Oil and Gas Investor

SUPERMAJOR APPEAL

Exxon Mobil Buys a Top Spot in the Permian Basin

GENERATIVE AI

What happens to the Energy Industry if its Computers Lie, Steal and Hallucinate?

PRIVATE EQUITY

Oil, Gas Firms' Old Exemption Offers Loophole in New Regulation

THE OGI INTERVIEW

A WHOLE NEW WORLD

CEO Cindy Taylor on Oil States International and its Role in the Energy Transition

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UNDISCLOSED	UNDISCLOSED	UNDISCLOSED	UNDISCLOSED	UNDISCLOSED
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EQUITY PRIVATE PLACEMENT	STRATEGIC PARTNERSHIP	ASSET ACQUISITION	EQUITY PRIVATE PLACEMENT	EQUITY PRIVATE PLACEMENT
Sole Placement Agent	Sole Placement Agent	Financial Advisor	Sole Placement Agent	Sole Placement Agent
UNDISCLOSED	UNDISCLOSED	UNDISCLOSED	UNDISCLOSED	$350 MILLION
VIKING MINERALS	VIKING MINERALS	**Shadow Creek Minerals**	NOBLE ROYALTIES, INC.	VIPER Energy Partners
ASSET DIVESTITURE	ASSET DIVESTITURE	ASSET DIVESTITURE	ASSET DIVESTITURE	FOLLOW ON OFFERING
Financial Advisor	Financial Advisor	Financial Advisor	Financial Advisor	Underwriter
$66 MILLION	$104 MILLION	$53 MILLION	UNDISCLOSED	UNDISCLOSED
KIMBELL ROYALTY PARTNERS	KIMBELL ROYALTY PARTNERS	KIMBELL ROYALTY PARTNERS	**Multi-Basin Minerals Company**	**Multi-Basin Minerals Company**
FOLLOW ON OFFERING	INITIAL PUBLIC OFFERING	FOLLOW-ON OFFERING	ASSET DIVESTITURE	VALUATION ANALYSIS
Underwriter	Underwriter	Underwriter	Financial Advisor	Financial Advisor

MINERALS & ROYALTIES STATISTICS	PRIVATE FINANCING STATISTICS
~$2.4 Billion	~$11.7 Billion
Aggregate Transaction Volume Since 2017	Aggregate Capital Raised Since 2009
15 Closed Transactions Since 2017	37 Closed Transactions since 2009

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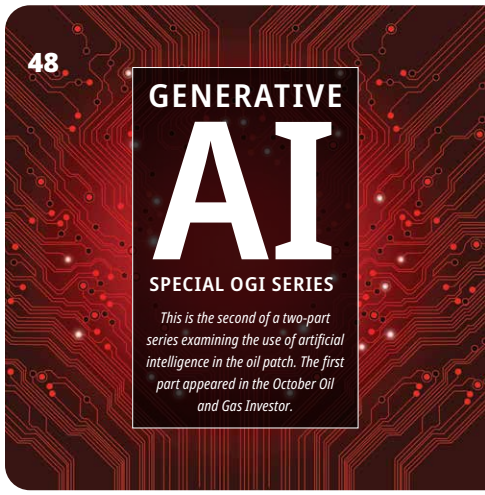
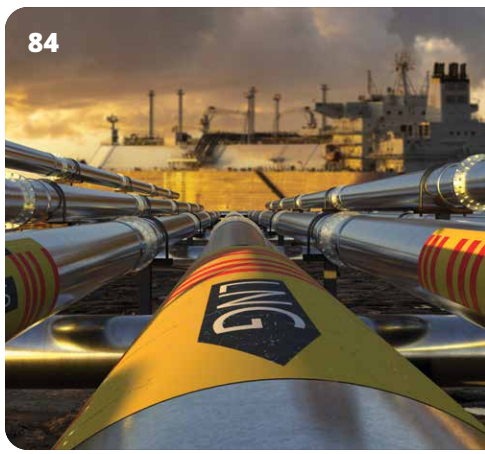
THE OGI INTERVIEW

PART TWO: GENERATIVE AI

COMMENTARY





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ACTIVITY HIGHLIGHTS

A&D WATCH

▸ EXXON MOBIL BUYS PIONEER

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ABOUT THE COVER:
Felix Navarro captured the picture of Oil States International CEO Cindy Taylor in the company's Houston headquarters.

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Addition By Subtraction

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The absorption of Pioneer Natural Resources by supermajor Exxon Mobil is the inevitable end of the Permian Basin pure play's story. It was just a matter of timing.

Consolidation is key to corporate growth. To some extent, either everybody's doing it or they surely—perhaps quietly—want to do it.

That's how the big guys get bigger: after examining the track record of their successful but smaller, more nimble peers, they buy them up. It works for independent producers that want to grow via M&A—as we reported on deals during the first half of the year when public E&Ps gobbled up a buffet of private companies: Diamondback Energy bought Lario Permian and Firebird Energy; Marathon Oil acquired Ensign Natural Resources; and Ovintiv took out Black Swan Oil and Gas, PetroLegacy Energy and Piedra Resources.

Here come the biggest fish

And now it may be time for the supermajors to dine.

The Exxon-Pioneer deal is the largest in the upstream oil and gas space since Exxon bought Mobil in 1998 for $82.5 billion. The all-stock $60 billion price edged aside Occidental Petroleum's $57 billion purchase of Anadarko Petroleum in 2019.

In some instances, the real value of a big deal isn't immediately clear. As Chris Mathews, our A&D senior editor, reported, this latest Exxon acquisition revisited the angst of the supermajor's 2010 purchase of XTO Energy for $36 billion. At the time, it raised eyebrows, but it's hard to argue against the deal value today.

Similarly, Oxy came under fire for the Anadarko purchase, led largely by activist shareholder Carl Icahn. But the company—and its Teflon leader, CEO Vicki Hollub—today have a strong balance sheet and as much shareholder support as any other U.S. producer.

Moreover, this sort of consolidation among shale producers is part of their corporate lifespan.

Hours after the Exxon buy was announced, Pioneer CEO Scott Sheffield told Bloomberg Television as much.

"Shale companies cannot survive on their own, long term. They're going to have to merge up, consolidate and be part of diversified companies," he said in October.

And for all the reasons we've examined and reported on at length inside *Oil and Gas Investor* and on HartEnergy.com—scale, scale and scale—plus a few others, there is no denying that consolidation is an industry standard.

Independents and independence

The Pioneer story is different. And its absorption by Exxon is a loss.

By definition, an independent producer is more nimble and risk-taking than the lumbering giants that control the vast majority of resource and profit.

CEO Scott Sheffield's tenure is dappled by independent displays.

Sheffield was the first leader of a large oil and gas company to hold his business and his peers accountable in 2019 for the rampant flaring of natural gas in the Permian Basin. That was the same year I had reported on my findings from six months spent analyzing Texas Railroad Commission records that proved the agency had literally never denied a producer's request to flare natural gas. When it came time for me to write about the issue, Sheffield was the only CEO in the Permian willing to take my call.

He went on to tell me and dozens of others around the world that Permian flaring is a "black eye" that needed some healing. It was bold, and at least part of the reason the industry continues to effort—at various levels—measurable and meaningful reductions.

The next CEO to assume such public accountability was Matt Gallagher, chief at Parsley Energy until October 2020. That's when Pioneer bought the firm and put Gallagher on its board of directors.

The flaring issue is not the only example of Pioneer's leadership being willing to make a bold move and to do it independently.

The E&P was among the first to respond to deep and widespread shareholder anxiety over dismal returns, tweaking executive compensation to put the C-suite's interest in line with those of investors and then introducing a variable dividend, an oil and gas rarity.

He publicly challenges the leadership of OPEC whenever it strikes his fancy. He knows what his sector of the U.S. oil and gas industry can do—and has done—to impact the global energy economy and tweak OPEC's power. He called out the cartel when it tried to undermine the shale revolution with a pseudo price war in 2014, and he was a respected, reasonable voice during Texas Railroad Commission talks about a production cap during the early months of the pandemic.

Sheffield's departure from the limelight will leave a void in the industry's accountability and its global voice. But it also presents an opportunity for other oil and gas executives to grab the independent mantle in front of God and everybody and step into prime time. OGI

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SHALE

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CONFERENCE & EXHIBITION

June 2024
TBD

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ENERGY CAPITAL

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Sept. 2024
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LEADERSHIP

DUG EXECUTIVE OIL
CONFERENCE & EXHIBITION

Oct. 2024
Midland, TX

TECHNOLOGY

DUG TECH
CONFERENCE & EXHIBITION

Nov. 2024
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AWARDS

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Market Doubts? Suspender Your Disbelief

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The more things change, the more they really, really change.

In November 1980, the first IBM personal computer was about a year away from launch, almost all telephones were connected to a wall and the average price of crude oil was $35.09/bbl or an inflation-adjusted $122.93/bbl.

Technology was big back then but so was oil. The No. 1 company by market capitalization was IBM, valued at $34.6 billion ($128.12 billion in 2023), according to City Index. Telecommunications giant AT&T was No. 2 at $33.4 billion ($123.68 billion).

Six of the eight companies that followed to round out the top 10 of 1980 were oil companies and they accounted for 55% of the largest companies' market cap. The other two were General Motors, maker of vehicles that ran on refined oil products, and DuPont, maker of chemicals derived from oil products.

Investing in public companies was facilitated by brokers, almost all men, who wore vests, wide ties and suspenders to hold up pleated slacks. If you wanted to make money in the market and were willing to take more risk than IBM or Ma Bell could offer, you would contact a broker and tell him you wanted to be … drum-roll … an oil and gas investor.

Those investments made sense because the global economy back then ran on energy that was overwhelmingly supplied by fossil fuels. Just like now. Just like it's been for the last 100 years or so.

Just like it was in 2000, when only Exxon Mobil and Shell represented energy in the top 10, accounting for 16% of the largest companies' market cap. (In 1980, Exxon, Mobil and Shell combined accounted for 31%.)

Tech companies like Microsoft (PC software), Cisco (networks), Intel (chips), NTT Docomo and Nokia (phones) ruled in 2000. Exxon had purchased Mobil in 1999 and the combined value of the energy behemoths was dwarfed by Microsoft, a company missing from the 1980 list because it wasn't traded until 1986.

Bill Gates' baby was worth over $1 trillion in 2000 (in 2023 dollars), more than all top 10 companies' combined value on the 1980 list. Now its value is around $2.5 trillion, and yet that comes well short of Apple's $3.03 trillion.

Don't give up

The list reflects profound changes in the world since 1980. The combined market cap for Exxon and Mobil then was an inflation-adjusted $193 billion. In 2000, Exxon Mobil's market cap totaled $460.2 billion. In early October 2023, the company's market cap was virtually the same at $464 billion and only one oil and gas company—state-owned Saudi Aramco—now ranks among the 10 largest companies in the world.

This is not exactly breaking news. Publicly traded oil and gas companies have struggled in the market for quite a while now. And if you want to note that Warren Buffet's Berkshire Hathaway has invested billions in Chevron and Occidental Petroleum, also note that 46% of the Oracle's portfolio is in Apple.

An automaker still ranks among the largest companies but it is Tesla, manufacturer of electric vehicles. The market cap of Tesla is roughly equal to the market cap of carmakers ranked No. 2 through No. 10 in 2023, according to CompaniesMarketCap.com. Not General Motors, though; GM is only No. 12 on the automaker list, with a market cap of about $43 billion, or about 5.5% of Tesla's.

It's how the market perceives profitability in the era of the energy transition. GM, after all, is doing well. It is No. 4 in revenue and No. 7 in earnings among automakers, just $1 billion behind Tesla in the four quarters ending June 30. But investors question whether it can compete in the new EV era, just as they question whether fossil fuel companies can compete as the energy transition continues to ramp up.

Portfolio manager David McAlvany believes fossil fuel companies can compete, at least in the natural gas space.

"The reality is, we're looking at the most critical transition fuel in terms of the green energy transition," he told BNN Bloomberg, the Canadian business channel, in mid-September. "We can't go anywhere without natural gas, love it or hate it. This is where we're at."

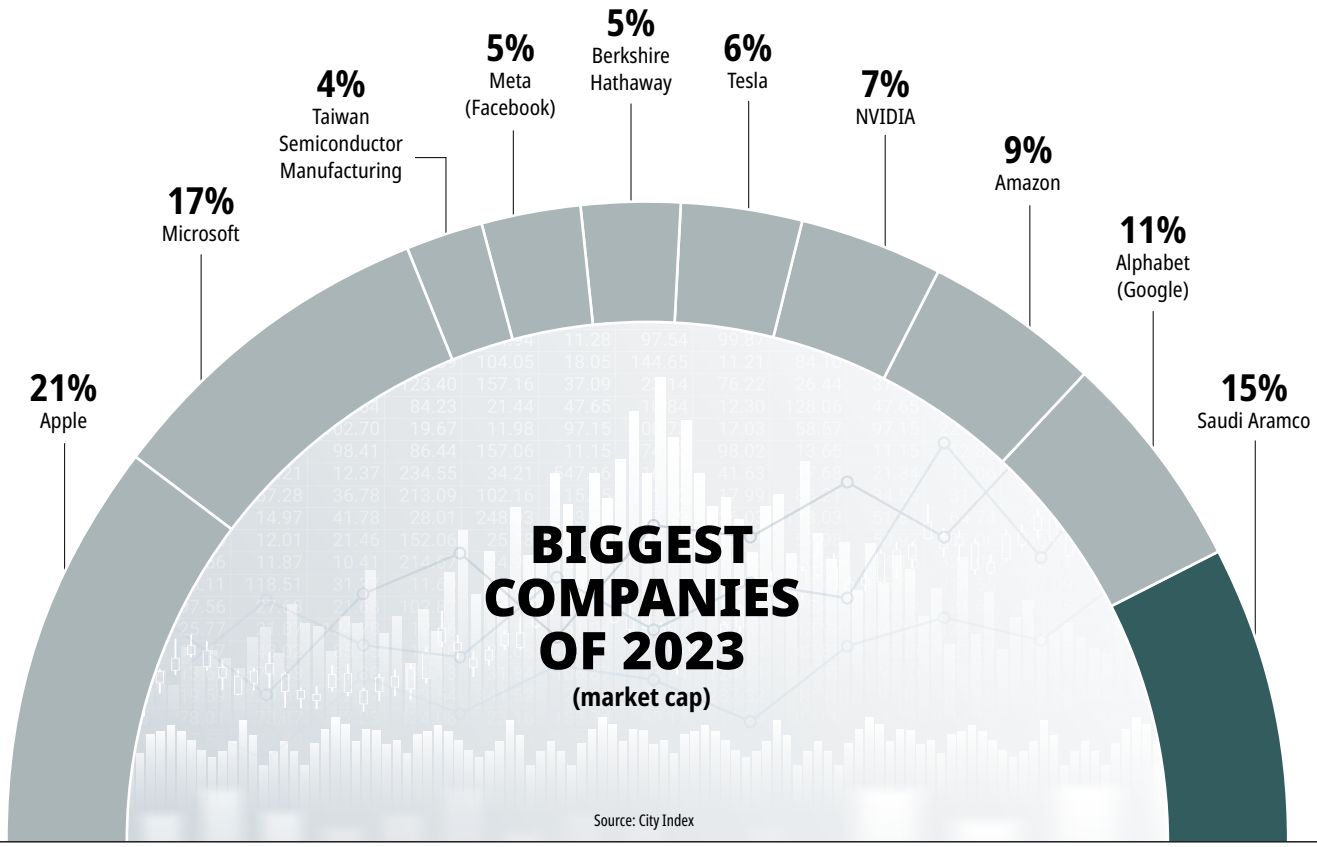
He is skeptical that offshore wind will gain enough traction and be financially viable. And coal? Please.

"Natural gas is the way forward," he insists.

Companies he likes in the space include Devon Energy, Chesapeake Energy and midstream giant The Williams Cos.

But that's foresight, and hindsight is so much more accurate. Only four of the largest companies by market cap in 1980 exist as entities today. One day, people may utter sentences like, "I remember when everybody used to have an iPhone."

Don't give up on fossil fuel investments just yet. Even suspenders have made a comeback. OGI



A Three-Pronged Regulatory Blitz

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Jack Belcher is a principal at Cornerstone Government Affairs, where he focuses on regulatory affairs, risk management and ESG matters within the energy and transportation sectors.

Driven by efforts at the U.S. Environmental Protection Agency (EPA) and other federal entities to lower greenhouse-gas (GHG) emissions, there are a number of regulatory forces in motion that are going to have a profound impact on the U.S. oil and natural gas industry in the coming years. These actions will ultimately impact industry by: 1) requiring the measurement of all GHG emissions, including methane, from certain oil and gas operations, 2) implementing inspection and mitigation requirements designed to reduce methane emissions, and 3) assessing a fee on methane emissions.

In 2009, EPA launched the Greenhouse Gas Reporting Program (GHGRP) as a mechanism for gathering emissions data from different industries. Subpart W of the GHGRP instructs owners and operators of petroleum and natural gas systems that emit more than 25,000 metric tons of GHGs annually to report that data to EPA.

The Inflation Reduction Act of 2022 (IRA) expanded the GHGRP to require reporting of emissions from additional categories, including "large emissions events;" more site-specific emissions reporting (such as reporting on nitrogen removal units, produced water tanks, and mud degassing); direct measurement (including satellite and aerial flyovers) where possible; more detailed monitoring and estimating for pneumatic controllers and pumps; and comprehensive engine emissions capture.

EPA estimates that the annual costs from the rule will be $82,701 for E&P reporters; $15,245 for gathering and boosting reporters; $24,670 for gas processing reporters; and $1,656 for pipeline reporters. These requirements are expected to be finalized in August 2024 and to take effect at the beginning of 2025.

In December 2022, EPA issued a supplementary regulatory proposal in its ongoing rulemaking on methane and volatile organic compounds (VOCs) as part of the New Source Performance Standards for oil and gas facilities (including pipelines) under the Clean Air Act Amendments Subpart 0000 rules. For the first time, the amendments would establish emissions guidelines for methane emissions sources from existing facilities. Comments from industry mostly focused on the rule's $14 billion in estimated compliance costs, potential disincentives for new technologies, the overall regulatory burden of the rule, and the outsourcing of enforcement, such as having environmental NGOs identify "super emitters."

Another looming regulation is the IRA's fee on excess methane emissions from oil and gas operations covered under EPA reporting regulations under Subpart W. The fee will be assessed on methane emissions occurring after Jan. 1, 2024 from offshore oil and gas production, onshore oil and gas production, gathering, and boosting; onshore gas processing, transmission compression and pipeline transmission; underground gas storage; and LNG storage, and import and export equipment.

The fee applies to applicable facilities that report more than 25,000 metric tonnes of CO_2 equivalent per year on their GHG reporting forms. The fee will be assessed on methane emissions thresholds that include greater than 0.20% of natural gas sent to sale from the facility or 10 metric tons on methane per million barrels of oil sent from the facility if no natural gas is sent to sale. For gathering, boosting, gas processing and LNG, the threshold is 0.05% of the natural gas sent to sale from the facility. For onshore gas compression, pipeline transmission and underground storage, the threshold is 0.1% of gas sent to sale. The fee is set out on a sliding scale, starting at $900 per metric ton in 2024, increasing to $1,200 per metric ton in 2025 and settling at $1,500 per metric ton for 2026 and beyond.

EPA anticipates that actions taken in the IRA, including the methane fee and financial and technical assistance available for methane emissions reduction will result in a 40% methane emissions reduction by 2030.

The federal government's three-pronged approach to methane emissions will have a profound impact on the oil and gas industry, which is already undergoing capital investment and implementing new processes to address this carrot-and-stick approach to regulations. EPA continues to tighten restrictions on oil and gas operations, requiring regular inspections of all wellheads, reporting of larger sources of GHG emissions including methane, new inspections and mitigation measures, and imposing a significant fee on methane emissions.

At the same time, service companies large and small are finding new opportunities for helping the domestic oil and gas industry address this regulatory offensive and comply with increasing strict emissions standards. In the near-term, it appears highly unlikely that Congress or any other force within the government, including the courts, will have the political capability of reversing these methane emissions regulations. OGI

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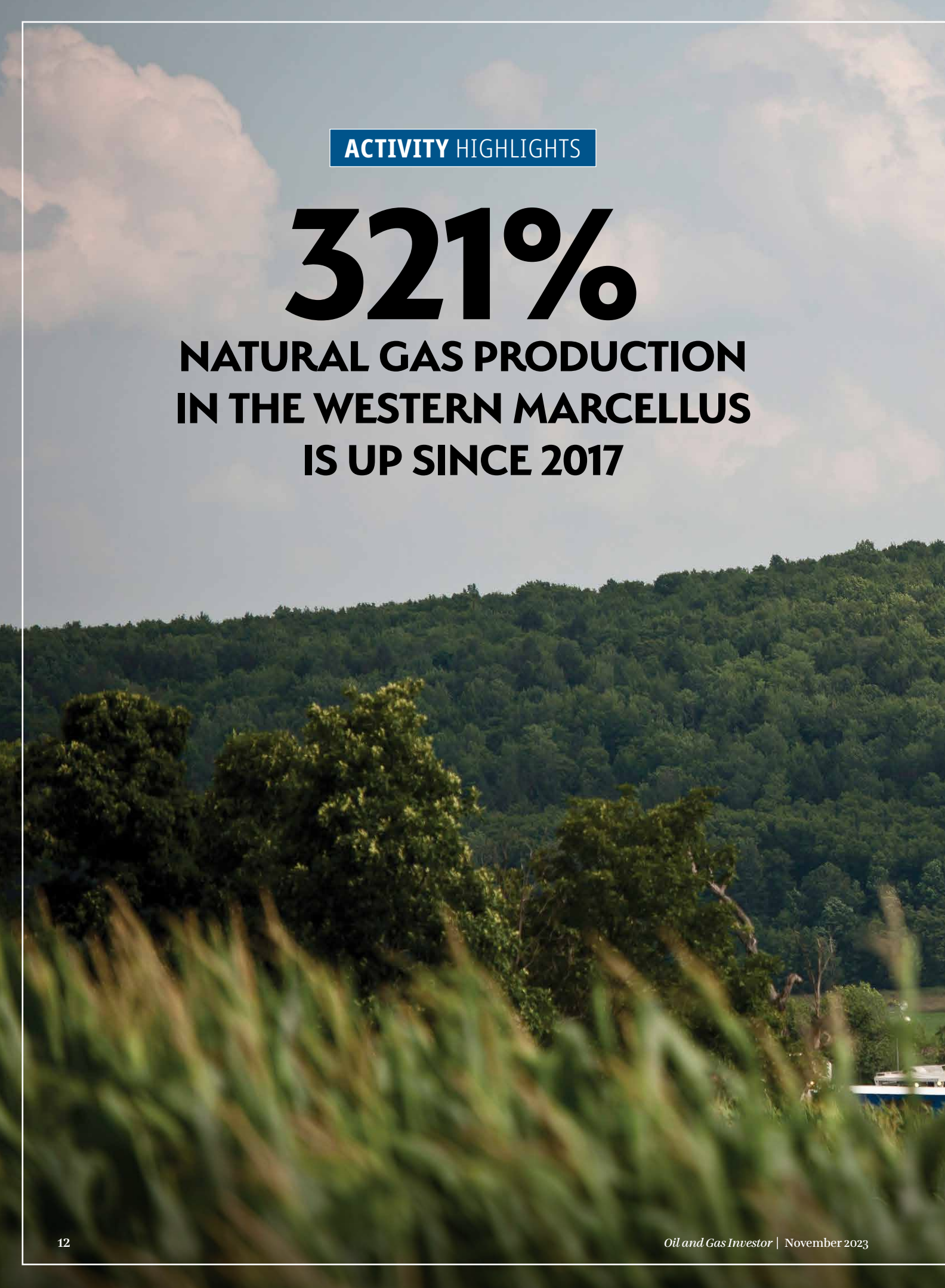
NATURAL GAS PRODUCTION IN THE WESTERN MARCELLUS IS UP SINCE 2017



Helge Hansen/Equinor

FOCUS ON: WESTERN MARCELLUS

Gas producers continue to drill into the western Marcellus Shale—despite significant volatility in natural gas prices over the past year.

Henry Hub spot prices are expected to average $2.71/Mcf during 2023, down nearly 60% from $6.67/Mcf last year, according to the Energy Information Administration.

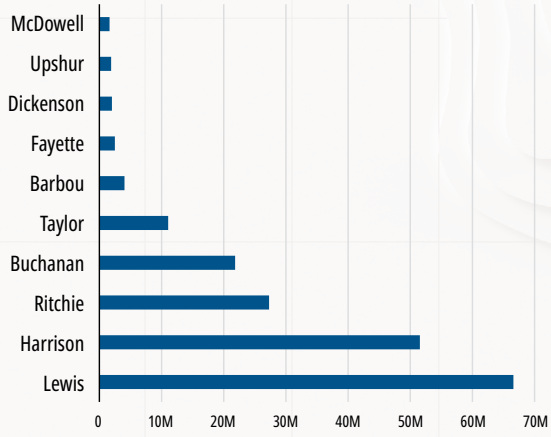
Gas output from the western Marcellus peaked in August 2022, when total production reached more than 113.61 Bcf, according to Rextag data. Henry Hub spot prices averaged $8.30/Mcf during second-quarter 2022 as Russia's invasion of Ukraine and rising global demand upended energy markets.

But total gas production had dropped to about 62 Bcf as of May 2023, Rextag data show.

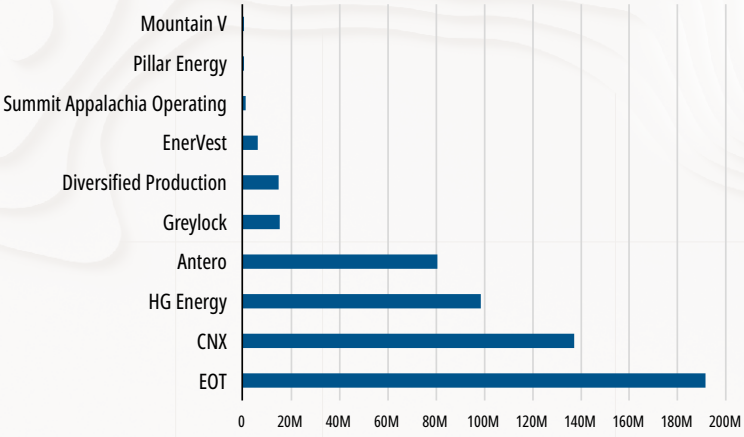
Over the past year, production in the western Marcellus has been led by natural gas giant EQT Corp. CNX is the second-largest producer, followed by HG Energy, Antero Resources and Greylock Energy.

Gas production is being led out of Lewis County, W.Va., followed by Harrison and Ritchie counties.

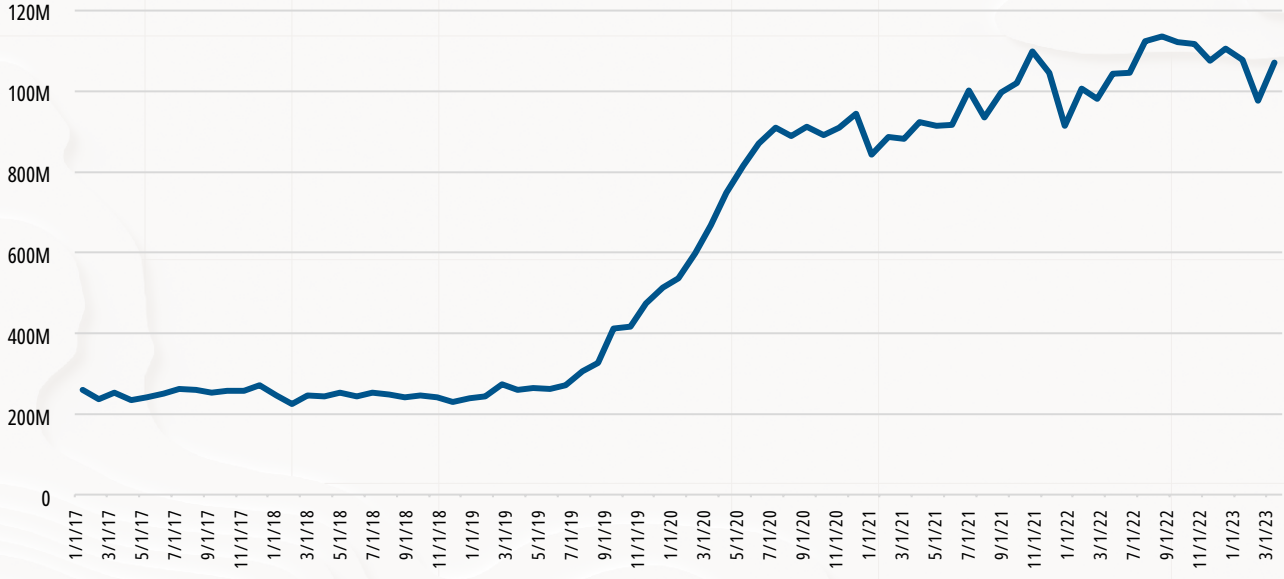
Top gas-producing counties (Pa.)
(monthly, last 12 months, Mcf)



Top natural gas operators
(monthly, last 12 months, Mcf)



Western Marcellus natural gas production
(monthly, Mcf, January 2017-March 2023)



Source: Rextag

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PERMITS

E&Ps continue to plan drilling activity in the Permian Basin at a high clip, permit applications show.

