on the purchase is about 24% based on the volume-weighted average pricing over 30 days.

The partnership aims to achieve a leverage target of 4x within 12 to 18 months of closing, which is expected to occur during the second quarter.

Earlier in January, Sunoco agreed to sell 204 convenience stores to 7-Eleven for about $1 billion, indirectly helping to finance the all-stock NuStar deal. The convenience stores are primarily located in West Texas, New Mexico and Oklahoma.

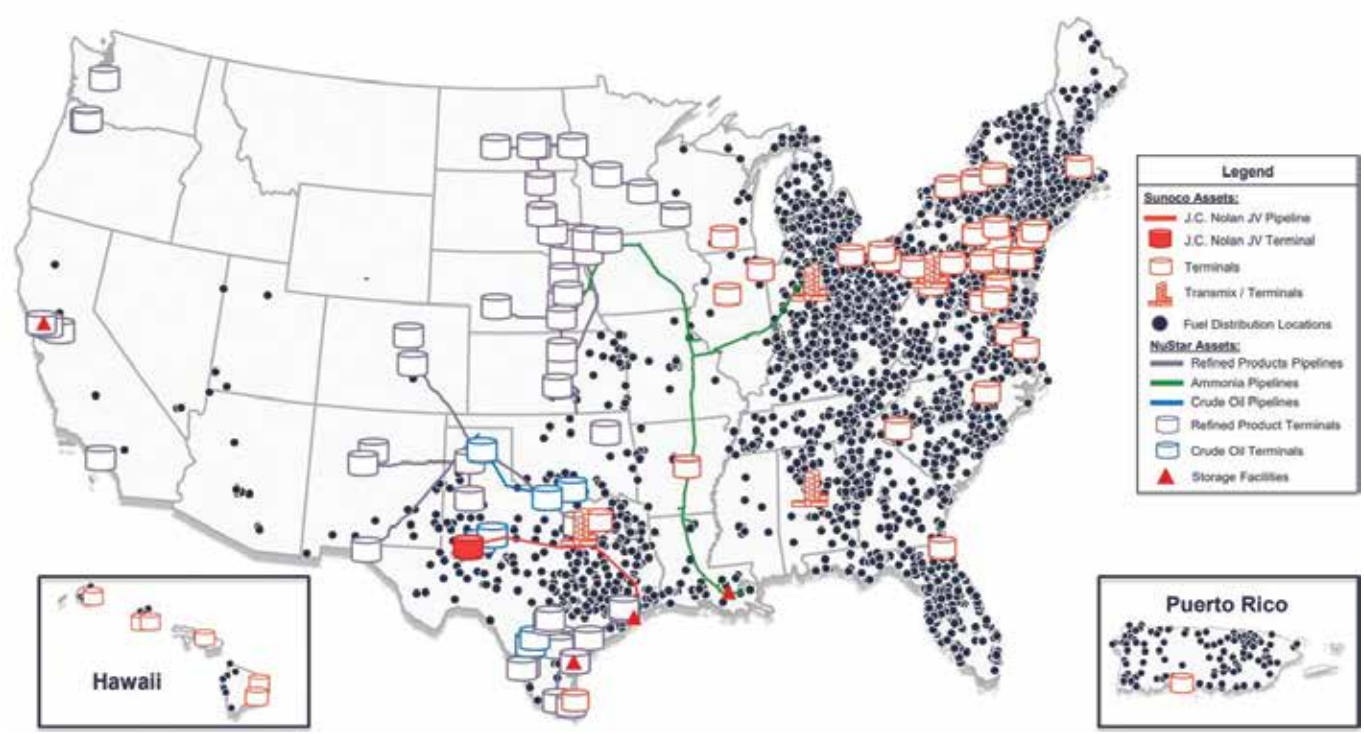
The partnership expects to generate net proceeds of approximately $750 million from the asset sale, which will be used to materially reduce debt, Sunoco CEO Joseph Kim told analysts.

"The pro forma company's metrics would reflect variables that are very similar to investment-grade companies," he said.

Fitch Ratings affirmed Sunoco's long-term issuer default rating at BB+ with a "stable outlook" following the deal announcement.

"Fitch believes the acquisition of NuStar will improve [Sunoco's] business risk profile through an increase in geographic and

Sunoco and NuStar's combined assets



Source: Sunoco investor presentation

The transaction brings together Sunoco's fuel distribution and terminal portfolio with NuStar's extensive pipeline network for crude oil and refined products.

business line diversity," Fitch stated.

NuStar will contribute crude and refined products terminals, as well as fuel and oil pipelines, a large ammonia pipeline and exposure to renewable fuels on the West Coast.

Of the pro-forma EBITDA, approximately 45% will come from fuel distribution, 25% from crude oil and 25% from refined products, with the balance from other services, Fitch noted, citing better balance and business line diversity going forward.

M&A strategy

Sunoco's deal with NuStar represents a similar strategy to several of Sunoco's other recent acquisitions.

Take Sunoco's 2021 acquisition of NuStar's East Coast U.S. terminal assets for $250 million, for example, said Sunoco COO Karl Fails. Sunoco was able to take its own East Coast fuel distribution business and couple it with NuStar's expanded midstream presence in the area.

"You get benefits going both ways. Having the fuel distribution business helps keep your midstream assets more full," Fails said. "And often, the midstream assets provide a foundation for additional growth or supply synergies on the fuel distribution side."

After closing the East Coast asset deal, Sunoco was able to stand up a gasoline blending business out of NuStar's terminal in Linden, N.J.—another example of creating new value for the combined business, Fails said.

Sunoco also aims to scale up its fuel distribution presence in the western Midwest—where the partnership doesn't have a huge footprint—using NuStar's existing asset base in the region.

Last year, Sunoco bought 16 refined product terminals from Zenith along the East Coast and in the Midwest for $110 million.

The NuStar takeover also expands Sunoco into new business lines, including crude oil pipelines. NuStar operates approximately 2,100 miles of crude pipelines in Texas and Oklahoma.

The transaction will also deliver Sunoco around 2,000 miles of pipeline to transport ammonia, another new business line for the partnership.

While these segments will be new to Sunoco's portfolio, they do have ties to the refined products business with which the partnership is already quite familiar, said Grischow.

"We follow those markets closely and are excited to have assets that are going to be able to provide value for a broader customer base, moving a broader suite of product," Grischow said.

Sunoco ties run deep

Energy Transfer acquired Sunoco in 2012 for $5.3 billion. Today, Energy Transfer controls all of the incentive distribution rights (IDRs) of Sunoco, but Sunoco has remained independently traded.

Energy Transfer co-founder and Executive Chairman Kelcy Warren led the acquisition of Sunoco to expand the business, but he said in a recent interview that it also held stronger sentimental ties.

After all, Warren's father was a longtime, loyal Sunoco employee in East Texas.

"It was just unbelievably rewarding," Warren said. "It's never the reason a business person should ever do an acquisition. If it has sentimental value to you, then never, ever. But, in this case, yeah, it had that, but it was also a fabulous acquisition for our unitholders. But it was a big deal. Big deal for me." OGJ

4Q Deals Hit $144B. What's Next?

With fewer U.S. takeover targets, operators may go abroad to add reserves, according to Enverus.

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Oil and gas producers' 2023 merger talks culminated in a $144-billion tsunami of year-end deals, according to Enverus Intelligence Research.

Full-year 2023 deals totaled $192 billion.

Two deals alone represented $125 billion of fourth-quarter and full-year deal value: Pioneer Natural Resources for $65 billion by Exxon Mobil, and Hess Corp. for $60 billion by Chevron.

The bid for Pioneer is the "third-largest upstream deal ever by enterprise value," Enverus reported; the Chevron-Hess deal, the fourth-largest.

According to London Stock Exchange Group (LSEG) analysis, the Pioneer deal was the largest announced globally in any sector in 2023. The Hess deal was No. 2.

"Oil and gas is undergoing a historic consolidation wave comparable to what occurred in the late 1990s and early 2000s [that gave rise] to the modern supermajors," said Andrew Dittmar, Enverus senior vice president.

The acquisitions are "the preferred tool to replace declining reserves and secure longevity in these companies' profitable upstream businesses," he added. Also, for top acreage, "there are also now more buyers than sellers, driving prices upward."

At top in remaining resource is the Permian Basin, where Pioneer is a pure-play, "offering both the most high-quality remaining drilling opportunities and the greatest potential for resource expansion," Enverus reported.

The potential is vertical "from the prolific region's stacked resource benches."

Permian deal-making alone was $103 billion of full-year 2023 deal value. Occidental Petroleum made a winning $12-billion bid for Permian pure-play CrownRock. The deal is expected to close this quarter, according to Oxy.

"Buyers increasingly showed a willingness to pay whatever it took to boost their footprint in this critical play, and prices for future drilling inventory climbed to new highs," Dittmar said.

Exxon Mobil's offer for Pioneer represents $89,500 per flowing boe/d, according to a Hart Energy analysis.

2024: To Canada

The number of potential acquisitions "has grown short," Dittmar added, although "the buyer interest is still there," thus a 2024 repeat of 2023 activity is unlikely.

Privately-held Midland Basin pure-play Endeavor Energy was at the top of prospective buyers' take-out targets prior to the announcement of its purchase by Diamondback Energy for $26 billion.

A Hart Energy analysis of Exxon Mobil's valuation of Pioneer estimated Endeavor could have fetched as much as $30 billion.

As large reserve-replacement and expansion opportunities diminish onshore in the U.S. Lower 48, Enverus reported, "buyers may increasingly look outside the United States for acquisition opportunities."

The Chevron-Hess deal is one example. While Hess operates in the Bakken Shale in the

Top Deals of 2023

Value	Target	Date	Status
$64.9B	Pioneer Natural Resources	October 2023	Pending
$59.6B	Hess Corp.	October 2023	Pending
$42.1B	Seagen	March 2023	Pending
$32.5B	Johnson & Johnson Services	July 2023	Completed
$29.6B	Splunk	September 2023	Pending

Source: London Stock Exchange Group

Endeavor Energy "has an excellent chance of generating the largest transaction of 2024."

—**Andrew Dittmar,** ***senior vice president, Enverus***

Williston Basin, Chevron is buying it "largely for its exposure to Guyana," Enverus reported.

An obvious place to go is Canada, where buyers can find "a large resource base in a developed and stable country."

The Montney Shale play has some 20 years of Tier 1 inventory remaining at the current drilling pace. It "will likely get some close looks from U.S. companies concerned about the scale and quality of inventory left to buy at home."

Pruning

2024 may also come with relatively smaller transactions as a result of post-M&A portfolio pruning, Dittmar said. For example, Occidental plans to divest up to $6 billion of property.

"That should be a welcome development for some of the smaller public E&Ps plus private capital that have been priced out or lacked the scale to compete in the strategic core Permian deals," Dittmar said.

Plays on the 2024 deal roster may be in Oklahoma in the SCOOP and STACK, in South Texas' Eagle Ford and in North Dakota's Bakken. "These plays had just a combined $11 billion of deals in 2023," Dittmar said.

While private equity has funded some 20 new E&Ps since 2021, "the game has changed for these firms. Rather than buying promising exploratory acreage and hoping to prove it up before selling to a public operator, the firms will likely be looking to buy relatively developed assets cheaply and generate dividends for their private investors," Enverus reported.

Natural gas

Of the $192 billion of 2023 upstream M&A, $6 billion was gas-weighted property.

Among these, "the largest gas deal wasn't announced until nearly the end of the year when Tokyo Gas purchased Rockcliff Energy in the Haynesville for $2.7 billion in December 2023."

Already exceeding 2023 total gas-weighted deal value is the Chesapeake Energy-Southwestern Energy merger announced in January for some $12 billion, including SWN's debt.

"There is likely to be increasing interest in gas assets as the long-awaited U.S. LNG ramp nears with the U.S. slated to add 10 Bcf/d of LNG export capacity over the next 36 months," Enverus reported.

"That should eventually offer relief for producers from low natural gas prices, although they will likely need to be patient. With gas storage filling and production still strong, gas prices through most of 2024 are likely to be as low or lower than the challenged 2023 market." OGJ

Transaction Highlights

California Resources Corp., Aera Energy to Combine in $2.1B Merger

California Resources Corp. (CRC) agreed to an all-stock merger with Aera Energy, a joint venture created by Shell and Exxon Mobil, in a deal valued at $2.1 billion.

The deal comes almost one year after Exxon and Shell closed the sale of Aera to German asset manager IKAV for $4 billion in February 2023. Canada Pension Plan Investment Board (CPP) subsequently bought a 49% stake in the company.

CRC said it expected to be immediately accretive. At closing, Aera's owners will receive 21.2 million shares of CRC's common stock, equal to approximately 22.9% of CRC's fully diluted shares. The deal includes Aera's net debt and other obligations.

CRC said the transaction adds large, conventional, low decline, oil weighted, proved developed producing reserves and sustainable cash flow. In third-quarter 2023, Aera averaged 76,000 boe/d, 95% oil. The company had estimated proved reserves of approximately 262 MMboe at year-end 2024.

Pro forma for the transaction, CRC estimated it will average 150,000 boe/d (76% oil) and hold proved reserves of approximately 680 MMboe (90% proved developed). The combined company will own interests in five of the largest oil fields in California with opportunities to increase oil recovery.

Post-closing, CRC estimates free cash flow to more than double to $685 million in 2024 at strip pricing as of Jan. 25: $79.81/bbl Brent and $2.65/MMBtu Henry Hub. Through 2028, free cash flow will total nearly $3 billion.

CRC's board also authorized a 23% increase to CRC's buyback program, representing $1.35 billion. The program's authorization was extended through year-end 2025. After the deal closes, and subject to board approval, the company expects to increase its fixed quarterly dividend.

CRC has identified synergies that management expects to total $150 million annually, which will be realized within 15 months of closing. Cumulative synergies over the next decade have an estimated PV-10 value of nearly $1 billion. Synergies are expected to be realized primarily through lower operating costs, capital efficiencies, G&A reductions and optimization of shared field infrastructure.

"This strategic transaction will create scale in our operations, generate significant free cash flow, accelerate cash returns to shareholders and expand our energy transition platform," said Francisco Leon, CRC's president and CEO.

Leon said the company remains committed to reducing emissions and "this combination will advance our goal to permanently sequester 5 million metric tons per year of CO_2 in our underground storage vaults."

Erik Bartsch, Aera's president and CEO, said the two companies have "decades of experience and track records that will serve as a foundation for a strong combination. We are committed to continuing to deliver the energy Californians need today and working to deploy carbon capture at-scale."

The transaction, which has an effective date of Jan. 1, 2024, is expected to close in the second half of 2024.

Permian E&P Midway Energy Partners Secures Backing from Post Oak

New Permian Basin E&P Midway Energy Partners has closed an equity commitment from investment funds managed by Post Oak Energy Capital to acquire and exploit a pipeline of opportunities throughout the play.

The size of the commitment wasn't disclosed.

Midway Energy, based in Midland, Texas, was founded in 2023 by CEO Jack Walter, COO Brady Adams and Jordan Cox, senior vice president of engineering. Each has successfully participated in building Permian private equity-backed ventures and public companies.

Walter said Midway Energy intends to build a best-class operator and said Post Oak has an outstanding track record of value creation in the energy industry.

"We are encouraged by the opportunity set in the Permian Basin and look forward to leveraging our technical and operational expertise, along with Post Oak's financial acumen to maximize shareholder value through responsible development-oriented projects," he said.

Adams said Midway Energy has built a reliable network of service providers that will allow the company to develop projects "responsibly and efficiently." The company looks "forward to kicking off our development program in the near future."

Ryan Walsh, Post Oak director, said growing tailwinds of consolidation, coupled with continued industry-wide capital constraints, "are generating bespoke opportunities for nimble companies such as Midway who can expeditiously identify and deploy ready capital into otherwise overlooked or stranded inventory."

Silver Hill Energy Enters Bakken with Liberty Resources Acquisition

Silver Hill Energy Partners is entering the Bakken play through the acquisition of Liberty Resources II.

Dallas-based Silver Hill agreed to acquire Denver-based Liberty's interests in oil and gas properties, rights and related assets in North Dakota.

Net production from the acquired assets averaged around 13,000 boe/d (76% oil, 86% liquids) in December and its proved developed producing reserves total approximately 16 MMBoe.

Liberty has 84,000 net acres across Mountrail, Burke, Williams and Divide counties, N.D.

Liberty currently has one rig drilling in Mountrail County, and the company expects to complete 12 additional wells during the first quarter. The acquired assets include more than 300 gross operated drilling locations.

Silver Hill will also assume 100% ownership of Liberty Midstream Solutions, which owns gas gathering, gas processing and produced water logistics assets in North Dakota.

The midstream assets include 33 miles of gas gathering lines, 22 miles of water gathering lines, a 33 MMcf/d gas processing facility and five saltwater disposal wells with about 60,000 bbl/d of disposal capacity.

"After years of considering various opportunities for entry points into the Bakken, we are thrilled to be acquiring what we believe is an ideal initial upstream and midstream development platform for

An oil rig operates in Williston, N.D. The Williston Basin has seen an uptick in dealmaking and M&A rumors.

Shutterstock

us in the play," said Kyle D. Miller, founder and CEO of Silver Hill, in a news release.

The transaction is expected to close March 14. Financial terms of the acquisition were not disclosed.

Silver Hill plans to finance the acquisition through a combination of debt and equity. Equity consideration will come from Silver Hill Energy Partners III—Silver Hill's third partnership and first institutional private equity fund—as well as from another Silver Hill-sponsored partnership.

Silver Hill Energy Partners III closed in 2022 with $1.02 billion in capital commitments.

Senior bank debt from each partnership's credit facilities will also finance the Liberty acquisition, Silver Hill said.

Silver Hill said it plans to use the Liberty acquisition in the Bakken "as a springboard for future growth in the area through additional bolt-on acquisitions and related investments in upstream, midstream, minerals and royalties."

Silver Hill III was formed following the successful merger of Silver Hill I and II's upstream assets into RSP Permian in 2017 for $2.5 billion in cash and stock. RSP Permian later sold to Concho Resources, which was later acquired by ConocoPhillips in a $13.3 billion transaction in early 2021.

Permian Resources Acquired More Delaware Basin Acreage in Two Bolt-on Acquisitions and an Acreage Swap

The Midland producer executed two separate transactions to acquire 11,500 net leasehold acres and 4,000 net royalty acres in Eddy County, N.M., for about $175 million.