Martin County, Texas—located in the core of the Midland Basin—garnered the most well-permitting activity in the past month, according to Rextag data.

Permitting activity was also active in Reeves and Loving counties, Texas, in the Permian's more western Delaware Basin.

Other counties in the Midland Basin—Midland, Glasscock and Reagan counties, Texas—also raked in a notable amount of well permits.

Texas, again, led the pack with 341 well permits issued in the past month.

But other states also saw permitting activity: Colorado ranked second with 56 permits, while Louisiana ranked third with 29.

In Caddo Parish, La., in the heart of the gassy Haynesville Shale, operators filed for 16 well permits.

Dunn County, N.D., within the Williston Basin, brought in 12 permits.

And Weld County, Colo., in the Denver-Julesburg Basin, raked in nine permits.

Permitted wells by state

State	Well Count
Texas	341
Colorado	56
Louisiana	29
North Dakota	26
Oklahoma	14

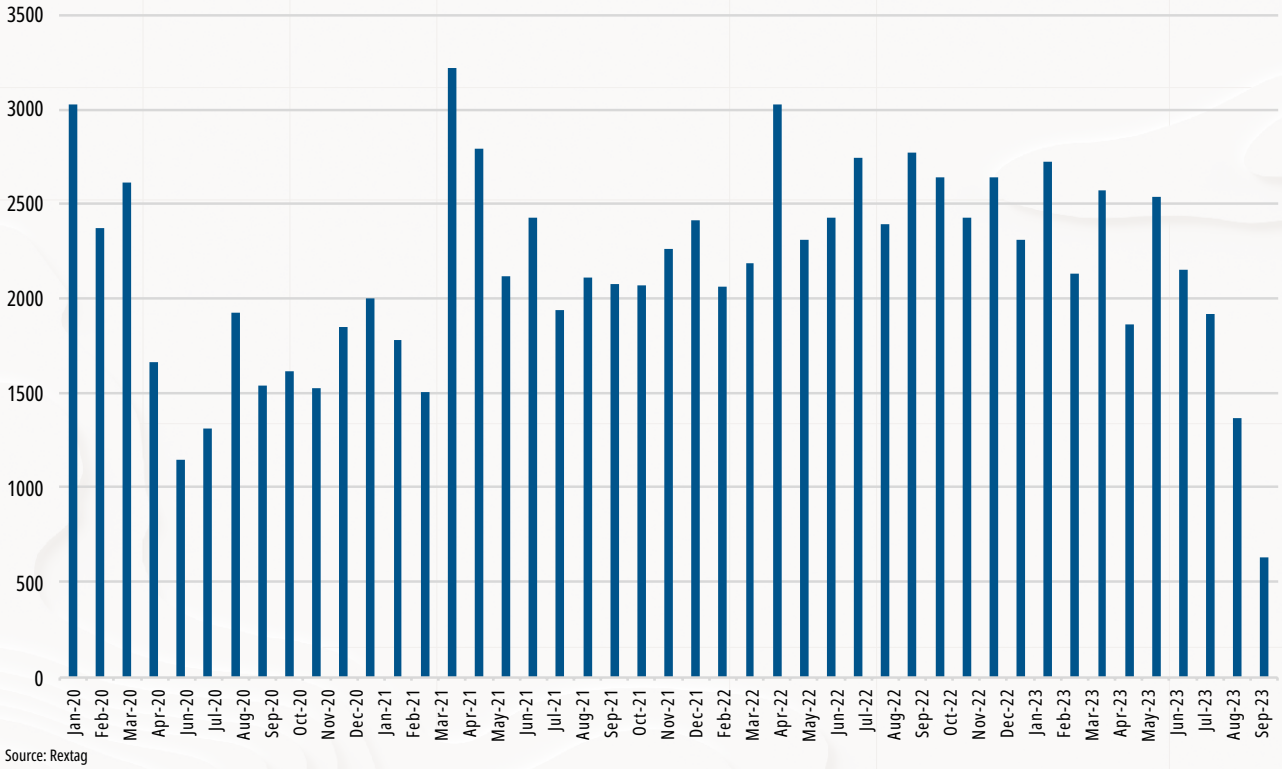
Permitted wells by operator

Operator	Well Count
Endeavor	23
Marathon Oil	20
EOG	20
Terra	16
Hibernia Resources III	14
Continental	13
Petro Operating	12
ConocoPhillips	12
Petro-Hunt Permian	12

Permitted wells by county

County	Well Count
Martin, Texas	44
Reeves, Texas	26
Loving, Texas	25
Atascosa, Texas	23
Midland, Texas	21
Glasscock, Texas	18
Reagan, Texas	17
Caddo, La.	16
Ward, Texas	13
Dunn, N.D.	12
Webb, Texas	12
Weld, Colo.	9

U.S. permits issued



Source: Rextag

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A Marriage Made in Midland

With its $60 billion acquisition of Pioneer Natural Resources, Exxon Mobil will bring its Delaware Basin drilling strategy into the Midland Basin.

CHRIS MATHEWS
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With its roughly $60 billion blockbuster deal to acquire **Pioneer Natural Resources**, **Exxon Mobil** aims to deploy its Delaware Basin drilling strategy onto Pioneer's massive Midland Basin position.

The all-stock transaction, valued at approximately $59.5 billion excluding the assumption of Pioneer's net debt, will bring together two of the largest oil and gas producers in the Permian Basin.

Spring, Texas-based Exxon Mobil has 570,000 net acres spread across both the Delaware and Midland basins, the U.S. supermajor said in October.

The transaction will add Irving, Texas-based Pioneer Natural Resources's 856,000 net acres in the core of the Midland Basin.

Exxon has a large, contiguous acreage footprint in the Permian's more western Delaware Basin. The blocky acreage position enables Exxon to drill four-mile laterals on its Delaware footprint, Exxon Senior Vice President Neil Chapman said on a call with journalists.

"Pioneer has the largest contiguous acreage in the Midland Basin by a long, long way," Chapman said. "It is in the runway of the highest Tier 1 acreage in the Midland Basin."

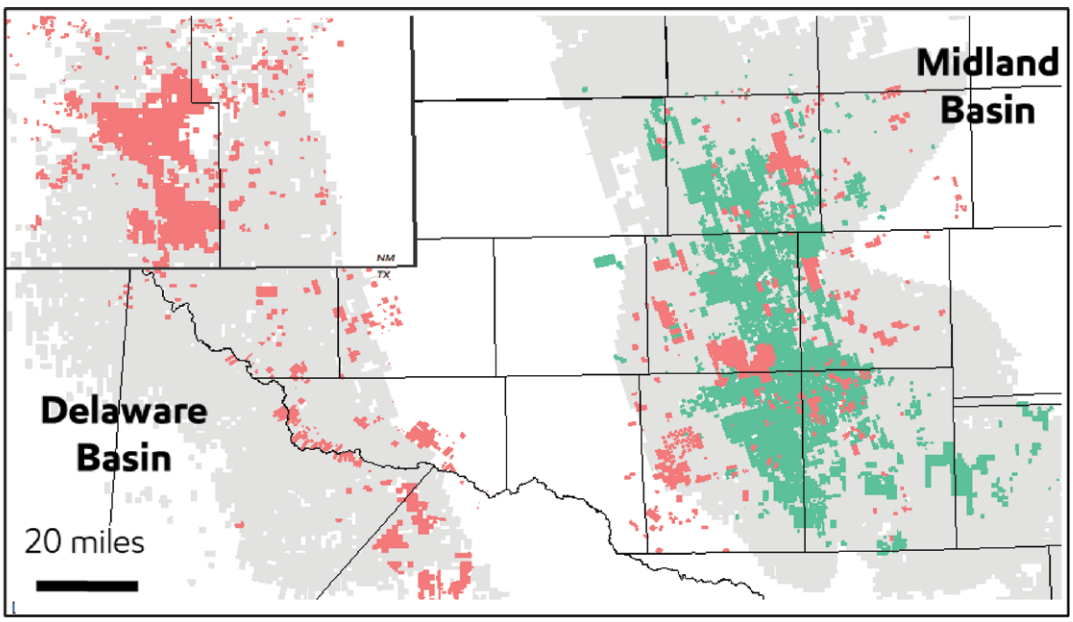
The company plans to apply its advancements in drilling technology and well design onto Pioneer's massive acreage footprint in the heart of the Midland Basin.

"Most people are drilling one- to two-mile laterals," Chapman said. "We can have just one drilling rig to drill the whole of the four miles—and that's obviously a big cost saving."

Exxon has also improved oil recovery from its Permian footprint by fine-tuning a cube development strategy—where operators drill multiple horizontal wells in stacked intervals from a single surface location—for several years.

"The first cube was [drilled] in 2018, maybe the back end of 2017," Chapman said. "We're most experienced in that space and I think that's something additional we will bring to the Pioneer acreage."

Pioneer's contiguous, high-quality acreage enhances Exxon Mobil's Permian position



Source: Exxon Mobil

Exxon Mobil will add Pioneer's over 850,000 net acres in the core of the Midland Basin through an approximately $60 billion mega-merger.

Exxon has laid out aggressive growth plans for its Permian production: the company previously aimed to ramp up Permian output to 1 million boe/d by 2027.

After closing the Pioneer deal, Exxon now expects its Permian production to be about 1.3 million boe/d. By 2027, the company aims to grow production up to 2 million boe/d (>75% liquids).

Roughly 45% of Exxon's global upstream volumes will come from U.S. production after closing the Pioneer deal.

The transaction will also deepen Exxon's runway for future drilling in the Permian. Pioneer holds about 6,300 net locations of high-quality drilling inventory in the Midland—wells generating a 10% return with WTI prices of below $50/bbl, according to estimates from Enverus Intelligence Research.

Stocking up

The all-stock deal is valued at approximately $59.5 billion, or $253 per share—a nearly 18% premium over Pioneer's closing stock price of $214.96 per share on Oct. 5.

Darren Woods, chairman and CEO at Exxon, said the all-stock nature of the deal helps better insulate the company from the ups and downs of the oil and gas commodity cycle.

"We kind of thought about it from the standpoint of the transaction currency grows with the commodity cycle and declines as the commodity cycle comes off," Woods said. "Therefore, we've got some insulation from that exposure."

The value of Exxon's stock in early October—about 10% off of its all-time high—also made it an attractive currency to tap for the Pioneer deal.

"You obviously expect to offer a market premium for an asset of this quality," Chapman said. "Obviously, we've looked at the movements in stock prices. We believe it's a really good time to act."

Fueling the M&A fire

As the market digests the $60 billion megadeal between Exxon and Pioneer, experts believe other oil companies could pursue large-scale M&A in the Permian Basin.

Analysts at **Truist Securities** "anticipate further consolidation in the upstream space given the limited inventory and the inexpensive price of most smaller E&Ps versus both the larger operators and historical valuations," according to an October research report.

Rather than pursue large-scale acquisitions, E&Ps have, by and large, opted to direct their abundant cash flows toward shareholder returns in recent years.

But the massive Exxon-Pioneer combination could usher in a new era for the U.S. shale industry, marked by large-scale consolidation, said Matthew Bernstein, senior shale analyst at **Rystad Energy**.

Dan Pickering, founder and chief investment officer of **Pickering Energy Partners**, said the Pioneer-Exxon deal could cause a bit of fear of missing out, or "FOMO," by other operators.

"The momentum begets momentum," Pickering said.

$6 Billion in Free Cash Flow ... Maybe

Analysts mildly skeptical of Exxon Mobil's claim of a boost from the Pioneer deal.

Exxon Mobil will gain $6 billion in free cash flow from its acquisition of **Pioneer Natural Resources**, the supermajor's executives said on Oct. 11, the day the transaction was announced.

Analysts were skeptical.

"Pioneer offers pure leading asset margins and immediately adds $5 billion in annual free cash flow," Exxon Mobil CFO Kathryn Mikells said during a call with analysts. "With synergies, we expect incremental free cash flow of $6 billion in the second full year."

Bank of America analyst Doug Leggate questioned that.

"Maybe our numbers are off, but we had about $5 billion of free cash flow coming from Pioneer," he said on the call.

Mikells said roughly two-thirds of the $6 billion projected figure comes from the synergies of increased fossil fuel recovery as the technologies and best practices of the two companies are combined, and the remainder is expected to come from capex efficiencies.

She expects the strong balance sheet and incremental cash flows generated post-closing to "provide even more opportunities to enhance shareholder distribution."

Bountiful free cash flows enjoyed by nearly every E&P allow companies more flexibility in paying off debt and returning capital to shareholders as they hold off on drilling new wells. Mikells said Exxon Mobil will enjoy even more of that flexibility with the Pioneer free cash flow boost.

"Decisions will be made in the future in terms of what we do with that flexibility, but clearly we have more flexibility to enhance shareholder returns," she said.

"I don't know if [Exxon's cash flow projection is] unrealistic. … But it's ambitious. I think that's the right way to frame it," **TD Cowen** analyst Jason Gabelman said to Hart Energy after the call. But, he said, the projections are in keeping with ambitions Exxon had previously expressed.

"Exxon has consistently talked about a focus on increasing the recovery rates that they're getting out of the Permian.... But that's been difficult for the industry to crack," Gabelman said. "Exxon's been talking about it for a while, and I think they seem optimistic they can do it, but it's one of these things that from the outside, it's difficult to believe until it's done."

On the call with analysts, Mikells and Exxon Mobil CEO Darren Woods repeatedly promoted the Pioneer acquisition's promise of greater success at the drill bit.

"When combined with our technology and industry leading operational capabilities, we know that together we can unlock far more value than either of us could alone," Woods said. "Our combined capabilities will enable us to get more resource out of the ground more efficiently and with a lower environmental impact."

Whatever the free cash flow boost is, Gabelman said much of it is widely expected to go to dividends and stock buybacks.

—Patrick McGee, Senior Editor, Finance

$60 Billion Deal 'Completely Different' from XTO Takeover

'This is night and day from where we were,' Exxon's Woods says of the $36 billion acquisition in 2010 that brought the supermajor into the Permian.

With its roughly $60 billion acquisition of **Pioneer Natural Resources**, **Exxon Mobil** is cementing itself as the global leader in unconventional oil and gas. That's a far cry from 2010, when executives said Exxon was late to the unconventional party.

Spring, Texas-based supermajor Exxon Mobil agreed to acquire Irving, Texas-based Pioneer Natural Resources in an all-stock deal valued at $59.5 billion, or $253 per share in mid-October. Including the assumption of Pioneer's net debt, the approximate total enterprise value of the deal is around $64.5 billion.

The shale megadeal will deliver Exxon more than a decade of incremental drilling runway in the heart of the Permian Basin, America's top oil-producing region.

For some analysts and company executives, the blockbuster shale deal brings back memories of Exxon's $36 billion acquisition of unconventional gas player **XTO Energy** in 2010. But Exxon Chairman and CEO Darren Woods emphasized how far Exxon has come since the days of the XTO deal.

"This is night and day from where we were," Woods said in an internal company message filed with the U.S. Securities and Exchange Commission.

"If you go back to [2009], that was an acquisition to fill a gap that we had in our capability set," he said.

The XTO deal gave Exxon exposure to unconventional oil and gas development in the prolific Permian Basin.

But the XTO acquisition didn't happen without headaches: while the deal realistically had more potential than Exxon anticipated at the time, oversupply weighed on commodity prices and undermined the value of the deal, Woods said.

Former Exxon CEO Rex Tillerson previously said the XTO transaction was "ill-timed."

But Exxon anticipated the huge impact unconventional oil and gas development would have on the industry going forward, so the company didn't shy away from the Permian. Exxon's Permian footprint deepened considerably after a transformative $6.6 billion acquisition of the Bass family's Delaware Basin acreage in early 2017.

Woods said that Exxon has learned a lot about the Permian and unconventional oil and gas development since inking those deals. The company's contiguous, blocky acreage position in the Delaware Basin has enabled Exxon to drill longer laterals than many of its competitors in the basin.

Exxon has drilled three- and four-mile laterals to maximize resource recovery and lower drilling costs on its Delaware acreage, Senior Vice President Neil Chapman told the media the day the transaction was announced.

The supermajor has also fine-tuned a cube development strategy in the Permian, where multiple horizontal wells are drilled in stacked intervals from a single surface location.

"We now have an understanding of a play in a resource that I would say is as good as, if not better than anybody else out there."

—Darren Woods, *Chairman and CEO, Exxon Mobil*

"We now have an understanding of a play in a resource that I would say is as good as, if not better than anybody else out there," Woods said.

"I see this as a completely different situation," Chapman said.

Replicating success

With another multibillion-dollar bet on the Permian, Exxon aims to deploy more than a decade of shale lessons learned on Pioneer's premium acreage position in the core of the Midland Basin.

Exxon's roughly $60 billion acquisition will add Pioneer's 856,000 net acres in the Midland Basin to Exxon's 570,000 net Permian acres.

The transaction also extends Exxon's runway for future drilling in the basin. Pioneer holds about 6,300 net locations of high-quality drilling inventory in the Midland—wells generating a 10% return with WTI prices of below $50/bbl, according to estimates from Enverus Intelligence Research.

By adding Pioneer's blocky Midland acreage footprint, Exxon aims to drill longer three- to four-mile lateral lengths there in the future, Chapman said.

Increasing cube development on the acreage will also deliver greater resource recovery and capital efficiency on Pioneer's acreage, he said.

Chapman also sees potential to lower drilling costs on a more contiguous acreage position in the Midland.

"It allows us to move the drilling rigs a very short distance at a time," Chapman said. "All of this brings us cost savings."

After closing the Pioneer deal, Exxon expects its Permian production to be approximately 1.3 million boe/d. By 2027, Exxon aims to grow production up to 2 million boe/d (>75% liquids).

Roughly 45% of Exxon's global upstream volumes will come from U.S. production after closing the Pioneer deal.

The Pioneer acquisition is expected to close in the first half of 2024.

—Christ Mathews, Senior Editor, Shale/A&D

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Civitas Resources Digs Deeper into Permian

After its acquisition of Vencer closes, half of the company's total production will derive from the basin.

Analysts say **Civitas Resources**' early October acquisition of **Vencer Energy** delivers greater Permian Basin inventory depth at attractive terms.

Denver-based Civitas agreed to pay approximately $2.1 billion in cash and stock to acquire assets from Houston-based Vencer, a Midland Basin E&P backed by Swiss energy trader, **Vitol**.

In the current price environment, the $2.11 billion purchase price is attractive at $33,760 per flowing boe/d of production—a more than 25% discount compared to Civitas' previous acquisitions in the Permian, said Gabriele Sorbara, managing director of equity research at **Siebert Williams Shank & Co.**

Civitas' latest acquisition comes months after the company first entered the Permian Basin with acquisitions of two private E&Ps—**Hibernia Energy III** in the Midland and **Tap Rock Resources** in the Delaware Basin.

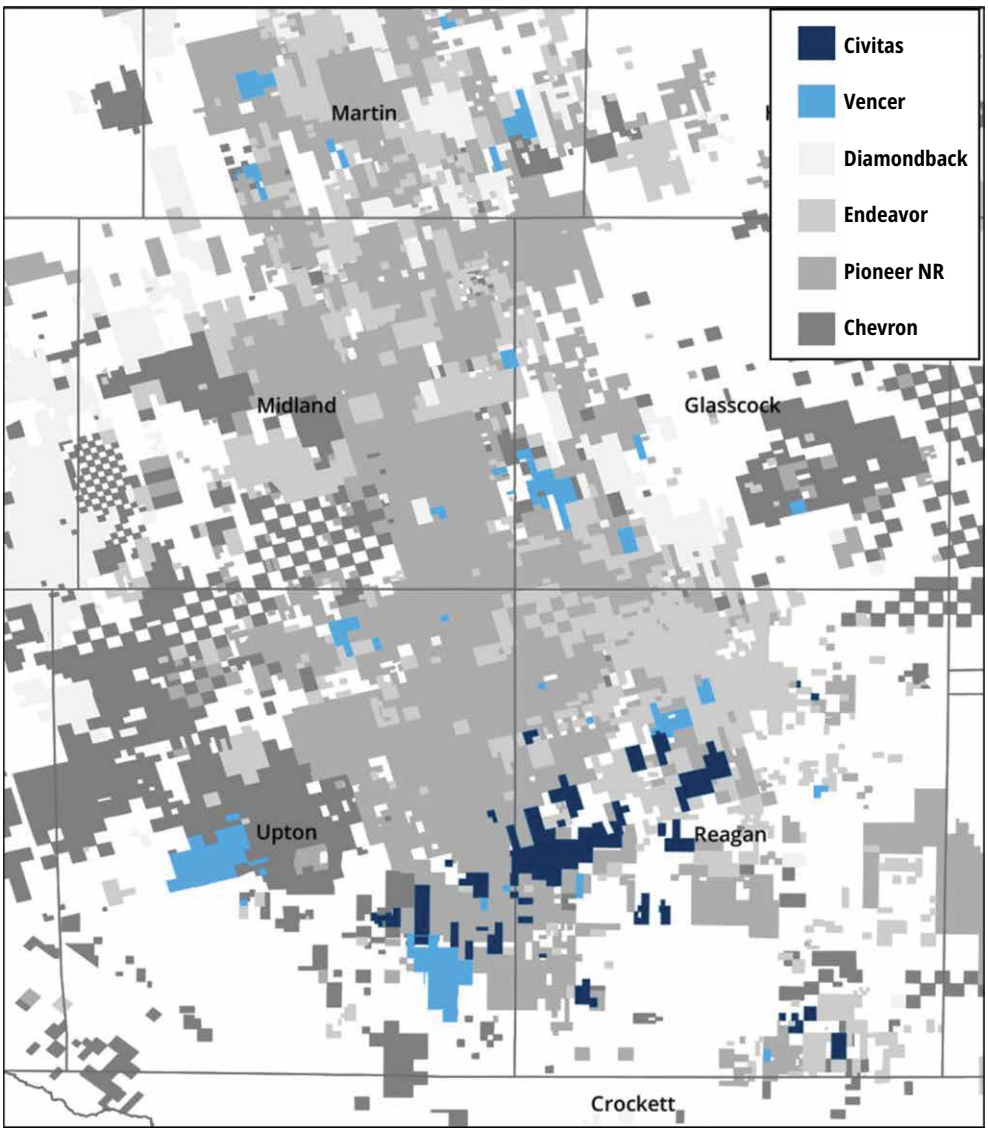
Before expanding into the Permian this year, Civitas' production base was anchored by the Denver-Julesburg (D-J) Basin. In the course of just four months, the company is now guiding for Permian production to account for 50% of its total output.

"We anticipate potential upcoming non-core D-J (and potentially Permian) sales to help push the company into a more prominent majority Permian position, along with potential incremental acquisitions," analysts at **Truist Securities** wrote in a research report; Civitas plans to sell around $300 million in non-core D-J Basin assets by mid-2024.

The Vencer deal will add around 44,000 net acres and about 62,000 boe/d (50% oil) in the Midland Basin, Civitas said. After the deal closes, Civitas' total Permian production will be approximately 170,000 boe/d.

Civitas is adding around 44,000 net acres and about 62,000 boe/d (50% oil) in the Midland Basin by acquiring Vencer Energy. The deal will also extend Civitas' drilling inventory with an incremental 400 gross development

Civitas-Vencer acreage



Source: Civitas

Hart Energy

locations, primarily targeting the Spraberry and Wolfcamp formations. Civitas is paying about $1.1 million per net undeveloped well, Sorbara said.

The Vencer deal is priced at around 2.8x 2024 adjusted EBITDAX at $80/bbl WTI and $3.50/MMBtu Henry Hub prices, Civitas said. The relatively low purchase price compares favorably to the company's previous Permian deals, according to analysts at **Jefferies**.

"We believe [Civitas] acquired one of the few Permian privates remaining that is accretive to asset quality," Jefferies Equity Analyst Lloyd Byrne wrote in a research report.

After closing the deal, Civitas anticipates generating approximately $1.8 billion in 2024 free cash flow, based on $80/bbl WTI and $3.50/MMBtu Henry Hub prices.

The Vencer acquisition is expected to close in January 2024.

Parachuting into the Permian

As Civitas looked at deals to diversify its portfolio, the company knew it had to jump into a new basin with meaningful scale, Civitas CFO Marianella Foschi said at Hart Energy's Energy Capital Conference in Dallas in October.

On their own, neither of the deals with Hibernia or Tap Rock, both backed by private equity firm **NGP Energy Capital Management**, would have delivered Civitas the Permian runway the company wanted.

But bought together, the deals added meaningful scale in both the Midland and Delaware basins.

"We believe we now have a scale position in the top three basins in the Lower 48, and that was important to us," Foschi said.

Civitas looked at a lot of deals during 2022—probably about $30 billion across 12 different transactions—but didn't go through with any of them, she said. Oil and gas prices were high, and sellers were asking a lot for their assets.

"We spent all of 2022 with negative net debt, so we were very well-positioned to compete, in theory," Foschi said. "But the issue at the time was valuations."

Commodity prices normalized through the beginning of 2023, which opened up opportunities for Civitas to close on M&A at more attractive terms.

Along with Civitas's deals, the Permian has seen a flurry of M&A activity this year as public E&Ps scramble for inventory depth and private equity monetize their upstream portfolios.

Vitol eyes more M&A

Vencer was established in 2020 with financial backing from Vitol. The company acquired its foundational asset base in the Midland Basin from Hunt Oil the following year.

Vencer's production has increased to an average 60,000 boe/d from about 40,000 boe/d since that time, Vitol said in a statement.

Vitol remains enthusiastic about deploying more capital into the U.S. upstream sector. The company's other Permian E&P platform, Austin-based **VTX Energy Partners**, has consolidated a sizable acreage position in the southern Delaware Basin.

VTX Energy continues to look at acquisition opportunities across the southern Delaware and in different basins around the Lower 48, CFO Graham Bayley said during Hart Energy's A&D Strategies & Opportunities Conference in October.

—Chris Mathews, Senior Editor, Shale/A&D

TotalEnergies Exits Oil Sands With Two Deals

Suncor purchases Fort Hills project for $1.1 billion, and ConocoPhillips closes on acquisition of 50% interest in the Surmont oil sands.

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Suncor Energy is set to purchase TotalEnergies remaining Canadian oil sands assets in the Fort Hills mining project.

Suncor Energy announced it is purchasing **TotalEnergies's** remaining Canadian oil sands assets in the Fort Hills mining project for US$1.08 billion (CA$1.47 billion).

The acquisition adds 61,000 bbl/d of net bitumen production capacity and 675 MMbbl of proved and provable reserves to Suncor's oil sands portfolio.

Upon acquiring the 31.23% working interest in the Canadian Fort Hills oil sands mining project, Suncor will own 100% of Fort Hills on top of its 100% ownership of its Firebag and MacKay River assets.

"With 100% ownership of Fort Hills, we will pursue opportunities to create additional value through regional synergies and basin-wide management of our unparalleled, integrated oil sands asset base," said Suncor CEO Rich Kruger in a statement. "This transaction is aligned with our strategy to wholly own and operate long-life strategic assets."

The announcement comes as TotalEnergies simultaneously announces the finalization of its sale of 50% interest in the Surmont oil sands asset and associated midstream commitments to **ConocoPhillips** as the French energy major fully exits the Canadian oil sands.

The ConocoPhillips transaction is for a base amount of about US$3 billion (CA$4.03 billion) plus up to US$330 million (CA$440 million) in contingent payments.

Including adjustments, TotalEnergies received a cash payment at closing of US$2.75 billion (CA$3.7 billion). At current Western Canadian Select prices and production levels, TotalEnergies will receive the entirety of the contingent payments within a year.

"The disposal of our Canadian oil sands assets fits our strategy to focus our allocation of capital to oil and gas assets with low breakeven," TotalEnergies CFO Jean-Pierre Sbraire said in a statement, noting that proceeds will go toward $1.5 billion of buybacks in 2023.

—Hart Energy Staff

UPSTREAM

• **Kimbell Royalty Partners** closed a $455 million cash deal, adding royalty interests in the Permian Basin and Midcontinent assets from a private, undisclosed seller.

The acreage is concentrated in the Delaware Basin (49%), Midland Basin (10%) and the Midcontinent (41%).

Kimbell, based in Fort Worth, Texas, estimated that as of June 1, the acquired assets produced approximately 4,840 boe/d (1,619 bbl/d of oil, 1,227 bbl/d of NGLs and 11,964 Mcf/d of natural gas).

For full-year 2024, Kimbell estimates the acquired assets will produce approximately 5,049 boe/d (1,682 bbl/d of oil, 1,312 bbl/d of NGLs and 12,327 Mcf/d of natural gas).

The seller's Permian acreage has 11 rigs actively drilling as of June30, offering exposure to operators including **EOG Resources**, **Occidental Petroleum** and **ConocoPhillips** in the Delaware Basin and **Pioneer Natural Resources**, **Endeavor Energy Resources** and **SM Energy** in the Midland Basin.

• **Talos Energy** closed the sale of a 49.9% interest in its Mexican subsidiary **Talos Mexico to Zamajal SA de CV**, a wholly-owned subsidiary of **Grupo Carso** controlled by the family of the Mexican billionaire Carlos Slim.

The minority interest sold by Talos Mexico was valued at $124.8 million, Houston-based Talos said in late September. Under the terms of the transaction, Talos received $74.85 million cash at closing, with an additional $49.9 million due upon first production.

Talos Mexico, now owned 50.1% by Talos Energy, holds a 17.4% interest in the Zama Field.

"We are excited to partner with Carso on Zama, one of the largest global shallow water oil discoveries in recent years," Talos President and CEO Timothy S. Duncan said.

Duncan said Talos's operational track record combined with Carso's "critical local presence and global commercial reputation" would help the company advance the Zama project toward its final investment decision and first production.

• **Murphy Oil** closed sales of non-core operated assets across its western Canadian footprint.

The subsidiary of Houston-based Murphy Oil Corp. completed a divestiture of non-core assets in the Kaybob Duvernay play and its entire non-operated Placid Montney position.

The sales generated cash proceeds of approximately US$104 million (CA$141 million), Murphy announced in mid-September.

The divestiture, first announced in August, was originally expected to bring in cash proceeds of approximately US$112 million. A portion of the proceeds will be directed to investment in West Africa and Asia.

"We are pleased to unlock the value of this non-core portion of our Kaybob Duvernay and Placid Montney assets," said Murphy President and CEO Roger W. Jenkins in the release. "We look forward to progressing our capital allocation framework, as well as allocating proceeds towards our new business in Côte d'Ivoire and development in Vietnam."

The divested assets included the Saxon and Simonette areas of the Kaybob Duvernay, where Murphy holds a 70% working interest as operator.

The sale included Murphy's 30% working interest in the Placid Montney assets operated by Athabasca Oil Corp., as well as pipelines, batteries and related processing and marketing contracts.

The deal also included 138 net drilling locations across 42,000 net acres in Kaybob Duvernay and 26,000 net acres in Placid Montney.

The combined assets currently produce approximately 1,700 boe/d net, 39% oil. Net proved reserves were 5.3 MMboe as of Dec. 31, 2022.

• California-focused oil producer **Berry Corp.** closed its acquisition of **Macpherson Energy Corp.**, expanding the E&P's footprint in the Golden State.

Dallas-based Berry's acquisition of Macpherson Energy included a $70 million all-cash payment—$50 million of which was paid at closing. Under terms of the agreement, the remaining $20 million cash portion will be paid in July 2024, Berry said.

Macpherson is a privately held E&P in Kern County, Calif. The company's oil-producing properties are located near Berry's assets in Kern County, the company said in regulatory filings.

"Macpherson's high-quality, low decline oil-producing properties are a complementary fit with Berry's existing portfolio and demonstrates Berry's disciplined approach to consolidation with a focus on value creation and accretion," Berry CEO Fernando Araujo said in mid-September.

"This transaction is immediately accretive to Berry in both production and cash flows, supports our overall strategic plan to efficiently maintain our California production, and is expected to enhance our cash flows and shareholder returns," he said.

Berry financed the initial $50 million payment through a combination of cash on hand and funds drawn under its credit facility. The company expects the final cash payment to be funded similarly.

Berry raised its full-year 2023 guidance in conjunction with the Macpherson deal: the company expects average daily production to range between 24,800 boe/d and 25,400 boe/d (93% oil) this year. That's up 500 boe/d at the midpoint from Berry's previous production guidance of between 24,000 boe/d and 25,200 boe/d for 2023.

• **Vitesse Energy**, a non-operating oil and gas producer, said in October it made acquisitions totaling roughly $50 million in oil and gas interests in the Williston Basin in North Dakota, a development that an analyst said should be well received by investors.

Donovan Shafer, **Northland Capital Markets** senior research analyst, said Vitesse's non-operating acquisitions were agreed upon later in the summer when oil futures were still lower. The acquisitions, he said, were "a good move" and are "absolutely positive for the stock."

"It's mostly the timing," Schafer said, adding that the acquisitions were announced the day the markets opened after attacks in Israel boosted the price of oil.

According to Vitesse's press release, the company expects the acquisitions to increase the company's capex guidance range and cash flows in the fourth quarter. The interests were acquired through the company's near-term development acquisition program and underwritten above the company's internal rate of return hurdle, using a discount to current NYMEX strip prices.

"We believe VTS underwrote most of these acquisitions in the much lower strip prices in the May-August time frame and did most of its hedging in the much higher-priced September period, making these highly attractive acquisitions," Schafer said.

Schafer said the acquisition appears to

be the work of Vitesse's new CFO James Henderson, who joined the company in August.

• **W&T Offshore** is growing its shallow water footprint in the Gulf of Mexico through M&A.

Houston-based W&T closed an acquisition of working interests in eight shallow water oil and gas assets in the central and eastern shelf region of the Gulf of Mexico, the company announced in September. The seller was not disclosed.

The deal delivers to W&T Offshore additional production within the company's existing operations in water depths of between 25 ft and 265 ft.

The assets include 22,079 net acres with current production of approximately 2,400 boe/d (42% oil). The properties have an average working interest of around 72%.

Around two-thirds of the acquired production is operated, W&T said. As of June 1, estimated proved reserves for the eight properties totaled 3.2 million boe (49% oil).

"All of the producing properties included in the acquisition announced today meet the time-tested investment criteria we have used for our prior successful acquisitions," said Tracy W. Krohn, chairman, president and CEO at W&T Offshore, in a news release.

The assets were acquired for a gross consideration of $32 million; W&T said the purchase price was funded with cash from its balance sheet.

"We continue to utilize our strong cash position and expertise in acquiring complementary GoM assets to enhance the scale of W&T," Krohn said. "Acquisitions have been a key component of how we have grown reserves and production at W&T."

W&T had working interests in 46 fields in federal and state waters as of June 30. The company's leasehold spans 419,000 net acres off the coasts of Louisiana, Texas, Mississippi and Alabama.

• **Dorchester Minerals** continues to expand its Texas mineral and royalty footprint with M&A.

Dallas-based Dorchester Minerals LP (DMLP) closed an acquisition of mineral and royalty interests located in three counties in Texas, the company said in late September. The transaction included approximately 7,984 gross acres and 716 net royalty acres.

The mineral and royalty interests were exchanged for 494,000 DMLP common units representing limited partnership interests in Dorchester Minerals.

Dorchester Minerals owns producing and non-producing oil and gas mineral and royalty interests in 28 states.

The company has closed on other acquisitions in Texas, Louisiana and New Mexico in recent months.

• **Energy Resources**'s subsidiary **1979 Royalties** closed an acquisition of acquisition of approximately 5,000 net oil and gas mineral and royalty interests in the Midland Basin.

The assets were sold by **EnCap Investments** portfolio company **Peacemaker Royalties** for $61 million in cash, according to the press release.

Primarily operated by Endeavor and **Ovintiv**, the acquisition covers royalty acres in Midland's Martin and Dawson counties, Texas. The leasehold has 218 producing wells with a net present value discounted at 10% per year of approximately $35 million.

The properties are approximately 15% developed horizontally and hold approximately 500 additional undeveloped locations across seven primary horizontal targets, 1979 Royalties said.

Total PV-10 value is "in excess of $150 million," with an undiscounted value of approximately $425 million generated based on net reserves of more than 9 MMboe. The effective date of the transaction is June 1, 2023.

MIDSTREAM

• Tulsa, Okla.-based **ONEOK** completed its acquisition of **Magellan Midstream Partners** on Sept. 25 following its narrow approval by Magellan shareholders on Sept. 21.

The acquisition adds refined products and crude oil transportation assets to ONEOK's natural gas and NGL portfolio, creating more than 50,000 miles of pipeline infrastructure and a connection to almost 50% of U.S. refining capacity, according to the company's website.

Magellan unitholders received $25 in cash and 0.667 shares of ONEOK common stock for each outstanding Magellan common unit. Magellan common units will no longer be publicly traded on the New York Stock Exchange, while ONEOK will continue to trade on the NYSE.

"This is a significant day for Tulsa and the industry as we bring together the talented ONEOK and Magellan teams and look to the future as one company," Pierce H. Norton II, ONEOK president and CEO, said in the press release. "Our expanded products platform will present additional opportunities in ONEOK's core businesses and further enhance the resiliency of our company. We are committed to ensuring a smooth transition aimed at delivering on the many benefits of this combination for our customers, employees and shareholders."

• **LM Energy Holdings** entered definitive agreements to sell subsidiaries and assets related to its Touchdown Crude Oil Gathering System in Eddy and Lea counties, N.M. The buyer of the assets and financial details were not disclosed.

LM's crude oil gathering assets include more than 130 miles of pipelines and two terminals with 136,000 bbl of storage capacity. The company began development in 2019 and has grown volumes to approximately 75,000 bbl/d.

Elliot Gerson, LM Energy's CEO, said the "transaction positions LM as a stronger and even better capitalized company that is focused on our gas business."

LM Energy has continued expanding its gas-gathering systems in Eddy and Lea. The systems provide low-pressure gathering, dehydration, compression, liquids handling and high-pressure gathering services. The company has constructed more than 70 miles of pipelines and will commission its sixth compressor station during fourth-quarter 2023.

"Gas volumes in the Northern Delaware Basin continue to outperform expectations, and meanwhile operators and regulators are increasing their focus on eliminating flaring. That combination creates a massive need for additional gas gathering and processing infrastructure," Gerson said. "With our existing team, assets and relationships, we are extremely well positioned to continue growing our gas business."

The Touchdown sale is to close in the fourth quarter.

SERVICES

• **Expro** completed its acquisition of offshore services provider **PRT Offshore**.

The acquisition will expand Expro's technology portfolio within the subsea well access sector in North and Latin America and push development of PRT Offshore surface equipment in Europe, Sub-Saharan Africa and Asia-Pacific regions.

"We believe this will offer significant growth opportunities for PRT Offshore in these attractive markets," said Expro CEO Michael Jardon. "Simultaneously, Expro plans to leverage PRT Offshore's strong position in deepwater offshore well completion and intervention across the [North America and Latin America] region to provide integrated solutions to our customers."

Total consideration to be paid is approximately $106 million, including Expro's shares.

• **SK Capital** said in early October it had acquired Houston-based **Milestone Environmental Services**.

The acquisition is intended to expand carbon capture and sequestration (CCS) strategies to address global climate change. Milestone has announced several CCS projects and their hopes that this partnership will execute their energy transition developments for decarbonization by developing permanent injection sites.

"Our offerings enable companies to reduce their carbon footprint and enhance their ability to meet sustainability goals," Gabriel Rio, CEO of Milestone Environmental Services, said in the release.

"Permanent, safe sequestration of carbon is an essential part of combating climate change, and Milestone has the strategy and capabilities to play a leading role in delivering solutions to multiple industries."

• **EnergyMark** announced in late September that it had acquired fellow New York energy supply company **Crown Energy Services.**

The acquisition includes all of Crown Energy's customers, energy storage and transportation capacity and production from 24 local natural gas producers, and adds to EnergyMark's operations in renewable natural gas supply, community solar project management and renewable energy credit and carbon offset procurement.

"EnergyMark will continue to provide reliable, locally sourced energy, while also offering industry leading sustainability and renewable energy options to the Crown book of customers," said Gary Marchiori, president of EnergyMark.

• Oilfield services provider **Eastern Energy Services** will acquire 100% of the ownership interests of **Conquest Completion Services**, the company said.

Houston-based Conquest is a provider of large-diameter coiled tubing units and oilfield chemicals used to advance reservoir performance. The acquisition supports Eastern's completion, intervention and production services in several basins, including the Haynesville Shale, Austin Chalk, Tuscaloosa Marine Shale, Louisiana and conventional fields in Mississippi, Alabama and Florida. OGJ

SPAC Attack: Clean Energy, Oil and Gas Cashed In on Pandemic-Era Frenzy

The pandemic's wild SPAC boom helped launch several new public companies in the energy space, but federal intervention and souring investor appetites brought the historic boom back down to earth.

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Amid a growing financial market crisis at the beginning of the COVID-19 pandemic, investors leaned on SPACS in a big way—but the balloon may be about to burst as the capital going into SPACS deflates.

When global financial markets plummeted early in the COVID-19 pandemic, going public through a traditional IPO became a lot harder. So, investors—and companies looking to go public—leaned on special purpose acquisition companies (SPACs) in a big way.

SPACs have been around since the 1990s and the dot-com era, but the volume of SPAC IPOs, and the number of de-SPAC business combination transactions with their target companies, skyrocketed during the pandemic.

In 2019, 30 de-SPAC transactions—when the public SPAC and its target combined—came to fruition in the U.S., according to the law firm White & Case, which has advised clients on hundreds of SPAC business combinations and initial public offerings (IPOs). In 2020, that figure jumped to 99. Then, in 2021, the U.S. market nearly doubled with 196 de-SPAC deals.

Those combinations were fueled by billions of dollars of SPAC investment.

In 2020, 247 U.S.-listed SPAC IPOs launched—a 319% increase year-over-year from the 59 SPAC IPOs seen in 2019. SPAC IPOs ballooned to 612 in 2021.

The U.S. market was in the middle of a veritable SPAC boom.

"Sometimes a SPAC can be viewed as a means of getting public when it may be a little more challenging to go public through a regular-way IPO," said Joel Rubinstein, a partner at White & Case who has counseled clients on SPAC transactions since 2005.

"Certainly, when we had the SPAC boom in 2020 and 2021, earlier-stage companies were able to go out using SPAC vehicles in a way that they might not have been able to do had they tried to go the regular way," he told Hart Energy.

SPAC vehicles are industry-agnostic, but the market saw a flurry of energy-focused SPAC activity during the boom.

A large number of those SPACs, and the target businesses they acquired, were focused on clean energy and the energy transition: electric vehicles, electrification, battery storage, renewable natural

"Sometimes a SPAC can be viewed as a means of getting public when it may be a little more challenging to go public through a regular-way IPO."

—**Joel Rubinstein**, *partner, White & Case*

gas and other areas focused on reducing emissions.

Fewer of the business combinations have focused on oil and gas or oilfield service companies. That was the case early on in the SPAC boom, too.

So the question remains: Why did markets see more upside in early-stage technology plays and green energy—sometimes companies that haven't generated a single dollar of profit—than cash-flow positive E&Ps?

"In a certain sense, if you've got a cash-flow positive, even traditional oil and gas company, that could be also something that would be good in today's market," Rubinstein said.

"The early stage companies where you're trying to go out based on long-range projections—those are beyond difficult to try to get any money for these days," he said. "The appetite for that has totally dried up."

SPAC attack

There are a number of reasons companies chose to race down the SPAC track versus going through the highly regulated, traditional IPO process.

When working through an IPO, companies are required to make filings with the Securities and Exchange Commission that eventually become public.

"The market can tell when you're about to launch your road show and how long that process has gone," said Nick Dhesi, a partner at Latham & Watkins focused on M&A transactions, IPOs and other investment structures.

"Then, on the back-end of what, again, is a partially public process, that's when you're really setting a price and seeking to close your deal," he said.

What the SPAC process offers to a company seeking to go public, or the target company, is essentially confidential price discovery. A SPAC and its target company can confidentially negotiate with potential counterparties and third-party investors to align around the underlying value of that target business—all before anything is filed with the public.

"You can figure out the value of your business and get people committed to finance it without having to say anything publicly," Dhesi said.

One of the ways these confidential negotiations play out is through a private investment in a public equity (PIPE) vehicle, in which institutional investors agree to buy units at a certain price before the securities begin trading publicly.

"I think that was the allure to PIPE investors: to be able to invest at …that standardized $10 [per unit] price but based on a business that they expected to grow well beyond where that deal was priced—based on forward-year projections," Dhesi said.

A SPAC's combination with its target company is also more akin to a merger than a private company offering shares to go public.

When two parties evaluate a potential merger, they use a multiple projections and forward-looking information to determine what will change on a combined or standalone basis.

Annual summary of de-SPAC transactions in the U.S.

This chart shows de-SPACs in the U.S. by volume and value between Jan. 1, 2019 and June 30, 2023.

Rank date	Number of deals	Market share %
2019	30	6
2020	99	20
2021	196	40
2022	101	21
2023	64	13
Industry total	**490**	**100**

Quarterly summary of de-SPAC transactions in the U.S.

This chart shows de-SPACs in the U.S. by volume and value between Jan. 1, 2019 and June 30, 2023.

Rank date	Number of deals	Market share %
2019 Q1	3	1
2019 02	4	1
2019 Q3	13	2
2019 04	10	2
2020 Q1	9	1
2020 Q2	8	1
2020 Q3	34	7
2020 04	48	10
2021 Q1	80	16
2021 02	50	10
2021 Q3	29	6
2021 04	37	7
2022 Q1	13	3
2022 02	26	5
2022 Q3	22	4
2022 04	40	8
2023 Q1	38	8
2023 Q2	26	5
Industry total	**490**	**100**

Source: White & Case, Refinitiv data

The U.S. market saw a historic number of de-SPAC transactions during the pandemic, fueled by an uptick in SPAC IPOs.

The same is true for SPAC deals: SPACs and their target companies can market a potential merger based on where they expect the combined business to be down the road, not based on current performance.

"It was really a rife environment for earlier-stage companies to be able to tap into that capital and go public when we were in the pandemic and there wasn't a lot of capital floating around," Dhesi said.

It was this discussion about public disclosures by SPACs—or, arguably, the lack thereof—that eventually helped bring the SPAC boom to its knees.

Last spring, the SEC proposed new regulations to strengthen disclosures in SPAC IPOs and merger transactions involving shell companies and private businesses.

The overhanging threat of federal intervention poured freezing water on a red-hot SPAC market. Deals stalled as accountants and legal advisers wrestled with determining what new information needed to be disclosed.

The due diligence bar for SPAC deals had just been raised significantly, White & Case attorneys wrote at the time.

Souring appetites

The SPAC and de-SPAC deal drop-off was also prompted by the lackluster returns many of these transactions have generated for investors.

Near the apex of the SPAC fervor, the De-SPAC Index, a medley of high-profile de-SPAC'd stocks including companies like DraftKings, Virgin Galactic, QuantumScape and others, launched in May 2021.

But the de-SPAC exchange-traded fund had more than 77% of its value wiped out in less than two years, according to data from Yahoo Finance. The De-SPAC Index ultimately shut down and liquidated its assets in January 2023.

To a certain degree, investors stopped believing the lofty financial projections that SPACs and their target companies were pitching. Many investors that invested into a SPAC before finding a deal to target have pulled their money out once a deal was announced.

SPAC investors are generally given the opportunity to exit their investment by redeeming their shares—though the terms for warrant redemptions may vary greatly across the SPAC universe, the SEC notes.

When investors buy SPAC units, that bucket of money is held in trust for future use. When investors redeem their positions, the trust bucket gets smaller. And those buckets of cash have gotten a lot smaller over time.

The amount of capital held in trust fell from $200 billion at the top of the boom in 2021 to below $50 billion come 2023, according to data from SPAC Research, a data consultancy.

"Once that trend started, I think it really only accelerated," Dhesi said.

"That's what led to going from mid-2021, when redemption rates were around 1%, to really the opposite where you were in the high 90s for a lot of these deals that were getting done 12 to 18 months later," he said.

Chasing green

Though investor interest in SPACs is much smaller than just two years ago, SPAC-related combinations continue to transact in the energy and power space.

Energy and power was the third-largest sector for de-SPAC deal volume and fourth-largest by deal value during the first half of 2023, according to White & Case's latest analysis.

The sector continues to benefit from clean energy and low-carbon subsidies, including provisions passed under the Inflation Reduction Act last year.

In February, publicly traded Nubia Brand International Corp. announced plans to merge with Honeycomb Battery Co., a battery materials and components developer, in a deal valued at around $954 million.

Power & Digital Infrastructure Acquisition II Corp. unveiled plans to merge with Montana Technologies in a $618 million deal this summer. Montana Technologies develops energy-efficient HVAC and water technology systems.

And ESGEN Acquisition Corp. plans to merge with residential solar player Sunergy Renewables LLC in a $410 million announced this spring.

The three made up the top de-SPAC deals announced in the energy and power space so far this year, per White & Case.

Houston-based services and technology provider Nabors Industries sponsored a clean energy-focused SPAC, Nabors Energy Transition Corp., that plans to merge with Australian concentrated solar developer Vast Solar.

This summer, Nabors' second energy transition SPAC, Nabors Energy Transition Corp. II, closed its IPO at $305 million.

Renewable natural gas producer Archaea Energy went public by merging with blank-check company Rice Acquisition Corp., led by former EQT Corp. director Daniel Rice, in 2021. Archaea was acquired by BP in a $4.1 billion deal that closed in December 2022.

The second Rice SPAC, Rice Acquisition Corp. II, completed a combination with NET Power in June. NET Power develops and licenses lower-emission power generation technology.

The oil and gas sector is seeing some SPAC action, albeit significantly less. Drilling Tools International went public through a merger with ROC Energy Acquisition Corp. this summer. DTI provides drill collars, stabilizers, crossover subs, wellbore conditioning tools, drill pipe and tubing in North American, European and the Middle Eastern markets.

Last year, private equity firm Grey Rock Investment Partners merged with a SPAC backed by former U.S. House Speaker Paul Ryan (R-Wis.) to form publicly traded Granite Ridge Resources. Granite Ridge owns interests in wells in the Permian Basin, the Eagle Ford, the Bakken, the Haynesville Shale and the Denver-Julesburg Basin, according to regulatory filings.

Earlier in the pandemic—in August 2020—Pure Acquisition Corp. merged with HighPeak Energy to form a publicly traded Midland Basin E&P.

Oil and gas interests used blank-check vehicles to go public even before the pandemic SPAC boom. Magnolia Oil & Gas was formed through the combination of publicly traded TPG Pace Energy Holdings Corp. and EnerVest's South Texas division in 2018.

Falcon Minerals was formed through a 2018 SPAC merger between Osprey Energy Acquisition Corp. and Blackstone-backed Royal Resources. Last year, Desert Peak completed a $4.8 billion reverse merger with Falcon Minerals to form publicly traded Sitio Royalties Corp.

The past few years have seen SPACs blast off to the moon—and crash back down to earth. But as public markets make up losses from last year, and investors seek shareholder returns, the energy space may see more SPAC deals on the horizon.

"The SPAC market is likely to be right behind the IPO market in the same way because there's a backlog," Rubinstein said. "There are a ton of companies that have wanted to go public. The equity capital markets have essentially been closed for 18 months for regular-way IPOs, with only very limited exceptions."

Amid a deluge of backlogged regular-way IPOs, the SPAC process offers companies an alternative to be able to go public more quickly, he said. OGI

Can 'Forgotten Exemption' Rescue PE Funds?

A new batch of SEC transparency rules 'scares the hell' out of fund CFOs, but Section 3(c)(9) may save the day.

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A "forgotten exemption" tucked away in an 83-year-old law may spare oil and gas funds from new Security and Exchange Commission (SEC) reporting requirements widely disliked in private equity circles.

Private equity and hedge funds have been bracing for the implementation of the SEC's new rules approved in August. The exemption could let the oil and gas funds off the hook from new SEC transparency and reporting requirements that private equity sees as intrusions that could throw a wrench into investor relations and add costs, administrative burdens and tight deadlines. A coalition of investment and fund industry groups are suing the SEC for what they see as an overreach of the commission's statutory authority.

But word is spreading among fund managers and their lawyers that funds investing exclusively in oil and gas appear to have a way out thanks to an obscure section known as 3(c)(9) ofthe 1940 Investment Company Act.

"I like it," said Haynes Boone partner Vicki Odette, who said she is discussing the exemption with clients. "If all you do [in a fund] is energy, you really should look at 3(c)(9) to see if you can get out" of the new requirements.

Robert Seber, a partner at Vinson & Elkins, referred to 3(c)(9) as the "forgotten exemption" because it has sat in the statute mostly unneeded and almost entirely unnoticed for more than 80 years.

"It's hard to find anything written about this exemption in the last 30 years.… But, now with the new private fund rules, there's certainly a reason to look at this more closely," he said. "If you are relying on the forgotten exemption and managing an oil and gas fund, then the new rules don't apply to you with regard to that fund.… Now, there's reason to pay more attention to this."

Seber said the rules are disliked by private equity firms partially for the new administrative burdens they will bring.

"When we talk to the CFOs of funds, it scares the hell out of them. They're like, 'I'm going to have to spend all next year to figure out how to calculate returns,'" he said, adding that some of the financial reporting has narrow timeframes, and there will be a cost for the new financial reporting. He said further complication comes from new rules on what are commonly called side letters. The letters specify terms for individual investors and larger investors can often negotiate better terms for themselves.

Scott Moehrke, a partner with Kirkland & Ellis, said the new rules are less onerous than the SEC originally proposed, "but there are still things that might cause headaches, like rules on how you're supposed to allocate expenses relating to deals that don't necessarily have a lot of definition.

"There are requirements in certain instances to get investor approval of certain transactions, which might slow you down if you want to engage in a certain practice and need to get an investor consent to do it."

This is where the exemption can help.

"One of the benefits is you're outside of these new rules. The other benefit is you're generally not limited in the type or number of investors that you can take," he said.

Moehrke said that a private fund using Investment Company Act Section 3(c)(1) can have up to 100 beneficial owners, and a private fund using Section 3(c)(7) must limit owners to "qualified purchasers" which generally are individuals with at least $5 million or investments or institutions with at least $25 million of investments. The exemption for oil and gas funds would bypass those restrictions. Moehrke said that while the real estate sector has shown interest in the exemption the Investment Company Act offers them, he has not yet not heard much from those who can benefit from the oil and gas exemption. He expects that to change.

"The rules were just adopted about a month ago, and a lot of them don't really come into play until next year. It takes a while for the industry to figure out what they are going to do with this issue," he said. "I'm certain some energy funds, when they're raising their next fund, may think about this and some may decide it's advantageous to use the oil and gas exemption.'"

Odette said private equity firms and especially hedge funds see the new rules as "very intrusive" and are not happy about the side letter rule because it makes preferential liquidity "virtually impossible," especially for hedge funds.

Seber said parts of the regulations, such as audits, are less concerning because most firms already conduct them.

The Investment Company Act, signed by President Franklin D. Roosevelt, was originally intended to protect regular investors. In the 1930s and 1940s, oil and gas investing was seen as a domain of extremely rich Americans. A 2003 American Bar Association publication described the original basis of 3(c)(9) as exempting "wealthy, sophisticated investors" from protections they did not need. OGJ

North Hudson Keeps Targeting Permian

Private equity firm's new fund will take aim at additional non-operated oil and gas acquisitions.

North Hudson Resource Partners is targeting more non-operated investments in the Permian Basin after closing its latest investment fund.

North Hudson

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Private equity firm North Hudson Resource Partners plans to deploy more capital into the Permian and other regions with a new non-operated investment fund.

Houston-based North Hudson recently closed its latest non-operated fund at $232 million, North Hudson Managing Partner Mark Bisso told Hart Energy in an exclusive interview.

North Hudson has raised four discretionary funds for non-op oil and gas investments; the firm typically targets strategic partnerships on larger-scale deals, non-op authorization for expenditure (AFE) wellbore opportunities and acquisitions of ground-game acreage interests.

Bisso said dealmaking by North Hudson's non-op platform, the firm's primary investment platform, is keeping them busy.

"The deal flow is very active and dynamic," he said. "We're looking at two to four deals a week."

Through early October, North Hudson had acquired more than $200 million of assets of non-op interests in 2023. Transactions have ranged from as little as $500,000 up to $40 million—although the firm is able to participate in larger deals, Bisso said.

"We could really do most-sized deals that present themselves in the non-op space—obviously with some limitations," Bisso said.

Since launching in January, the firm has closed on non-op acquisitions valued at $650 million.

Non-op deal flow

The non-op oil and gas world has always been competitive, but it's a space that's getting more crowded, Bisso said.

"The market's gotten bigger. There are more people doing it on the buy side," he said. "But there are a lot more operators that are regularly accessing this AFE market."

That's especially true in the Permian Basin, America's top oil-producing region and the driver of U.S. oil production growth.

Of the roughly 600 onshore drilling rigs deployed in basins around the country, roughly half are drilling in the Permian Basin, according to rig count data compiled by Baker Hughes Co.

North Hudson plans to continue committing capital to non-op investments in the Permian with its latest fund, called North Hudson Production Partners II.

The Permian has seen some large investments by players in the non-op oil and gas space: Northern Oil & Gas (NOG) teamed up with Earthstone Energy this summer on a $1.5 billion deal to acquire

"The deal flow is very active and dynamic. We're looking at two to four deals a week."