Permian Resources acquired the properties for around $10,000 per net leasehold acre, after adjusting for the value of production.

The new properties consist of mostly undeveloped acreage and are largely contiguous with Earthstone Energy's legacy position in the Delaware Basin. Permian Resources closed a $4.5 billion takeover of Earthstone last November, adding scale in both the Delaware and Midland basins.

"Since closing the Earthstone transaction, Permian Resources has added 14,000 net acres and 5,300 net royalty acres located in the core of the Delaware Basin at attractive valuations," said James Walter, co-CEO of Permian Resources, in a press release.

"As a result of our portfolio management efforts over the past year, Permian Resources has more than replaced the approximately 150 wells included in its 2023 development schedule, effectively increasing inventory life," he said.

Permian Resources said it has identified more than 100 gross operated, two-mile drilling locations on the acquired properties, which immediately compete for development capital.

"The quality of the acquired acreage is consistent with our core Parkway position, which represents one of the highest returning assets within our portfolio," said Will Hickey, co-CEO of Permian Resources.

Permian Resources continues to make strides in its organic ground game M&A strategy, having added around 500 net acres across 35 grassroots transactions during the fourth quarter.

During first-quarter 2024, Permian Resources also completed an acreage trade, further reinforcing its position in Lea County, N.M.

The company traded into

approximately 2,000 net acres with "increased working interest" adjacent to its current position. The company also traded out of approximately 2,000 net acres of non-operated acreage and "lower working interest" operated acreage.

Permian Resources says it expects to begin development on the newly acquired acreage in 2024.

NOG Closes Utica Shale, Delaware Basin Acquisitions

Northern Oil and Gas (NOG) closed two previously announced acquisitions with private sellers in the Utica Shale and northern Delaware Basin assets for $162.6 million.

In November, NOG said it would enter the Utica Shale with the purchase of interests including 0.8 net producing wells and 1.7 net wells in process from a private party. The Minneapolis company added non-operated interests in Ohio's Jefferson, Harrison, Belmont and Monroe counties.

The primary target zones are the Point Pleasant Formation and the Utica Shale. Nearly all of the acquired Ohio assets are operated by Ascent Resources.

NOG also extended its footprint in the Delaware Basin in a separate transaction that bolts on non-operated interests across about 3,000 net acres in the northern part of the play. The interests are primarily in Lea and Eddy counties. The company owns existing interests in approximately 90% of the leasehold.

The two deals were initially priced at $174 million. NOG paid $28.4 million in closing costs incurred in fourth-quarter 2023 and the remaining $134.2 million in first-quarter 2024.

The first quarter closings were funded in part by a $17.1 million deposit paid at signing in November. The closing settlements are a net of preliminary and customary purchase price adjustments and remain subject to post-closing settlements between the parties.

Humble Midstream II, Quantum Capital Form Partnership for Infrastructure Projects

Humble Midstream II Partners and Quantum Capital Group announced a partnership for North American infrastructure development and operations.

The statement did not include the amount of Quantum's capital commitment to Denver-based Humble II.

"With this commitment from Quantum, we are able to focus on building infrastructure solutions that support the North American energy complex," said Steven Huckaby, Humble II CEO. "As energy security and sustainability remain important issues, we believe that traditional and low-carbon energy solutions will each play a vital role in fueling our world."

According to the statement, Humble II lists its goals as developing and operating both traditional infrastructure and facilities for the energy transition.

Last September, after Exxon Mobil bought Denbury—a major carbon pipeline operator—Humble II's Huckaby said enthusiasm for clean-energy midstream was growing.

"In most cases, individual emitters are not likely to have enough scale with their volumes to drive CCS (carbon capture and sequestration) projects on their own," Huckaby said in September. "So, it's mostly the sequesterers and the midstream leading the dance."

A a Quantum partner said the capital group had confidence in Humble II's experience and ideas.

"They have a demonstrated track record in the infrastructure space and a creative, customer-focused approach to providing solutions to the industry," said Garry Tanner, Quantum partner. "We believe the current environment presents an attractive opportunity to develop, own and operate energy infrastructure."

Vital Energy Again Ups Interest in Acquired Permian Assets

Vital Energy again upped its interests in producing Permian Basin assets that the E&P scooped up through acquisitions last year.

Vital closed a second acquisition of additional working interests from Henry Energy, Moriah Henry Partners and Henry Resources for approximately $78 million.

The transaction increases Tulsa, Okla.-based Vital's working interest in 54 producing wells by an average of 67%.

The deal boosts the company's estimated 2024 production by 1,850 boe/d (51% oil).

Truist Managing Director Neal Dingmann said in a February research report that Vital had made "another highly accretive addition" with the transaction.

The purchase price works out to about $40,000 per flowing barrel and is expected to add about $25 million to free cash flow in fiscal year 2024.

"Not only is the purchase price discounted vs. recent deals, but in our view, working interest additions are among the most attractive deals given the minimal incremental costs," Dingmann and Truist analysts wrote, adding that the firm is raising its target price for Vital to $86 from $81.

Vital funded the deal by issuing approximately 879,000 shares of its common stock and approximately 980,000 shares of its 2% cumulative mandatorily convertible preferred securities.

It's the second transaction associated with the exercise of tag-along rights by owners of certain assets in the Henry acquisition.

"We are pleased to have closed our second transaction to increase our working interests in high-value properties associated with the Henry acquisition," said Vital's President and CEO Jason Pigott. "Both transactions were attractively priced, accretive to free cash flow per share and highly supportive of our deleveraging goals."

ARM Energy Sells Minority Stake in Natgas Marketer to Tokyo Gas

A Tokyo Gas subsidiary has acquired minority equity interests in a new natural gas marketing company founded by ARM Energy Holdings.

Financial terms of the transaction weren't disclosed.

Tokyo Gas America purchased a stake in the new firm, ARM Energy Trading, which is comprised of ARM Energy Services and ARM Energy Mexico, one of the largest private physical gas marketers in North America, according to the release.

The transaction allows ARM to continue growing its asset optimization and trading strategy while furthering its overall energy platform, said Zach Lee, CEO of ARM Energy.

"Combining our existing business units with Tokyo Gas' assets will create material synergies, while also providing us with an entry to marketing and trading of other products," Lee said. "With its strong asset base and global reach, Tokyo Gas stands at the forefront among organizations creating a stronger, more dynamic energy future, and we are thrilled to partner with them to create more value together through ARM Energy Trading."

Akira Inukai, CEO of Tokyo Gas America, said ARM's extensive customer relationships and capabilities in natural gas procurement and sales have established it as a leader the industry. "Demand for natural gas continues to surge in North America, and this investment positions us strongly to capitalize on the important continued growth in the region," Inukai said.

ARM Energy Trading will be led by the current management team of ARM Energy with Zach Lee serving as board chair. OGI

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BKV's IPO Just Waiting for the Right Window

CEO Chris Kalnin says the Barnett's largest gas producer wants to see how the IPO market performs.

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BKV Corp. stands "at the ready" to launch its IPO, says CEO Chris Kalnin.

Public markets, on the other hand, aren't yet ready for BKV, he says.

In November 2022, Denver-based BKV filed its paperwork with the Securities and Exchange Commission, but the company has yet to price or pull the trigger on a share offering, despite a limited amount of IPO activity in the E&P and oilfield services spaces last year.

In an exclusive interview with Hart Energy, Kalnin said that volatility in natural gas prices, geopolitical instability in the Middle East and multiple U.S. bank failures were among the issues last year that soured the E&P's appetite for an IPO.

"It just feels like '23 was not a real stable year," Kalnin said. "There were too many things that were spooking investors, I think, to really get a solid run at an IPO market."

BKV is the largest producer in the Barnett Shale—the storied gas play near Fort Worth, Texas, unlocked by pioneer George Mitchell to usher in the shale revolution.

BKV entered the Barnett in 2020 by acquiring over 289,000 net acres from Devon Energy. The company expanded its Barnett footprint by acquiring another 165,000 net acres from subsidiaries of Exxon Mobil in 2022.

BKV also has a smaller footprint of assets in northeastern Pennsylvania.

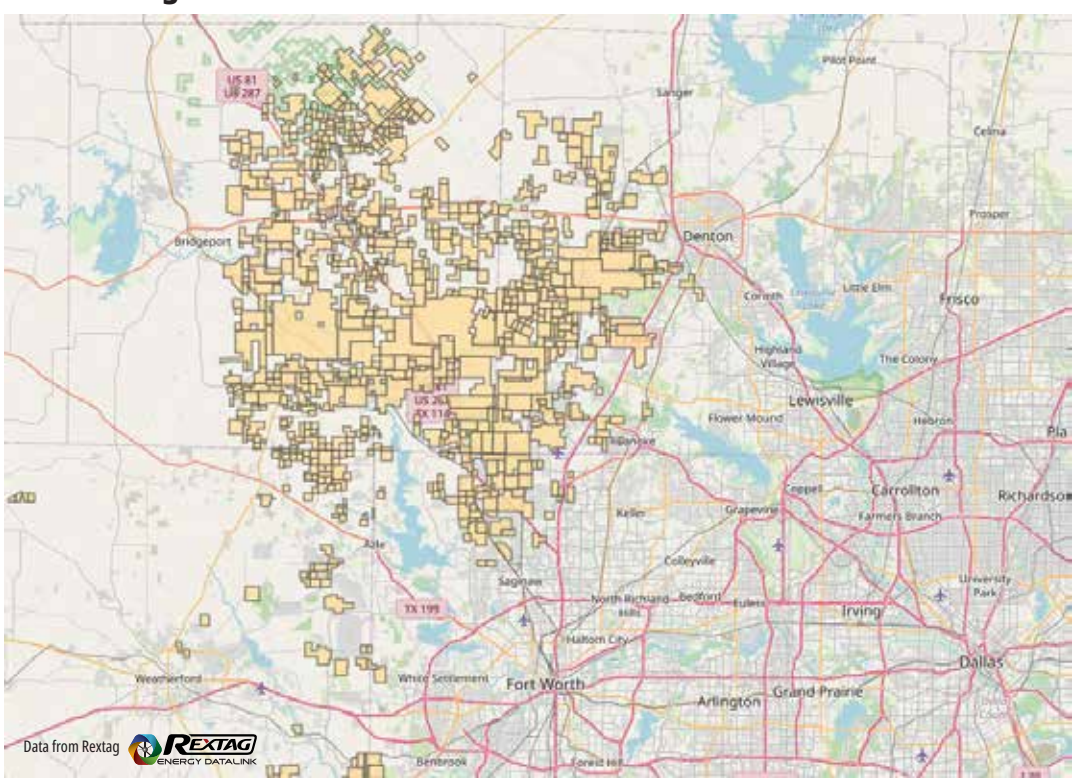
Production averaged 866.9 MMcfe/d (80% natural gas, 20% NGL) as of September, according to the company's most recent SEC filings; BKV's total acreage position was approximately 497,000 net acres at that time.

Gas glut

A rapid decline in natural gas prices in late 2022 and throughout 2023 came as a massive surprise to the market and chilled near-term investor interest in the gas sector, Kalnin said.

Henry Hub spot gas prices averaged $6.42/MMBtu in 2022 amid a confluence of

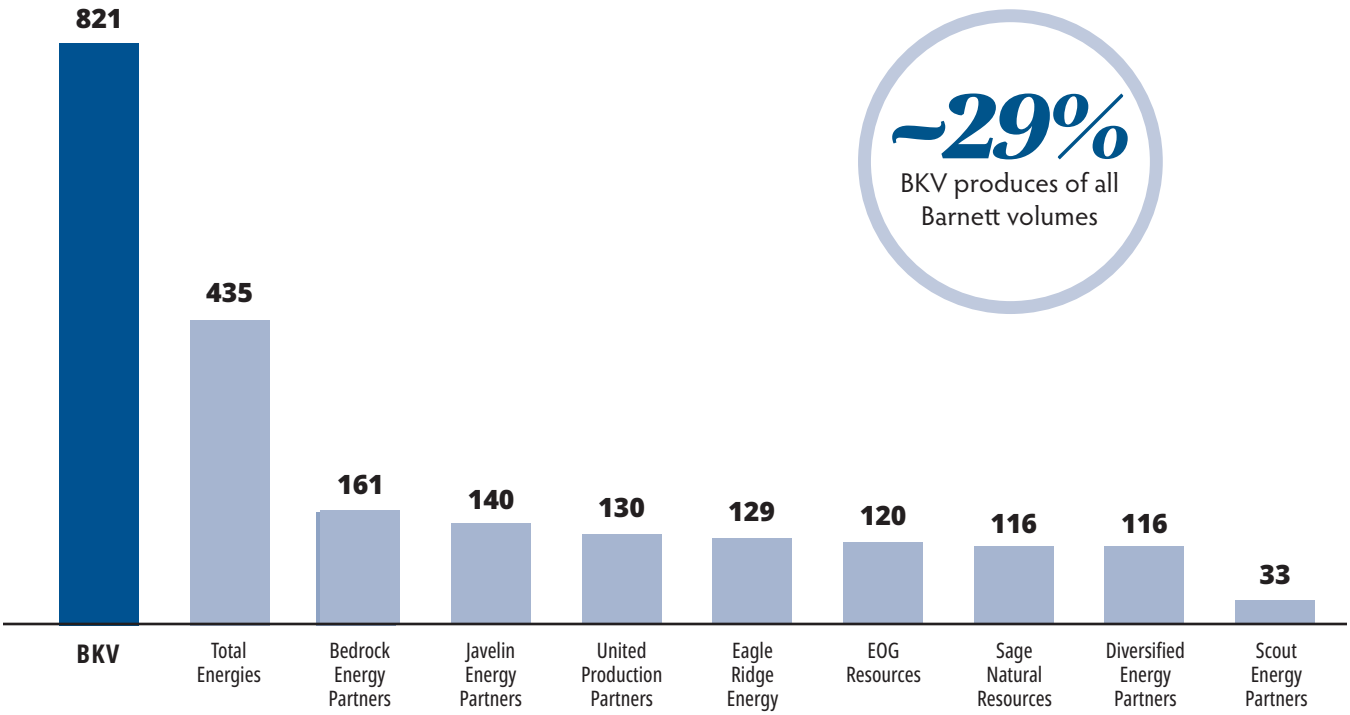
BKV's acreage in the Barnett Shale



BKV holds a large acreage position in the Barnett Shale, northwest of Fort Worth, Texas.

Top 10 Barnett producers

August 2023 - gross operated production (MMcfe/d)



Source: BKV Corp. regulatory filings; Texas Railroad Commission data

supply-demand imbalances emerging from the COVID-19 downturn, Russia's invasion of Ukraine and a myriad of other issues.

But prices fell over 60% to average $2.54/MMBtu in 2023 due to an oversupply of production and glutted storage inventories, according to the Energy Information Administration.

"I think that the general sentiment is super bullish gas long-term, but people don't want to mistime that window," Kalnin said.

BKV, along with most of the largest U.S. gas producers, believes better price stability will start to come into view later this year and into 2025 as a wave of new LNG export capacity comes online along the Gulf Coast.

That confidence in natural gas prices needs to also be mirrored by confidence in the broader economy, he said.

But one of the biggest things BKV is watching for is other IPOs successfully taking off. No one is eager to serve as the guinea pig.

"I think we need to see IPOs perform," he said. "I think we need to see the IPO market come back in a big way."

Launch window

The economic volatility isn't just chilling oil and gas IPO activity. Ryan Maierson, a partner at Latham & Watkins with over two decades of experience advising on corporate dealmaking and transactions, said the number of IPOs over $100 million are still near their lowest levels in three decades.

There have been a few marquee IPOs that have generated a tremendous amount of interest recently—like the Mediterranean restaurant chain Cava Group, or Kenvue, a spinoff from Johnson & Johnson.

But that limited activity hasn't been enough to woo hesitant IPO investors back into the fold. In fact, the aftermarket performance of some marquee IPO stocks has been relatively lackluster—another factor holding back companies looking to IPO themselves.

"These are anecdotes; they're not data," Maierson said. "There's just not enough information to be able to accurately predict what's going to happen this year, I think."

The closed IPO window hasn't necessarily been a burden for upstream companies. Many E&Ps are spitting out record amounts of free cash flow and returning as much capital to shareholders as feasibly possible through dividends and buybacks.

"When you have more capital discipline, you may have fewer companies that feel like they need to tap the capital markets in order to raise additional funds to build out their growth plans," Maierson told Hart Energy.

After several years of limited interest by the public capital markets, a small handful of energy and energy services companies launched public offerings in 2023.

TXO Partners went public in January 2023. The MLP is led by Bob Simpson, an industry veteran who founded XTO Energy, which sold to Exxon Mobil for $41 billion in 2010.

Atlas Energy Solutions, a proppant and logistics services provider in the Permian Basin, made its IPO in March 2023.

Kodiak Gas Services, a provider of contract compression services with a large Permian footprint, made its public debut last summer.

And Midcontinent E&P Mach Natural Resources, which also is organized as an MLP, went public in October.

Energy stocks generally performed well in 2023, so some experts expect to see more energy IPO activity move forward this year.

Better clarity on the timing of interest rate reductions by the Federal Reserve should spur additional signs of life in the IPO market, Maierson said.

Geopolitical instability in the Middle East, like the Israel-Hamas war and ongoing turmoil affecting shipping in the Red Sea, present other macro risks for the oil and gas sector itself.

"I'm still cautiously optimistic that there will be a continued upturn—not only in the broader IPO market, but in the energy and energy transition spaces, in particular."

Capturing the gas value chain

BKV doesn't want to be known just as a gas producer.

The company aims to differentiate itself from other competitors in the market with robust, net-zero emissions goals and a vision for an integrated gas value chain—from wellhead to pipeline, all the way to power generation and retail electricity.

BKV—in partnership with its financial sponsor, Thai energy giant Banpu—owns interests in two combined cycle gas and steam turbine power plants in Temple, Texas—Temple I and Temple II.

The plants, located within the Texas electric grid's north zone market, have annual average power generation capacities of 752 MW and 751 MW, respectively.

The company also owns midstream assets for gathering, processing and transporting natural gas produced by its own upstream assets, as well as for third-party producers.

BKV plans to establish midstream contracts in the near term to allow the company to supply its own natural gas directly to its power plants in Temple, the company said in regulatory filings.