—**Mark Bisso,** ***managing partner, North Hudson***

assets in the northern Delaware Basin from Novo Oil & Gas. NOG scooped up one-third of the assets on a non-op basis for $500 million. NOG also partnered with Vital Energy to acquire a 30% non-operated stake in Forge Energy II Delaware.

This spring, U.S. Energy Development Corp. announced spending $225 million to acquire a 25% working interest in the Mascot Project, a stacked pay asset in the core of the Midland Basin.

"Naturally, [the Permian is] where you're going to find the most deal flow for people selling down AFEs," Bisso said.

North Hudson also has non-op interests in the gassy Haynesville Shale and in the Denver-Julesburg Basin. The firm will continue to evaluate M&A opportunities in those regions with Production Partners II.

North Hudson is certainly not opposed to expanding its reach into other basins, Bisso said. The firm has looked at non-op opportunities in the Eagle Ford Shale and the Bakken but hasn't yet invested.

"I think that's probably a function of us probably not looking at enough stuff in those basins, given what we have going on in our core areas of focus," Bisso said.

North Hudson works with more than 30 operating partners and has interests in excess of 1,500 wellbores across its non-op footprint.

Operated and credit footprint

North Hudson's non-op platform is the firm's primary investment vehicle, but the firm also has a sizable operated investment in the San Juan Basin of New Mexico and Colorado.

In May 2022, North Hudson closed an approximately $402 million acquisition of LOGOS Resources II in a deal with affiliates of ArcLight Capital Partners.

The LOGOS deal included average production of 106 MMcfe/d and a 230,000 net-acre position in the San Juan. North Hudson raised a specific pool of capital to complete the LOGOS transaction.

"We have a very active drilling program going there," Bisso said. "We'll bring on nine wells this year, and we're targeting to drill 20 wells next year."

North Hudson also launched a credit vehicle, North Hudson Energy Credit Partners, earlier this year. The fund was designed to provide senior secured loan financing for middle-market onshore oil and gas companies.

North Hudson's credit fund looks to make loans of between $20 million and $50 million. OGJ

Enverus: Natural Gas Beatings to Continue

The market may not be fun, but it's working and prices will rise as infrastructure comes online.

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Natural gas prices are inching up, with the prediction of long-term Henry Hub pricing ascending to the $5/MMBtu range as the market does "what it needs to do," said Bernadette Johnson, Enverus's senior vice president and general manager for power and renewables.

Natural gas storage is about 410 Bcf higher, compared to the same period last year, which has helped depress prices. But the market will compensate for that and new infrastructure will help, Johnson said during Hart Energy's America's Natural Gas conference in September in Houston.

"The good news is the market works. Price will do whatever it needs to do," she said. "It's not always fun, it's not always comfortable."

With more infrastructure in place, the picture begins to look better with pricing in the $5 range, she said. Henry Hub is expected to be around $3/MMBtu in 2023 and 2024, around $4/MMBtu from 2025 to 2027, and up to $5/MMBtu from 2028 to 2030.

But it will take time to get that infrastructure in place. That's a big challenge for the Haynesville Shale, Johnson said. So far, signs point to Haynesville rigs bottoming out with little upside until 2025.

A lot of production growth in the Permian "is coming from associated gas because the oil prices are so high," she said, but if gas prices rise, production in the Haynesville will grow. "We'll see additional gas start to come out of the region. So, this is an area where the market works really well. Very, very elastic, very sensitive to gas prices."

Haynesville woes

For now, there's not enough takeaway capacity for more Louisiana gas.

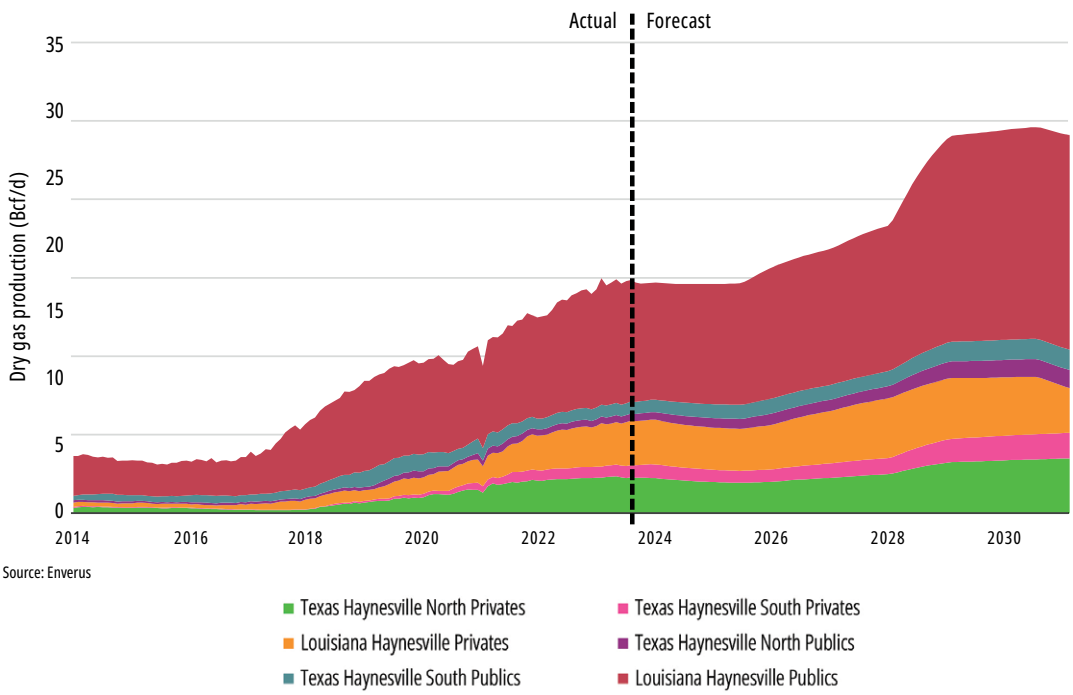
In the Haynesville, "We're waiting on infrastructure, we're waiting on LNG exports. We have a ton of capabilities to produce a lot of gas very quickly," she said.

Johnson expects a certain amount of gas in the Haynesville to wait on production until the infrastructure is in place, while associated gas can be a different story.

"If you have more associated gas coming out of the ground, it's basically free," she said.

Haynesville production forecast

Unprecedented supply growth needed to offset decline, demand and storage need



Source: Enverus

Equitrans Midstream Corp.'s Mountain Valley Pipeline (MVP), a 300-mile natural gas pipeline in Virginia and Western Virginia, will help with capacity in that region when it's fully operational. Johnson said she expects that pipeline, which is about 94% complete, to make an impact in 2024 and bring incremental gas from the Northeast into the system.

"We're not building in the full expectations for MVP until next winter season," she said.

The supply of natural gas has never been more crucial.

"Natural gas demand for natural gas-fired power generation is up, year on year. A lot of that's due to weather" and reflects on how dependent the world and the power sector are on hydrocarbons, she said. "This summer, it was hot. I think a lot of us know that Texas, it felt like it was never going to be cool."

Prolonged summer heat put the energy grid to the test, especially as this year's average temperatures year-to-date have been 9 F higher than the 30-year average, she said.

On Sept. 6, "we got very close to resource inadequacy and rolling blackouts," Johnson said.

The market wins

While renewable resources are contributing to the grid, natural gas remains an important backstop when renewables aren't available, she said.

"There is also definitely a disconnect, or gap, between … the aspirational goals that are being set versus the science," she said, referencing a preference for development of renewables over fossil fuels. "It's not going to be without pain, it's not going to be without rolling blackouts. It's not going to be without pretty significant disruptions for a lot of regions."

That said, Johnson said she believes in the market.

"You can't change science, and eventually the market wins," Johnson said.

Innovations in battery storage will be crucial to maximize renewable energy as a source to the power grid.

"There are significant political, investor, consumer and microeconomic forces supporting strong, strong tailwinds for renewables. So, are they reliable? No, not yet. Are we going to have, eventually, some breakthroughs in battery technology that start to change that picture a bit? Probably. They're breakthroughs, though" which means they could come next year or in a decade, she said.

"There is also definitely a disconnect or gap between what the policy folks, the aspirational goals that are being set versus the science."

—Bernadette Johnson, ***senior vice president and general manager for power and renewables at Enverus***

On the LNG front, "significant additional capacity is coming," Johnson said.

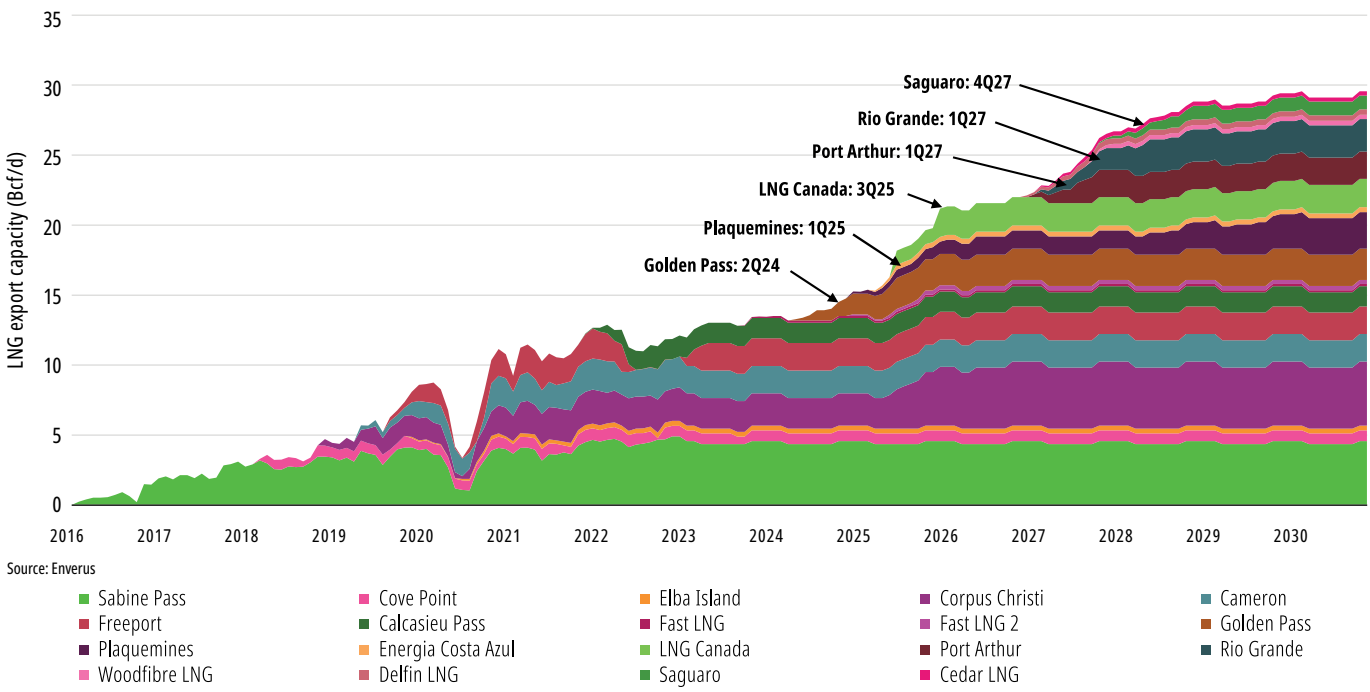
Demand for U.S. supply will approach 30 Bcf/d by 2030 as projects including Golden Pass, Plaquemines, LNG Canada, Port Arthur, Rio Grande and Saguaro Energía come online between the second-quarter 2024 and year-end 2027. Eight other projects—Lake Charles, Calcasieu Pass 2, Driftwood LNG, Commonwealth, Delfin, Sabine Pass Expansion, Saguaro LNG and Cameron Phase 2—are pre-final investment decision.

Around the world, it looks like regasification capacity will be ready when it's needed, she said.

"Is there demand? Yes, but is it going to be filled up immediately? Are they all going to run full all the time? They're not," she said. OGJ

North American LNG demand

Nearly 30 Bcf/d of LNG demand by end of 2030



'The Whole Industry Has Shrunk'

The strategies of private equity firms have shifted to mirror the prudence of the publics, expert says.

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While public E&Ps' capital discipline is well known, private equity firms have transformed their strategy to meet the changes the oil and gas industry has faced in recent years—and those moves have some parallels with public E&Ps' current financial prudence.

At Hart Energy's Energy Capital Conference in October, Billy Quinn, managing partner of the Dallas private equity firm Pearl Energy, described selling assets when there is not a staggering profit to be made, but when "the market is good enough."

Brooks Despot, a director at EnCap Investments, said his firm's current practice is "building companies for the long-term" instead of flipping portfolio companies after just a few years of ownership—rewriting the script from the heady days of the shale boom.

Even though public E&Ps are flush with some of their most abundant free cash flows ever, investor demands have pushed them into an era of capital discipline. Private equity's new discipline comes from the opposite source—they are on the side of the industry short on cash and experiencing difficulties raising capital.

"We find ourselves in this place where there is, relative to recent history, the lowest amount of available, callable or liquid private equity available in the space—generally less than $10 billion," Frost Cochran, managing director and founding partner of Post Oak Energy Capital, said during the panel discussion. "The industry is smaller and there are fewer management teams. There are fewer of us as private equity firms engaged in the space, there are fewer commercial banks. The whole industry has shrunk."

The lack of capital has attracted new partners in the form of family offices, some from overseas.

"They tend to be a little bit more entrepreneurial and opportunistic," Quinn said.

Frost added that family offices "are here now because they see there's a window, but they're entrepreneurial and when your valuations get high, we may not see them."

Evan Smith, senior vice president of Stephens Inc., said people are wrong to think family offices are passive investors with "dumb money" that lack expertise.

"In reality, a lot of those family offices have hired people from private equity, and a lot of them look more and more like private equity firms, and the type of deals they're doing," he said.

In the smaller environment with less capital, private equity is maneuvering to benefit from what the larger companies are doing.

"Our companies that we are invested in are currently almost exclusively in full development mode. [It's] a very different story than the public side because we're not looking at distributions or stock buybacks—a complete recycling of cash flow," Cochran said. "The drill bit is where we see the opportunity to gain some edge while some of the public companies are captive to their dividend and stock buyback strategy."

Despot said public companies are shedding noncore assets that EnCap is "eager to evaluate and hopefully acquire."

Panelists described their approach to energy as "commodity agnostic," while Frost described natural gas as an "ESG asset." OGI

Hart Energy

David Elder of Akin Gump; Frost Cochran of Post Oak Energy Capital; Brooks Despot of EnCap Investments; Billy Quinn of Pearl Energy; and Evan Smith of Stephens Inc. at Hart Energy's Energy Capital Conference in Dallas.

Paisie: High Geopolitical Risk for Oil

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.

Since July we expected that oil prices would move upward, with the price of Brent crude reaching $90/bbl and OPEC+ remaining proactive in adjusting supply to counteract disappointing economic news and negative trader sentiment.

We also put forth the view that oil prices would not break through $100/bbl—not only because of continued concerns about the global economy, but also because of increased supply from producers outside of the OPEC+ quota system, including sanctioned producers (namely Venezuela and Iran). Additionally, we expected U.S. production to increase this year even with the decreasing rig count.

Therefore, considering our expectations for demand along with supply, our base case called for oil prices to moderate moving into the fourth quarter, in part, because the gap between demand and supply would not be as great as some market participants were currently expecting.

We also have been highlighting that a major upside risk to oil prices stemmed from geopolitics that could result in disruption to oil production and oil movement—most notably from the Russia-Ukraine conflict and from the tensions between Iran and the U.S. The geopolitical risk became more tangible recently with the outbreak of the conflict between Israel and Hamas.

Prior to the initiation of the conflict in Israel, the dynamic of the last few weeks aligned with our expectations that the price of Brent crude would be under pressure and would test $90/bbl again. The price of Brent crude broke below $90 during the first week of October, falling to $84.07/bbl before rebounding slightly at the end of the week.

The sharp drop-off in oil prices occurred even though the Joint Ministerial Monitoring Committee of OPEC+ announced (as expected) no change with respect to the current production cuts. During that week, the sentiment of Brent oil traders continued to turn more bearish with net long positions decreasing by 10.35% after decreasing the prior week by 8.29%. The net long positions of traders of WTI also decreased, which broke the streak of four consecutive weeks of increases.

The dynamics of the oil market during the last few weeks, however, were disrupted by the conflict in Israel, which had an immediate impact on oil prices with concerns that the conflict would expand beyond Israel, in part, because Hamas took hostages that include citizens from Western countries, including the U.S.

Additionally, there have already been exchanges between Israel and with Hezbollah's positions in Lebanon. The more significant risk of escalation is associated with Iran, which is a supporter of Hamas and Hezbollah. Additionally, prior to the attack, Iran had been increasing its efforts to disrupt shipping through the Strait of Hormuz, including seizing vessels and confronting U.S. Navy ships. To show support for Israel and to discourage the outside actors from becoming involved, the U.S. has moved two aircraft carriers to the region. The situation is reaching a critical point as of the time of writing this, with Israel preparing for a military incursion into Gaza, which is being preceded by a bombing campaign.

Where oil prices go next depends on how the conflict plays out. In the very short term, the price of Brent crude could test $95/bbl. If the conflict is contained and the threat to the flow of oil is mitigated, the risk premium will start eroding and the previous price dynamics will govern price movements.

The possibility remains, however, that the conflict could expand with the potential for the direct participation of Western countries. That scenario involves not only Iran, but could also draw in Russia and China, given that both have increased their ties with Iran during the last few years. China is a major buyer of Iran's energy exports and Russia has been acquiring weapons from Iran.

Additionally, some politicians in the U.S. are trying to link the conflict in Israel with the conflict in Ukraine with the view that Iran is playing a central role in both conflicts. With this scenario, the price of Brent crude could test $115/bbl—and even go higher if there is a disruption to oil supply—either because of physical interference or because of an embargo imposed by oil producers in opposition to supporters of Israel.

The more hopeful scenario is still the most likely; however, the scenario depends on the following set of developments:

- Israel exhibits restraint in addressing Hamas, in part, from pressure from the Biden administration along with public opinion;
- Neither Iran nor the U.S. become directly involved in military conflict even though there are some on both sides voicing support for such action;
- Saudi Arabia does not support any calls for an oil embargo, but instead is willing to add supply, if needed to stabilize the market;
- Russia attempts to play a positive role in resolving the conflict, even though Russia has expressed support for Palestine (and Hamas) and is an ally of Iran; and
- China continues monitoring the situation and encourages an equitable solution to the conflict.

Regardless, the conflict will be disconcerting with social unrest and tripwires that present the possibility of the situation spinning out of control. OGJ

Pickering: The Upcycle is Here

No need to curb your enthusiasm around prices that should linger around around $80/bbl through 2027.

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After enduring the "lower for longer" downcycle that started in 2014, the question for the energy industry is how long this new cycle of higher prices will last.

Dan Pickering, chief investment officer at Pickering Energy Partners, believes the oil and gas industry is in a strong upcycle. Speaking at Hart Energy's Energy Capital Conference in Dallas in October, he said certain activities and behaviors tend to occur near the end of an upcycle.

Dan Pickering

Those activities and behaviors include enthusiasm and the belief that the good times will last forever, he said.

"There's a ton of enthusiasm for the sector" due to better oil prices, even though it's not performing as well on the S&P now as it has in the past, Pickering said. "'This time is different.' Famous last words," he said.

A surge of capital can also signal the coming end of an upcycle, he said.

"Capital inflows typically in a bull cycle toward the top. You have to fight the money off. It really wants to get invested. It really wants to be involved, whether that's public money or private money. And I would say we're not seeing that," Pickering said.

"Meaningful" consolidation also typically happens as an upcycle ends, but Pickering is not seeing that currently.

"If you think back to cycles of the past of most industries, what happens right toward the end, everybody gets so excited they have to buy each other, and we're seeing a lot of consolidation now, but we're not seeing the BP-Amoco-Arco, the Chevron-Texaco type of consolidation," he said, adding he believes that type of consolidation is still years away. "[Right now] is sort of at the beginning sort of an upcycle, from my perspective."

Forecast: $80/bbl through 2027

Oil prices have improved due to a number of factors, including a fundamentally tight market and the fact that the "recession we've been afraid of hasn't happened," he said.

"Now oil's working. It has a tendency to work when … the fundamentals are pretty decent," Pickering said.

He sees the sweet spot of oil pricing at between $75/bbl and $90/bbl and forecasts oil to be around $80/bbl through 2027.

"For those of you in the room that have heard me talk before, I mean $80 is the highest I've ever been willing to go on record for any kind of a forecast, and I've never been willing to go from 2023 to 2027, that long a time period," he said. "I just think it's a pretty tight market with some good underlying dynamics."

Pickering said the U.S. oil and gas industry no longer does well at $50/bbl, or even $60/bbl, but that over $100 is not sustainable for consumers.

"Over $100/bbl, you're starting to hit people in the pocketbook on the consumer side, and we just don't want that as an industry," he said.

The next thing? Rigs

At one point, U.S. production "bottomed" at 11 MMbbl/d but has now almost returned to 13 MMbbl/d, he said.

"There's plenty of good rock, there's just a lot less than there was," he said.

That means that operators are busy thinking about the next thing.

"We're hearing about even longer laterals. It was one section, now it's two sections. It's 15,000-ft laterals," Pickering said. "There's not enough of that to really move the needle, and I don't think you're going to make a meaningful move above our prior peaks without rig count."

U.S. production will remain around 13 MMbbl until it begins to add rigs, he said.

"I think we finish this cycle with the U.S. heading to 14 [million barrels per day] or 15 million barrels a day and a higher level, the only way we're going to get there is rig count," he said. "We can't get there with new technology."

Energy transition, or the boiled frog

The energy transition could make the oil and gas business more difficult, but it could make it more profitable, at least in the short run, as oil and gas shore up supply when there is tightness in the energy mix.

Pickering said everyone should be prepared for oil demand to peak "at some point in our lifetime," and for gas demand to peak after.

"Hydrocarbon demand is going to peak, and that renewable percentage of energy supplied, which is now at 7%, is going to be much, much higher," he said. "We're boiling the frog here. That's a slow-moving process."

Achieving net-zero emissions by 2050 won't happen without some serious changes by consumers, he said.

"We're not going to make 2050 net zero unless the world gets a ton more serious about changing their consumption patterns, and getting people to change consumption patterns is really, really hard. 'Let's save the world, but I don't want to do it,'" he said. OGI

Kissler: What Does Mideast Unrest Mean for Markets?

Market Watchers

DENNIS KISSLER
BOK FINANCIAL SECURITIES

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The war that has broken out in Israel could have long-term effects around the world. While Israel has very limited oil production—close to zero—the impact of the Hamas attack may result in lower global oil supply via either increased sanction monitoring on Iran or a contagion of the battle from Israel to include Iran given Iran's historic sponsoring of Hamas.

How do you see the unrest in the Middle East (Israeli/Hamas war) affecting crude prices longer term?

The longer-term effect is most likely more bullish than bearish to prices, as it's just a matter of time until it reaches into Middle East oil-producing areas. All eyes will be watching Israel's progress and any intentions they may have toward Iran. Global exports from Iran have been growing (up nearly 1 MMbbl/d from levels a year ago), and if further sanctions are implemented, world supplies could tighten further.

As of mid-October, Russia's fuel and exports are estimated to be near five-month lows. Also keep in mind, current U.S. crude and diesel inventories are well below the five-year average going into mid-October with winter demand around the corner. The Cushing, Okla., hub and the Strategic Petroleum Reserve storage are also at concerning lows. Again, like I have mentioned before, $90+/bbl for an extended period is too high and damages global economies and $50/bbl is too low and causes destruction to the U.S. energy infrastructure.

What could cause prices to move lower even if the Israeli/Hamas war escalates?

A few subdued facts for crude prices are that, given the latest cuts in OPEC and Russian production, the excess spare capacity could come to the world market from OPEC if needed on further war escalations. U.S. crude production surged to a new record high in the third quarter.

We are also entering maintenance season for major refineries that have put off major projects. When refineries are idled, near-term demand for crude lessens and crude storage can see some larger builds. Seasonal driving demand for fuel also slacks through most of October and November.

Higher global interest rates can also be a longer-term headwind for demand. Still a lot of "what ifs" remain with unrest in the Middle East, and producers should be proactive hedgers on price strength.

Our team has been tracking trends around deglobalization over the past few years and the movement of the world from a unipolar power, focused in the United States, to a multi-polar world. While countries like China and Russia have emerged as formidable competitors that both appear willing to use military might to assert their interests, this conflict in the Middle East accelerates the era of deglobalization as countries begin to pick sides.

In addition, a reassessment of the U.S. supply chain for key goods and services is likely to result in some movement of production from low-cost countries to higher-cost countries. OGJ

Investors: Show Us the Money, Not Growth

During the shale boom, analysts and investors used to reward E&Ps for more production—no more.

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During the shale revolution, analysts and investors used to reward E&Ps for growing production at all costs. Experts say those days are over, probably forever.

Today, the investment community is much more keen on E&Ps shoring up their balance sheets, paying off debt and returning as much cash to shareholders as possible, White & Case Partner A.J. Ericksen said at Hart Energy's Energy Capital Conference in Dallas.

Compared to the early days of the fracking boom, E&Ps aren't in a huge rush to pump money into their undeveloped shale inventory. Most producers are operating in maintenance mode, where they're maintaining—or slightly boosting—oil and gas output, and generating piles of free cash flow in the process.

But even just maintaining current production levels, not massively growing output, requires a significant amount of capital investment by shale E&Ps.

"If you're a pure shale company, and you have a baseline decline approaching in some cases at least 40%—just to stay stable is more challenging than sort of meets the eye," said Neal Dingmann, managing director of energy research at Truist Securities.

E&Ps are deploying cash to keep production relatively flat but they're also pumping huge amounts of cash into buying back shares, paying out dividends—and reducing debt. "The average leverage for my companies is the best it's been certainly in over a decade," Dingmann said.

Some investors question how long the gravy train can last. In many cases, oil and gas companies are raking in more free cash flow than ever—but they're drilling through their top-quality acreage as costs to drill new wells rise.

"For shale, the biggest issue today is depth of inventory and quality of inventory," said James Wicklund, managing director of client relations and business development for PPHB. "And if you've got a lot of depth and great quality, then maintaining that production is one hell of a lot easier."

M&A inventory scramble

Big E&Ps, such as supermajors Exxon Mobil and Chevron and the Permian Basin's giant independent Pioneer Natural Resources, have long runways of undeveloped drilling inventory.

"The average leverage for my companies is the best it's been certainly in over a decade."

—**Neal Dingmann**, *managing director of energy research, Truist Securities*

"... If you've got a lot of depth and great quality, then maintaining that production is one hell of a lot easier."

—**James Wicklund**, *managing director of client relations and business development, PPHB*

When they're not deploying cash toward shareholder returns, small- and mid-sized E&Ps with shorter runways are making big acquisitions to shore up more undeveloped inventory—especially in the Permian, America's top-producing oil basin.

Permian Resources, Vital Energy, Ovintiv and other E&Ps have pumped billions of dollars into Permian M&A in recent months.

"A lot of the M&A you're seeing is actually to lengthen or strengthen depth of inventory," Wicklund said.

Dingmann said that some of the operators he covers have had to pivot out of their best inventory to start drilling into less economic areas.

"Organic activity is going to be very difficult because you have a huge baseline decline, you have limited inventory," Dingmann said. "You just have a lot of these things that are stacking up against these companies." OGI

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A WHOLE NEW WORLD

In an exclusive interview, Oil States CEO Cindy Taylor describes the service and equipment company's evolving role amid the ups and downs of the energy business.

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Oil States International is perhaps best known for its manufactured products and services that support oil and gas drilling, completions, subsea installations and production, but the traditional energy service and equipment company is also carving out niches for itself in the renewables space.

The Houston-based company has diversified into deep-sea minerals gathering and offshore wind technologies while eyeing where it can help accelerate growth in other areas like CCUS and geothermal energy. This focus on diversification follows industrywide lessons learned from challenging post-COVID years and Russia's invasion of Ukraine.

Balancing energy security, sustainability and affordability is essential; however, the unexpected can upend everything.

The COVID-19 pandemic brought profound challenges to companies throughout the industry supply chain: demand for oil and gas dramatically declined, inflation soared and market disruptions linger. Prices plummeted. On April 20, 2020, WTI sold at negative prices—the first time WTI futures contracts traded at less than $0 since entering the market in 1983.

"It was a gut-wrenching moment for any company, certainly ours," said Oil States CEO Cindy Taylor, who is also on the board of directors for the Federal Reserve Bank of Dallas. "PPP loans supported small, privately owned businesses. The Main Street Lending Program focused on investment grade entities, so companies like ours were unable to participate. We had no choice but to cut costs and cut costs fast and deep, which included reducing our global workforce by about 30% in 2020."

But Oil States has largely recovered. Backlog growth reported this summer in its offshore manufactured products segment has reached its highest levels since the end of 2015, which supports further growth through 2024.