Last February, BKV launched its own retail electric business, BKV Energy, to sell power to commercial, industrial and residential retail customers in Texas. Since launching last year, BKV Energy has nabbed more than 34,000 customers.

Kalnin likens BKV's vision to what we saw the big oil majors start doing in the 1950s: They didn't just pump oil and gas—they started building refineries and fuel stations and their own midstream systems.

Why?

"One, they wanted to build relationships with the end customers," Kalnin said. "But importantly, they wanted to reduce the volatility of just being a commodity producer and capture margin along the entire value chain."

If there was a downturn in commodity prices, the majors could make up some of those losses through gains on refining margins, or retail sales at gas stations, he said. That model has not been as popular with investors of late, but sentiments can change.

And BKV wants to do all of this while achieving net-zero Scope I and Scope 2 emissions by the end of 2025. To meet that goal, BKV is working on several carbon capture, utilization and storage (CCUS) projects to permanently sequester emissions from its owned-and-operated upstream assets.

Commercial operations for BKV's first, high-concentration CCUS project, Barnett Zero, began last year; first volumes were injected in November 2023. The Barnett Zero project separates CO_2 from substantially all of BKV's EnLink Midstream-gathered gas production.

Kalnin believes that the market for a premium product like carbon-sequestered gas, or carbon-negative gas, will only grow as global demand grows for cleaner forms of energy.

Last August, BKV inked an agreement with French energy company Engie for the sale and purchase of BKV's carbon-sequestered gas.

Under the contract's terms, BKV committed to deliver up to 10,000 MMBtu/d of carbon-sequestered gas. Delivery is expected to begin early this year.

BKV expects its second CCUS project to begin sequestration by the end of this year. OGJ

Sabadus: US to Steer Global Energy Markets Amid Clashing Forces

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Russia's invasion of Ukraine triggered a gas supply crisis of unprecedented magnitude in Europe and introduced a slew of disruptive risk factors that will reshape energy markets for years to come.

Increased geopolitical risk is accelerating the globalization of natural gas flows, while the shift from fossil fuels to renewables is pulling in a deglobalizing direction, prompting the decentralization of infrastructure and the fragmentation of energy markets.

With strong international commitments, the world is set for full decarbonization by the middle of the century. Much less clear is the intermediate term, the transition period when natural gas is still required as a backup fuel to intermittent renewable generation. This transition period, therefore, will have wide-ranging implications for the ways we produce, price and consume energy, and could undo the political alliances and the economic foundations that underpin current arrangements.

In this fast-changing reality, the emergence of the U.S. as the dominant natural gas and renewables producer and exporter would not only provide more stability to energy markets but also guarantee a smoother transition to fossil-free economies.

U.S. LNG's big moment: imports rise 70% in Europe

Up until the start of Russia's war, natural gas supply disruptions in one corner of the world would have barely reverberated in other parts because flows had been shaped by regional pipeline networks covering limited geographies. But with Russia—a leading exporter of natural gas to Europe—cutting pipeline gas exports to Europe by nearly 80%, all that changed as widespread shortages began to appear around the European market. However, it has opened the door for LNG, particularly for U.S. suppliers.

Historically, Russia had exerted a strong energy influence over Europe, supplying one-third of its total imports in recent years with largely dictated prices and contractual terms. Strapped for options, the EU turned to the LNG gas market while also seeking to fast-track the deployment of wind and solar capacity. These efforts have culminated in LNG becoming the primary source of energy supply in less than a year, rising year-on-year close to 70% in 2022, according to internal data.

Meanwhile, the U.S. has emerged as a primary supply partner, particularly thanks to the country's shale gas revolution. Simply put, U.S. LNG exports have seen extraordinary growth in recent years since opening its first LNG export terminal in 2016. Moreover, with Europe's LNG importing capacity set to expand in the short-term by one-third, the market opportunity for the U.S. to become the dominant force in LNG supply for decades to come is massive.

The deglobalizing forces of renewable energy and the U.S. opportunity

While geopolitical tensions are making natural gas markets more global, remarkable advances in renewable energy are creating a new localized and decentralized approach to energy markets. European consumers have already demonstrated their influence in rebalancing markets toward renewables by reducing natural gas demand by an estimated 15% below the 2017-2021 average in the face of a severe gas supply shortage.

The U.S. has keenly spotted the parallel energy opportunity that exists here in relation to renewables and has dedicated vast sums of money to become a dominant player in this space. If the U.S. is successful and achieves the preeminent position in the renewable supply chain, the U.S. will be able to rewrite decades of historical market agreements in the years ahead across both LNG and renewables.

U.S. LNG could ease geopolitical risks

The emergence of the U.S. as the dominant producer of LNG will also help to promote the U.S. as a foremost provider of LNG, but also a supplier that is insulated from geopolitical risks in the same way that others are not, thus boosting the perception of the U.S.' export pipeline as one of the most reliable. This is because, unlike Russian pipeline or LNG exports, which are heavily politicized, the U.S. industry is driven by private enterprise, which responds to global demand and supply signals.

An energy face-off: globalization vs. deglobalization

Deep into the fourth industrial revolution, opposing forces are reshaping the world in this energy transition period: globalization caused by the natural gas market versus deglobalization caused by burgeoning renewable energy markets. Geopolitical strife is simultaneously influencing these forces and being influenced by them. In the long term, the world is heading for greener economies of scale which will entail the full replacement of fossil fuels, decentralized energy systems and real-time markets. The intermediate period, however, will be even more interesting to watch and, as always, the U.S. will be called to play a significant role. OGJ

Private Equity: Seeking 'Scottie Pippen' Plays, If Not Another Michael Jordan

The Permian's Tier 1 acreage opportunities for startup E&Ps are dwindling. Investors are beginning to look elsewhere.

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Where's the "exploration" in E&P anymore? Private equity investors say they may find them outside of the onshore Lower 48.

"I think there are a lot of areas that we all have paid less attention to in recent years," Daniel Goodman, partner with Carnelian Energy Capital, said at the Independent Petroleum Association of America's annual Private Capital Conference in Houston.

Some were put aside for regulatory reasons; some, for subsurface reasons. Among these are the Gulf of Mexico, the Midcontinent and Canada.

"If the Permian is [Michael] Jordan, then we call these [other plays] the Scottie Pippen,'" he said, referring to the former Chicago Bulls stars and Pippen's great, but not greatest of all time (GOAT) status.

"The Permian's inventory is not infinite. So luckily, there are a lot of other plays," Goodman said.

For example, conventional oil and gas reservoirs will get a new look. "Those can be fantastic," he said.

But no matter the nature of the new rock, "These less-focused-on areas still have attractive opportunities that we and our peers are thinking about."

Carnelian-funded and Calgary-based Parallax Energy earlier this month, reported that "the Canadian E&P sector offers opportunities to capture and optimize assets amidst a still-fragmented and under-capitalized landscape."

It also invested in Hawthorne Energy, similarly focused on Western Canadian E&P.

In the Gulf of Mexico, it invested in non-operated producer Alta Mar Energy.

The non-Permian opportunities are still plenty, Goodman said. "I think that can go on many, many years."

But who takes the bigger risk?

It will be up to larger operators than the startups, which E&P private equity typically funds, to do the job of creating the next new and substantial drilling inventory though.

"Private equity is typically not the one that's going to spend the R&D dollars to prove up new plays," Goodman said. "We don't foresee a lot of new exploration [within our portfolio], but what is done will probably be done mostly by large privates and publics."

"We'll wake up in five years and the industry will have bigger companies and more diversified companies across geography and commodity."

—**Dan Pickering**, *founder and chief investment officer, Pickering Energy Partners*

One way or another, "The world needs more drilling inventory."

Another PE firm, Pearl Energy Investments, noted at the conference that it made two recent investments in Permian-focused E&Ps: Swordfish Energy and Slant Energy II. The latter is also looking at North Texas and East Texas.

Also, Quantum Capital Group's investments include D-J Basin-focused Bison Oil & Gas and Canada-focused Whitecap Resources, it noted at the conference.

Dan Pickering, founder and chief investment officer for Pickering Energy Partners, said that even Permian producers will eventually "run out of room" in their specific basins.

"They are going to have to look outside their current geographic focus," he said.

And outside their hydrocarbon mix. "Oil companies are going to have to look at gas opportunities and vice versa," Pickering said.

Eventually, what is viewed today as Tier 2 acreage will be viewed as Tier 1. "The definitions of Tier 1 and Tier 2 are going to begin morphing," Pickering said.

"So, we'll wake up in five years and the industry will have bigger companies and more diversified companies across geography and commodity."

It's inevitable, he added. "I think that's where the whole industry is going." OGI

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McClain: Silver Silver Linings in Biden's LNG Policy

EMILY McCLAIN
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MARKET WATCHERS

The Biden administration's announcement to impose a temporary halt on U.S. LNG projects stunned both domestic and global markets, especially as shipments of the fuel have begun playing an oversized role in feeding demand in Europe and elsewhere.

With Russian supplies completely turned off, the West had banked on growing U.S. volumes to plug in the gap and keep prices in check during times of extreme weather or a potential revival in industrial consumption. But that surety of supply from a reliable partner hangs in balance now.

The directive to the Department of Energy to reevaluate the climate impact of these ventures has thrown into disarray potentially 100 million tonnes (MMtonne) of projects in North America.

Still, though perhaps unintended, the move comes with some silver linings—it may help alleviate part of the massive oversupply expected in the second half of the next decade as these projects come online. In the near term, the pause on new non-FTA approvals could lift some pressure of an already strained supply chain, lower both equipment and labor expenses and ease some of the cost inflation they face now.

While the recent pause will only affect projects that have yet to receive non-FTA authorization, it has caused uncertainty in the LNG project development scene. Short-term impacts could include delays in projects nearing final investment decision (FID), worsening existing challenges in project timelines and investor confidence.

Based on the current global gas market balance and LNG expansion plans, there are indications of a potential oversupply if all global LNG projects in the pipeline proceed as planned. While this could impact LNG demand in the 2030s, the immediate impact on the gas market is minimal, given that CP2 on the Louisiana coast and similar projects are not expected to come online for several years.

Opportunities and challenges

The demand for additional LNG supply from 2030 onward presents both opportunities and challenges. The U.S. could play a pivotal role in meeting this demand, but uncertainties surrounding project approvals and regulatory changes would cast doubt on its ability to step up.

Other LNG markets like the UAE, Qatar, Mozambique and Tanzania may need to fill the gap if the U.S. fails to capitalize on this demand. Ultimately, the trajectory of LNG projects in the U.S. will shape the future landscape of global energy markets, with far-reaching implications for energy security and sustainability.

With the U.S. on a net-zero pathway, future domestic demand growth seems unlikely, posing risks to demand for LNG feed gas. The potential loss of access to LNG feed gas demand could have dire consequences for domestic gas prices, as seen in Australia, where operators have ceased investments, leading to price volatility.

Additionally, this recent move raises concerns about the country's reputation as a reliable LNG supplier and the impact on future LNG investments. Since 2016, the U.S. has provided policy certainty, speed of execution, and commercial and technical innovation, all of which help to keep commodity prices in check. However, the recent shake-up has created uncertainty for investors and the global gas market.

The administration's decision has induced nervousness among future LNG customers, including allies in Europe and Asia. This could potentially lead to a scramble for alternative suppliers for new long-term contracts. This reliance on uncontracted volumes subject to the spot market could disrupt Europe's energy security and climate initiatives, as competition for alternative suppliers may drive up prices and shift consumption toward less environmentally friendly sources like coal (as happened in 2022).

Similarly, Asia, with the largest potential for LNG demand growth, could be forced to seek alternative sources, potentially compromising its energy security and climate goals.

Given the politics now associated with LNG approvals, resolution may be delayed until after this year's elections. There is speculation about the duration of the pause and its potential reversal if Donald Trump is elected president. Rystad Energy anticipates future LNG approvals to resume in 2025, even if President Joe Biden secures a second term. Still, the delay in LNG approvals could impact projects scheduled for FID in 2024.

Is there a silver lining? Even with all of these uncertainties, there are potential positive outcomes that are worth considering. First, this pause could help alleviate looming oversupply conditions in the mid-2030s, leading to smoother market dynamics in the medium term. Another benefit that could occur is the prospect of a greener future for U.S. LNG as the DOE reassesses these projects.

This pause may promote and secure the future of Green LNG, positioning the U.S. as a leader in clean energy sources. OGI

Kissler: Despite Conflicts, Demand Impacts Oil Price the Most

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Ever since Iranian-backed Houthis began attacking ships in the Red Sea in November, there's been the risk that oil supplies could be disrupted if the situation were to escalate—and in many ways, escalate it has.

The Yemen-based movement continues to attack commercial ships, which has extended shipping times for companies choosing to go around the Horn of Africa instead, and has also increased shipping costs.

Then, in late January, a drone attack in Jordan killed three U.S. service personnel and injured more than 30. That was the first time U.S. troops were killed by enemy fire in the Middle East since the beginning of the war in Gaza. Yet, contrary to what one might expect, crude prices have actually showed a lackluster performance.

In fact, as of early February, crude futures had traded at mostly a sideways choppy pattern. Yes, there has been a $2-to-$4-per-barrel increase in prices, but that may have had more to do with cold weather-related production issues in the Dakotas than actual fear of oil transportation in the Middle East being disrupted.

Lower demand drags down prices

The point is that more traders are beginning to fear a fall in global demand than they are a supply disruption by militants. Indeed, the facts so far support the greater risk of the former.

One factor is slower economic growth in Asia, particularly in China. The Hang Seng Index has shown a 7% to 8% drop since Jan. 1. When you take into account that China is globally the largest importer of crude oil, traders' greater fear of falling demand—as opposed to fallout from the Red Sea attacks—is understandable.

Furthermore, China's slow economic recovery is not the only potential headwind for oil prices. U.S. gasoline demand also dropped substantially in the last two months. Although a decline tends to occur this time of year, the degree is what's surprising. Demand for this time of year is well below the five-year average, according to data from the U.S. Energy Information Administration (EIA).

This decline might be due to the three-week-long major cold temperatures seen across the U.S., which may have put a damper on automobile travel. However, another more lasting factor may be the fact that

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it now seems that the Federal Reserve will keep U.S. interest rates higher for longer than many expected. These higher rates have been weighing on the average U.S. consumer's pocketbook, which includes fuel purchasing.

Mideast conflict still a risk

Even though demand is the bigger weight on traders' minds right now, the Red Sea attacks and the U.S. "shadow war" with Iran still have the potential to impact the global oil supply and prices. Iran currently exports around 1 MMbbl/d. If a major event were to occur—such as the Houthis sinking an oil tanker, resulting in harder sanctions on Iranian oil—those barrels of Iranian oil would certainly be missed.

That said, the resulting increase in prices would likely be minimal over the long run, as other OPEC nations could quickly fill the void. The last major U.S. attack on Iran was in 1987. At that time, prices bolted approximately 3% higher the first few days, only to be right back down in the following weeks.

Of course, as with any military engagement, anything can happen, and a major escalation to ground troop involvement by the U.S. and Iran could easily cause a very quick, dramatic rise to prices. However, in the near-term, volatility will remain in focus, though all eyes will be on Middle East tensions in addition to global demand. OGJ

Fear Not, the Robots Have Arrived

Wood's Iris Edge and ENVision software provide a new and more accurate way to not only discover emissions leaks, but manage them.

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Wood

Wood and Xplorobot have partnered to use different types of robots and drones to map out facilities and detect leaks.

More and more, oil and gas projects are resembling a mid-2000s science fiction movie with mediocre CGI: robots, computer screens with bright colors and loads of data, world domination—well, maybe not that one. But this isn't a big buget Hollywood production. It's real and it is becoming the norm.

Wood Plc is one of the companies embracing digitalization and leading this charge. Though it's not a robotics company, the engineering and consulting company employs robots and digital software to support its clients' day-to-day operations. It partners with companies like Xplorobot to assist clients with emissions reduction.

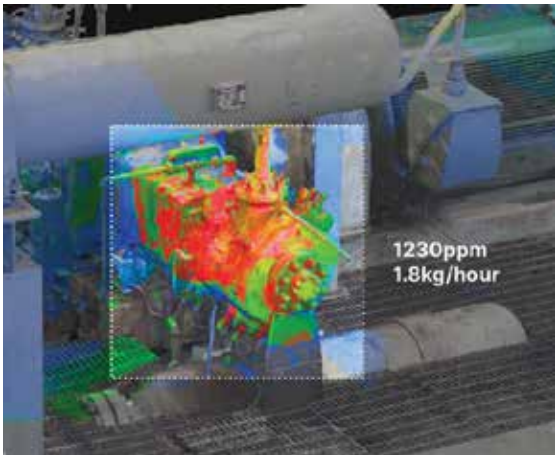
"What separates us from anybody else is the technology that we're using and the ability to localize and quantify the emissions," Stephen Kelman, operations director at Wood, told Hart Energy. "There's no other technology that we have seen or used in the market that has the ability to hone in to a specific flange or valve and say, 'That's the flange that's leaking, and that's the quantity of methane.'"

Wood's emissions-detecting technology, Iris Edge, is deployed using Xplorobot's handheld sensors and drones, and has undergone trials using robots. Its operation is similar to others on the market: the maintenance team maps out the route the robot will take through the facility and the robot then follows that path, capturing emissions and visual data, as well as thermal, acoustic and vibration data. Once collected, the robot returns to its "doghouse" or home location and then uploads all images and data it has captured to the company's database. Once the data has been uploaded, a color-coded 3D model is produced with all the data gathered overlaid on top of the model to enable localization and quantification of the emissions.

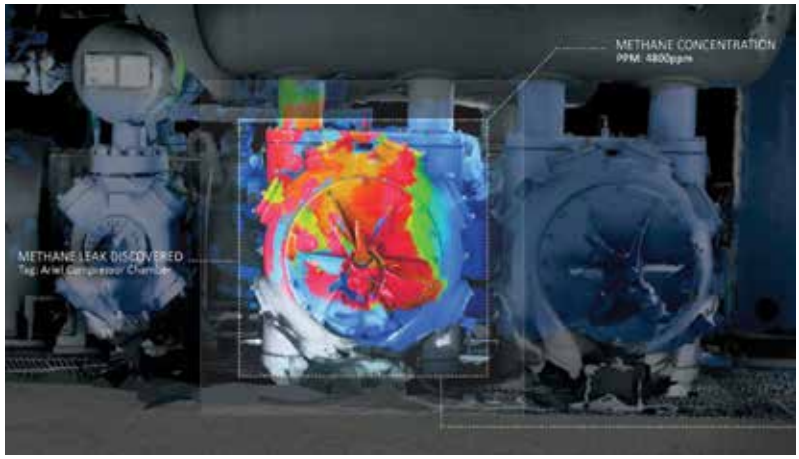
When combined with either handheld or robotic data-gathering products, Iris Edge is able to digitally scan infrastructure, provide immediate alerts on fugitive emissions down to the flange level, and bring the asset from detection to repair within 24 hours, the company says. It also integrates into existing operations, which can save on hardware, labor costs and overall inspection costs.

Watching in real-time

Iris Edge is also able to feed data into ENVision, which is software proprietary to Wood. "If our



Iris Edge uses tunable diode laser absorption spectroscopy (TDLAS) to quantify leaks down to parts per million per meter.



Wood

Once emissions data has been gathered, a color-coded 3D model is produced with the data gathered overlaid on top of the model to localize the emissions.

"There's no other technology that we have seen or used in the market that has the ability to hone in to a specific flange or valve and say, 'That's the flange that's leaking, and that's the quantity of methane.'"

—**Stephen Kelman,** ***Operations Director, Wood***

Wood

Iris Edge can be used via handheld sensors, as well.

client has ENVision deployed, we can also use the [Iris] data to support that," Kelman said. "So, we have the ability to bring the two together."

Backed by the Azure Cloud platform, ENVision software helps manage emissions data, streamline and automate data points for clear and accurate emissions view, and provide real-time insights into emissions and carbon releases.

"By having access to that data, in combination with your external data, you find out what you need to be doing, how you can get there, how you can build a roadmap, etc.," he said. "It's automated so you'll get real-time event detection notifications … it will enable you to reduce your reporting man hours by up to 80% because a lot of it's done in the platform. It gives you more accurate results on your emissions [calculations], and reduces your cost to compliance."

Wood's methane detection tools have a good track record. In 2022, Wood and Xplorobot teamed up to conduct a pilot study for Wyoming-based Carbon Creek Energy using the Iris Edge software. That study reviewed 4,200 of Carbon Creek's natural gas wells. Leaks were discovered within the first 10 minutes of the operations and fixed the next day. The Iris Edge technology was also able to certify the cleanliness of Carbon Creek's natural gas to make sure it was responsibly sourced, which in turn helped to track their transition to net zero.

Another study for a Canadian energy company using both handheld and robot hardware options identified a previously undetected anomaly and its exact location, allowing the client's onsite team to repair it within 24 hours. Before Iris Edge, operators used optical gas imaging cameras, which located the leaks but could not quantify the exact amount of methane escaping. Iris Edge uses tunable diode laser absorption spectroscopy (TDLAS) to quantify the amount of methane to parts per million per meter.

Looking ahead

Concerns about costs and logistics can oftentimes dissuade operators from implementing robots in their operations, especially offshore, Kelman said. Wood's advantage is that its technology offerings are cheaper, particularly those involving handheld devices that can be operated by workers who are not certified technicians.

He also said operators are drawn to Wood's technology because the system not only detects anomalies within assets, but allows the operator to better understand the emissions profile, which helps in reaching reduction goals.

It can also help clients save money by avoiding penalties and monetizing operations via methane performance credits.

"The big piece for us is just focusing on helping our clients understand their emissions profile and then really helping them to document that and develop a longer-term strategy around how they want to manage their emissions," Kelman said. "When the penalties from the EPA come into force this year, they have something that they can base their data off of so they can report and have data to back it up." OGJ

Well Logging Could Get a Makeover

Aramco's KASHF robot, expected to deploy in 2025, will be able to operate in both vertical and horizontal segments of wellbores.

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Autonomous robotics could be moving from the surface into the wellbore. When they do, they could revolutionize well logging by eliminating surface equipment, enhancing safety and reducing cost and downtime.

Aramco is developing a robot that is both buoyancy- and propeller-driven, which will allow it to operate in both vertical and horizontal segments of wellbores.

The Kinetic Autonomous Sensing in High Fidelity (KASHF) robot is expected to deploy in 2025, Rami Jabari, head of robotics and autonomous systems at Aramco, said during a booth presentation at SPE's Annual Technical Conference and Exhibition in San Antonio.

Only five untethered and autonomous robots have been developed for downhole applications, and two were developed by Aramco, he said.

"There's a strong need for downhole robotics," he said.

Currently, the industry relies on wire line and coil tubing systems to deploy small sensors into the well to record data like pressure and temperature.

"We can eliminate the need for all the surface equipment by utilizing either buoyancy-driven or, in some cases, propeller-driven" robots, Jabari said.

Case for downhole robots

Jabari said the most obvious benefit of using autonomous downhole robotics is safety, but there are cost and efficiency benefits as well.

And using autonomous downhole robotics simplifies logistics.

"Think about everything on the surface. All that's gone now," he said.

Beyond the low capital and operational costs, he said, are other important benefits.

"The key thing is this minimizes human error, and then it reduces the time required for a job. And then, in terms of health and safety risks, obviously those are significantly reduced because you have less people that are required onsite at the time," he said. "And then the carbon footprint compared to a conventional wire line truck, it's significantly less because you no longer have a truck waiting around for many hours throughout the course of a couple days."

And, if data is power, the final benefit is big.

"You can get your data more frequently," Jabari said.

Jabari said that despite a clear value proposition for autonomous downhole robots (ADRs), there may be some barriers to developing and using them.

Hart Energy

Rami Jabari, head of robotics and autonomous systems at Aramco, shows a Sensor Ball during SPE's Annual Technical Conference and Exhibition in San Antonio in 2023.

"There's always a risk in putting something in your well, but we've taken that risk in the past with wireline tools," he said.

Sensor Ball

Aramco's Sensor Ball robot is simple, he said. The buoyancy-driven robot becomes negatively buoyant to drop in vertical wells and positively buoyant to return to the surface, all while capturing data, which eliminates the need for conventional technology like wire line, he said.

Aramco has developed a water well version of the Sensor Ball and has been developing a variation for use in oil wells, Jabari said.

"The key limitation with Sensor Ball is it can only address the vertical. We have wells that go horizontally," he said.

The KASHF Reveal

Marrying propulsion capabilities into a buoyancy-driven robot makes it possible for the robot to operate in horizontal wellbores.

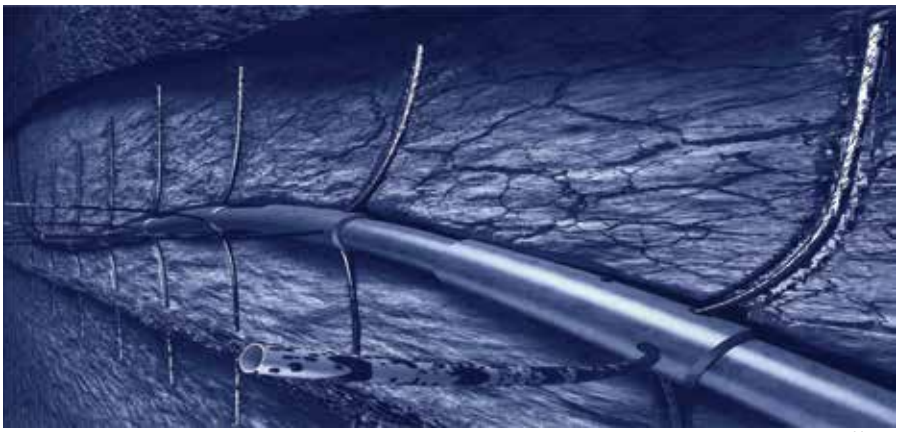
"It's negatively buoyant in the vertical, and then becomes neutrally buoyant in the horizontal, and then it can use propulsion to move forward," Jabari said.

Propulsion is superior to tractors, he said, because tractors require power from the surface to move. A neutrally buoyant robot in the wellbore requires very little energy to move, so propulsion is an advantageous method, he said.

In testing at Aramco's Houston Research Center, the propulsion-driven robot powered by 9V batteries traversed 5 km back and forth in a test track.

Jabari said KASHF is still under development. OGI

Tech Bytes



Fishbones

Fishbones' extended reach needles.

Fishbones, Aker BP Extending Reservoir Reach

Reservoir stimulation specialist Fishbones said it would team with Aker BP on a technology development project to extend reservoir reach by 50%.

The Research Council of Norway awarded a grant for the project, which will focus on the development of extended-reach needles, which are small diameter laterals that penetrate the reservoir to increase hydrocarbon recovery. The aim is to extend the reach of existing Fishbones needles by 50%, increasing the current span from 12 m to 18 m.

Drilling in Autonomous Control Mode

The industry is stepping closer to fully autonomous drilling operations.

SLB announced in late January it had combined digital technologies for surface automation, autonomous on-bottom drilling and directional drilling to enable 99% of a 2.6-km section to be drilled in autonomous control mode. According to SLB, over a five-well program at Equinor's Peregrino C platform offshore Brazil, the combination of technologies increased the rate of penetration by 60% for faster well delivery.

SLB said experts from multiple disciplines collaborated to design and implement the interconnected autonomous workflows that enabled the system to seamlessly drill the section.

DrillPilot software automated manual pipe handling and equipment sequencing tasks on the rig floor, while AI-driven technology in the DrillOps automation solution maximized on-bottom drilling performance.

Neuro autonomous solutions determined the optimum trajectory and delivered the well plan, adjusting steering sequences and drilling parameters to reach the target set by the DrillPlan well construction planning solution.

Jesus Lamas, SLB's president of well construction, said in a press release that leveraging AI and integrating advanced digital workflows helped improve safety and performance by making drilling more consistent and efficient.

Microbubbles Cleaning Produced Water

Adaptive Process Solutions (APS) has introduced a microbubble infusion unit (MiFU) to help operators of aging assets and reservoirs more effectively clean produced water for discharge to sea.

The company said that the unit can process between 1,000 bbl/d and 100,000 bbl/d of water and can remove up to 90% of oil and contaminants from produced water without requiring downstream filtration.

The microbubble technology, machinery and processes are a retrofittable add-on to existing water-treatment systems.

The Hazardous Zone 1-certified MiFU can use any type of gas, provided it is soluble, Frank Wurpel, director of engineering and technology at APS, said in a press release.

Halliburton Launches Formation Testing Service

Halliburton has introduced a wireline formation testing service called Reservoir Xaminer.

The service gives operators a one-stop pressure gradient and allows them to obtain four times the data that other tools provide in the same stop, Halliburton said. The probe section has dual quartz pressure sensors. It also includes real-time monitoring, larger area dual probes and high-strength straddle packers.

SLB, Nabors Collaborate on Drilling Automation

SLB and Nabors Industries are collaborating on automated drilling solutions for oil and gas operators and drilling contractors, the companies announced in January.

Under the deal, drilling automation applications and rig operating systems can be integrated to improve well construction performance and efficiency, the companies said.

Adaptive Process Solutions

The Microbubble Infusion Unit (MiFU).

The new integration provides access to a broader suite of drilling automation technologies and greater flexibility to use existing rig control systems and equipment on either SLB's PRECISE or Nabors' SmartROS rig operating system.

The agreement marks the fourth drilling automation collaboration Nabors has announced in nine months, including partnerships with Corva, Halliburton and ROGII, Nabors said.

New Subsea Drone Trials at Alvheim

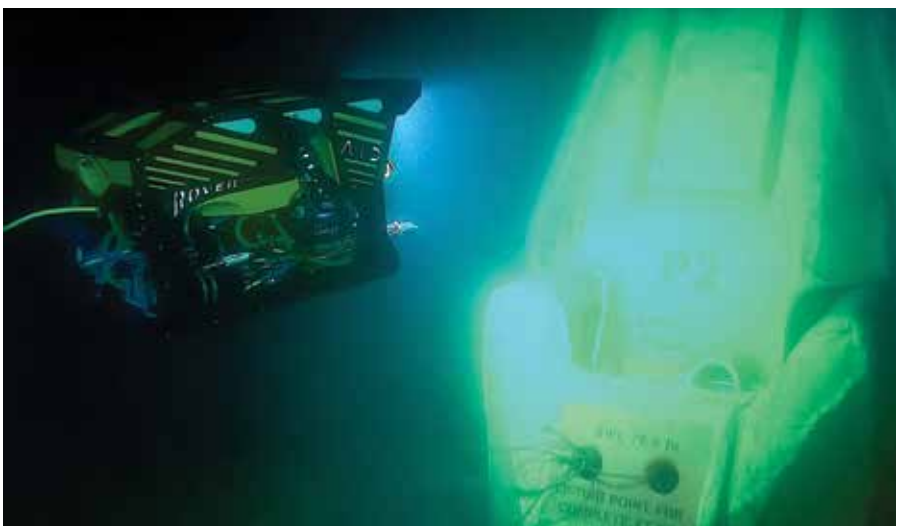
An autonomous inspection drone (AID) carried out a 10-day subsea trial at Aker BP's operated Alvheim Field in the Central North Sea.

The AID project is a strategic partnership between DeepOcean, Argus Remote Systems and Vaarst on a system developed with industry guidance, support and funding from Aker BP to bring a platform to market.

"The first inspection trial was highly encouraging. Based on this, we believe we can inspect the specific-subsea infrastructure at Alvheim noticeably faster next year," Kristoffer Johansen, DeepOcean technology manager, said in a press release.

The AID was mobilized on the DeepOcean-operated subsea IMR and ROV support vessel *Edda Fauna*, replacing the existing observation class ROV. The mission control was supervised both locally from *Edda Fauna* and remotely from a remote operations center in Haugesund, Norway.

The AID is based on a Rover MK2 ROV from Argus Remote Systems, with upgraded hardware and software packages. Argus is responsible for the AID platform and navigation algorithm. DeepOcean handles the digital twin platform, mission planner software and live view of the AID in operation, while Vaarst is responsible for the machine-vision camera, "Subslam 2x," for autonomous navigation and data collection.



DeepOcean

New subsea drone developed by DeepOcean, Argus Remote Systems and Vaarst, with funding from Aker BP, undergoes trials offshore Norway.

Sercel

Sercel's 528 and VE564 land solutions are designed to address complex operational and geophysical challenges, CGG said.

Sercel Launches Next-Gen Land System

Sercel, a unit of CGG Group, launched its next-generation, 528 land acquisition system and VE564 vibrator electronics to improve recording capacity, reliability, productivity and data fidelity.

Building on its 508 XT technology, the cable-based 528 system is light and can be solar-powered. Its scalable architecture also allows it to adapt to different-sized projects.

The VE564 vibroseis electronics technology can be embedded within the 528 platform. When combined, the two minimize downtime and boost productivity, the company said.

Intrinsically Safe AI Headsets Now Shipping

RealWear

A number of oil and gas industry companies have pre-ordered the Navigator Z1 hands-free computing solution, RealWear said.

RealWear has begun shipping its ATEX/IECEx Intrinsically Safe Navigator Z1 devices, the company said.

A number of oil and gas industry companies have pre-ordered the Navigator Z1 hands-free computing solution, RealWear said.

Navigator Z1 is powered by the Qualcomm SnapDragon 6490 chipset with a built-in advanced AI engine. The platform lays the foundation for RealWear's broader AI Core vision for frontline workers, the company said. It also now complies with ATEX/IECEx requirements for intrinsically safe certification. Navigator Z1 also ensures voice recognition for fully hands-free use up to 100dBA.

A Thermal by FLIR thermal camera module is scheduled for release in March. OGI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NGL Growth Expected to Beat Crude Oil's

Enterprise enjoyed a record quarter thanks to export demand; MPLX eyes market expansion.

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While future performance isn't a sure thing, many midstream companies were encouraged to see NGLs put an exclamation point on their end-of-year 2023 earnings.

"We have NGLs growing at a faster pace than crude oil," said Randy Fowler, co-CEO and CFO at Enterprise Products Partners (EPD) during the company's fourth-quarter earnings call. "We're seeing it across our system. Storage is going to become increasingly valuable."

For 2023, EPD reported NGL fractionation at volumes averaging 1.6 MMbbl/d, a record for the company and a 16% increase from 2022. The company also set records for NGL pipeline shipments, ethane exports and NGL marine terminal volumes.

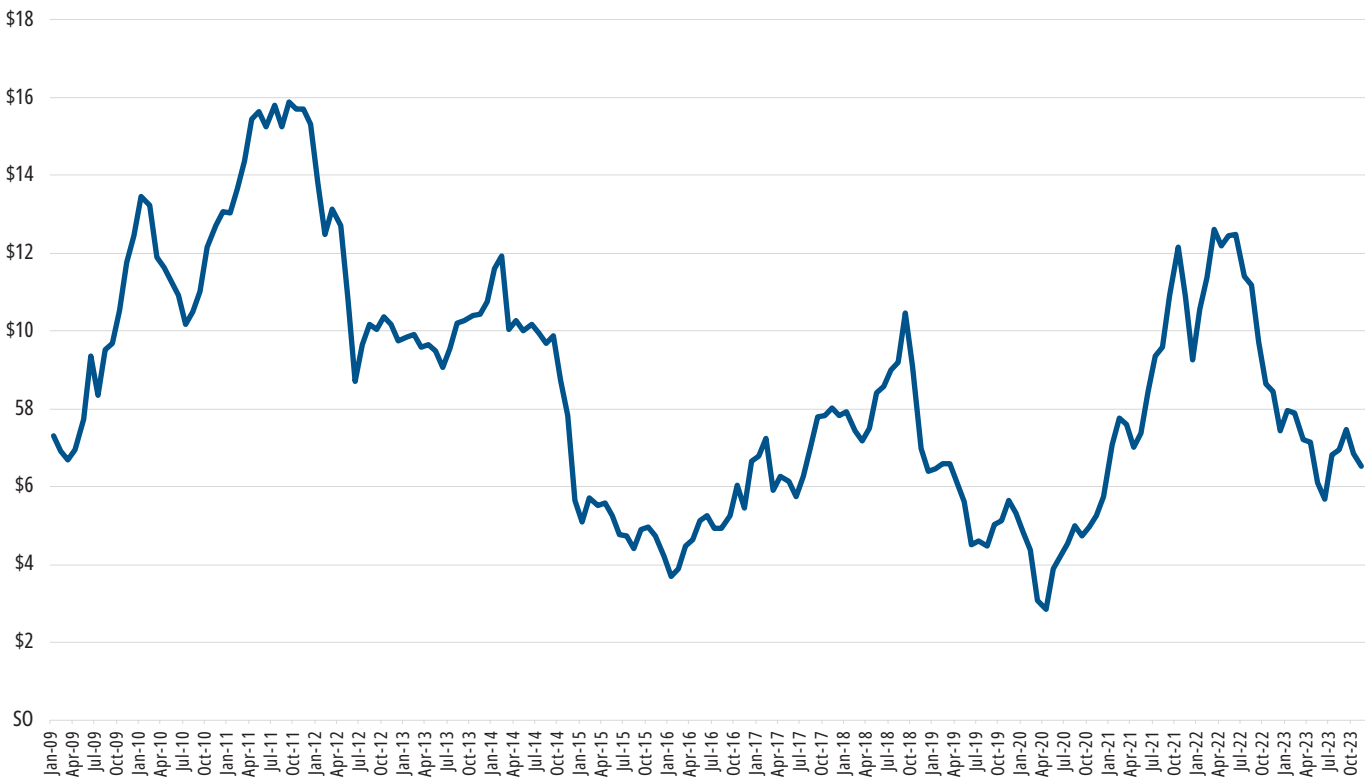
NGL prices are not close to their last five-year high in March 2022, when they hit $12.62/MMbtu, according to the U.S. Energy Information Administration. For all of 2023, average monthly prices stayed below $8/MMbtu and ended the year dropping to a $6.53/MMbtu daily average in November, the last month for which daily average prices are available.