"There is now growing acceptance that conventional oil and gas development is critical, and will be needed for decades in the future," she said.

Taylor grew up in Goldthwaite, a small town in the center of Texas, but she has traveled the world during her career in the energy business and witnessed the impacts that the business and its leadership can have on global economies. She's seen livelihoods destroyed during times of dictatorship as oil production fell in Venezuela and citizens adjusted from enjoying a progressive economy to standing in breadlines. She's also seen oil workers elsewhere demoralized, despite their efforts to provide affordable and reliable energy to the world.

"It gave me a great perspective about a lot of things we're talking about," she said.

THE OGI INTERVIEW

Watch the video interview here:

Q&A

Velda Addison: A common theme seen nowadays is reducing emissions. How is Oil States using its core expertise to pave a path toward a global energy mix that's both lower carbon and multi-sourced?

Cindy Taylor: What we're trying to do is take our core technologies, our core expertise that we've developed over decades and apply them in newer applications. What I tend to ask is, "What are we really good at? Where do we have differentiated market share and can that be adapted into new applications?" If you think about electrification, or battery storage, if you think grid infrastructure development, you're going to need the critical metals and minerals that build out the infrastructure. We don't mine to a large degree in the United States. I think probably 90% of these critical metals come from China or Chinese-controlled mines right now.

If we're going to progress, decarbonize and

Felix Navarro/Hart Energy

electrify, we will need the metals. Where are they and where is the least intrusive environmental footprint to source them? Open pit mining is a common source today but it can take years of overburden removal to reach the critical metals.

Put that into contrast to what Gerard Barron, CEO of The Metals Company, Allseas and Oil States is working on. There are polymetallic nodules located in the Clarion-Clipperton Zone of the Pacific Ocean, as well as in other deepwater regions around the world. Think deepwater offshore, middle of nowhere, but the metals are very accessible using deepwater oil and gas technology. Possibly complicating the development is defining who owns that resource. There's an International Seabed Authority under the auspices of the United Nations that is looking at potential environmental impacts from retrieving the metals off the seabed. We've already developed the systems to move the nodules up to the floating surface vessel. What we have done is take core expertise around our oil and gas riser systems—our industry produces oil and gas offshore in deepwater and has for decades—with a vertical conduit, basically from the seabed to the floating facility for oil and gas. We can do the same—with modifications—to source these metals off the seabed. So, that's one avenue of using core technologies in new applications.

VA: What other product development or technology initiatives are underway at Oil States?

CT: Another area of investment for us is floating production facilities offshore for use in wind applications. Over the last five to seven decades in the traditional oil and gas space, we've moved from fixed platforms near the shore to ultradeep platforms in floating harsh environmental conditions. We believe that offshore wind developments will take the same trajectory. We've developed a great application around a fixed tension leg platform (FTLP) that is designed for wind applications. The goal is to decarbonize the manufacturing process, the installation process, and drive the cost down to be economic to the consumer. That's the real rub with most of the energy transition investments. These platforms are very, very expensive. So, we're trying to condense the size of the platform and yet make it secure because the wind turbines need stability. Think about the movement and the vibrations, the wear and tear which can reduce the life of a wind platform if you don't have needed stability. Both stability in the seabed and wave dynamics are in play.

We've tested our wind FTLP in a simulated environment. One is not yet installed; it's a prototype. But through academic research and engineering data analysis, we've simulated testing in up to 150 meters of water depth and 20 meters of wave height. The next step is to actually build a real FTLP system, put it on a lease and allow it to work. Reducing the carbon footprint and scaling the equipment to make the investments economic are challenges that we all face. Our expectation is that the FTLP system for offshore wind comes to market in 2026 at the earliest.

We also have the potential for geothermal applications using our Merlin riser system technology, which is commonly used in oil and gas. These environments require a very intense connection system that can withstand high temperatures. Geothermal power is created by accessing heat, but you've got to be able to transport that heat from fractures deep in the earth back up to the surface. This process requires incredibly robust equipment that is capable of handling the high temperatures. You inject cool water, but then you heat it up subsurface and bring it back up. We have the equipment and the technology, but success is going to be very location specific just by the nature of geothermal applications. These are examples of things that we're focusing on, but we're not trying to be all things to all people. There are certain capabilities we have that can be adapted to new applications drawing upon our own abilities, manufacturing capacity, global facilities, as well as our cash flow to enable these technologies.

> ***"Part of our corporate strategy is to progress from largely supporting the oil and gas industry to supporting a multi-sourced energy mix."***
>
> —**Cindy Taylor,** ***CEO, Oil States International***

VA: Let's go back to the critical metals or minerals. Companies such as Exxon Mobil and Chevron have announced they are getting into the critical minerals market. Can some of your equipment be adapted for use onshore?

CT: Yes, it can, but … if it's mining, not so much. I personally think there is going to be very limited open pit mining allowed in this country. Time will tell. Just from the history we have in oil and gas permitting, coupled with the environmental issues associated with mining, I just don't see the United States permitting mining on a large scale. If you go offshore, into the deep water—there are going to be environmental issues there that also have to be addressed—but I think the world has to accept that all of these technologies have tradeoffs. Which one is the least intrusive? First of all, there is no truly carbon-free energy other than nuclear. We can all debate whether you will ever achieve net-zero carbon emissions or not. The point is, this industry is not resistant to expanding our capabilities and investing in newer technologies. There are certain things that I think we do well that provide avenues for us to grow newer technologies. I would first rank the minerals riser gathering systems for us in the metals recovery, again, assuming we're allowed to gather the minerals long term.

Wind is also a good solution for us but will develop over time. Westwood projected that there needs to be 26,500 offshore wind turbines installed over the next seven years. That's a huge number! I don't think anybody appreciates the supply chain impacts of even trying to engineer and manufacture this number of wind platforms. Right now, we're looking at water depths up to 150 meters for our FTLP wind system. To my knowledge, there are no vessels yet built to install them. So, just think about the scope and scale of what we're talking about. That's the reality check that people are beginning to appreciate. I was at a conference on the West Coast and we literally went through almost every transitional technology from geothermal, CCUS, direct air capture, electrification via wind, solar, etc. The realization is they're all going to take longer; they're all going to cost more and they're difficult to scale. That's going to be the major challenge that we face. There's no silver bullet out there.

VA: The Inflation Reduction Act (IRA) attempted to solve some of these issues or at least help solve some of these issues. Are you seeing any benefits from the IRA for Oil States?

CT: I'm going to say not yet and let me give you one reason. When we talk about our mineral riser gathering system, we've

Oil States International's FTLP Floating Wind Platform, a 2023 recipient of the Offshore Technology Conference's Spotlight on New Technology Awards, is designed for water depths up to 150 meters.

Source: Oil States International

invested in research and development and spent capital equipment dollars already. The same is true for the FTLP system, but much of that is being developed in the United Kingdom and Europe right now because they're so far ahead of the United States from a permitting perspective. The benefit of that technology will absolutely come to the United States, but we don't get credit for that under the IRA because monies were invested outside of the United States. That's one of the areas that I wish we could change. If you're not manufacturing in the United States, spending the money in the United States, you cannot access the IRA. But I can tell you we, as a country, will benefit from the technologies that we've invested in elsewhere.

We do have credits that we're getting from the United Kingdom because of the initiatives that we're taking but they are less lucrative. Areas like Scotland are probably a decade ahead of the United States as it relates to offshore wind permitting. We want all these clean decarbonized energy sources, but heaven forbid, we don't want to look at a windmill out our window. Right? I think it'll shock people that Texas is the No. 1 producer of wind energy and the No. 2 producer of solar energy in the United States. Everybody thinks, "oh, those people in Texas, all they care about is oil and gas." Not true. If you go up to the East Coast and start building out the windmill systems that we have in Texas, you're going to get massive resistance. So, offshore is a solution because the infrastructure is not in line of sight.

VA: What is Oil States's role in the energy transition?

CT: We want to take a leadership role in being a vocal advocate for our industry and a conduit for decarbonization long term. I think that statement probably sums it up pretty well. We're small though. We have to do what we can do economically, feasibly, for technology investments that we believe have long-term benefit to our company and to our shareholders. We have existing technology that can be adapted to benefit these future applications. Part of our corporate strategy is to progress from largely supporting the oil and gas industry to supporting a multi-sourced energy mix, which we believe the world will need over the long term.

> *"If you believe that a crisis could ensue, let's drop all the rhetoric and start working together."*
>
> —Cindy Taylor, *CEO, Oil States International*

VA: You've mentioned permitting, which has been an issue in the United States. Do you have any suggestions or ways to improve the situation here?

CT: First of all, governments control access and regulations in the various regions that we operate in. I'm the most optimistic person you will ever meet, but I get really down when I see dysfunction in our own government with so many issues becoming politicized. Permitting in the oil and gas world has become very politicized and those barriers have to break down. I fear that it will take a crisis for that to reverse. Europe averted a bit of a crisis last year. You can advocate for ESG, strive to be net-zero all you want, make investments in wind, but you'd better be thinking where your energy source comes from and ensure that they are both reliable and affordable. With United States permitting—it can be for oil and gas, it can be for mining, it can be for wind or nuclear—I don't think the American people fully understand the complexities of this transition, nor do they understand the cost.

We, on average, in Texas anyway, probably pay $0.13 a kilowatt hour, which is about 25% lower than the national average. If you were to say to the consumer, this energy transition is going to cost you $0.20 to $0.50 a kilowatt hour, do you think that attitude would change? It would, but that's what we have to address. Fifty percent of our population in the most advanced economy in the world has virtually nothing saved for retirement, according to the Wall Street Journal. How do you know that and say your gasoline is going to cost more and your power is going to cost more? Over half of the United States population lives paycheck to paycheck. There are real economic consequences that demand leadership from our government. Our debt to GDP is the highest it's ever been, and we really haven't rolled over to paying the higher interest rates on our government debt that have been raised to control inflation, which was largely triggered by the COVID pandemic-induced lockdowns.

All these things are interrelated. We rely on governments to lead and to fund infrastructure, and our government right now is deeply divided. I fear it takes a crisis, much like what Europe suffered, for this to trigger a greater sense of realism. We need to focus on permitting and planning infrastructure investments. Environmental groups should answer to a higher body as well. They have banged on the door of the Woodside CEO's home in Australia, and they have boarded ships in transit to the Arctic. These things have to be stopped. They're dangerous to the population and to the people doing it. It's one thing to be aspirational around net zero and alternative energy solutions. But if you believe that a crisis could ensue, let's drop all the rhetoric and start working together.

VA: Do you think we need to become more realistic about these net-zero goals globally? The IRA has incentives for renewables but you've mentioned the permitting problem, and there are transmission challenges in getting connected to the grid.

CT: We are blessed in this country. Yet, somehow, we convince ourselves that we're not. There are millions of people who have no access to energy at all. One of the very small members of OPEC last year—calm, collected, not offensive—just simply said, my small country's economy is very dependent on the revenue we generate from oil and gas production. My citizens consume the equivalent energy of one refrigerator. Why are you asking us to reduce my country's revenue to support the consuming nations in Europe and the United States by lowering the price of oil? It's a great question.

We consume, on average, 20 times more energy than a lot of people in the world. So, there also has to be the recognition that we need the rest of the world to come up to adequate living standards similar to what we've enjoyed. You have to accept that there are other views outside of these held in the United States and other developed economies. That doesn't mean we shouldn't invest in new technologies, but they have to be secure, reliable and affordable. We have to consider other parts of the world and their need to grow and develop, which demands energy. Let's just be honest with each other; recognize that we're going to rely on conventional oil and gas for a long time, but that the industry can fuel investments in longer-term, lower carbon technologies. The more technology we create in developed countries will allow us to deploy those technologies, in theory, at a lower cost to lesser developed economies. This can be a winning proposition if we can work together to solve problems and achieve these goals. OGI

GENERATIVE AI

SPECIAL OGI SERIES

This is the second of a two-part series examining the use of artificial intelligence in the oil patch. The first part appeared in the October Oil and Gas Investor.

WHEN COMPUTERS LIE, STEAL AND HALLUCINATE

Regulatory uncertainty and data security are also concerns as generative AI technology is adopted.

New technologies typically raise a host of concerns, and generative artificial intelligence (AI) is no exception.

In addition to reservations around the nascent technology's fallibility, some worry about how the technology could be used, abused and misused. Companies are setting guidelines about the use of the technology, and the government is working with the industry to devise regulations for the developing technology.

As acceptance and use of generative AI advances, one of the biggest questions users have about the technology is, "What's this going to do to my job?"

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AI 'hallucinations'

Chat GPT has a penchant for returning bad information, often referred to as "hallucinations."

Such mistakes are particularly problematic because people tend to trust computers, said Bill Braun, CIO at Chevron.

"People know that humans can be wrong. People have grown to expect that computers are always right, and now we're seeing the computer might not be right," he said.

Moe Tanabian, chief product officer at Cognite, said generative AI responses often "feel and look real" but are not always accurate.

"When they don't know the answer, they just make things up," he said.

Manoj Saxena, founder of the Responsible AI Institute, said the large language models driving generative AI are massive pattern detection machines.

"When you type into a Google search, it starts giving you the next predictive word. Imagine doing that predictive word across all of humanity's knowledge," he said. "It is confidently telling you what it should look like—the answer—not what the answer is, and that's what hallucination is."

Beyond the issue of whether to trust a response from generative AI is the issue of legal uncertainty.

Sriram Srinivasan, senior vice president for Halliburton Global Technology, said the service company is looking into the possibility of using GitHub Copilot, a tool which autocompletes code, in a project to rewrite legacy code in modern languages.

AI-assisted programming can help from a productivity perspective, but it may be problematic from a legal perspective.

"One of the things that we are being mindful about are issues around patentability and issues around copyright-ability. The question of AI-generated content being patentable is unsettled in the U.S. for sure, probably everywhere, so we have to be very careful in deciding where and how we want to use AI-generated code snippets," he said.

Generative AI poses other legal liability possibilities.

James Brady, chief digital officer for Baker Hughes oilfield services and equipment, said current generative tools are simply providing responses without detailing source material.

"Say that we turn ChatGPT loose on the SPE papers database, and then we ask it, 'What's the best way to do a multistage frac in the Bakken?'" he said.

The resulting recommendation may well violate another company's patent, he said.

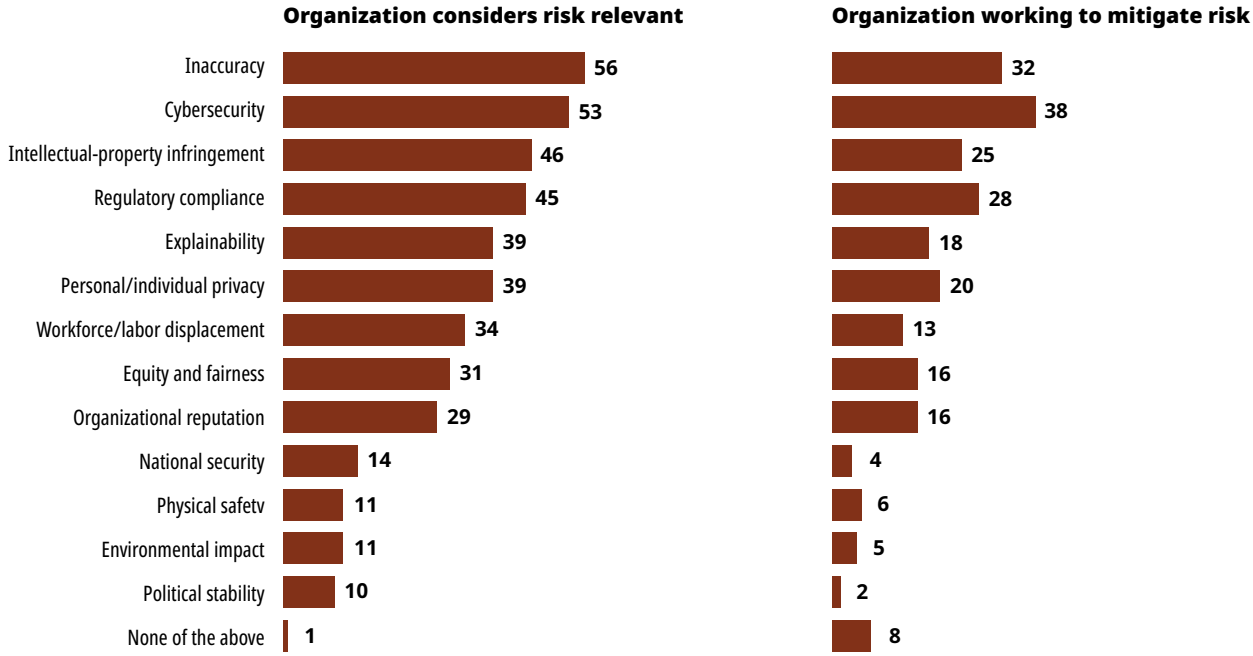
"It might not come out and say, 'watch out, this is patented.' It might just, from the assembled data, just say, I suggest that you do it in this way.'"

"People know that humans can be wrong. People have grown to expect that computers are always right, and now we're seeing the computer might not be right."

—**Bill Braun,** ***CIO, Chevron***

Generative AI-related risks that organizations consider relevant and are working to mitigate

(% of respondents[1])



Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11-21, 2023

[1]Asked only of respondents whose organizations have adopted AI in at least 1 function. For both risks considered relevant and risks mitigated, n = 913.
Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11-21, 2023

Gen AI adds more complexity to responsible AI framework

	CLASSIC AI	CLASSIC + GENERATIVE AI	
1	Safe	Fabricated and Inaccurate Answers	1
2	Secure & Resilient	Prompt Injections, Data Poisoning	2
3	Explainable and Interpretable	LLM Citations and Evidence	3
4	Privacy Enhanced	Data Leakage and Data Privacy	4
5	Fair, Bias Managed	Model and Output Bias	5
6	Accountable & Transparent	Audit Logs, Excessive AI Agency	6

Responsible and Trustworthy AI Foundations (NIST, IEEE, OECD, ISO, BSI, SCC, VDE)

Source: Responsible Artificial Intelligence Institute

Mehdi Miremadi, a senior partner at McKinsey & Co., said the use of generative AI brings up concerns about cybersecurity, privacy and security.

McKinsey GenAI Risks around here

Data "are incredibly sensitive assets. If you are opening them to these models, you're also opening significantly broadened potential access to this data," he said. "How do you ensure that this stays in the right hands?"

In fact, in McKinsey's "The state of AI in 2023: Generative AI's breakout year" report released in early August, respondents were almost as concerned about generative AI and cybersecurity, at 53%, as they were about inaccuracy with generative AI, at 56%.

ResponsibleAI GenAI Complex around here

Because there are concerns about generative AI tools, some companies are instituting guidelines about how generative AI technology offerings like ChatGPT can be used, while others are prohibiting it altogether.

Saxena said when employees use ChatGPT, they're exposing companies to risks because data they put into the program "goes right into OpenAI and Microsoft's hands." The RAI Institute provides diagnostics of how employees are using ChatGPT and offers guidelines and playbooks on how to use generative AI in a responsible way, he said.

Braun said Chevron is working to help its workforce understand how to approach and use new technologies like generative AI.

"We put in a speed bump before you go to that site that describes our expectations for safe use, and then, click that you acknowledge," he said. "We tried to describe in five or six bullet points what are the key things in terms of how to use it to make sure you're using it the right way."

He offered a parallel to a commonly used technology: employees have access to email, which raises concerns about them clicking links they shouldn't.

"We have to help the workforce understand how the threats of the technology continue to evolve," he said.

Chevron joined the RAI Institute and is learning from other members because it didn't want to try to navigate the world of AI on its own.

"The group comes together and can share practices and set expectations and shape what those guidelines look like, we think, is the best way to do that," Braun said.

Baker Hughes temporarily blocked ChatGPT from its network, Brady said. The risk with ChatGPT, he said, is that it's open and not secure.

"When you put something out there, you're effectively taking it outside the network," he said, and Baker Hughes wanted to ensure people weren't unconsciously putting confidential information into the internet. "We've done some raise-awareness stuff to communicate why we blocked it and are taking steps to re-introduce it for specific initiatives in controlled ways."

Regulating the risk

One of the things that makes generative AI tricky is that the new technology is developing rapidly with few mechanisms in place to regulate it.

"Generative AI models sometimes feel so real that it opens a lot of doors for malicious actors to abuse the system."

—**Moe Tanabian,** ***chief product officer, Cognite***

"Regulations have not caught up to this, and there is a real potential of a lot of damage being done over the next few years," Saxena said. "I call it the Chernobyl of AI, where things are going to blow up and create a lot of damage."

He said the industry needs to think about safety first.

"It's like everyone's focused on building the nuclear reactor and no one's thinking of putting the safety dome on top of it," he said. "I think now the time has come where people are saying, 'Hey, this is not just nice to have. This is something we must have.'"

Vasi Philomin, VP and General Manager for Generative AI at Amazon Web Services (AWS), said the company is working with policy makers and standards bodies to help shape regulations, standards and recommended best practices for AI and generative AI.

"We work with a lot of standards bodies to also help with the regulation to shape it, because I think it's important also for the regulators to work with industry to understand what is possible and what is not," he said.

Cognite's Tanabian said there is a push for regulations requiring "watermarking," or labeling of generative content as such.

"Generative AI models sometimes feel so real that it opens a lot of doors for malicious actors to abuse the system," he said.

For example, with just a snippet of a person's voice, a generative AI model can replicate audio indistinguishable from that person's voice. Anyone who knows that person would likely believe the message, he said.

"There is now a huge vacuum for governments to step in and create some set of regulations to authenticate and determine the authenticity of these contents. Is it coming from a generative AI model that is basically being used by a malicious actor, or is it actually real?" he said.

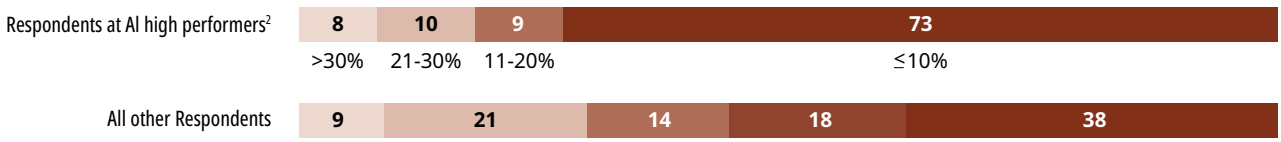
People & companies

Despite the concerns that generative AI raises, it brings opportunity to businesses and employees.

SparkCognition CTO Sridhar Sudarsan said the sooner one embraces the generative AI journey, the better. He also suggested that companies that think about using generative AI holistically, rather than piecemeal or incrementally, will achieve greater results from it.

Respondents at AI high performers expect their organizations to reskill larger portions of the workforce than other respondents do.

Share of employees at respondent's organization expected to be reskilled over the next 3 years as a result of AI adoption, % of respondents[1]



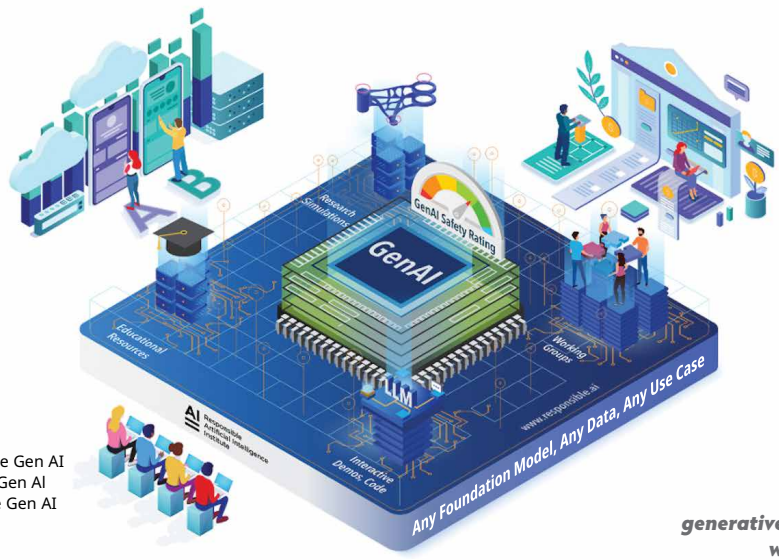
Source: McKinsey Global Survey on AI, 1,684 participants at all levels of the organization, April 11-21, 2023

[1]Asked only of respondents whose organizations have adopted AI in at least 1 function.
[2]Respondents who said that at least 20 percent of their organizations' EBIT in 2022 was attributable to their use of AI. For respondents at AI high performers, n = 50; for all other respondents, n = 863.

Responsible generative AI testbed

INNOVATE
- Pilot GenAI use cases and experiments
- Investigate AI safety, hallucination, bias
- Test regulatory and standards conformity

EDUCATE
101: Introduction to responsible Gen AI
201: Leading with responsible Gen AI
301: Implementing responsible Gen AI



ADVOCATE
- Public and regulator awareness and education
- Advocacy campaigns, policy working groups
- Human-centric design and GenAI safety index

Source: Responsible AI Institute

RAII members can use the generative AI testbed to experiment with the technology safely.

"The more holistically you get on, the better it will be," he said.

Miremadi said to achieve success using AI and generative AI, companies need "translators" who deeply understand their own craft and industry, but also the data science, algorithms and models.

"They're extremely critical because if you just go and bring a number of Ph.Ds who just know how to run these algorithms, you have a real gap in how you link them with the rest of the organization and how you actually integrate their skillset in the organization," he said.

He said data sciences training is already trending up, and more data scientists will be hired to help with AI and generative AI projects.

On the flip side, he said, there is a general hypothesis that the occupations most at risk to be wiped out by AI and generative AI technologies are those composed of many repetitive tasks. He does not believe AI applications will significantly impact the oil industry's workforce in a negative way, but anticipates some work delegated to the machine while new tasks and responsibilities fall to humans.

"I would think there will be, first of all, significant collaboration between human and AI," Miremadi said. "Second, there will be a difference in the types of tasks that folks do on a day-to-day basis."

RAI Institute's Saxena said workers who are concerned about their jobs should consider upskilling themselves to remain relevant and to thrive in the changing environment. First, he said, workers should educate themselves on what generative AI is and is not, what is possible with it, and what risks accompany use of the technology.

Second, he said, they should take on a small project. The institute offers a test bed where people can try projects in a low-risk setting. In that way, they can start activating their skills to understand the basic concepts and start using generative AI, not as competition, but as a collaborator, he said.

"A lot of people just look at this as, 'Oh, it's going to take away my job.' So it's man versus a machine. It's not just that," Saxena said. "While there will be many tasks and some jobs that will indeed be automated away, the greatest potential here is in using AI as a co-creator. It's man and machine." OGJ

CAUTIOUS DEPLOYMENT

Assistants and chat bots are likely to be the early entries into the industry.

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As generative artificial intelligence (AI) continues gain traction and investment, oil and gas companies are seeking ways enable the powerful technology—just not too fast.

For now, some companies are using the technology more as a consultant, highly efficient librarian or as a kind of advanced spreadsheet or database rather than putting it in control of sensitive or critical tasks.

The promise of the technology seems clear to generative AI advocates.

"Generative AI is going to be, I think, as big as, if not bigger than the internet itself," because of how it enables new customer experiences and more powerful applications, said Vasi Philomin, vice president and general manager for generative AI at Amazon Web Services (AWS).

Jay Shah, principal of energy marketing and innovation programs at AWS, said AI and generative AI have the potential to help the oil industry with production; health, safety and environment (HSE); operations; and maintenance, among other areas.

"We do believe generative AI and AI in general have the transformational capability to change the world as we know it," he said.

Shah said AWS is working with customers in the oil and gas space who are exploring and considering the possibilities generative AI solutions could bring to their businesses.

AWS's IT service management company has put its money where its beliefs are, announcing in June that it was investing $100 million in its Generative AI Innovation Center to help customers launch new generative AI products.

However, Manoj Saxena, founder of the Responsible AI Institute, said it's important to provide companies developing generative AI tools with a secure, collaborative, and rapidly scalable environment to explore and evaluate their capabilities and responsible AI features effectively.

For now, oil and gas companies are taking it slow, using AI for tasks such as examining equipment downtimes to assist with preventative maintenance, or to quickly access a company's technical libraries.

Unlike 'Star Trek'

Moe Tanabian, chief product officer at Cognite, said users can use the Cognite AI platform, launched in June, combined with Cognite Data Fusion to get answers to complex analytics questions. An example: analyzing how many pumps, out of thousands, experienced downtime after a day of freezing temperatures. AI could then report on how the damaged pumps were repaired and make recommendations on how to preemptively prevent future downtimes.

"When we explain this to the customers, they feel it's 'Star Trek,' but it's not. It's reality," Tanabian said.

Kriti Singh, senior research data scientist at Corva and lead developer of the company's Predictive Drilling platform, sees AI having a similar role—eventually.