However, companies in the right position, such as EPD, were able to use their established networks to take advantage of increased volumes on their NGL pipelines and steady demand abroad.

Enterprise reported strong performance at its Enterprise Hydrocarbons Terminal in the Houston Ship Channel, even though margins on propylene remain low.

"The PDH margins have improved, but there's still a lot of overcapacity," said Tug Hanley, the senior vice president for hydrocarbon marketing, on the conference

U.S. NGL composite price
monthly, $/MMBtu



Source: Bloomberg

call. "Weak margins don't lead to decreased NGL demand, because the demand is still ultimately there."

EPD plans to continue expanding its NGL infrastructure and brought online two new Permian Basin natural gas processing plants and a 12th NGL fractionator at its facility in Chambers County, Texas, in 2023.

The Williams Cos. (WMB) reported strong results through its crude and NGL segments, bringing in $92 million in the fourth quarter, as opposed to anticipated sales of $68 million.

WMB expects transmission projects will drive additional growth in 2024 and reported that it strengthened its position in the Denver-Julesburg Basin to enhance its natural gas and NGL value chain.

$6.53
Composite NGL price in November

Eye on growth

Other companies are looking to expand as well. MPLX is planning on taking a much stronger position in the market, according to Rob Wilson, senior director at energy infrastructure analyst firm East Daley Analytics.

"MPLX is positioning to join a small group of companies that own all parts of the NGL value chain linking Permian Basin supply growth to international demand," Wilson wrote after MPLX's fourth-quarter earnings call.

During the call, the company announced that it had acquired its partners' remaining 40% interest in two gas processing plants in the Delaware Basin. Also, at the end of 2023, MPLX filed for an air permit with the Texas Commission on Environmental Quality for NGL fractionation and storage on the Gulf Coast. With the new facilities, MPLX may have a production capacity of 150,000 bbl/d of NGLs by 2025.

"East Daley believes a few midstream players are poised to link together disparate parts of the NGL value chain and try to mimic the success realized by Energy Transfer (ET), Enterprise Products and Targa Resources (TRGP), the other three vertically integrated behemoths in NGLs," Wilson wrote. "MPLX is emerging as one of those players making a move."

MPLX owns a 25% share of the BANGL pipeline, which carries NGLs from the Delaware Basin to Corpus Christi, Texas.

NGLs were a mixed bag for some midstreamers.

Plains All American Pipelines (PAA) reported $169 million in revenue for fourth-quarter 2023, an $18 million increase in NGL income over the same period in 2022. However, the company's EBITDA for NGL in all of 2023, at $522 million, was a 1% increase from the previous year. For 2024, the company is forecasting a reduction in its NGL segment due to lower frac spreads.

PAA CEO Willie Chiang said the prediction of the reduction was an outcome of conservative forecasting.

"If there are opportunities out there, we'll capture them, but it's very difficult to predict exactly where they happen," Chiang said. "And again, this year's budget is based on a modest amount of market opportunities." OGI

Carlson: CHK-SWN Merger Leaves Sector Hanging

JUSTIN CARLSON
EAST DALEY ANALYTICS

Justin Carlson is co-founder and chief commercial officer of East Daley Analytics in Colorado.

Chesapeake Energy (CHK) and Southwestern Energy (SWN) have agreed to merge and create the largest U.S. natural gas producer. Is the blockbuster deal a good omen for the midstream sector? The outcome is likely to depend on how several factors play out.

The two producers formalized the long-rumored tie-up on Jan. 11. Under the agreement, Southwestern shareholders will see their stock converted into 0.0867 shares of CHK. The deal values SWN at $7.4 billion, or a $17 billion combined market cap based on CHK's share price prior to the announcement. The to-be-named CHK-SWN combo will have 7.9 Bcf/d of raw natural gas production as of third-quarter 2023 and would be the top gas producer in the Northeast and ArkLaTex (Haynesville).

East Daley Analytics expects the blockbuster deal to shift the risk and reward outlook for several names that provide midstream services for the producers. According to data in our Energy Data Studio platform, the largest midstream companies serving Chesapeake and Southwestern include Energy Transfer (ET), Williams (WMB) and DT Midstream (DTM).

In the Haynesville, Chesapeake operated five rigs at the start of 2024 compared to SWN's seven rigs. Chesapeake mostly splits its gas in the Haynesville between WMB's Magnolia and ET's Enable-Haynesville systems, though recently the producer's rigs have been more weighted toward the ET system (three rigs versus one). SWN sends most of its Haynesville gas to DTM's Blue Union system. However, like CHK, the producer has been more active of late on ET's Enable-Haynesville system (four rigs versus two).

The bear case

The recent trend toward upstream consolidation has not been kind to the midstream sector. East Daley has tracked upstream merger and acquisition (M&A) activity in 2023, mostly focused on adding scale in the Permian Basin. These deals have led to rig cuts of about 30% once producers merge.

From a midstream perspective, a bear case for the CHK-SWN merger assumes the new producing giant also takes a scalpel to its drilling budget. However, in the Permian consolidation dynamic, most of the rig attrition has involved publicly held producers acquiring private operators, which is not the case here.

On the investor call following the announcement, CHK and SWN management noted the two producers are aligned and not trying to grow natural gas production currently, given the oversupplied market. Executives also highlighted the flexibility to adjust rig activity based on where natural gas prices trend. The companies have guided to $400 million of reductions from overhead and synergies.

Therefore, gas price dynamics are likely to drive the outcome. If natural gas prices stay stuck in a $2/MMBtu range, then a bear case for the CHK-SWN deal becomes more likely. Among the basins, EDA does not expect rig cuts in the Northeast given the basin's low breakeven rates. The ArkLaTex, in our view, will be a more interesting basin to monitor as it is a swing basin in the U.S. natural gas market, and therefore more vulnerable to cuts if gas prices stay low, or to upside when prices increase again.

We see drilling on ET's Enable-Haynesville system as most vulnerable in a downside case, particularly since both producers have been active of late on that system, so there is more room to cut. However, CHK and SWN have commitments to several new pipeline expansions that could mitigate downside in the Haynesville. These projects include DTM's staggered LEAP project and ET's Gulf Run Pipeline expansion. The CHK-SWN combo may want to maintain Haynesville supply to fill these projects and feed new LNG demand coming online at the end of the year.

Upside case

In the long term, U.S. producers will see macro tailwinds from the massive growth expected in LNG demand. The additional upside case for a CHK-SWN merger is tied to global LNG markets, and whether the new, larger company can execute in the LNG space. CHK said it plans to build a marketing operation in Houston to trade in global gas and LNG markets once the companies merge.

LNG deals typically require long-term contracts, and counterparties with solid credit to assure lenders. These hurdles historically have kept the E&P sector locked out as investors in the LNG export boom. The CHK-SWN combo creates a producing company with more resources to lock down long-term deals, and a better balance sheet to credibly compete in the LNG space with global trading firms.

If a CHK-SWN combo can execute in global markets and expose more of its gas production to higher international prices, then low U.S. gas prices may not matter so much. In an optimistic scenario, the new company could underpin new LNG exports projects as both a supplier and investor, growing long-term gas demand and raising volumes for midstream names with exposure. OGI

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Tax Credit Uncertainty Looms for Blue Hydrogen

Proposed rules are up in the air, but producers planning to use natural gas have options.

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With potentially billions of dollars at play, natural gas—known as a transition fuel to some and a destination fuel to others—finds itself stuck in the middle again.

Its role in companies' ability to claim the 45V hydrogen production tax credit offered in the Inflation Reduction Act (IRA) is fueling more uncertainty. That uncertainty, industry experts say, could give some producers of blue hydrogen (natural gas with carbon capture and storage) and their partners pause.

"I think there are certainly some unanswered questions for blue hydrogen producers," Connor Thompson, legal scholar at the University of Houston Law Center, told Hart Energy. The government sought feedback from stakeholders on how to verify emissions for hydrogen production from fossil fuel and biomass resources, how to adopt rules pertaining to verification of the rate of carbon capture at blue hydrogen facilities, and how the so-called three pillars—deliverability, hourly matching and new supply—should be or can be adopted to fossil and biomass production of hydrogen.

"The initial 45V notice of proposed rulemaking was interesting particularly for blue hydrogen producers in what it didn't provide. It was really largely silent on blue hydrogen," Thompson said. "In my opinion, the document issued by IRS and Treasury really dealt with the requirements for green hydrogen, electrolytic hydrogen, and the adoption of the three pillars really focuses in on those green hydrogen producers."

Proponents are counting on hydrogen to help decarbonize a fossil-fuel dependent society and lower emissions. Predominately used today in oil refining and ammonia production, hydrogen is seen as a route to decarbonize hard-to-abate sectors such as steel, maritime and aviation, while also powering fuel cells, generating electricity, storing energy and serving as a transportation fuel.

Though natural gas is abundant, is cleaner than most other fossil fuels and could put hydrogen on a faster track to development using existing infrastructure, there are concerns about its cleanliness, particularly potential leakage.

Taming the 'super pollutant'

The GREET (Greenhouse gases, Regulated Emissions and Energy use in Technologies) model, which is updated annually, will be used by the Treasury Department to calculate lifecycle greenhouse gas emissions of hydrogen production from well to gate.

The 45VH2-GREET 2003 assumes that methane leakage during the natural gas recovery process and subsequent gas processing and transmission is about 0.9% of methane consumed by the reformer. However, the U.S. Environmental Protection Agency (EPA) estimates leak rates across the natural gas supply chain at about 2%-3%. Methane, a key ingredient of natural gas, is described by the EPA as a "super pollutant" due to potency that is higher than CO_2 and it is responsible for about one-third of global warming caused by human activities.

Efforts are already underway to reduce methane emissions from oil and gas operations.

"I think that you're going to likely see blue hydrogen producers putting the onus on those upstream [natural gas] producers and transporters of natural gas to really look at those [emissions] closely and that can be done contractually," Thompson said.

Meanwhile, two camps have emerged regarding the three pillars.

On one side, there's the opinion that these requirements will make the 45V tax credit unattainable for blue hydrogen producers, pushing them out of the market, Thompson said. In the other, he added, some say the rules are so stringent on green hydrogen producers that there will be an influx of capital into blue hydrogen projects with the idea that developers can use the 45Q tax credit for carbon capture.

"So, where things ultimately shake out? I can't say," Thompson said.

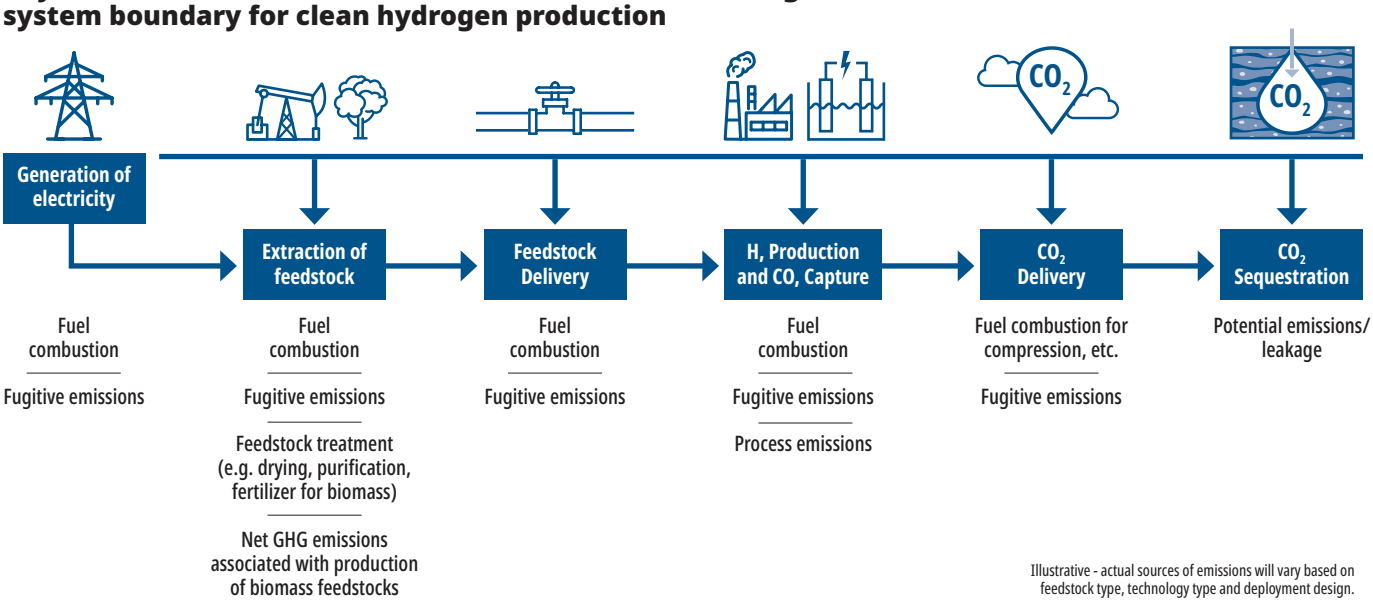
45V vs. 45Q

The IRA's 45Q provides a tax credit for qualified carbon oxide captured. The tax credit is $17/metric ton for sequestered qualified carbon oxide, but the value jumps to $60 per ton for storage associated with enhanced oil recovery (EOR), $85 per ton for dedicated geologic storage, $130 per ton for direct air capture with carbon utilization and up to $180 per ton for direct air capture with carbon storage.

The 45V and 45Q credits cannot be stacked, meaning companies cannot claim both.

"In our view, it's going to be very difficult to achieve a carbon intensity through a blue hydrogen project where going for 45V would be a better economic outcome than going for 45Q

Key activities related to GH emissions within the well-to-gate system boundary for clean hydrogen production

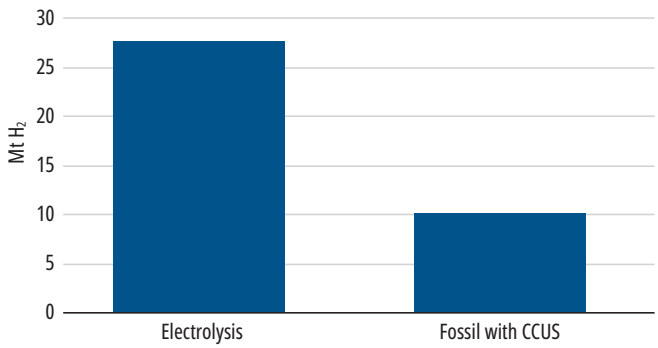


Illustrative - actual sources of emissions will vary based on feedstock type, technology type and deployment design.

Source: U.S. Department of Energy

Low-emission hydrogen production

Based on announced projects in 2030



Source: International Energy Agency

and carbon capture and storage," Ian Nieboer, head of energy transition research for the Enverus Intelligence Group, told Hart Energy.

Put simply: the 45Q has easier math than 45V, he said, with fewer strings attached.

With 45V "getting that carbon intensity down really does rely on you having a very low carbon intensity feedstock," Nieboer added. "It's achievable with things like RNG and sort of negative CI [carbon intensity] feedstocks, but that's also pretty scarce."

Enverus sees blue hydrogen producers opting for 45Q given the economics.

In the interest of achieving climate goals, Thompson believes it may be wise for Congress to consider letting companies claim both the 45Q and 45V.

"Maybe there's a world where you could get a reduced 45Q and a reduced 45V to help us push the industry along if ultimately clean hydrogen is what the United States wants to achieve," he said. The investment tax credit is another option.

A company's ability to get a tax credit may not necessarily make or break some projects, though it sweetens the economics for cleaner hydrogen. Most of the hydrogen produced today is gray, or produced using natural gas as feedstock without carbon capture and storage.

Unanswered questions will give some blue hydrogen producers pause, Thompson said; however, whether they pursue 45V or 45Q will be project specific. It goes back to the three pillars, considering factors such as deliverability requirements, needed electricity, proximity to storage, transportation options and associated costs, and distance to end-markets.

"Companies are going to have to look very closely at how to balance all those competing interests," Thompson said.

Proposed requirements

More than 2,100 comments were received on the proposed regulations.

Hydrogen producers meeting a certain prevailing wage and registered apprenticeship requirements could qualify for a credit ranging from $0.60 per kilogram (kg) of hydrogen produced to $3/kg, depending on the lifecycle greenhouse-gas (GHG) emissions from hydrogen production, including its power source.

To capture the credit available for 10 years for facilities that start construction before 2033, hydrogen producers must have used electricity from a clean power facility built within three years of a hydrogen plant entering service; produce clean power from the same region as the hydrogen producer; and provide proof of purchase of clean power, which comes in the form of an energy attribute certificate, that must be matched to production on an hourly basis.

The proposed requirements are considered the three pillars to building a clean hydrogen industry.

Globally, companies have announced projects that aim to produce a combined 38 million tons (Mt) of hydrogen—including 10 Mt of blue hydrogen—to meet government targets to produce 35 Mt by 2030, according to the International Energy Agency (IEA). However, only 4% of the announced projects have reached final investment decisions or are under construction.