She said a long-term goal for Corva's Predictive Drilling platform is to use generative AI to identify causes of drilling dysfunction, like high vibration, based on data and then use that information to automate identifying and mitigating

"We do believe generative AI and AI in general have the transformational capability to change the world as we know it."

—**Jay Shah**, *principal of energy marketing and innovation programs, AWS*

"One focus is to have predictive alerts."

—**Kriti Singh,** ***senior research data scientist, Corva***

"We'll keep generative AI out of mission critical tasks, and we might use generative AI" for other tasks.

—**Sriram Srinivasan,** ***senior vice president for Halliburton Global Technology***

those drilling dysfunctions in a closed loop drilling system.

"One focus is to have predictive alerts," she said.

That capability will require training models on drilling dysfunction data, and that can then be used in real time to predict potential problems, she said. The aim is to flag anomalies and alert the user to look at the data or take over manually.

"That's something that we are focusing on right now," she said.

For now, Singh said, the use case for generative AI is to act as a chat bot to help customers with questions. With the huge volumes of data available, the system could surface specific information quickly, she said. It would, she added, enhance user interaction and automate processes.

Sriram Srinivasan, senior vice president for Halliburton Global Technology, said that while the company is beginning to work with generative AI technology, he doesn't foresee Halliburton using the technology "in mission critical tasks anytime soon."

For now, he said, "We'll keep generative AI out of mission critical tasks, and we might use generative AI" for other tasks.

"It's perfect for collecting relevant information," such as trolling the lessons learned database and responding to questions asked in natural language, he said. Questions like, "How many wells have we drilled in this basin or with this tool?"

Beyond the hype

Nikunjkumar Patel, vice president of engineering and technology at Oceaneering, said AI and generative AI is so touted that people tend to think it "will solve all the problems."

"Eventually, it will," he said, but getting there will take time.

Until generative AI is mature enough, he said, "you have to take the tool as one of the inputs and not the absolute answer."

Initially, Oceaneering expects to use generative AI internally for things like automated reporting and chat bots for troubleshooting, Patel said.

James Brady, chief digital officer for Baker Hughes oilfield services and equipment, said the company is setting up a process around a generative AI project to help people think through potential issues associated with projects.

"You come up with some ideas about where you think generative AI could really move the business forward, and we've seen a lot of that," he said. "But then you also have to have a way of saying, 'The risks associated with my idea are this,' right? 'The cost of my idea is this.'"

An AI steering committee considers proposed projects from a risk and liability standpoint as well as the potential enterprise value behind the project, he said.

"That's up and running, and we're now trying to prime the pump of ideas," he said.

And some of those ideas could be around the generation of reservoir models and other ways to reduce the work humans have to do. Brady thinks of these types of helpers as digital assistants.

"What we see is generative AI … will extend the capabilities of people," he said.

A smart librarian

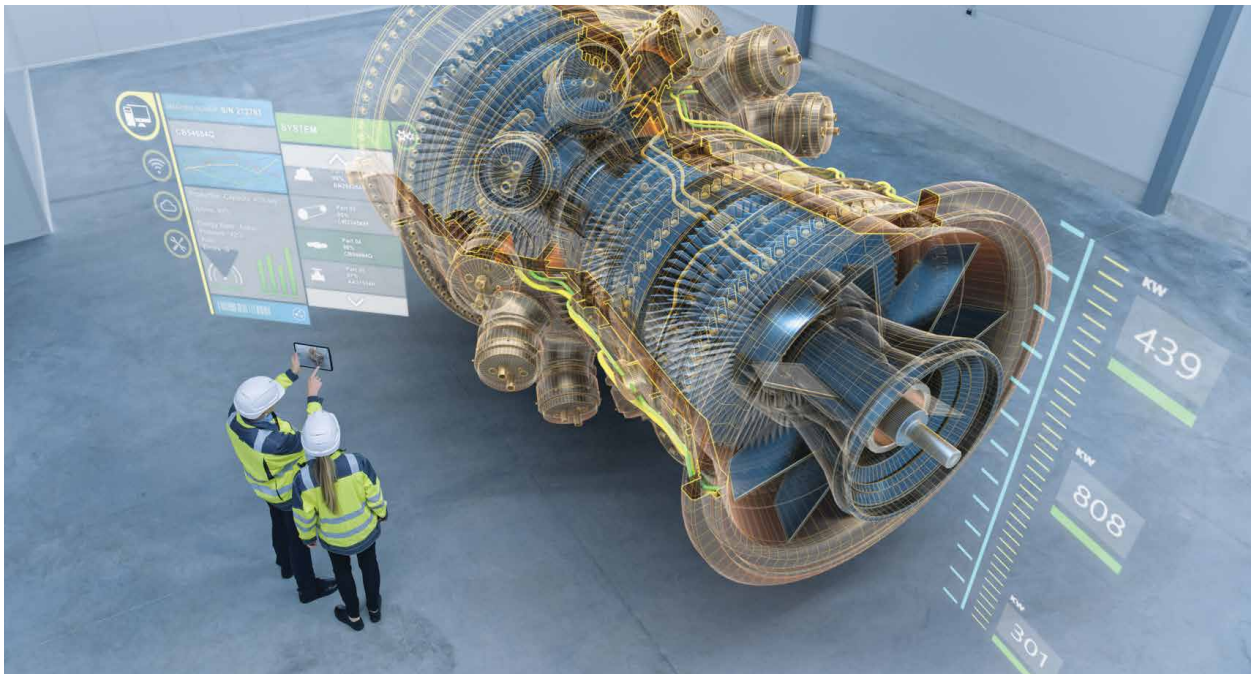
A potential generative AI project would help non-English speakers query work instructions and safety procedures in their own languages, he said.

Chevron CIO Bill Braun said the company is working on a generative AI agent able to help people do their jobs. Chevron Assist, the project's working name, can provide employees with access to "the full complement of our engineering standards, our safety expectations, the full set of knowledge around our company history and standards, and apply that to [their] work," he said.

The goal is to supply workers with relevant information without them having to spend time searching for it or dealing with different document versions or having to sift through irrelevant information, he said.

"We know how difficult it can be to find the right information and the right support for the different decisions and the different situations that we encounter on a regular basis," Braun said. "That's one that we're actively working on right now."

He said Chevron is also experimenting with other generative AI solutions and providing access to general purpose generative AI tools like Microsoft's Bing Chat Enterprise.



Cognite

Two Cognite engineers work to improve operations using Cognite AI's suite of generative AI capabilities.

"We're also trying not to rush these out because there is still a lot of learning that we're doing on them," he said.

Manas Dutta, general manager for the Workforce Excellence Breakthrough Initiative portfolio at Honeywell Process Solutions, said his company is also looking at an generative AI-based assistant. In this case, the assistant would provide help with documentation before and after jobs are carried out, he said.

"There are many different documents that a field technician or field operator has to refer to, to do a job. It's time consuming," he said. "Let's say half of the time goes in preparation, and this half is to do the execution. So, the preparation time is 50% because there are so many different places they have to refer to, to get the right information before they do the job."

The vision is that using generative AI to help field technicians digest all that information ahead of time will help them prepare more quickly, he said.

And after the job is done, Honeywell is exploring the use of generative AI to document the job.

"Basically in those areas where there are lots of manual and repeated work, we are looking at the use of generative AI to optimize those and eventually either reduce the time to do the work that they're doing or create the things faster," Dutta said.

The RAI Institute's Saxena compared the current stage of generative AI to the earliest days of the internet.

"They saw the Netscape browser back in 1996, and they didn't realize exactly what e-commerce could look like on top of it. That's the stage we are at," he said.

"There are many different documents that a field technician or field operator has to refer to, to do a job. It's time consuming."

—Manas Dutta, ***general manager for the Workforce Excellence Break Through Initiative portfolio, Honeywell Process Solutions***

Saxena predicts that generative AI will ultimately impact many aspects of the oil industry, from "exploring geological formations to predicting where the gas is, to optimizing operations to supply chain asset maintenance, predictive maintenance, training simulation, creating similar scenarios for employees on various climate challenges and emergencies, R&D for new processes," as well as things like economic modeling.

"Generative AI is going to be the silver thread that will run through all of the processes upstream, downstream," he said. OGI

OIL STATES

CONNECTING THE ENERGY FUTURE

Technologies & Services for a Multi-Source Energy Mix

Offshore Technologies & Services
Onshore Completions
Deepsea Minerals
Offshore Wind

Data, Data Everywhere

A survey suggests at least half of executives find unaligned data or the inability to see a holistic view of data as challenges in making decisions.

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The data landscape is messy. Data lives in silos—in apps, on paper, enterprise resource planning software, engineering drawings and documents and maybe even a few desk drawers.

These scattered sources make it difficult to locate needed information quickly, and get it to the right people and applications to make the best use of the data, Cognite's Ben Skal, senior director of product marketing, told Hart Energy.

He said the "data landscape mess" is partially due to the proliferation of applications that solve individual problems, such as predictive maintenance, but add a layer of complexity in some other way. The convoluted ways in which data is stored makes it "really, really difficult to scale."

"A new approach is needed," Skal said.

Connecting the dots

It is difficult to trust industrial data, say executives who responded to Cognite's "Asset-Heavy Industry Survey: Simple Access to Complex Industrial Data" report released in late September. Only 3% of respondents said they completely trusted their critical decision-making data, while 50% said they were at a three on a scale of one to five in trusting data.

With 97% of the respondents saying there is some level of mistrust in data, it's worth thinking about what the 3% are getting right, Skal said.

"It's one thing to be able to bring it together, but it's another thing to be able to understand how time-series data is related to equipment, is related to documents, is related to the drawings" representing operations, he said. "I would say what that 3% is doing is recognizing that it's not just about connecting, it's about understanding and providing that data in an interactive, user-friendly way to their end-users who actually make decisions."

Of the executives who responded to the survey, 56% cited unaligned data scattered across their systems as a key challenge. Another 50% said they had no holistic view of their data, which made it difficult to gain insights or collaborate across teams. About one-third cited implementing data management systems at scale, the amount of time it takes to get the right data to the right people, and discrepancies between reported data and actual situations as challenges to managing data.

With those challenges in mind, around half of surveyed executives are prioritizing improving production output, reducing maintenance costs and reducing the risk of critical asset failures.

The data landscape is a mess, and "a new approach is needed."

—Ben Skal, *senior director of product marketing, Cognite*

They'll need data to do those things, and Cognite sees the unification of industrial data across the operation technology (OT), information technology (IT) and engineering landscapes as the way to deliver on those goals, Skal said. And generative artificial intelligence (AI) will play a role, he added.

In the field, putting together the pieces of the puzzle requires bringing context to data when a user accesses it. For example, a worker in the field spotting an anomaly with a piece of equipment can use a mobile phone to take a picture of that equipment's tag. A search engine powered by generative AI can return relevant information about the equipment, such as the maintenance history, the original equipment manufacturer's documentation on the equipment, troubleshooting recommendations and other data.

To combat the issue of generative AI's tendency to hallucinate, or deliver inaccurate information, Skal noted, responses include source materials to enable verification of information.

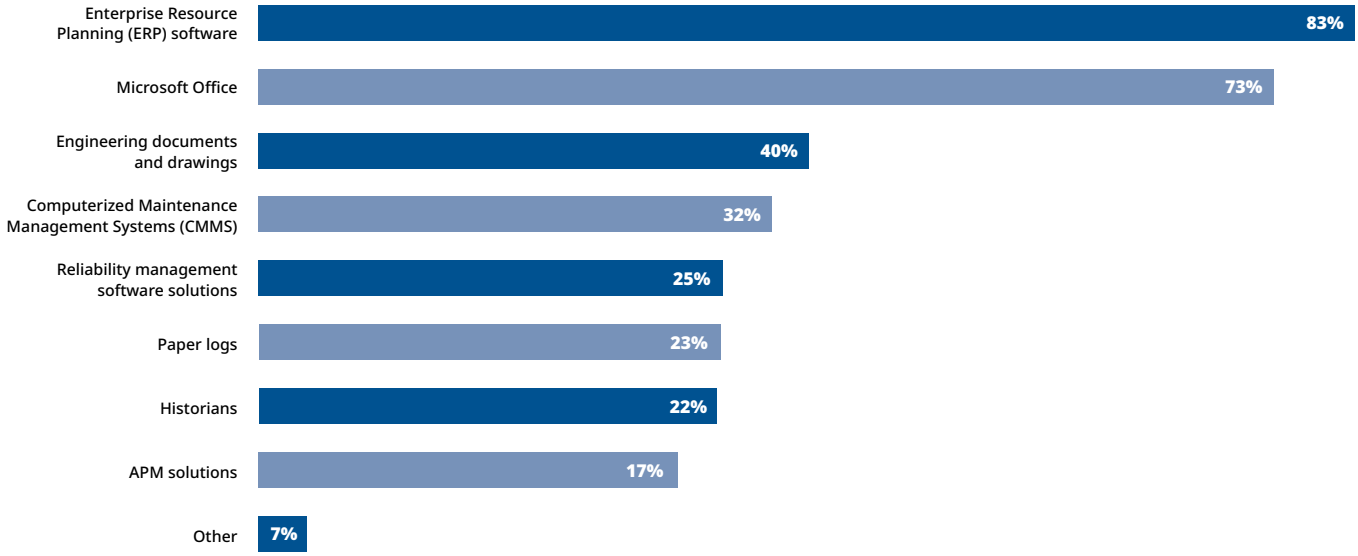
"We're not expecting people to trust generative AI results on their own," he said. "It's about creating that transparency for where those results came from."

A search service powered by generative AI in a connected worker app called InField is currently in beta test with an upstream oil and gas company and is expected to become widely available to the industry by the end of the year, Skal said.

Companies interested in progressing their digital journey should be liking data problems with business problems, he said. It can be tough to get buy-in to fund a data clean-up project when the company needs to improve production, he said. But approaching the business problem in a thoughtful way can contribute to cleaning up the data, he said.

"When you think about it like a step change in a journey, then all of a sudden, this idea of 'how do I start solving that industrial data problem' becomes a lot more manageable," Skal said. OGI

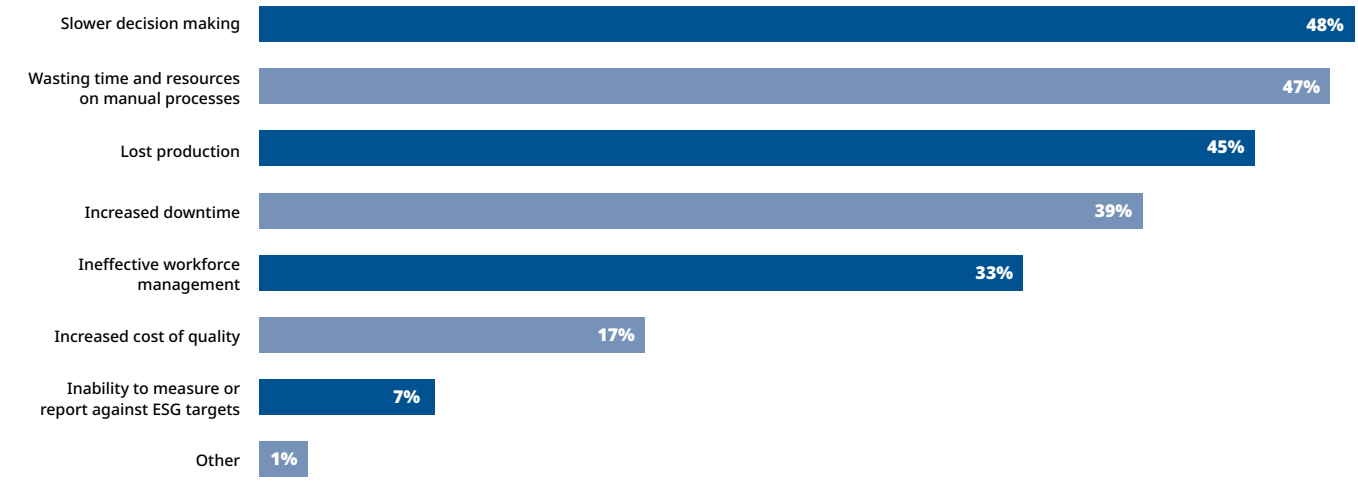
What sources drive decisions regarding your assets?



Source: Cognite

ERPs and Excel sheets are, by far, the main source for data for decision-making related to assets. These siloed systems lead to issues such as data duplication, prolonged manual data searches, and cumbersome collaboration across teams.

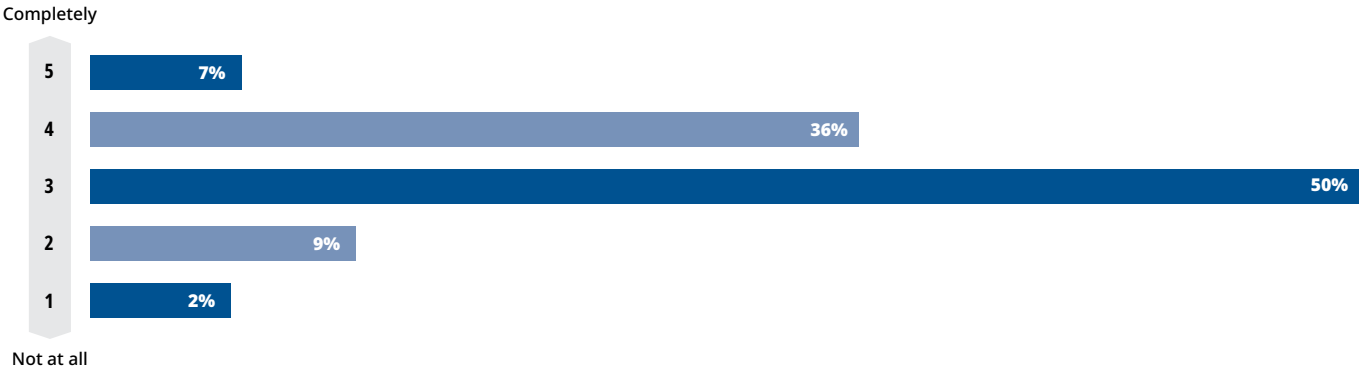
What are the key costs of lacking simple access to trusted data?



Source: Cognite

Asset-heavy industries are under pressure to increase production output, extend asset life and manage costs and risk. Existing efforts to improve with data-driven insights continues to fall short due to information silos, poor integrations and lack of scaling examples.

How much do you trust the data?



Source: Cognite

Only 3% of industry leaders surveyed fully trust their critical decision-making data.

'Smallest Number of Sales in History'

The Biden administration's proposed 2024-2029 National Outer Continental Shelf Oil and Gas Leasing Program triggers criticism from all sides.

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Future offshore leasing opportunities will be few and far between under the Biden administration's proposed 2024-2029 National Outer Continental Shelf (OCS) Oil and Gas Leasing Program.

In late September, the Department of the Interior (DOI) released the Proposed Final Program and Final Programmatic Environmental Impact Statement (EIS) for the next five-year leasing program, which contained only three lease sales—all in the Gulf of Mexico. Industry groups immediately expressed displeasure with the pared down offering, while environmentalists opposed any new lease sales.

The most recent version of the five-year leasing plan ties offshore wind lease sales with Gulf of Mexico oil and gas lease sales in 2025, 2027 and 2029.

2022's Inflation Reduction Act (IRA) stipulates that the Bureau of Ocean Energy Management (BOEM) can only issue a lease for offshore wind development if, in the previous year, the agency offered at least 60 million acres for oil and gas leasing on the OCS. Without federal oil and gas leasing, offshore wind is also hogtied.

Secretary of the Interior Deb Haaland said in a press release that the proposed final program "represents the smallest number of oil and gas lease sales in history."

The five-year OCS program proposed in July 2022 stated that between zero and 11 lease sales were possible. That plan was delayed and ultimately released the day after the previous five-year plan ended. The version proposed in July was met with industry concerns, culminating in an October 2022 call from industry leaders urging the Biden administration to quickly approve all 11 potential offshore lease sales due to concerns about energy security, reliability and affordability.

According to the DOI, more than 760,000 comments were made regarding the Proposed Program and Draft Programmatic EIS released in July 2022.

Industry outcry

In response to the unveiling of the final proposed OCS leasing program, API President and CEO Mike Sommers criticized the Biden administration's energy policies, saying they come

Source: BOEM

Under the final proposed 2024–2029 National Outer Continental Shelf (OCS) Oil and Gas Leasing Program, only three oil and gas lease sales will be held, all in the Gulf of Mexico; they are slated for 2025, 2027 and 2029.

at a time of "rampant" inflation in the country.

"This restrictive offshore leasing program is the latest tactic in a coordinated strategy to reduce energy production, ultimately weakening America's energy dominance, limiting consumers' access to affordable reliable energy and compromising our ability to lead on the global stage," he said in a press release. "For decades, we've strived for energy security and this administration keeps trying to give it away."

National Ocean Industries Association President Erik Milito called the proposed program an "utter failure" for the country in a press release and said the White House is ignoring energy reality while limiting U.S. energy production opportunities. He further called out the Biden administration for the delay in releasing the plan and how it plans to handle environmental analyses for the sales.

"The decision to postpone environmental analyses for individual lease sales needlessly compounds the erosion of long-term confidence and certainty in the Gulf of Mexico region. Environmental assessments for lease sales typically take one to two years to complete, which is precisely why they are conventionally carried out in tandem with leasing program development," he said. "Every prior administration, irrespective of party, followed this process in a way that enabled uninterrupted leasing activities. The choice to slow walk lease sales while the Interior Department embarks on environmental work is just setting the table for potential future delays, including from litigation by activist groups, and an offshore energy leasing cliff."

Miliot also expressed concern that limits on offshore development would result in increased reliance on energy imports from countries with higher emissions.

"This jeopardizes our energy security and economic prosperity and undermines our efforts to reduce emissions and combat climate change—goals purportedly championed by the current administration," he said.

Sen. Joe Manchin (D-W.Va.), chairman of the Senate Energy and Natural Resources Committee, also expressed concern about the proposed leasing plan while acknowledging that "three lease sales is more than the zero," a possibility that may have occurred without passage of the IRA.

"It's now clear without a shadow of a doubt that without the IRA, this administration would have ended federal oil and gas development completely," he said in a press release. "Granting the bare minimum of oil and gas leases will result in a minimum of renewables leases as well because the IRA tied the two together. You can't have one without the other."

Source of contention

Lease sales have been a source of contention during the Biden administration. In addition to allowing the 2017-2022 OCS Oil and Gas Leasing Program to close without having the next five-year leasing program in place, the last three sales included in the 2017-2022 plan—Gulf of Mexico Lease Sales 259 and 261 and the Cook Inlet Lease Sale 258—were canceled. The DOI cited a lack of interest in the Cook Inlet cancellation. Ultimately, leases were awarded on 259 and Cook Inlet.

Lease Sale 261 in the Gulf of Mexico also made recent headlines. It was originally slated for Sept. 27 to meet the IRA's Sept. 30 deadline for holding the sale and, following a legal scrap, the Fifth U.S. Circuit Court of Appeals in New Orleans ordered the sale to proceed. The BOEM will open bids for Lease Sale 261 on Nov. 8. OGJ

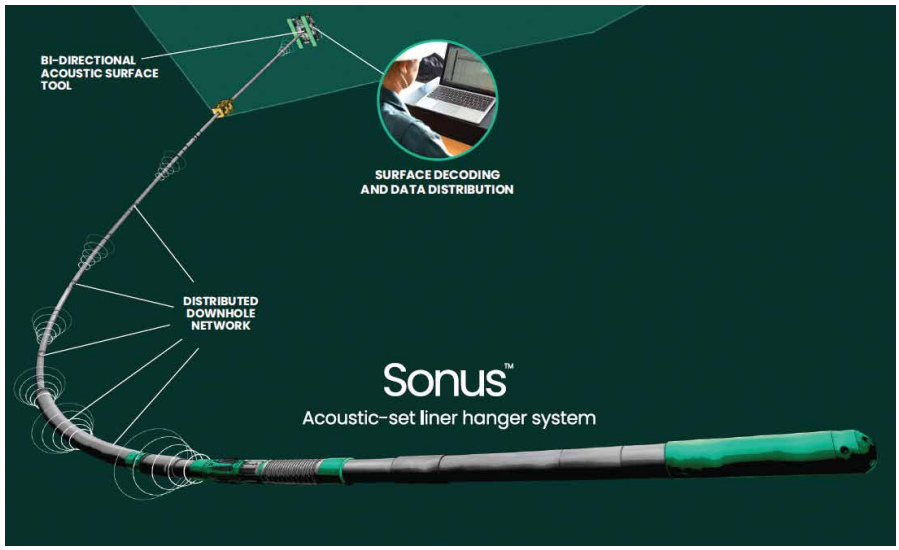
Tech Bytes

Baker Hughes Unveils Acoustic-set Liner Hanger System

Baker Hughes in September launched Sonus, the industry's first acoustic-set liner hanger system. By using Baker Hughes' XACT downhole acoustic telemetry platform, Sonus allows operators to selectively set and release from the liner hanger.

Liner hangers play a role in anchoring and suspending a liner within the previous casing string. They facilitate the cementing process, enabling well control during drilling or transitioning to the completion phase.

Traditional methods are set using a ball and seat mechanism, while XACT's applied acoustics technology enables real-time data transmission from previously inaccessible environments, regardless of fluid, flow, formation or depth.



Baker Hughes

Baker Hughes' Sonus, an acoustic-set liner hanger system

Unique Group Releases Subsea AI Chat Offering

Unique Group launched Aquila Subsea, a generative AI chat solution to provide instant responses to a range of subsea-related queries in September. The chat solution is intended to empower survey engineers and researchers to quickly understand manuals, troubleshoot issues and access critical information.

Aquila Subsea was developed in-house by Unique Group's Research and Development Team.

SLB, INEOS Energy Sign Subsurface Agreement

In September, SLB said it signed a subsurface technology partnership with INEOS Energy to collaborate and innovate subsurface technologies, including AI capabilities, to help it drive operational performance for continued growth, new acquisitions and carbon capture and storage (CCS).

Under the agreement, INEOS Energy will integrate the SLB Delfi digital platform into its oil and gas operations, especially subsurface, wells, transport and monitoring. Delfi will integrate into current assets and new acquisitions, a critical element of the company's emissions-reducing CCS strategy for a sustainable low carbon future.

Jereh Completes IntelliFrac Field Trial

Jereh has wrapped up the field trial of its IntelliFrac electric fracturing unit, the company said in September.

During the field trial, which started in May 2023 in U.S. shale, the IntelliFrac accumulated more than 1,200 operating hours. Jereh's control and data acquisition software provided real-time monitoring and precise control over the fracturing process, the company said.

The IntelliFrac can operate on gas turbine power generators and reciprocating gas engines.

TWMA Launches Drilling Waste Treatment Tech

TWMA has launched the latest evolution of its RotoMill technology, the company announced in September.

The latest version integrates TWMA's XLink remote monitoring software to deliver operational insights while automating the wellsite processing system, the company said.

The RotoMill 2.0 processes drilling waste at the wellsite to eliminate the need to transport drilling waste long distances for treatment, and it recovers oil, water and solids from drill cuttings, allowing the reuse and recycling of all materials from the drilling waste, the company said.

New Sensor Tech for Spill Monitoring

PhotonTec

PhotonTec and LDI Innovation are partnering to provide access to new sensor technology for remote oil spill monitoring.

PhotonTec announced in October it is partnering with LDI Innovation to provide North American customers access to LDI Innovation's LED-based fluorometric oil and fuel sensing technology.

Juha Saily, business development manager for PhotonTec, said the new sensors provide higher reliability and sensitivity without false alarms.

The sensors can detect "all types of hydrocarbons" to enable real-time detection of "oil and fuel spills on water and land where conventional sensors are often ineffective," Saily said.

The BlueHawk and TinyHawk fluorosensors can be used in environments including oil rigs, water bodies, industrial facilities, refineries, ports and more.

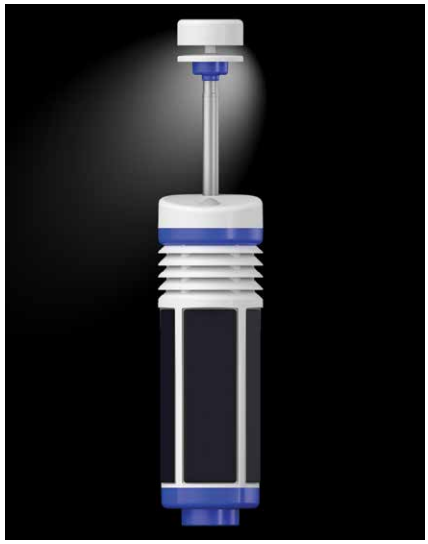
SLB Launches Methane Measurement Instrument

SLB's newest methane monitoring system uses IoT-enabled sensors to detect, locate and quantify emissions across oil and gas operations, the service company said in October.

The self-installed continuous monitoring system provides operators with leak detection sensitivity in a small, durable, plug-and-play solution, the company said. The technology, introduced by SLB's End-to-end Emissions Solutions (SEES) business, automates continuous methane monitoring to eliminate the need for manual data collection during site visits.