That 4% accounts for 2 Mt, which is double that of 2021, José Miguel Bermúdez Menéndez, an energy technology analyst for the IEA, said during a recent GTI Energy webinar. "However, we cannot deny that this is slow progress in implementation," Bermúdez added.

It's a consequence of expected barriers such as new and complex value chains, demand uncertainty, lack of clarity in regulations and sluggish policy implementation.

Projects in North America account for about half of the blue hydrogen announcements, Bermúdez said. OGJ

A Year of Probable Improvement

More technology stacking, commercialization of geothermal technologies and improved economic conditions are emerging dynamics, analysts say.

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Inflationary pressures, rising interest rates and supply chain woes wreaked havoc on some renewable energy players in 2023, but the outlook looks promising for 2024.

Business strategies are expected to evolve, technologies will move toward commercialization and improved economics could make for some enticing buying opportunities, analysts at energy intelligence firm Enverus told Hart Energy.

"Some of these technologies have been challenged, in the past, to present good returns. I think going into 2024, there's more places to look and there's some interesting places to put capital to work," Ian Nieboer, head of energy transition research for Enverus, told Hart Energy. "And there's probably more capital available to participate in that."

A focus on reducing emissions and increasing the use of renewables to slow global warming is expected to stick around as companies target net-zero goals. Easing inflation and interest rates are expected to improve economics in the U.S. as innovators push forward with transition technologies and clarity emerges on parts of the Inflation Reduction Act (IRA), further stimulating growth in lower carbon technologies.

Solar and wind energy, for example, are expected to lead growth in U.S. power generation this year and in 2025, according to the U.S. Energy Information Administration. Solar power generation could reach 286 billion kilowatt-hours (kWh) in 2025, up 75% from 163 billion kWh in 2023. Wind power generation could rise 11% to 476 billion kWh.

Looking forward, Enverus sees more stacking of energy transition technologies as companies look to add potential revenue streams by building on their core expertise.

Stacking technologies

Natural pairings could become dominant pairings in 2024 and beyond.

"What we've seen thematically is more and more business models that require multiple revenue streams or multiple technologies that let you access different parts of the market," Nieboer said. "Good examples are utility-scale solar being paired up with battery storage."

Another is blue hydrogen, which is effectively gray hydrogen production with a carbon capture and storage component, he added.

"Combining these things in a way that is interesting and compelling generally leads to better economics on balance. In our view, [in] 2024 and beyond, many of the scale business models will actually require multiple of these components to come together to be really compelling."

The International Energy Agency estimated that clean energy investment would rise to about $1.7 trillion in 2023. Clean energy investment continues to grow, Nieboer said, noting technologies like battery storage, once considered niche, are now mainstream.

Plus, "you've got the IRA kicking in. You've got some of these newer things around CCUS and hydrogen where you can actually start to see capital being deployed."

The industry is also expected to see oil and gas companies focus more on reducing their emissions. "They're trying to be better actors on their own, but also because of greater scrutiny, stronger policies, more pressure from the regulatory side," Nieboer said, adding there could also be more interest in carbon capture and storage. "It's sort of adjacent. It fits. It can be a complement to some of the underlying operations."

'Commercialization horse race'

Geothermal energy has not quite taken off everywhere, including in the U.S., but the sector celebrated some successes in 2023. This year could prove to be a turning point.

Using oil and gas horizontal drilling techniques to help capture geothermal energy, startup Fervo Energy proved the commercial viability of its drilling technology. Leaning on proven oil and gas technologies along with geothermal baseload expertise, Sage Geosystems also geared up to scale its energy storage technology after a commercial pilot showed its cost-competitiveness and efficiency. Both companies have backing from oil and gas sector companies such as Devon Energy and Nabors Industries.

Enverus forecasts geothermal is among the emerging technologies that will enter commercialization in 2024.

"As a technology, it fits in the mode of a typical E&P where you're used to drilling wells, moving molecules through the subsurface one

Fervo Energy said it has successfully drilled one vertical and six horizontal wells at its 400-MW Cape Station project in Utah, drilling wells faster than at Project Red in 2022.

Fervo Energy

"We're calling '24 as a year of probably improvement in a lot of places or dimensions that have been challenged, but there's all kinds of tail risks that could defer, delay or impact that."

—**Ian Nieboer,** ***head of energy transition research, Enverus***

way or the other direction," Nieboer said, noting it is still an early stage technology. "I don't think you're going to see a rapid takeoff like solar is going to be in 2024."

Another technology in the so-called "commercialization horse race" is direct lithium extraction (DLE). DLE is oilfield adjacent—due to brine generation during completion or production—and Nieboer said the industry could see more interest and activity around the technology.

Exxon Mobil last year announced plans to drill about 10,000 ft underground to access lithium-rich saltwater in the Smackover region. It will then use the DLE process to separate lithium from the saltwater, which will be reinjected to the reservoir. The extracted lithium will be converted onsite into battery-grade material.

Improving inflation, interest rates

Enverus also said improving inflation and interest rates will lead to "compelling buying opportunities," including in the residential solar supplier market.

"There was a ton of pressure and probably continues to be. Think about how heavily financed these projects are," he said.

Higher interest rates and supplier delays were partly to blame for some U.S. wind developers' decisions to halt some offshore wind developments and seek contract renegotiations. Danish wind developer Ørsted, for example, booked about $4 billion in impairment charges for third-quarter 2023.

Higher interest rates also impacted other energy sectors, including residential solar.

Going into 2024, with apparent stability in interest rates, a bounce back is expected.

"It was a really bad year for a lot of the equities tied to these particular technologies.… We see '24 as one that probably improves, and we would expect to see these companies perform better in the market," Nieboer said.

However, like any outlook, there are always factors or circumstances that can derail expectations. The energy transition themes for 2024 include continued elevated rates, macroeconomic pressure impacting capital availability, uncertainty about the application of tax credits and broader geopolitical risk, as well as the potential for supply chain disruptions.

"We're calling '24 as a year of probably improvement in a lot of places or dimensions that have been challenged, but there's all kinds of tail risks that could defer, delay or impact that," Nieboer said. OGJ

Transition in Focus

BIOFUELS/RNG

Strategic Biofuels Lands Investment Commitment for Green Fuels Project

Renewable fuel company Strategic Biofuels has decided to primarily produce sustainable aviation fuel (SAF) at its planned Louisiana Green Fuels (LGF) project instead of renewable diesel, having landed a major investment commitment from Japan-based Sumitomo Corp.

Strategic Biofuels and Sumitomo subsidiary Sumitomo Corp. of Americas (SCOA) entered a joint development agreement for the project at the Port of Columbia in Caldwell Parish, La. As part of the agreement, SCOA will form a Japan-based investment consortium with a goal to fund most of the capital needed to reach final investment decision (FID) and an early 2025 construction start, according to a news release.

SOCA plans to provide a 20-year offtake for about 640 million gallons of renewable fuels produced along with all state and federal renewable fuel credits, the release states.

Many airlines are turning to SAF to help decarbonize operations and lower emissions. Strategic Biofuels plans to use about 1 million tons per year of forestry waste as feedstock for the Louisiana biorefinery. The facility will also use green energy from an integrated biomass-fired plant to produce 86 megawatts (MW) of power. The company said 1.36 million metric tons per year of CO_2 produced will be sequestered from both of the operations.

Clean Energy Begins RNG Production at Tri-Cross in South Dakota

California-based Clean Energy Fuels Corp. has started production at its new renewable natural gas (RNG) facility at the 5,000-cow Tri-Cross Dairy Farm, according to a news release.

Located in Viborg, S.D., the facility is expected to produce 1 million gallons of RNG annually.

Clean Energy Fuels said the construction cost for the facility, including the digesters and processing plant, was $34 million. Construction was completed in December 2023, followed shortly by RNG injection.

Clean Energy Fuels

Clean Energy Fuels Corp.'s RNG facility in Viborg, S.D.

"We anticipate 2024 to be a pivotal year in the demand for RNG fuel in the transportation market with the introduction of Cummins' X15N natural gas engine for heavy-duty trucks," said Clay Corbus, Clean Energy's senior vice president of renewables. "Clean Energy's fueling infrastructure is expanding to meet that demand and we'll need a constant source of additional low-carbon RNG to supply those stations."

CARBON MANAGEMENT

Summit Carbon Solutions, POET Partner on CCS Project

Summit Carbon Solutions has partnered with biofuel producer POET to annually capture and permanently store more than 4 million metric tons of CO_2 from POET's 17 bioprocessing plants, according to a news release.

The partnership will incorporate POET's 12 facilities in Iowa and five facilities in South Dakota into Summit's carbon capture and storage project.

"As the world seeks low-carbon energy solutions, carbon capture ensures that ag-based biofuels will remain competitive for decades to come," said POET CEO Jeff Broin. "This is a tremendous opportunity to bring value to farmers, bioethanol producers, and rural communities and counties in participating states, and I believe it will unleash even more opportunities for ag and bioprocessing in the future."

The South Dakota plants will be included in the upcoming state application, aiming to ensure a streamlined integration into Summit's existing project framework, according to the news release. Separate applications will be filed for the plants in Iowa.

HYDROGEN

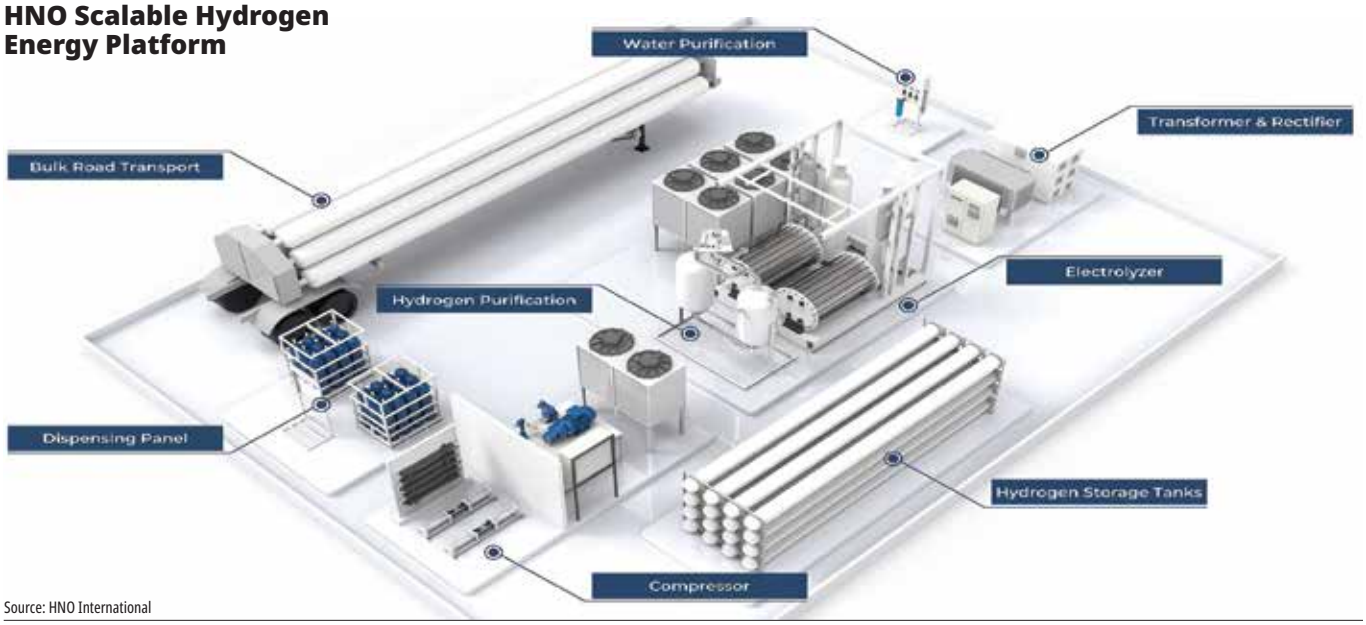
HNO Unveils Plans for Green Hydrogen Facility in Houston

California-based HNO International partnered with electrolyzer manufacturer Element One Energy and the Pneumatic and Hydraulic Co. to develop a first-of-its-kind scalable hydrogen production project in Houston.

HNO, a green hydrogen tech company, said the companies aim to develop a 500 kg per day green hydrogen production facility, targeting completion in second-quarter 2024. It will mark the first installation of HNO's modular Scalable Hydrogen Energy Platform, which is designed to produce, store and dispense hydrogen from water using a 1.25-MW electrolyzer.

"This facility is just the beginning, as

HNO Scalable Hydrogen Energy Platform



Source: HNO International

The Scalable Hydrogen Energy Platform is a modular hydrogen energy system that produces, stores and dispenses hydrogen using an electrolyzer.

we have plans for additional installations in 2024, 2025, and beyond, further solidifying our position as leaders in the hydrogen energy infrastructure sector," said Donald Owens, chairman at HNO International.

The platform, which requires a footprint of less than 3,000 sq ft, can be scaled to produce more than 5,000 kg of hydrogen per day, HNO said.

SOLAR

Recurrent Lands Microsoft as Customer, Closes Project Financing

Canadian Solar subsidiary Recurrent Energy sealed a power purchase agreement with Microsoft Corp. for 100% of the energy produced at the 127-MW Bayou Galion Solar project being developed in Northeast Louisiana, the solar company said.

The tech giant, which said it aims to become carbon negative by 2030, also plans to purchase the renewable energy credits produced by the solar farm. Located in Morehouse Parish, the project is expected to be operational by fall 2024.

Canadian Solar also said it closed $160 million in project financing for the project. Mitsubishi UFJ Financial Group acted as coordinating lead arranger for the financing.

"This project represents an important milestone as we continue to advance our pipeline in new markets and increase project ownership," said Recurrent CEO Ismael Guerrero. "Bayou Galion Solar extends our relationship with our esteemed partners at MUFG and establishes a new relationship with Microsoft, one of the world's largest renewable energy power buyers."

WIND

Avangrid to Construct Wind Farm in Oklahoma

Iberdrola Group's U.S. renewable energy arm Avangrid plans to develop a 147.5-MW wind farm in Oklahoma, marking the company's first onshore wind project in the state.

The company said the planned 33-turbine wind farm, Pontotoc Wind, will be located in Pontotoc County and generate about 500,000 megawatt-hours (MWh) of power annually. The amount is enough to power more than 40,000 homes, Avangrid said in a news release.

"We are thrilled to be developing our first renewable energy project in Oklahoma, that will deliver clean, renewable, wind power to the Pontotoc County community along with jobs and local investment," said Avangrid CEO Pedro Azagra. "With Pontotoc Wind, we are helping to accelerate a clean energy transition in the state and across the U.S."

Construction is expected to start in 2024.

RENEWABLES

Xcel Energy Plans More Than 4 GW of Renewables, Energy Storage

Minnesota-based utility Xcel Energy has unveiled a clean energy plan for the upper Midwest that aims to add 3.6 gigawatts (GW) of new wind and solar facilities and 600 MW of battery energy storage by 2030.

Plans for the electric system—which powers millions of homes and businesses in eight Western and Midwestern states—also include extending the operations of the Prairie Island and Monticello nuclear plants in Minnesota through the early 2050s. The company has already converted or shuttered more than 20 coal units across eight states as it moves to exit coal by 2030.

The move to further decarbonize operations comes amid a continued push to lower emissions as the U.S. extends tax credits to incentivize development of renewable energy projects to green grids.

Xcel said carbon emissions reductions are expected to exceed 80% by 2030 and could reach up to 88% under its proposed plan, setting the company up to meet Minnesota's new 2040 carbon-free standard. The company also said it intends to capture about $5.7 billion in estimated tax credit savings from the Inflation Reduction Act.

As part of the plan, Xcel also proposed to add more than 2.2 GW of "always-available resources" by 2030 to back up renewables during peak demand and extend operations at the Prairie Island and Monticello nuclear plants. The company wants to extend the life of Prairie Island's two units by 20 years to 2053 and 2054 and Monticello's by 10 years to 2050, Xcel said in a news release. OGJ

Sleepy Texas Beach Town is Top US Energy Port

Increased midstream investments opened export markets for the prolific Permian—and boosted the Port of Corpus Christi to the largest energy gateway in the U.S.

The Port of Corpus Christi's energy operations include 16 public oil docks that handle crude oil, refined products, LNG and LPG.

Photography by Hart Energy

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CORPUS CHRISTI, Texas—The laid-back hinterlands surrounding the headquarters of the Corpus Christi Port Authority, located downtown in the midsize Texas Gulf Coast city, belie the port's remarkable transformation into the largest U.S. port in total revenue tonnage and the country's leading energy export gateway.

Rankings aside, Corpus is an easy-going city 208 miles south of Houston, better known for tourist attractions that include the Texas State Aquarium, Art Museum of South Texas and more than 100 miles of beaches.

But in the background of the quiet Corpus downtown, the city is energized—especially as it relates to the movement of oil, gas and other commodities.

Corpus' port has been in operation since 1926 and is strategically located near major Texas crude oil and natural gas production. The port's energy operations include 16 public oil docks that handle crude oil, refined products, LNG and LPG.

The port has five multi-purpose cargo docks for break bulk cargo, and it boasts being the largest port to handle wind energy components on the U.S. Gulf Coast, where it has six near-dock laydown yards.

The port also features 45 acres of open storage space with direct access to deep water, railways and highways where it has two bulk docks: one with a 34-ft draft and another with a 47-ft draft. The port has connectivity with three North American Class-1 railroads and two major interstate highways.

In 2022, the most recent year that full data is available, the port boasted 7,736 vessel calls, contributing positive economic impacts, including state and local taxes. That compares to approximately 6,843 vessel calls in 2021, spokespeople with the Port Authority said during a recent tour of its facilities.

In 2022, the port ranked third globally in oil exports when it moved 1.94 MMbbl/d. It trailed only the Ras Tanura port in Saudi Arabia (6.5 MMbbl/d) and the Basrah Oil Terminal in Iraq (3.45 MMbbl/d), according to official Port Authority data.

Houston, often called the energy capital of the U.S., was for decades the undisputed oil capital of the Petroleum Administration for Defense District, or PADD III. A change in legislation began to shift energy supplies through Corpus. The lifting of an oil export trade ban in late 2015 saw waterborne exports soar across the Gulf Coast, and Corpus was the recipient of the bulk of the growth, Wood Mackenzie said in a 2023 report.