The "always on" instrument "widens the accessibility to continuous methane monitoring for the industry, providing producers with a practical pathway to achieve a more complete picture of their emissions profile," Kahina Abdeli-Galinier, SLB's emissions business director, said in a press release.

The device contains an integrated solar panel, wind measurement and methane sensor. The instrument can be self-installed in minutes, mounted on existing infrastructure. SLB said it can be deployed at "virtually zero cost" similar to a self-installed home security camera. The device enables operators to more economically scale up and quickly roll out continuous methane monitoring across their facilities, SLB said. OGJ



SLB

SLB's new methane monitoring device contains an integrated solar panel, wind measurement and methane sensor.

Halliburton Launches Host of New Tech

In September and early October, Halliburton introduced a host of new technologies, including the Intelevate platform for electrical submersible pump (ESP) monitoring, GuideStar for precise wellbore positioning, the BaraFLC Nano-1 wellbore sealant, the PulseStar service for high-speed streaming of downhole data, and the EquiFlow Density autonomous inflow control device (AICD).

• Halliburton called Intelevate a new data science driven platform to help operators design, build and operate end-to-end ESP monitoring solutions.

The Intelevate platform from Summit ESP, a Halliburton Service, integrates historical engineering and performance data with active operational information to provide a holistic view of an operator's ESP system. The service processes, analyzes and models production data with real-time visualization and reporting to develop a comprehensive production optimization plan, including remote changes and interventions, Halliburton said.

• The GuideStar service uses high-resolution sampling to provide continuous, definitive survey measurements for more precise wellbore positioning.

The service improves the understanding of the centerline wellbore positioning and reduces survey time, the company said.

"The GuideStar service's high-resolution sampling rate optimizes real-time drilling decisions and minimizes tortuosity throughout the wellbore," Jim Collins, vice president, Sperry Drilling, said in a press release. "This allows for smoother casing runs, and it facilitates bottom hole assembly fatigue and wear calculations to ensure quality and reliability."

• The new BaraFLC Nano-1 wellbore sealant is a nanocomposite suspension that boosts wellbore stability. The new sealant works with the company's existing conventional and high-performance water-based fluid systems to create a tighter, more secure seal that decreases fluid loss into the formation.

The new BaraFLC Nano-1 sealant uses nanoparticles to reduce interaction between filtrate and reactive shale formations, preventing pore pressure transmission. This helps strengthen wellbore integrity, which can extend drilling time and efficiency, the company said.

• The PulseStar service provides operators with consistent, high-speed streaming of downhole data, Halliburton said.

The automated mud-pulse telemetry system transfers high-resolution, real-time drilling and subsurface data at extended depth to provide more efficient and consistent well delivery, the company said.

It automatically adapts to environmental changes for optimal data rate and detection while artificial intelligence provides self-optimizing pulses to maintain high data quality across the reservoir and advanced signal processing allows downlink for two-way communication while drilling.

• The EquiFlow Density AICD addresses reservoir fluid uncertainties and allows the operator to enhance hydrocarbon recovery in wells where current autonomous technologies are limited. EquiFlow Density uses a density amplifier designed to differentiate reservoir fluids. It incorporates a fluid selector to magnify density forces by creating artificial gravity while making the device completely orientation neutral. The fluid selector opens or closes autonomously to restrict water without surface intervention. The tool reduces water influx, which is typically treated at the surface.

EquiFlow Density AICD produces and restricts downhole fluids using density, even when the viscosities are identical. This allows operators to optimize hydrocarbon production in difficult wells where current autonomous technologies are not effectively able to separate the water from the desired oil.

Executive: Williams a Natural Fit for CCS

Chad Zamarin discusses carbon capture and storage, NextGen Gas and permit reform.

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Chad Zamarin, executive vice president of corporate strategic development for The Williams Cos., spoke at Hart Energy's America's Natural Gas conference in September. After his presentation, he joined Hart Energy Editorial Director Jordan Blum to discuss the company's foray into carbon capture and storage, and the need for pipeline permit reform.

Jordan Blum: We were just talking about how Williams is getting more into carbon capture and storage (CCS), getting closer to those LNG hubs. Can you just elaborate on what Williams is doing in the carbon capture space and how it's such an integral role for midstream to fill?

Chad Zamarin: We have a great asset base in the Haynesville Basin. We gather over 5 Bcf/d of natural gas in the Haynesville, and we are targeting that production, or a large part of it, to provide gas for LNG exports along the Gulf Coast. And we're in the process of developing an extension of our gathering system to move about 2 Bcf/d of gas from the Haynesville to the LNG markets. Alongside that project, we're developing the capability to capture CO_2 in the Haynesville Basin, put that CO_2 in the same pipeline that we move natural gas through, move the CO_2 down to the southern end of the pipeline, remove the CO_2, put the CO_2 permanently underground, and move the natural gas to LNG terminals so that we can export it to friends and allies around the world. And so, we think it's a great example of how the existing infrastructure is really critical to scale up the next generation of energy technologies like carbon capture and sequestration.

JB: So, utilizing those existing facilities, as well. Is this just the beginning of Williams getting more and more into CCS and other projects?

CZ: If you think about CO_2, we know how to move products through pipelines. We know how to store products underground. We store over 3 Tcf of natural gas underground every year, and so we know how to move these products. For CO_2, it's really just the challenge of: Can you aggregate enough CO_2 to support the infrastructure needed to capture the CO_2 and move it through pipelines, and ultimately inject it and store it permanently underground? We're looking across our footprint at where can we bring our capabilities. Again, we're very good at large, complex infrastructure solutions. We're very focused on natural gas, but our services [are] providing environmental and economic benefits. So, how can we leverage that capability to do more? CCUS is something that we're focused on.

JB: You mentioned the Louisiana Energy Gateway and NextGen Gas. Can you explain why low carbon natural gas is so important to fuel that LNG export growth?

CZ: We call it NextGen Gas, and that really is a term that refers to the wellhead to water and the wellhead to burner tip value chain of the natural gas business. We want to make sure that we can shine a spotlight on how we can manage emissions through that value chain so that we can really focus on the benefits of natural gas around the world. I mean, natural gas is an incredibly powerful decarbonization tool. We've proven that here in the United States. Over the last 15 years, it's been the single largest contributor of driving down emissions here in the U.S. primarily through displacing coal for power generation. But the fact of the matter is the world will burn more coal this year than any year in the history of the planet. So, we've got to make sure that we can address concerns with the natural gas value chain, demonstrate that we have very low well-managed emissions through that value chain so that we can really focus on the massive benefits that we can drive with natural gas: providing

Construction of the Mountain Valley Pipeline near Craigsville, W. Va. After eight years, the interstate natural gas pipeline was approved in the summer of 2023.

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> ***"We have a great wind resource in Texas and Oklahoma, but as the wind slows down, the only reason our energy system continues to work reliably is because natural gas consumption increases to fill that void."***
>
> —**Chad Zamarin,** *executive vice president of corporate strategic development, The Williams Cos.*

energy, affordability, energy reliability and security. And really importantly, displacing higher carbon emitting fuels like foreign coal and driving down emissions, like we did in the United States. We need to do that all around the world.

JB: With this next wave of LNG export growth in the U.S., clearly a lot more gas infrastructure is going to be needed. Can you talk about the needs and challenges that are going to go into getting all that done?

CZ: We are ourselves investing in new technologies. We believe in the all-of-the-above energy ecosystem. So solar and wind are going to play important parts in the energy economy of the future, and electrification is going to play an important part. But as you increase the penetration of electrification and solar and wind, you also increase the intermittency of the energy that we depend on. The only way that those systems will continue to work reliably is to have natural gas as that intermittent backup that can provide the resource we need when the sun sets, when the wind slows down. That's what happens today in Texas. It happens in Oklahoma. We have a great wind resource in Texas and Oklahoma, but as the wind slows down, the only reason our energy system continues to work reliably is because natural gas consumption increases to fill that void.

And so, as power demand continues to increase, electrification increases, LNG demand increases, we've got to have a robust build-out of natural gas infrastructure to maintain reliability. And it is a challenge. I mean, we just saw a major pipeline get approved in the United States, the Mountain Valley Pipeline. It took eight years. It took way more investment than was expected. It took an act of Congress. It took the Supreme Court of the United States weighing in to make that project go. We can't have that be the process for getting infrastructure built in the United States. We've got to get back to building if we want to unleash the benefits of natural gas, both here at home and on the global stage. We've got to address permitting reform and be able to build pipelines and infrastructure to bring it to market.

JB: When you're talking about an act of Congress, usually you're not speaking literally.

CZ: This is literally. It took an act of Congress and so we've got to fix our permitting process. OGJ

▸ **ENERGY** TRANSITION

Shell Aims to 'Decarbonize Profitably' Its New Energies, US CEO Says

Energy companies such as Shell are under pressure to provide affordable energy and lower emissions while increasing shareholder returns.

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Shell's strategy has not changed as the company remains focused on delivering more value with less emissions, Shell New Energies US CEO Glenn Wright said in October, addressing unease about its position in the energy transition.

"In order for that to be a reality, it's imperative that what we do is both economically viable, socially acceptable and environmentally sustainable," Wright said during an event co-hosted by the Baker Institute Center for Energy Studies and Baker Botts LLC in Houston. "Those are the three legs of the stool. If any one of those legs fails, the solution fails. So, our aim … is to continue our work and to decarbonize profitably."

The comments were delivered in response to concerns that the supermajor was scaling back investments in renewable energy. Focused on increasing returns, Shell said it will hold oil output steady through 2030, having hit a lowered oil production target early through divestments.

Shell, which is targeting net-zero emissions by 2050, continues progress on providing cleaner energy solutions as energy demand rises, Wright said, pointing out how the company is repurposing the footprint of its energy and chemical parks. Shell's low-carbon investment plans include investing between $10 billion and $15 billion through 2025 in areas such as biofuels, hydrogen, electric vehicle charging and carbon capture and storage.

"In my business, we will continue to invest in power opportunities, but we will do so in areas and spaces where it makes economic sense to do so and where we are incentivized to do so," Wright said.

Energy companies, including Shell, are under pressure to not only provide affordable energy safely and to lower emissions, but also increase returns for the shareholder. However, inflationary pressure and supply chain issues have posed obstacles, especially for offshore wind.

While the company has pulled out of some wind projects, including two wind projects offshore Ireland, it has powered forward with other investments. These have included the acquisitions of renewable natural gas company Nature Energy and Sprng Energy, a solar and wind power supplier, as well as starting construction on one of Europe's largest renewable hydrogen plants.

The renewables investment comes alongside continued oil and gas production.

Protecting the core

Determining where to invest capital is probably the biggest question in boardrooms today, said Michael LaMotte, senior managing director for Guggenheim Securities. Speaking about E&Ps' limited capital investment and moves to pay down debt and pay dividends, he said companies in the industry should protect the core first.

"Identify that and focus on it because that's where all that cash comes from at the end of the day," said LaMotte, who spoke on a separate panel. "The return on your capital is going to be enhanced if you improve the efficiency of the operations in and around that core."

It is also important to think about creating long-term value. Despite views on the pace of the transition, the "transition is here and we are in it." He spoke of the need for companies to leverage core competencies into new energies.

Many are doing just that. Think Occidental


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"We will continue to invest in power opportunities, but we will do so in areas and spaces where it makes economic sense to do so and where we are incentivized to do so."

—**Glenn Wright**, ***CEO, Shell New Energies US***

Petroleum Corp. in the carbon management space.

"[It's] really important how to think about taking what feels like a liability, what feels like a compliance cost to the business, and flip it on its head and say, 'OK, this is actually a new business opportunity,'" LaMotte said, acknowledging the core is not leaving anytime some.

Sharing similar sentiments as Wright, LaMotte added that investments must be economic with focus on obligations to shareholders to generate a return.

"But it also has to be cleaner. It's striking that balance" between protecting the core and focusing on something new and cleaner to leverage competitive advantages.

By 2050, the world's population is expected to exceed 9 billion, nearly 2 billion more people than today, Wright said. Energy demand will likely double.

"We must find ways to profitably decarbonize. I cannot emphasize that enough. We aim to decarbonize, but we must do so profitably," Wright said. "And we must work closely with others in new ways because we can only reach net zero if society reaches it, too."

Pumping up power

The most profound change and fastest growth will happen in the power sector, according to Wright. Shell deepened its position in the renewable power space with its 2021 acquisition of Savion, a large utility-scale solar and battery energy storage developer, and the 2022 launch of its residential retail business in Texas. The company manages more than 8 gigawatts of power generation across North America.

"Electricity is far and away the easiest energy source to decarbonize. Every energy consuming sector, which is everybody from road transport to home and commercial heating and cooling, to manufacturing and major industrial processes, is actively pursuing electrification in some fashion," Wright said.

Like others in energy, he says reform is needed—particularly regarding access to interconnections and transmission reform—as more renewable energy lines up to flow to the grid.

"FERC Order 2023 starts to help us in this regard.... How this will play out will continue to unfold, but it will encourage and allow quicker access to bring renewables online," Wright said. "We also need to ensure that the market design encourages resource adequacy. We can encourage, certainly, the development of renewables. What's important is that these assets are located in the right places at the right time."

Power grids in parts of the U.S.—including the Electric Reliability Council of Texas—experienced stress this summer amid high demand and high temperatures, which prompted some conservation alerts.

"As we see more and more renewables come onstream, we need more and more resources that can provide ancillary services that can help firm those renewables and ensure that the grid continues to operate," Wright said. OGJ

EY: Three Decarbonization Priorities for Oil and Gas

Current dynamics make the timing right for oil and gas companies to reinvest, EY experts say.

PAT JELINEK AND SWAPNIL BHADAURIA
ERNST & YOUNG

Pat Jelinek is a principal at Ernst & Young in Houston and serves as the EY Americas Oil and Gas Leader. Swapnil Bhadauria is a senior manager at Ernst & Young and serves as the EY Americas Oil and Gas Digital Operations Leader. Sayantan Chatterjee of Ernst & Young contributied to this article.

While progress around energy transition continues to accelerate, demand for reliable, affordable energy services and products persists around the world. It's become clear that the hydrocarbons with the strongest economics and lowest carbon emissions, along with access to distribution, will have the clearest path to market.

This dynamic is making the time right for the oil and gas (O&G) sector to use record profits to reinvest. In doing so, there are three critical priorities on which O&G companies need to focus: develop strategies to reliably measure, reduce and report carbon emissions; decarbonize field operations; and embed circularity and low-carbon fuels in energy products.

Carbon emissions management: reliably measure, reduce and report

To reach society's decarbonization ambitions, cleaner energy is necessary and that means managing emissions and reducing the carbon intensity throughout the product lifecycle. However, companies first need to have access to reliable data and understand baseline metrics. In a recent EY survey, energy executives pointed to multiple challenges when it comes to carbon emissions management:

- Limited access to high-quality data, including sensors to measure fugitive emissions
- Trade-offs between profitability, operational procedures and regulatory requirements to reduce emissions
- Disconnected enterprise-wide functions or processes to collect and harmonize emissions data
- Lack of standardization for global reporting requirements

Recognizing these challenges, leading companies are putting new systems in place that can measure, monitor and report key data points to inform strategic decision-making and ultimately meet greater market demands for more, cleaner energy. The first step is to identify data requirements at a more granular level to improve data capture and accuracy. For example, this may include collecting data from legacy systems to estimate accurate carbon emissions and intensity, as well as investigating if investments already made in sensor technology and data analytics are being harnessed to their full potential. In some instances, additional investments in sensors or analytics aren't required. It's a matter of putting the people and processes in place to reap the benefits of those technologies.

Moreover, once accurate data is captured, leadership teams need to empower their workforce to leverage it in their everyday duties, no matter where they sit in the organization—out in the field, commercial or back-office operations—as this will be pivotal in reducing emissions year over year.

Decarbonization of field operations: lowering the net-carbon footprint

Decarbonization is front and center for asset-operations teams as companies work toward net-zero emissions goals. This is driving operators to match field emission goals to corporate emission goals, making it necessary to implement and execute a roadmap to lower the carbon footprint of field operations. While these efforts have been ongoing for many years, the execution is not simple and often requires multidisciplinary stakeholder engagement across the organization to find the right balance of economics and emissions. There has been an uptick in momentum for field operators to redesign, optimize and innovate in three specific areas:

- Equipment-level and production optimization across the network of assets to reduce emissions: led by field operations and maintenance, with engineering support, as part of routine field management;
- Electrification and use of renewables to power production: led by capital projects and facilities engineering to help meet asset goals; and
- Using emission byproducts to produce energy or energy products, e.g., using CO_2 for EOR in carbon capture utilization and storage (CCUS) or using CO_2 to produce synthetic fuels and plastics): led by asset development teams and field engineering teams

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Low carbon in design: embedding circularity and renewables, as well as lower carbon molecules at scale, in energy products

Embracing circularity and fuel alternatives in product design can lead to improved margins as commercial customers are increasingly favoring, and are ready to pay a premium for, more sustainable products. Technology can help companies create transparency, expedite the process of determining circularity and automate sustainability certification. O&G companies can look for guidance from the chemical industry, which is already playing a pivotal role in the circular transition by investing in new product technology, value chain partnerships, circular business models and waste management infrastructure.

Led by portfolio development teams, adding low-carbon fuels to a company's product mix or portfolio can help create new revenue streams with products such as H2, sustainable aviation fuels and biofuels. O&G companies that can work collaboratively to develop circular strategy around these efforts can find new ways to reduce their carbon footprint. This may include implementing measures to achieve goals, and continuously monitoring progress to identify operational efficiencies or roadblocks in that journey.

Putting people at the center within the organization and across ecosystems

Major industry events over the past decades have informed and matured safety work practices and have elevated safety to be a No. 1 priority today. Putting people at the center of change is what has made this industry successful in the past. Organizations that keep people at the center of their decarbonization journey will be able to drive adoption, accelerate innovation and differentiate in the market with a competitive advantage.

Every organization will have unique challenges. There isn't a one-size-fits-all playbook to address every concern. Two common roadblocks that we often see are building a company culture and upskilling employees around decarbonization. O&G management teams need to shepherd in a fundamental culture change and help their workforces understand and embrace these priorities. Organizations need multifunctional teams set up with an innovation mindset and wide-ranging skills—domain expertise, data, business intelligence and artificial intelligence—to tackle complex problems as the industry navigates the energy transition via decarbonization and digitalization.

In addition to tackling these roadblocks, organizations have the opportunity to leverage the broader partner ecosystem and innovation that is already happening at a much faster pace than before. Vendors are no longer just service providers; they want to operate like partners to jointly accelerate decarbonization from the onset of the journey. Industry leaders are coming together across traditional organizational barriers and disciplines with a commitment to solving decarbonization for the energy industry. OGJ

Where Old Energy Law Meets New

What happens when energy transition projects collide with oil and gas law, and what to expect in the future.

MEGHAN McELVY
CONTRIBUTING EDITOR

Meghan McElvy is a partner at Bradley Arant Boult Cummings LLP and serves as a co-chair of the firm's Energy practice group.

Over a century of oil and gas development in the U.S., a robust body of law has developed covering virtually every aspect of exploration and production and interpreting virtually every provision in oil and gas leases, joint operating agreements and innumerable industry contracts.

For decades, oil and gas case law and contracts were based on vertical drilling as the primary method of extraction. With that came certain notions of drainage from drilling on adjacent tracts and subsurface trespass that assumed oil and gas migrated freely beneath the surface and that whomever owned the soil, owned it down to the center of the earth.

Just as skyscrapers and airplanes forced a modernization (and moderation) of the notion that landowners owned the soil up to the heavens—such that high altitude travel and blockage of sunlight generally are not trespasses—so, too, did the rise of horizontal drilling and hydraulic fracturing. The tight shale formations led courts to reconsider whether there is actually drainage from fracked horizontal wellbores and whether injection wells, which may allow waste fluid or CO_2 to migrate deep beneath the surface and even beneath producing formations, actually violate property rights—and, if so, whose?

Similarly, today, the transition from fossil fuels to lower carbon sources of energy is causing many companies in the oil and gas sector to undergo even greater and more complex changes. For starters, energy resources are now being pursued above and below ground. The International Energy Agency predicts in its World Energy Outlook that emissions from oil, gas and solid fuel production will peak sometime in the next decade, while more renewable resources such as wind and solar come online.

Adding to that growing complexity is the fact that new technologies are emerging (either as an energy resource or as a means to remove/reduce CO_2 emissions), including LNG, geothermal wells, biofuels, hydrogen, carbon capture utilization and sequestration (CCUS), and battery storage technologies, each with their own unique clean energy and commercialization profiles.

Finally, recent policy responses to climate change—the Inflation Reduction Act being a prime example—mean that producers engaging in energy transition projects will not only need to comply with environmental regulations, but also ensure compliance with requirements for federal or state tax credits, which can be critical to their commercial viability.

All of these factors raise the question of how historical oil and gas law principles may be applied to energy transition developments and where new ground may need to be tread.

There already are several cases decided or currently percolating through U.S. courts that address examples of where traditional oil and gas law concepts are applicable to energy transition projects.

For solar, one Texas appellate court in 2020 resolved the competing interests of a large-scale solar facility against the owners of the mineral interests on the land where the solar array was located.

The mineral owners claimed the existing solar panels impaired their ability to drill for any oil and gas–an alleged violation of Texas' accommodation doctrine, which requires surface owners and mineral owners to reasonably accommodate each other in utilizing the surface for their competing estates. Relying on the fact that the mineral owners had no current plans to develop the minerals, the court held that the solar facility had not sufficiently encroached on the mineral owners' right to access the minerals to require an accommodation. Although the solar facility won this particular case, it leaves open the possibility for liability where the mineral estate owner has taken steps toward mineral development that have been hindered or blocked by development on the surface for renewable energy purposes.

With regard to CCUS projects, applications for which are rising as a result of the federal 45Q tax credits, some states, such as Wyoming and North Dakota, have passed laws dictating that the surface owner owns the "pore space" in all strata beneath the surface, including where injected CO_2 may be stored.

Other states, however, have grappled with the question of pore space ownership through the courts. In Texas, courts have not definitively decided the issue, although a majority of decisions appear to recognize that the surface

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> ***"Whether the agreements concern fossil fuel or renewable energy resources should not in theory alter the manner in which commercial disputes are decided."***
>
> —**Meghan McElvy,** ***partner, Bradley Arant Cummings LLP***

owner owns the subsurface, including geological structures beneath the surface such as salt domes, which may be attractive for CO_2 injection and storage.

Given that CCUS injection wells are more efficient and beneficial when located near heavy CO_2 emitting sources (thus minimizing transportation costs and risks), another area where conflict may arise is interference by CCUS wells with existing wells or formations.

Even cryptocurrency mining impacts oil and gas. A lawsuit recently filed in Colorado questions whether cryptomining activities can carry an oil and gas lease past its primary term—something that usually requires production in paying (or commercial) quantities.

While these are just a few examples of how traditional oil and gas law concepts may be grafted onto disputes involving new technologies, there are undoubtedly issues that will remain the same.

Whether the energy resource is "old" (oil, gas or coal) or "new" (wind, solar or geothermal), leases between owners of the surface or mineral estates and the energy producer will remain a necessary part of how development is accomplished on both public and private lands.

While renewable leases have some key differences with power purchase or connection agreements with grid operators, many provisions are essentially the same: a signing bonus, a term, royalties or some other measure of payment, and reclamation obligations once development has concluded. With those inevitably come age-old disputes over termination, the proper deduction (or not) of post-production costs from royalties, and liability for the plugging (or removal) and abandonment of production facilities.

One of the benefits of the reasonably prudent operator standard is its flexibility and adaptability to a variety of production activities, which should give it lasting impact even when applied to renewable energy projects.

Most courts construe oil and gas agreements according to their terms, without adding language that the parties themselves did not include. Whether the agreements concern fossil fuel or renewable energy resources should not in theory alter the manner in which commercial disputes are decided.

It is impossible to imagine every new scenario, but existing oil and gas law and contractual interpretation principles seem flexible enough to accommodate cleaner energy technologies, and still carry the oil and gas sector into the future. OGJ

Romito: Shhh ... 'Silent Compromise' In Progress

DAN ROMITO
PICKERING ENERGY PARTNERS

Dan Romito is a consulting partner at Pickering Energy Partners focusing on quantitative ESG strategy and implementation.

The laws of mathematics, supply and demand always trump popular trends and ideological zeal. One can wish for a desired paradigm, but history teaches us that market forces will always prevail.

This distinctly applies to the evolution we are observing in the global energy markets. The data show that the U.S. consumed approximately 32 Tcf of natural gas in 2022. While the sheer magnitude of that figure initially appears immense, keep in mind that CO_2 emissions in the U.S. between 2007 and 2022 decreased by roughly 18%. It is also worth noting that annual U.S. GDP, on average, increased about 2.7% per year during the same time frame.

Natural gas consumption within the European Union was significantly lower than in the U.S. in 2022. Twenty-seven countries within the EU consumed approximately 412 Bcm in 2022, but the Eurozone's GDP is almost half of the U.S. GDP ($15 trillion versus $28 trillion). Interestingly, the U.S. produced 980 Bcm of natural gas in 2022, while Europe imported roughly 85% of its natural gas. Moreover, Russian natural gas accounted for about a quarter of European natural gas imports. Since the 2008 financial crisis, Europe's GDP grew 1.6% yearly, while annual CO_2 emissions declined by nearly 25%.

The data is clear: Western economies have cracked the decoupling code. The U.S. and Europe have successfully figured out how to significantly lower their emissions profiles without sacrificing economic output. It is essential to acknowledge that the increased use of natural gas (which comprises about 33% of the energy mix in the U.S. and about 20% in Europe) is one of the most influential variables driving this trend.

The EU recently voted to designate natural gas as "green" and "sustainable." Natural gas is not only a fossil fuel but is composed of about 95% methane. It begs the question—why would the EU suddenly redesignate a methane-based fossil fuel as "green" when it is simultaneously implementing policies and regulations intended to penalize, if not eliminate, fossil fuels?

The answer is straightforward—the long-term economic health in Western economies increasingly relies on natural gas.

With these goalpost adjustments, the cynicism generated within the industry is more than understandable. Fossil fuel divestment proponents focus too much on aspirational goals rather than critical empirical and economic data. Whether those setting the divestment agenda like it or not, there is a distinct correlation between GDP expansion and energy consumption.

Investors and governments already show evidence of instituting a quiet compromise, i.e., balancing economic truths with ongoing ESG-related pressures. I foresee more pragmatic energy agendas emerging globally as stakeholders realize how geopolitics, population trends and socio-economic dynamics adversely impact local economies.

At the end of the day, it is all about the data. Parties who continue to double down on the divestment of fossil fuel-based assets are at threat of losing money and face. Quantitative analysis of the current economy and non-fundamental trends will objectively showcase that Western economies, led by the U.S., are leading global decarbonization efforts.

Herein lies the foundational tenet of what we are beginning to unofficially call "The Silent Compromise." The capital markets are opening their arms once again to hydrocarbon businesses. However, quality long-term capital rewarded to the energy space will be contingent upon showcasing positive non-fundamental trends for material ESG-related drivers of the business. Showcasing trends is a function of self-reporting material quantifiable data points that validate best-in-class characteristics.

The energy sector must improve its external quantitative messaging to provide investors with the evidence required to justify a specific investment. Empirically, the data already indicates that the U.S. displays a global best-in-class ESG profile. To win quality capital moving forward, corporate management teams must objectively demonstrate how their strategy and performance are accretive to this best-in-class resume.

Other ESG-related goalposts will likely continue to shift as market forces demand it, implying that adequate preparation is critical. Capital will be reallocated to the hydrocarbon businesses because economic law will facilitate viable and attractive long-term alpha.

However, this alteration comes with an explicit asterisk. Namely, financially performing companies worthy of valuation premium must also proactively provide quantitative evidence that they belong in the upper quartile of popular ESG rankings. Future investor diligence will require objective proof that an investment's material ESG profile does not lag peers and appropriate benchmarks. This effort may feel painful now, however, outlooks suggest that non-fundamental reporting is due to increase in both volume and sophistication. Therefore, it is wise for companies to boost their data collection game. OGI

Transition in Focus

GEOTHERMAL

Fervo Breaks Ground for Geothermal Drilling Campaign in Utah

Fervo Energy

Fervo Energy's Cape Station geothermal project is located in Beaver County, Utah.

Geothermal technology company Fervo Energy has kicked off an exploration drilling campaign, ceremoniously breaking ground at its Cape Station project in Beaver County, Utah.

The geothermal company said it aims to deliver 400 megawatts (MW) of 24/7 carbon-free electricity from the project, bringing power to the grid in 2026 and fully scaling production in 2028.

Researchers estimate southwest Utah has more than 10 gigawatts (GW) of high-quality geothermal reserves, according to Fervo. The state has been the site of research carried out over the last six years by the U.S. Department of Energy's Frontier Observatory for Research in Geothermal Energy (FORGE).