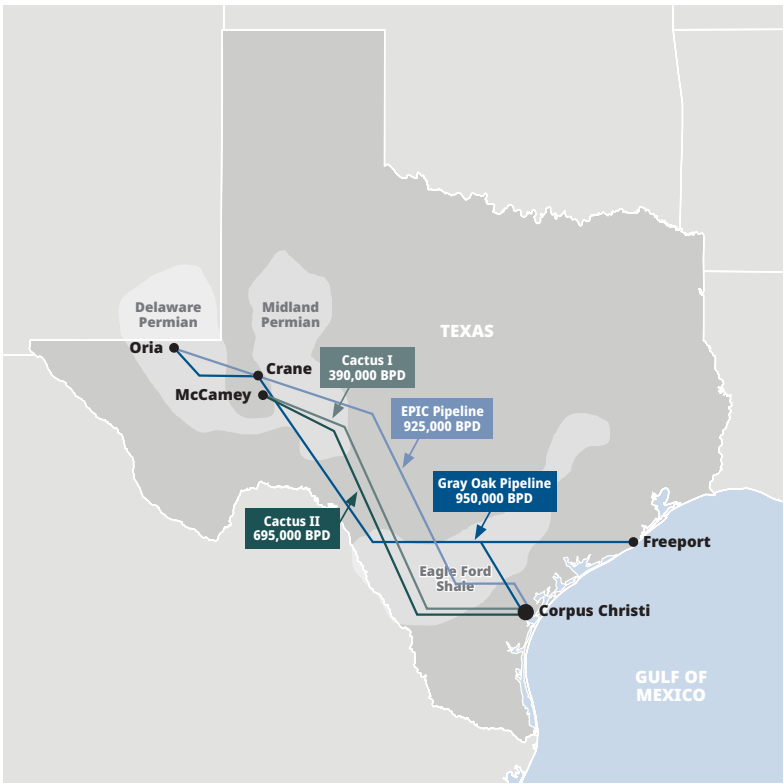
Corpus has attracted midstream investment to open export markets to accommodate rising supplies from the Permian Basin. That large-scale infrastructure development "in the form of better dock capacity, inbound pipe capacity from the Permian and storage capacity has catapulted Corpus Christi into prime position for tidewater access for U.S. barrels," according to Wood Mackenzie.

Nearing the century mark

The port's mission is simple: to remain the energy dockyards of the Americas.

In that vein, the port, home to a 36-mile channel, has commenced the last part of an infrastructure

Existing crude oil pipeline infrastructure



Source: Port of Corpus Christi

Top 5 for crude oil exports in 2022 (bpd)

#1 U.S. crude oil export gateway

#1 U.S. port by annual revenue tonnage

#2 U.S. port in LNG exports | estimated 808 Bf in 2022

#3 Export port for crude oil in the world

7,736 Vessels moved in 2022

30K+ Acres of land managed

Economic impact: **$18B** $13.4 billion for CC metro area

State and local taxes: **$431B**

project to widen and deepen the channel. When completed, it will have a depth of 54 ft Mean Lower Low Water, up from 47 ft, and a new width of 530 ft, with additional barge shelves also being constructed. This compares to an original dredged depth of 25 ft and a width of 200 ft when it first opened.

The improved channel will allow the port to fully load Suezmax-class vessels, reducing the need to top off vessels offshore and the associated ship traffic and vessel emissions, according to port authority statements. Berths in the port currently range from 246 ft to 1,000 ft.

Phases one and two of the channel improvement project have concluded and the third phase is estimated to be completed in early 2024. The fourth and final phase of the project is slated for completion in early 2025, according to the Port Authority.

Texas' LNG capital

In general, rising U.S. energy production in the past decade has helped the country solidify its energy security and become a net energy exporter. But Russia's February 2022 invasion of Ukraine allowed the U.S. to emerge as a reliable supplier of LNG to Europe, Asia and the rest of the world.

Much of the success is tied to Texas-based gas producers and LNG suppliers, including Freeport LNG in Freeport, Texas, and Cheniere Energy.

Cheniere's 1,000+ acre Corpus Christi liquefaction facility in the Corpus Christi Bay is within sight of the entrance into the Port of Corpus Christi. Cheniere's facility is home to three LNG trains with a total liquefaction capacity of 15 million tonnes per annum. The company's Corpus Christi Liquefaction Stage 3 brownfield expansion project is set to sail by year-end 2024, according to Cheniere's website.

With Cheniere's contributions, the port ranked No. 2 in 2022 in U.S. LNG exports, when it moved an estimated 808 Bcf of gas, according to port authority data.

The most recent data shows the port moved 52 million tons (MMton) of goods in third-quarter 2023, up 7.7% compared to third-quarter 2022. This was the sixth consecutive quarter of record growth, and the first time in history that goods moved through the channel surpassed the 50-MMton mark, according to Port Authority.

The record tonnage was primarily due to higher oil exports, which reached 32.4 MMton in third-quarter 2023, as well as slightly higher volumes of LNG, petroleum products and agricultural commodities.

Wind parks and hydrogen

Wind parks with towering turbines stretch as far as the eye can see in the areas surrounding the port. Four of them—Harbor Wind, Midway, and Papalote Creek I and II—boast a combined 248 turbines with a total rated capacity of 551.8 megawatts, according to the U.S. Wind Turbine Database (USWTDB).

But there are many more wind farms around Corpus.

While the port's past has been tied mainly to oil and gas, its future will increasingly see renewables growing in importance.

The port's Horizons Clean Hydrogen Hub and Trans Permian H2Hub have already submitted a full application through the U.S. Department of Energy (DOE) Office of Clean Energy Demonstration Regional Clean Hydrogen Hubs Program.

The integrated hydrogen hub concept forms part of a roadmap that will diversify and decarbonize the port. It also creates a unified framework to leverage existing infrastructure and commercial connections between West Texas energy production and the port, according to port authority spokespersons.

The port also aims to offer centralized carbon capture utilization and storage (CCUS) options, the spokespeople said.

The plan includes actions to cultivate CCUS opportunities, identification of alternatives for CO_2 delivery infrastructure, as well as leasing port-owned pore space for CO_2 injection and storage. OGJ

Pitts: Producers Ponder Biden's LNG Strategy

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U.S. President Joe Biden has sparked a heated discussion, not only in the U.S. but abroad, over his policy freezing the approval process of new LNG export projects until further analysis is complete. U.S. oil and gas producers should be pondering its impacts.

Their doubts will not be limited to what this means for U.S. LNG exporting dominance, environmental issues around Permian Basin and other LNG feed gas, emission reductions and safety issues at LNG facilities, or greenhouse gas (GHG) emissions across the entire gas supply chain. Other things to consider might include what this means in terms of future increases in U.S. piped-gas to Mexico to feed proposed Mexican LNG export facilities, as well as uncertainties around foreign policies dating to the Trump administration.

Biden's mandate specifically relates to whether "additional LNG export authorization requests to non-FTA countries are in the public interest."

The key phrase here is "public interest" and how it relates to the U.S. economy, national security, energy security, environment and GHG emissions. Surely methane and CO_2 aren't considered the "good" in any debate about the climate changing impacts of the upstream, downstream and midstream sectors, but they might be the "bad" and the "ugly."

Let's be clear: Biden's "temporary pause on pending applications" doesn't apply to already authorized exports of some 48 Bcf/d, according the U.S. Department of Energy. That said, U.S. LNG exports are still expected to nearly double by the end of this decade, meaning the U.S. will continue to jockey with Qatar and Australia for bragging rights as the world's top LNG supplier.

It should be noted that U.S. gas production is expected to average 104 Bcf/d in 2024 with U.S. LNG exports averaging 12.1 Bcf/d (11.6% of total production), according to the U.S. Energy Information Administration (EIA). In 2025, production is expected to be 106 Bcf/d, with exports totaling 14.4 Bcf/d (13.6%), respectively.

While current offtake agreements tied to already approved projects have been spared, Biden's landmark move is really about supplying the Asian market post-2030, many LNG analysts argue. It also relates to potential impacts on plans for investment across the gas supply chain and what will come of future offtake agreements involving Asian as well as other investors.

Some pundits say this is a muted discussion amid the U.S. presidential election cycle this year. Others wonder what will come of the mandate if Republicans retake the White House.

It's necessary to consider Biden's move in light of elections and, obviously, the Paris Agreement of 2015, a legally binding international treaty on climate change that aims to limit temperature rises to 1.5 C above pre-industrial levels. If Biden wants to show that the U.S. is leading the climate charge, this was maybe his second punch before the November election. The first punch was the Inflation Reduction Act (IRA). Despite these jabs, as hard and fast as the president can deliver them, the UN Environmental Program (UNEP) continues to argue that unless GHGs fall dramatically, global warming could surpass 2.9°C this century.

It needs to be documented that Biden's LNG mandate might have an impact opposite the goal of reducting global warming. Coal usage around the world could increase if and when countries in the future looking to transition to gas don't have the resource.

On that point, many players betting on U.S. LNG might have to start playing it in four-year or eight-year cycles, depending on who wins the White House. That plays in Qatar's favor since alternating control of leadership in the U.S. is a non-issue under Emir Sheikh Tamim bin Hamad's watch in Qatar since he exercises full executive power.

The Qataris want to edge out the U.S. at the top of the LNG supply chain. That leaves no room for doubt about their plans to exploit the over 900 Tcf of gas, around 10% of the world's known reserves, found in Qatar's non-associated North Field, the largest of its type in the world. Qatar's next moves will add around 49 million tonnes per annum (mpta) in LNG export capacity to its 80.1 mtpa in 2022, so keeping the pressure on the U.S. (80.5 mtpa in 2022, according to data from the International Gas Union), and the Aussies (80.9 mtpa).

Biden's mandate again brings into the fold discussions about the energy trilemma—affordability, security and sustainability. Russia's invasion of Ukraine emphasized its importance. The recent rise in tensions in the Middle East shows that it's still an issue. OGI

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Paisie: Oil Market Shifting Back to Supply/Demand

JOHN PAISIE
STRATAS ADVISORS

John Paisie is president of Stratas Advisors, a global research and consulting firm that provides analysis across the oil and gas value chain. He is based in Houston.

Oil prices continue to linger around their 200-day moving average and well below the highs seen during September of last year. Oil traders continue to be concerned about resiliency of economic growth and skeptical of OPEC+'s ability to manage supply.

Additionally, while the geopolitical situation has been tenuous, there has been no interruption in the production or flow of oil. Consequently, while oil prices jump on disturbing geopolitical news, oil prices quickly give back the upside as soon as oil traders realize that oil is continuing to flow.

Looking forward, we think the oil market is getting closer to an inflection point where the focus will be shifting from macro-level factors toward supply/demand fundamentals.

We are expecting the following:

• One way or another, we think the fighting will end in Gaza during the next month or so through negotiations, in part, because of internal and external pressures on the Israeli government.

• Not only will the pressure increase on Israel, pressure is increasing on the Biden administration with calls for a cease-fire coming from several factions that are important sources of support for the Democratic Party, including the progressive members in Congress, political leaders of Democrat-led cities and black pastors. In response, the Biden administration is putting pressure on Israel. In early February, the administration issued a memorandum that requires allies receiving military aid to provide assurances that there are adhering to international law. Israel will have 45 days to respond.

• Neither the U.S. nor Iran are likely to confront each other directly. Instead, we expect both parties to be measured in their actions. Consequently, we think the risk of disruption to the delivery of oil to the market is limited.

With respect to the global economy we are expecting the following:

• The U.S. economy will remain relatively strong and will continue to be supported by deficit spending and, to some extent, by the Federal Reserve ending its tightening cycle. It is unlikely, however, that the Federal Reserve will cut rates as fast as some market participants are hoping. While headline inflation has decreased, core inflation (excludes food and energy) has been stuck around 0.3% on a month-to-month basis, which is a level that is nearly twice the target rate of the Federal Reserve. As such, the Federal Reserve will either have to change its view on the acceptable level of inflation or keep interest rates higher for a longer period than currently expected by the market.

• China's economy will continue to face challenges. The latest official Purchasing Managers Indexes (PMI) for China indicated that China's manufacturing sector contracted for the fourth straight month with the reading for January coming in at 49.2. The PMI for the non-manufacturing sector came in at 50.7, which indicates only mild expansion. In contrast to the U.S. equity markets, China's CSI 300 Index has lost around 40% of its value since the highs of 2021. Also, China is still facing a debt-laden real estate sector, which represents around 25% of China's GDP.

• The EU economy, while growing at a much lower rate than the U.S. economy, is poised to be provided with a boost from interest rate cuts that are likely to take place later this year.

Based on the economic outlook, coupled with the outlook for alternative fuels and EVs, we are expecting that oil demand will increase at a moderate pace during the remainder of the year, and despite the struggles of China, Asia-Pacific will represent the bulk of increased demand.

From a supply perspective, we are expecting that OPEC+ will attempt to be proactive in managing supply to support oil prices. We also think that OPEC+ still has the ability to influence the oil market, despite the growth in non-OPEC supply. However, to convince oil traders to adopt a more bullish sentiment, OPEC+ will need to adhere closely to its supply targets, and most likely extend its latest round of supply cuts past the end of March.

Given the expectations for macro-level factors, as well as the supply/demand fundamentals, we are forecasting that the price of Brent crude will increase during the second and third quarters of this year and move toward $90/bbl. There are risks associated with this forecast—upside risks and certainly downside risks. It is still possible that the situation in the Middle East will spin out of control and result in oil prices spiking.

Alternatively, oil prices could tumble if growth in oil demand disappoints because of the global economy faltering—and similarly if OPEC+ loses control of the oil supply. These risks, however, represent developments outside of our reference forecast. OGI

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Around the World

NORTH AMERICA

Freeport LNG Down One Train After Texas Freeze

Freeport LNG, which operates a three-train export facility on Quintana Island along the Texas Gulf Coast, said recent freezing temperatures in Texas impacted its Train 3, which will be offline for at least one month.

Freeport's three-train 15 million tonnes per annum (mtpa) export facility is the seventh-largest in the world and second-largest in the U.S. The facility initially started importing LNG in June 2008 and flipped to exporting in 2019.

"During Winter Storm Heather, one of our refrigeration electric motors at our liquefaction facility experienced an electrical issue that will necessitate a replacement of the motor with an on-hand spare," Houston-based Freeport LNG confirmed to Hart Energy.

"We anticipate an outage of approximately one month of one of our three trains as we work to safely and expeditiously return our liquefaction facility to normal operations," the company said.

According to Freeport LNG, the three trains have a combined liquefaction capacity equivalent to around 2.2 Bcf/d of gas, enough to power and light a metropolitan area around the size of San Antonio, for a full day. Freeport has plans to add a fourth train, which will add 5.1 mtpa, or 0.7 Bcf/d.

TGS, SLB for GoM OBN Acquisition

TGS, in collaboration with SLB, announced in February the Engagement 5 Ocean Bottom Node (OBN) multi-client acquisition in the U.S. Gulf of Mexico.

The seventh program within the seismic joint venture involves the acquisition of 157 Outer Continental Shelf blocks covering 3,650 sq km through a long offset, sparse OBN survey that will start in first-quarter 2024.

The expansion of data coverage in the eastern region of Green Canyon will adjoin with prior phases, establishing a continuous coverage area spanning over 23,000 sq km from the Mississippi Canyon area in the east to the Garden Banks area in the west.

The project is supported by industry funding.

US Threatens to Not Renew Venezuelan Energy Sector License

The U.S. Department of State alerted Venezuela that it could decide not to renew General License No. 44, issued on Oct. 18 to assist the OPEC country in rebuilding oil and gas production capacity, amid what Washington labeled "anti-democratic actions."

The U.S. has already revoked sanctions relief for Venezuela's gold sector—

Shutterstock

María Corina Machado, opposition leader in the upcoming Venezuela elections, was disqualified by Venezuela Supreme Tribunal.

General License No. 43A—in response to the disqualification of opposition leaders from the 2024 presidential election, U.S. Department of State spokesperson Matthew Miller said in January.

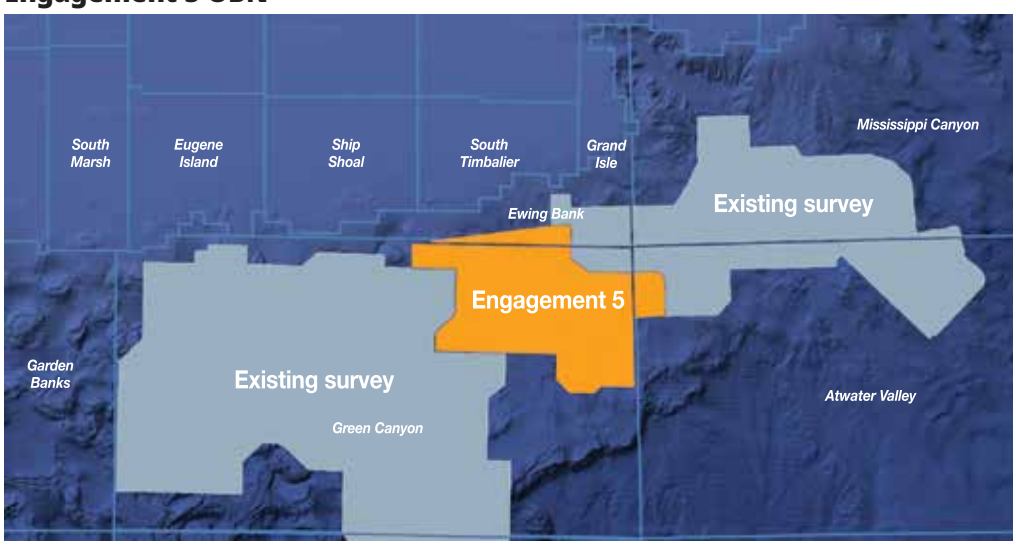
Miller's comments were in response to a decision by Venezuela's Supreme Tribunal of Justice upholding the disqualifications of opposition leaders María Corina Machado and Henrique Capriles that undermines the competitive presidential election slated for late 2024.

Venezuela's oil production averaged 786,000 bbl/d in December, according to secondary source data from OPEC's Monthly Oil Market Report. Venezuela's production averaged 749,000 bbl/d in 2023 and 688,000 bbl/d in 2022, up from a low of around 500,000 bbl/d in 2020 but still far from its 1997 peak of about 3.2 MMbbl/d.

ARM Energy Sells Minority Stake iMarathon Chasing 20%+ IRRs with Refinery Upgrades

Findlay, Ohio-based Marathon Petroleum Corp. (MPC) is pursuing improvements at its Los Angeles refinery and a hydrotreater project at its Galveston Bay refinery, the

Engagement 5 OBN



Source: Rextag, TGS

company's President Maryann T. Mannen and CEO Michael J. Hennigan said during the company's fourth-quarter 2023 earnings call with analysts.

At MPC's 363,000 bbl/d Los Angeles County refinery, near the Los Angeles Harbor, the company is pursuing efficiency and modernization improvements. Improvements—focused on integrating and modernizing utility systems and increasing energy efficiency—aim to improve reliability and lower costs. MPC plans to make remaining investments of $330 million in 2024 and $145 million in 2025. The improvements are expected to be completed by year-end 2025.

At MPC's 593,000 bbl/d Galveston Bay refinery in Texas City, Texas, the company is pursuing a project that includes investments to build a 90,000 bbl/d high-pressure distillate hydrotreater. The project aims to strengthen the competitiveness of the refinery by improving the ability to produce higher value finished products. MPC plans to make project investments of $100 million in 2024, $175 million in 2025 and $425 million between 2026 and 2027. The project is expected to be completed by year-end 2027.

ARM Energy Sells Minority Stake in Natgas Marketer to Tokyo Gas

A Tokyo Gas subsidiary has acquired minority equity interests in a new natural gas marketing company founded by ARM Energy Holdings, the company said. Financial terms of the transaction weren't disclosed.

Tokyo Gas America purchased a stake in the new firm, ARM Energy Trading, which is comprised of ARM Energy Services and ARM Energy Mexico, one of the largest private physical gas marketers in North America, according to the release.

The transaction allows ARM to continue growing its asset optimization and trading strategy while furthering its overall energy platform, said Zach Lee, CEO of ARM Energy.

Mexico Pacific Inks Exxon to Third LNG Contract, Targets 2024 FID

Mexico Pacific, which is developing the 15 million tonnes per annum (mtpa) Saguaro Energia LNG project in Mexico, continues to eye an initial final investment decision (FID) regarding the first two trains and possibly a third sometime in 2024, its CEO said.

The announcement came after Texas-based Exxon Mobil signed on to a third long-term sales and purchase agreement (SPA) for an additional 1.2 mtpa of LNG from the project located on the west coast of Mexico.

"While we remain focused on initially taking FID on Trains 1 and 2, this latest LNG SPA with Exxon Mobil concludes the LNG sales required for a subsequent Train 3 FID expected this year," Mexico Pacific CEO Ivan Van der Walt said in January.

East Daley Analytics expects the facility to take FID in first-quarter 2024.

The third SPA is between Mexico Pacific and Exxon Mobil LNG Asia Pacific (EMLAP). Per the Train 3 LNG SPA, EMLAP will acquire the volumes on a free-on-board (FOB) basis over a 20-year term, Mexico Pacific said in the release. The 1.2 mtpa originates from the option under separate SPAs signed with Exxon in January 2023 related to volumes from Trains 1 and 2.

AUSTRALIA

Ichthys Subsea Infrastructure Installed

McDermott and Baker Hughes have installed the subsea infrastructure at the INPEX-operated Ichthys field offshore northern Australia, McDermott announced in January.

The McDermott and Baker Hughes consortium won the project in 2019 to handle engineering, procurement, construction and installation (EPCI) of umbilicals, risers and flowlines. The project also includes a subsea production system comprised of a new 7-in. vertical Christmas tree network, which form a subsea well gathering system tied back to the existing Ichthys Explorer central processing facility. The consortium's scope also included in-fill umbilicals, risers and flowlines EPCI involving the development of new subsea wells tied into existing gathering systems.

LATIN AMERICA

Exxon's Payara Hits 220,000 bbl/d Ceiling in Just Three Months

Exxon Mobil's third development project offshore Guyana, Payara, reached its nameplate production capacity of 220,000 bbl/d in January, less than three months after it started production in the Stabroek Block offshore Guyana, Exxon's CEO Darren Woods said on the company's fourth-quarter 2023 webcast with analysts.

"Part of that was around the optimization of the drilling and making sure that we had what we needed to bring that up quickly," Woods said.

Payara, by way of the *Prosperity* FPSO vessel, commenced production in November. The project was initially expected to reach its nameplate capacity over the first half of 2024 as new wells were brought online.

Texas-based Exxon, which leads a consortium in Stabroek that includes Hess Corp. and China's CNOOC, said that Guyana exceeded its 2023 gross production guidance of 380,000 bbl/d, delivering more than 390,000 bbl/d.

Pan American Extends Archer Drilling Services Contracts

Pan American Energy awarded Archer's Argentina subsidiary $125 million in additional drilling services, Archer announced in January.

One contract, valued at $100 million, is a two-and-a-half-year extension through the fourth quarter of 2027 for three rigs working in Pan American's Cerro Dragon Field. The other contract, valued at $25 million over two years, is for one additional drilling rig in Vaca Muerta. The rig is scheduled to mobilize in the first quarter.

Titania Jackup Wins Work offshore Mexico

Paratus Energy Services announced that SeaMex Holdings and related subsidiaries won a one-year contract for the Titania jackup in Mexico from an unnamed customer.

The new contract will contribute approximately $55 million in backlog and was expected to begin in mid-February.

Atlanta Phase 1 Milestone Reached

Enauta Participações said in February that it had reached milestones on its Atlanta Phase 1 project offshore Brazil.

The early system is fully producing, with three wells in operation averaging more than 21,000 boe/d.

In January, the first subsea multiphase pumping system (MPP), manufactured by OneSubsea, was loaded in Norway bound for Brazil. The MPP will be installed to support Atlanta's oil and gas production and its on-scheduled delivery highlighted one of the key challenges to reach the FPSO *Atlanta's* first oil schedule by August. OGJ

Events Calendar

The following events present investment and networking opportunities for industry executives and financiers.

Scan me

EVENT	DATE	CITY	VENUE	CONTACT
2024				
Influential Women in Energy Luncheon	**March 8**	**Houston**	**Hilton Americas-Houston**	**hartenergy.com/events**
AOG Energy	March 13-15	Perth, Australia	Perth Convention & Exhibition Centre	aogexpo.com.au
CERAWeek by S&P Global	March 18-22	Houston	George R. Brown Conv. Ctr.	ceraweek.com
World Petrochemical Conference	March 18-22	Houston	Marriott Marquis	wpc.spglobal.com
DUG Gas+	**March 27-28**	**Shreveport, La.**	**Shreveport Convention Center**	**hartenergy.com/events**
MCE Deepwater Development	April 9-11	Amsterdam	Hôtel Mövenpick Amsterdam City Centre	mcedd.com
International Partnering Forum 2024	April 22-25	New Orleans	Ernest N. Morial Convention Center	oceantic.org
World Energy Conference	April 22-25	Rotterdam, Netherlands	Rotterdam Ahoy	worldenergycongress.org
2024 AGA Operations Conference & Spring Committee Meetings	April 28-May 2	Seattle	Hyatt Regency Seattle	aga.org
Offshore Technology Conference	May 6-9	Houston	NRG Park	2024.otcnet.org
SUPER DUG	**May 15-17**	**Fort Worth, Texas**	**Fort Worth Convention Center**	**hartenergy.com/events**
IADC Drilling Onshore Conference & Exhibition	May 16	Houston	Hyatt Regency Houston West	iadc.org
10th Mexico Gas Summit	May 16-17	San Antonio	St. Anthony Hotel	mexicogassummit.com
2024 AGA Financial Forum	May 18-21	Palm Desert, Calif.	JW Marriott Desert Springs Resort and Spa	aga.org
ASES Solar 2024	May 20-23	Washington, D.C.	GW University	ases.org
Louisiana Energy Conference	May 28-30	New Orleans	The Ritz-Carlton	louisianaenergyconference.com
Global Energy Show Technical Conference	June 11-13	Calgary, Canada	BMO Centre at Stampede Park	globalenergyshow.com
URTeC	June 17-19	Houston	George R. Brown Conv. Ctr.	urtec.org/2024
IPAA Leaders in Industry Luncheon	June 18	Houston	Petroleum Club of Houston	ipaa.org
CIPA 2024 Annual Meeting	June 20-23	San Diego	TBD	cipa.org
Carbon Management Americas Conference	June 25-27	Denver	The Ritz-Carlton	commodityinsights.spglobal.com
IAEE International Conference	June 25-28	Istanbul, Turkey	Boğaziçi Üniversitesi	iaee2024.org.tr
SPE Artificial Lift Conference and Exhibition	Aug. 20-22	The Woodlands, Texas	The Woodlands Waterway Marriott & Convention Center	spe-events.org
IMAGE	Aug. 25-30	Houston	George R. Brown Conv. Ctr.	aapg.org
New Energies Summit & Expo	**Aug. 12-13**	**TBD**	**TBD**	**hartenergy.com/events**
IADC Advanced Rig Technology	Aug. 27-28	Austin, Texas	Hyatt Regency Hotel	iadc.org
Forty Under 40 Awards	**Sept. 6**	**Houston**	**TBD**	**hartenergy.com/events**
Monthly				
ADAM-Dallas	First Thursday	Dallas	Dallas Petroleum Club	adamenergyforum.org
ADAM-Fort Worth	Third Tuesday, odd mos.	Fort Worth, Texas	Petroleum Club of Fort Worth	adamenergyfortworth.org
ADAM-Greater East Texas	First Wed., odd mos.	Tyler, Texas	Willow Brook Country Club	etxadam.org
ADAM-Houston	Third Friday	Houston	Brennan's	adamhouston.org
ADAM-OKC	Bi-monthly (Feb.-Oct.)	Oklahoma City	Park House	adamokc.org
ADAM-Permian	Bi-monthly	Midland, Texas	Petroleum Club of Midland	adampermian.org
ADAM-Tulsa Energy Network	Bi-monthly	Tulsa, Okla.	The Tavern On Brady	adamtulsa.org
ADAM-Rockies	Second Thurs./ Quarterly	Denver	University Club	adamrockies.org
Austin Oil & Gas Group	Varies	Austin, Texas	Headliners Club	coleson.bruce@shearman.com
Houston Association of Professional Landmen	Bi-monthly	Houston	Petroleum Club of Houston	hapl.org
Houston Energy Finance Group	Third Wednesday	Houston	Houston Center Club	hefg.net
Houston Producers' Forum	Third Tuesday	Houston	Petroleum Club of Houston	houstonproducersforum.org

Email details of your event to Jennifer Martinez at jmartinez@hartenergy.com.
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Oil and Gas Investor

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Fact-Checking an LNG Denier

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President Joe Biden messaged in January he would pause approval of new U.S. LNG export project permits, partly because a TikToker asked him to.

Toward forming bad energy policy, he could have asked Kathy Castor. The U.S. representative from Tampa, Fla., billboarded some members of Congress' energy illiteracy in a House hearing on LNG in early February. And like Biden, Castor vote-baited.

The worst: Castor incorrectly blamed U.S. natural gas producers for her constituents' higher electricity bills in 2023.

Castor chaired a now defunct House committee on the climate that was disbanded after December 2022 when the GOP regained the House majority. Its predecessor had been a committee on energy independence.

Hart Energy fact-checked Castor's remarks. Higher electricity costs for the Tampa area in 2023 had been expected since the fall of 2022 when Tampa Electric (TECO) announced a state-approved rate increase. That hike was due to higher feedstock costs—natural gas—in 2022.

The reason natural gas prices were higher, though, was a temporary market misperception that global gas would be undersupplied due to Europe rejecting shipments from Russia post-invasion of Ukraine.

In addition, the TECO rate adjustment was to recoup 2022 spending on post-hurricane repairs after Ian and Nicole.

Hart Energy also checked what the 2023 rate was for TECO's 840,000 accounts: It was roughly the 2023 residential rate in Houston: $161 for 1,000 kWh.

Also, Castor didn't mention in the House hearing that TECO won state approval in the fall of 2023 for a lower 2024 rate, reflecting 2023's reduced natural gas prices and the lack of hurricanes. The bill for 1,000 kWh fell to $143 this year. TECO reported this in November.

Also, Castor didn't mention that TECO began converting its powergen to natural gas from coal during this century. Its Big Bend plant was turned on in 1970 with a coal-fired unit and three more coal units were added in 1973, 1976 and 1985.

In 2022, the oldest unit was converted to natural gas; two others were retired and the fourth was converted to gas with a coal backup.

Another station, Polk, has a 1974 vintage gas-and-coal unit. A unit added in 2017 primarily uses natural gas.

The third plant, Bayside, was turned on in 2003 using natural gas; a second gas-fired unit was added in 2004.

TECO reported, "… Natural gas has reduced Bayside Power Station's nitrogen oxides and sulfur dioxide emissions by approximately 99% to date, plus particulate matter emissions have decreased by more than 93% from 1998 levels."

Four gas-fired peaking units were added in 2009.

Castor also didn't mention that she complained in 2019 to the Florida governor's office about TECO's conversion from coal to natural gas, calling it "a different dirty fuel source."

She argued in the complaint for converting Tampa's powergen wholly to solar and wind. In the February hearing, though, she did not mention that TECO's rate includes eventual recovery of the $850 million it's spent on adding 600 megawatts of solar capacity, which is cited in TECO owner Emera Inc.'s annual report.

TECO's 2023 fuel mix was 85% gas, 10% solar and 5% coal. It expects the switch to gas will save its customers more than $700 million during the next 30 years, it reported, calling it "the most cost-effective fuel to produce power."

Still grasping for a reason to not export U.S. natural gas to consumers abroad, she said that she didn't want any more sent to China—one of the world's largest polluters and users of coal.

Hart Energy checked the latest EIA data. China was the fifth-largest recipient of U.S. LNG (20.3 Bcf) in June 2023, totaling 6.2% of all U.S. LNG exports that month (327.8 Bcf).

Meanwhile, 169.8 Bcf (51.8%) was delivered to Europe, including 45.9 Bcf to the Netherlands (No. 1); 45.6 Bcf to France (No. 2); 18 Bcf to Poland; and the rest to Germany, Italy, Spain, Belgium, Portugal, Greece, Finland and Lithuania.

Other European countries that typically receive U.S. LNG but were full by June were Croatia and the U.K., receiving a combined 57 Bcf in November.

After the Netherlands and France, Japan ranked No. 3 in June (28.0 Bcf); Argentina, No. 4 (22.7 Bcf).

Providing testimony in the House hearing included Toby Rice, president and CEO of EQT Corp.

But Castor directed her questions only to an environmental sympathizer, Gillian Giannetti with the Natural Resources Defense Council, who said Castor's constituents' higher energy bills are caused by LNG exports.

The Henry Hub price for natural gas the morning of the hearing, Feb. 6, was $2.06/MMBtu.

In a last gasp, Castor cited a Jan. 25 letter to Biden by 60 (of the 705) members of the EU Parliament that said "Europe should not be used as an excuse to expand LNG exports that threaten our shared climate and have dire impacts on U.S. communities."

Hart Energy looked at the letter. Signing it were members of the parliament's Green Group, Left Group and Socialist Group. OGI

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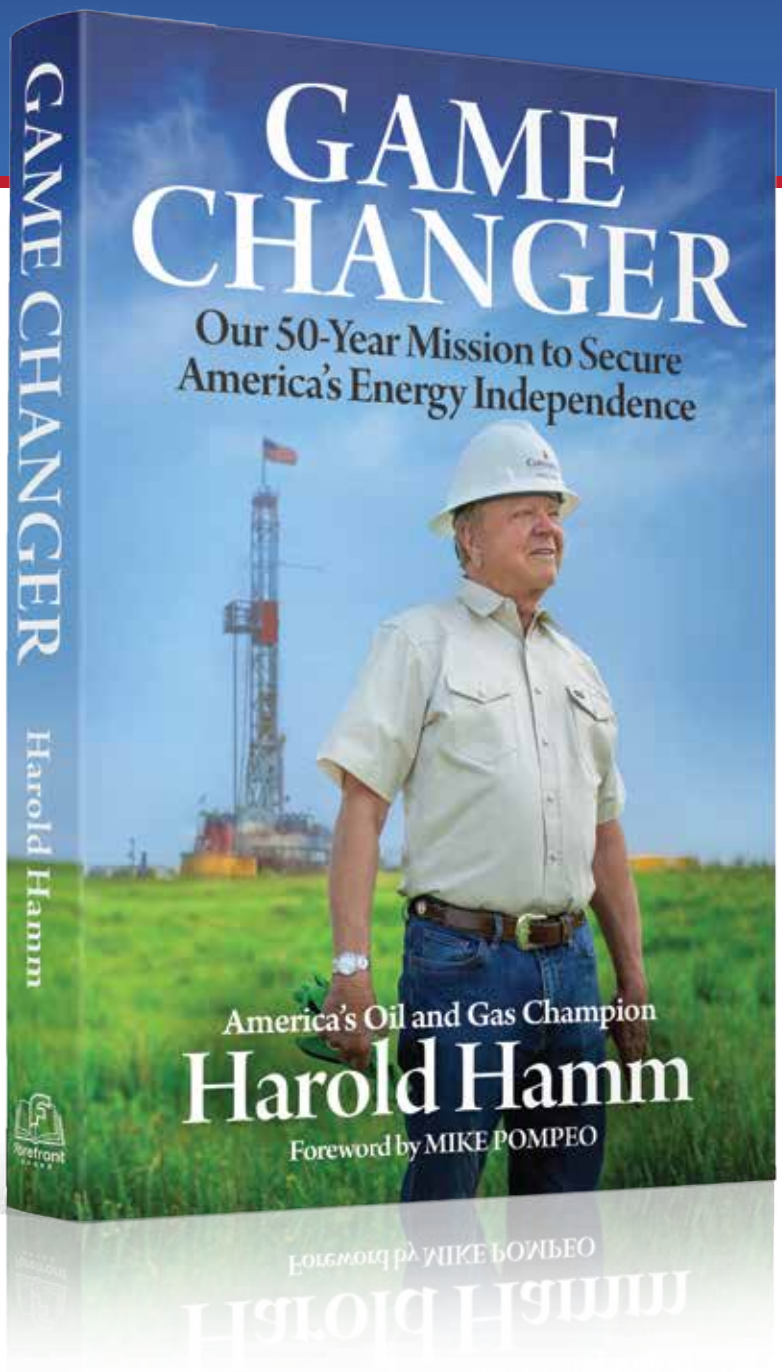

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