Earlier this year, Fervo said the company proved the commercial viability of its drilling technology—which uses oil and gas horizontal drilling techniques—to capture geothermal energy. Utilizing multistage, plug-and-perforate stimulation treatment design with proppant to improve the permeability of horizontal wells, the 30-day well test resulted in an enhanced geothermal system (EGS) record-setting flow rate of 63 liters per second, which made way for a record EGS output of 3.5 MW of produced electricity, the company said.

HYDROGEN

Inpex, Partners Unveil Low-carbon Ammonia Project

Inpex Corp., Air Liquide, LSB Industries and Vopak Moda Houston have teamed up on a low-carbon ammonia production export project on the Houston Ship Channel, according to a news release.

The companies aim to produce more than 1.1 million tonnes per annum of ammonia by year-end 2027, if the project is approved.

Air Liquide and Inpex would provide low-carbon hydrogen for the project, while LSB and Inpex would collaborate on producing the low-carbon ammonia as well as selling it and finalizing offtake agreements, according to the release. Vopak Moda operates ammonia storage and infrastructure from its Very Large Gas Carrier at the Houston Ship Channel.

Mitsubishi Power Installs 5.5-MW Electrolyzer in Japan

Mitsubishi Power

An alkaline water electrolyzer cell stack manufactured by HydrogenPro AS

Mitsubishi Power has permanently installed a 5.5-MW single stack pressurized alkaline electrolyzer at the Takasago Hydrogen Park in Japan for long-term validation, the company said.

The two-phase validation process started at the Herøya Industrial Park in Norway, where a unit and short-term validation ended in a 96-hour baseload run of safe and reliable operation, Mitsubishi said. The second long-term validation began with the permanent installation at Takasago.

Plans are to use the electrolyzer design to produce green hydrogen at the Advanced Clean Energy Storage (ACES Delta) project, which is being jointly developed in Utah by Chevron and Mitsubishi Power Americas. Equipment is scheduled to begin arriving in fall 2023 to produce green hydrogen and store it in two large salt caverns until it is needed for dispatch back to the grid.

RNG

BP's Archaea Energy Brings RNG Facility Online in Indiana

BP said it has brought online a renewable natural gas (RNG) plant that converts landfill gas, marking the company's first RNG plant startup since its $4.1 billion acquisition of Archaea Energy in 2022.

Located in Medora, Ind., next to a landfill owned by Rumpke Waste and Recycling, the plant is capable of processing 3,200 cu. ft of landfill gas per minute into RNG. That's enough gas to heat more than 13,000 homes annually, BP said.

Gas captured from decomposing waste at the landfill can be transformed into electricity, heat or RNG. The facility's standardized modular design enables plants to be built on skids with interchangeable parts and quicker than custom built plants, BP said in a news release.

The Medora plant startup comes as BP aims to increase its biogas volumes by about six times to approximately 70,000 boe/d by 2030. The company has identified bioenergy as one of five strategic transition growth engines expected to help deliver about $2 billion EBITDA in 2025 and more than $4 billion in 2030.

SOLAR

Dominion Energy Proposes Developing 12 Solar Projects in Virginia

Utility company Dominion Energy has proposed developing a dozen solar projects in Virginia, packing enough energy to power nearly 200,000 homes, in a move that would boost its solar output in the state to more than 4.6 GW.

The company said it made the request to bring online nearly 800 MW in solar energy as part of its annual clean energy filing with the Virginia State Corporation Commission (SCC).

Six of Dominion's proposed solar projects would be owned or acquired by the company. These include projects ranging in size from 3 MW to 127 MW in the Virginia counties of Brunswick, Hanover, Henry, Pittsylvania, Powhatan and Richmond, according to the news release. The proposal also includes 13 power purchase agreements.

Dominion said the projects, if approved by the SCC and necessary permits are granted, will support more than 1,600 jobs and generate more than $570 million in economic benefits across Virginia. Construction would be complete between 2024 and 2026, adding about $1.54 to the average residential customer's monthly bill.

Consumer Energy to Transform Former Coal Plant into Solar Site

Michigan-based utility Consumers Energy plans to build an 85-MW solar array at its shuttered Karn coal plants in Michigan's Bay region, the company said.

The announcement, which follows the June closure of the Karn 1 and 2 coal plants, comes as the company moves to shut down all of its coal plants by 2025 and scale up renewable projects as part of its Clean Energy Plan.

The company said it is aims to have the solar project operating by 2026. The project is expected to provide enough energy to power about 20,000, Consumers Energy said.

National Grid Renewables Powers Up Yellowbud Solar

National Grid Renewables

National Grid Renewables' Amazon Solar Farm Ohio—Yellowbud is located in the Ohio counties of Ross and Pickaway.

Operations have begun at the 274-MW Yellowbud solar project in Ohio, National Grid Renewables said, providing renewable energy to retail giant Amazon as part of a power purchase agreement.

The solar farm is estimated to offset 370,000 metric tons of CO_2 emissions per year, which National Grid Renewables said is equivalent to removing about 55,000 cars from roads for a year.

Located in the Ohio counties of Ross and Pickaway, the solar farm will also move Amazon closer to its goal of net-zero carbon emissions by 2040.

Yellowbud is expected to generate an estimated $90 million in direct economic impact during its first 20 years of operations, National Grid Renewables said.

Sunnova Energy Lands $3B DOE Partial Loan Guarantee

The DOE's Loan Programs Office closed on a $3 billion partial loan guarantee for Houston-based Sunnova Energy International's Project Hestia, which aims to give disadvantaged homeowners and communities more access to clean power.

The loan equates to a 90% guarantee of up to $3.3 billion of term loans, Sunnova said in a news release.

Through the 568-megawatt (MW) capacity Project Hestia, Sunnova will make available rooftop solar, battery storage and virtual power plant (VPP)-ready software available during the next 25 years. The smart software, app and portal aims to not only lower emissions but also "enhance the informed use of load controllers and smart appliances, and support grid stability by giving consumers near real-time insight into their residential energy system and quantifying the location-specific emissions impact of changes in consumer behavior," Sunnova said.

As part of the project, loans for clean energy systems for between 75,000 and 115,000 U.S. homeowners will be available, the DOE said. The project could avoid an estimated 7.1 million tonnes of CO_2, roughly equivalent to eliminating such emissions from 1.5 million vehicles.

Sunnova expects the loan guarantee agreement to "support over an estimated $5 billion in Sunnova loan originations, reduce the company's weighted average cost of capital, and generate interest savings."

Plans are to utilize it in fourth-quarter 2023 for Hestia 1.

BP Starts Construction of Texas Peacock Solar Project

BP began construction of its 187-MW direct current Peacock Solar Project just north of Corpus Christi in San Patricio County, Texas, BP said in a press release. The project is part of the company's plans to invest in and build renewable energy capacity of 50 GW by 2030.

The renewable electricity generated from the project—enough to power the equivalent of 34,000 homes—will be sold under a long-term power purchase agreement to Gulf Coast Growth Ventures, a joint venture between Exxon Mobil and SABIC.

Lightsource BP, BP's 50:50 joint venture partner, is developing and managing the construction of Peacock on behalf of BP. PCL Construction, the main EPC contractor for the project, will install First Solar low-carbon solar panels and GameChanger Solar trackers.

WIND

Ørsted Cranks Up 200-MW Wind Farm in Kansas

The 200-MW Sunflower Wind farm has initiated operations in Marion County, Kan., Ørsted said, bringing to 13 the company's operational wind farm count in the U.S.

The wind farm has the capacity to power more than 70,000 homes.

In connection with the project, Ørsted said it also "pioneered a landmark supply chain decarbonization effort to deliver renewable energy access and bundled renewable energy credits from Sunflower Wind to nine companies."

Ørsted, working with Schneider Electric, said it entered power purchase agreements with Amcor, PepsiCo, Stryker, Citizens and Walmart's Project Gigaton cohort, which includes Amy's Kitchen, Great Lakes Cheese, The J.M. Smucker Co., Levi Strauss & Co. and Valvoline Global Operations. OGI

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10:30 AM - 2:00 PM

Hilton America's - Houston

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International Women's Day is a global day celebrating the historical, cultural, and political achievements of women. This is the day to appreciate their efforts! The gala lunch will showcase the accomplishments of distinguished women who have influenced all aspects of the oil and gas industry.

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Permian Gas Could Make Mexico No. 4 LNG Exporter

Quantum Energy Partners-backed project links the basin to Asian markets.

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Mexico is poised to become the world's fourth-largest exporter of LNG when the terminal on its West Coast is complete, a financial backer of the project said.

The key to Houston-based Mexico Pacific's $14 billion project, said Blake Webster, partner at Quantum Energy Partners, is the abundance of natural gas produced in the Permian Basin.

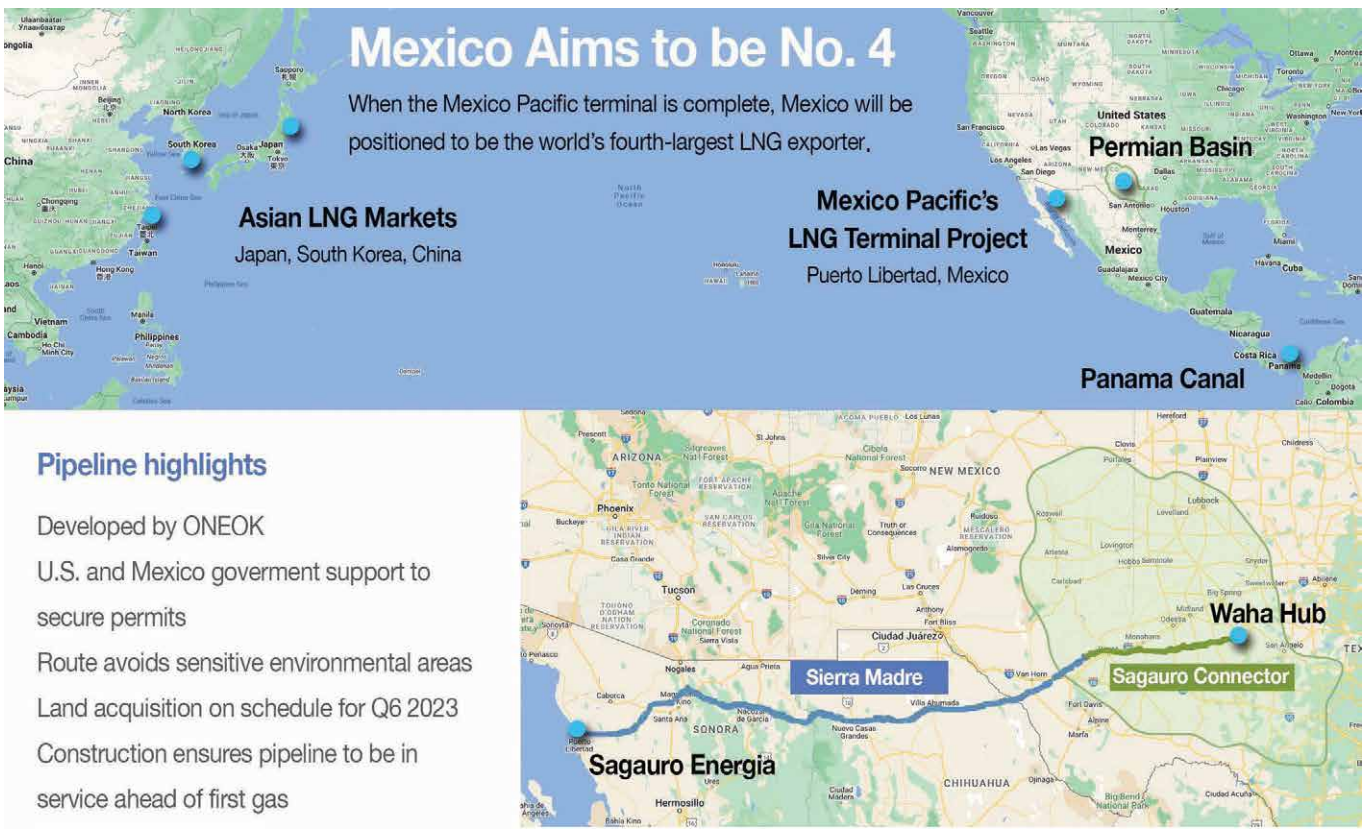
"There's a direct line connecting the Waha hub, which is the main gas hub in the Permian Basin, directly over to the West Coast of Mexico where you see Saguaro Energía, which is our facility," Webster said at Hart Energy's America's Natural Gas conference in Houston in September. "From there, you have a direct access around Baja directly to the Asian markets."

The line he referred to is the proposed Sierra Madre pipeline, to be built by ONEOK. The 1,000 km pipe is designed to move as much as 2.8 Bcf/d from Waha in the Permian Basin to Puerto Libertad, in the Mexican state of Sonora. Saguaro Energía will eventually consist of three trains producing 5 million tonnes per annum (mtpa) each, or 15 mtpa as a whole. There is land around the facility for future expansion.

"This is the first and only independent LNG project that's backed by three supermajors," Webster said, listing ConocoPhillips, Exxon Mobil and Shell. The rationale to commercially support the project came down to the ability to lock in 20-year fixed contracts, including one signed in July with China's Zhejiang Energy.

"It's a real testament to the value that they see in taking those volumes and routing them through our infrastructure, and being able to access Asian markets a little bit more," he said.

A critical component of the project is the Sierra Madre conduit. At the start of the



Source: Quantum Energy Partners, Hart Energy

A rendering of the Sagauro Energía LNG facility when construction is complete

Mexico Pacific

> ***"The key to Houston-based Mexico Pacific's $14 billion project is the abundance of natural gas produced in the Permian Basin."***
>
> —**Blake Webster,** ***partner, Quantum Energy Partners***

facility's development, there was already plenty of pipeline capacity from Waha into Mexico, and the partners explored leveraging that existing infrastructure.

"Ultimately, we felt like this was something that was critical for not only the company but also the customers to be able to provide that flow assurance and really having our own dedicated pipeline," Webster said.

Another selling point is government support on both sides of the border.

"This is a project that, I think, the U.S. looks at technically, not only just from a decarbonization standpoint as we think about U.S. natural gas displacing coal in Asian markets, but it's also a big driver of jobs in the Permian Basin," he said. The estimate is 13,000 jobs directly tied to the project and, indirectly, employment for another 21,000 workers.

The Mexico Pacific project enjoys a significant advantage over U.S. Gulf Coast LNG terminals because tankers will be able to reach Asian markets without passing through the Panama Canal. The trips are shorter, so less fuel is used, emissions from the carriers are reduced and canal tolls are avoided.

For example, the round trip from Mexico Pacific's terminal to Asian ports is 36 days, with a shipping cost of $1.03/MMBtu. Shipping that cargo from the U.S. Gulf Coast via the Suez Canal adds 34 days at cost of $2.42/MMBtu. Shipping from the Gulf Coast through the Panama Canal adds more than 30 days at a cost of $2.22/MMBtu, and shipping via the Cape of Good Hope adds more than 40 days at a cost of $2.13/MMBtu.

And then there's the spread. Webster noted that the estimated 600 Tcf of natural gas reserves in the Permian, along with the breakeven price that has at times been at zero, should make many projects viable.

"There is a disconnect on that price, which over the last five years has been about a buck," he said, referring to the difference between Waha and Henry Hub. "More recently it's been closer to $1.50/MMBtu, so we feel like the buyers of this gas are going to have a real advantage there.

At the time of the conference, the Asian JKM (Japan Korea Marker) LNG price was $14.60/MMBtu for November deliveries. The Waha price was $1.76/MMBtu, or a $0.76 discount over the Henry Hub close of $2.52/MMBtu. The Henry Hub price was $2.94/MMBtu. OGJ

Carlson: Canada Pipeline Could Leave US Market in the Cold

JUSTIN CARLSON
EAST DALEY ANALYTICS

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

Western Canada's crude oil industry is preparing to embrace global markets, a turn that could leave the U.S. industry fighting for supply in 2024.

After years of delay and cost overruns, the Trans Mountain Pipeline expansion (TMX) is nearing completion. The 715-mile looping of Trans Mountain, Canada's only liquids pipeline to the Pacific Coast, through Alberta and British Columbia will nearly triple maritime access for Western Canadian producers, increasing from 300,000 bbl/d to 890,000 bbl/d.

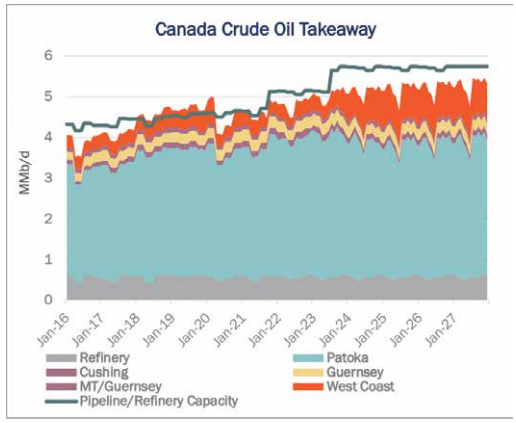
The estimated C$31 billion expansion will have consequences for markets across North America, according to East Daley Analytics' Crude Hub Model, affecting crude oil flows to refiners and terminal operators from Louisiana to the Midwest. We believe the project will be the most transformative for the U.S. market since the 2019-2021 period, when the industry built 4 MMbbl/d of new pipelines out of the Permian Basin.

Owned by the federal government, Trans Mountain is targeting start-up of the TMX expansion in first-quarter 2024. A recent dispute over a 0.8 mile section of the route through British Columbia had threatened that timeline. Citing technical challenges, Trans Mountain had sought permission from the Canada Energy Regulator to move the pipeline route and use open-trench and horizontal drilling for construction, rather than a trenchless method involving micro-tunneling.

The Stk'emlupsemc Te Secwepemc Nation (SSN) had contested the request, citing surface disturbances on the land native to the First Nation. However, the CER granted the Trans Mountain request in late September, avoiding a potentially long delay.

Once TMX starts flowing from Edmonton, East Daley anticipates about 470,000 bbl/d of heavy Canadian sour production will be immediately displaced on competing pipelines like Enbridge's Mainline and Express pipelines and TC Energy's Keystone pipeline. Rail terminals, which predominantly export heavy sour production into the Midwest (PADD 2), also will see volumes decline, according to EDA's Crude Hub Model.

Another group that will feel the effects is Gulf Coast refiners, particularly buyers in the St. James, La., market. Western Canada oil production currently moves south via ENB's Mainline and Southern Access Extension pipelines, then to the Capline Pipeline (Plains All American Pipeline, 54%; Marathon Petroleum, 33%; BP 13%) and terminates at St. James. Since its reversal in December 2021, Capline has become a key supplier of cheap barrels for Louisiana refiners



Source: East Daley Analytics

Crude oil flows and pipeline egress capacity from Western Canada

priced at Western Canadian Select. Barrels from Canada compete with higher-priced heavy sour barrels produced from the Gulf of Mexico.

Recent data from Louisiana regulators show Capline's imports from Patoka, Ill., averaged over 200,000 bbl/d in the spring, or more than double the pipeline's firm commitments of about 102,000 bbl/d. Flows from Patoka remained strong at about 150,000 bbl/d in August. The data supports comments from Plains All American that Capline has become a preferred shipping route since the reversal. However, East Daley thinks there is near-term risk to half these volumes, particularly to flows over the commitment level.

According to financials filed with the Federal Energy Regulatory Commission (FERC) and EDA's asset-level Capline Pipeline model, Capline will generate about $170 million in EBITDA for 2023. Assuming long-haul shipments of Canadian crude fall back to commitment levels (102,000 bbl/d) in 2024, this would pose downside risk to earnings of about $64 million for the pipeline. As the majority 54% owner in Capline, Plains All American Pipeline would be subject to the biggest earnings impact of about $35 million, net to its 54% share.

TMX will open new competition for Canadian barrels, and Lower 48 refiners using Western Canadian Select as a feedstock will need to pay more to continue attracting supply. East Daley estimates the Western Canadian Select discount to WTI could fall below $10/bbl once TMX is online. Alternatively, refiners could replace those barrels with heavy sours from the Gulf of Mexico, which are priced at a premium. In either scenario, U.S. crude oil exports are likely to take a hit until Canadian producers can expand oil output to fill the new export capacity. OGI

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Permian Infrastructure Sufficient for Now, Says Plains' McGee

Executive believes the basin will be 'a major contributor' to the world's energy supply for decades.

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Richard McGee, executive vice president, general counsel and secretary of Plains All American Pipeline, joined Jordan Blum in September at the University of Texas at Austin for the Kay Bailey Hutchison Energy Center Symposium. Watch the video interview at HartEnergy.com.

JB: Why is it so important to be involved with the energy center and be here at the symposium today?

RM: I really look at my participation in the energy center as an opportunity to pay it forward. I've been really blessed over about a 40-year career, so far, to work with some really smart and interesting people on really interesting projects all around the globe. The energy center is a student-focused organization that's geared and set up to help students be better prepared and to launch their careers by being involved in this center, for me, is an opportunity to feel like I'm helping somebody else the way that I was helped before. In that sense, I'm paying it forward.

JB: And what do you see as the role of the energy center, UT and really all of higher education to help solve the workforce issues for oil and gas and the upcoming or current great crew change?

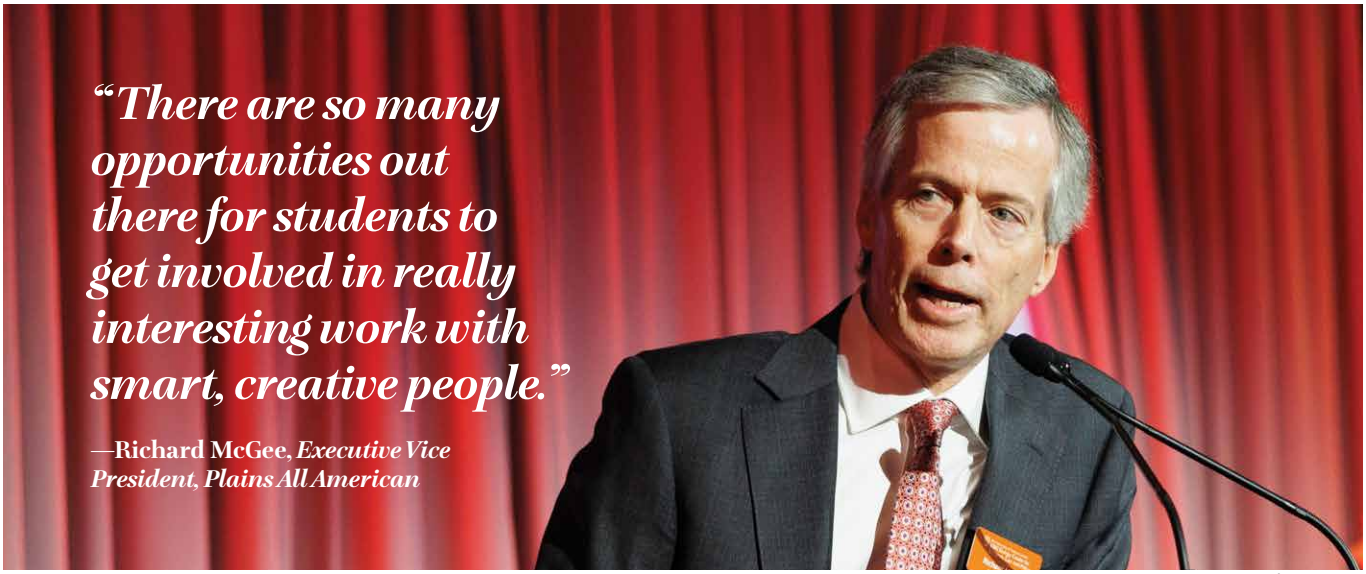
RM: The energy industry today, more than ever, needs technical and engineering talent. It needs business talent and it needs legal talent. The university is so strong across all of those areas, and the center provides an opportunity for students to tap into that, regardless of which school they're in. If you're in the law school, you can have access to business and engineering classes and vice versa. The other thing is that the energy center helps provide a connection for students to this vast network of UT-related individuals, company alumni, etc., that are involved in the energy industry. And that becomes a huge family that can help students—help them find their first opportunity once they've found an opportunity grow and evolve in their role, whatever it may be, with whatever company. So, I see the energy center really as a great add-on to what the university offers, and the university is in this great position to feed talent into this multidisciplinary game.

JB: What do you see right now as the most pressing gaps facing the industry?

RM: I think it really gets back to this point about where we are today with the energy transition. Probably more than ever, there's a real need for technical talent to unlock the potential of future forms of alternative energy. And I think that's where the university plays a key role now for people who have been involved in traditional energy. You talk about the great crew change. That's one thing and that's happening, but I think if you're a student today and you're looking at where is there going to be an opportunity-rich environment, you've got to look at energy. Because with the alternative energy evolving, or energy evolution, there are so many opportunities out there for students to get involved in really interesting work with smart, creative people and help solve problems that are really going to help the globe, frankly, for generations to come. I would say that's a very attractive thing from a student standpoint today.

JB: Now, there are obviously challenges on the horizon, but business is booming right now. Plains is very involved in the Permian Basin—record high production for both oil and gas there. How pleased are you with how things are going now and for the foreseeable future?

RM: We're certainly constructive on the Permian Basin. There is so much resource there that's yet to be tapped. Currently, the production levels are in the 5.8 million barrels a day range. We think it's going to inch up over 6 million barrels a day by the end of the year, and then, looking forward in probably three-ish year's time, we think it's very realistic that you could get to 7 million barrels a day in the Permian Basin. The wild card is that there's a lot of resources. Technology will change over the next decade, as it has in the past two decades, and that will make a big difference on how much oil is produced from the Permian Basin and what the needs are there from an infrastructure standpoint. I'd say we're very constructive on the Permian Basin. It's going to be a major contributor to global energy supply for decades to come—multiple decades, not just one decade. My view is that we're very



University of Texas at Austin

Plains All American Executive Vice President Richard McGee, speaking at the Kay Bailey Hutchison Energy Center Symposium at University of Texas at Austin, says that the company is "constructive on the Permian Basin" and expects the production levels to rise to 6 million bbl/d by year end.

constructive on the future of the Permian Basin.

JB: For the last decade or so, Plains has probably been more involved than any other company in building out the long-haul crude pipelines from the Permian. Do you think it'll be much longer before more of those big pipelines are needed again?

RM: In the near, medium term, I think the existing infrastructure is sufficient to deal with the production that's coming. You have a lot of pipes that were built during this period that you referenced. There's excess capacity. There are ways to get more capacity out of the existing pipes that are already in the ground. So, I don't think there's a big wave of new construction, new greenfield construction of long-haul pipes coming out of the Permian in the foreseeable three-to-four year timeframe. OGJ

Woodside's $7.2 Billion Bet on Deepwater Mexico Potential

Woodside Energy is investing in offshore Mexico, checking key production, climate and financial boxes for the firm, its partnership with Pemex and the country of Mexico.

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Australia's Woodside Energy is making a massive bet offshore Mexico at the large, high-quality conventional resource Trion development, which checks key production, climate and financial boxes for both Mexico and partners Woodside and state-owned Petroleos Mexicanos (Pemex).

Trion's $7.2 billion final investment decision (FID) was announced in June. Woodside's share is $4.8 billion, including a $460 million capital carry of Pemex. First oil is expected to flow in 2028.

"Although the decision was delayed by a year due to high contracting costs, Trion's sanction is good for Woodside, Pemex and Mexico's upstream as the project will contribute material barrels in the long-term," Welligence Energy Analytics North America Research Analyst Omar Rios told Hart Energy.

"This is especially true given exploration results in the Perdido [fold belt] since [Mexico's] energy reform. Dominated by the majors, no company has been able to replicate the success of Trion so far—a testament to the frontier and complex nature of the basin," Rios said. "For Woodside, project sanction demonstrates growth in its Americas portfolio from a valuation perspective, which includes assets in Mexico, the deepwater U.S. Gulf of Mexico and Trinidad and Tobago."

Trion's production will be processed through a floating production unit (FPU) with a nameplate capacity of 100,000 bbl/d, a Woodside spokesperson told Hart Energy. When Woodside is producing early in the field's life with no water breakthrough, the FPU will be able to process up to 120,000 bbl/d.

Trion is Woodside's first major investment decision following its merger in 2022 with BHP Petroleum. Trion was an asset in BHP's portfolio, and it will be Woodside's fourth major project in the Gulf of Mexico after Shenzi, Atlantis and Mad Dog, Woodside CEO Meg O'Neill said during a call with analysts.

Trion's joint venture (JV) and regulatory approval for a field development plan was approved by Mexico's National Hydrocarbons Commission (CNH) in late August, Woodside announced.

"The joint venture approved the field development plan and it was submitted to the regulator," O'Neill said. "We have started executing key contracts including the FPU, engineering procurement and construction contracts and the drilling rig contracts."

During the second half of 2023, Woodside plans to progress detailed engineering and procurement across FPU, floating storage and offloading (FSO) and subsea, umbilical, risers and flowlines (SURF); initiate preparations for regulatory permits for execution activities; and continue to award key contracts.

"Our experience to date with the regulatory environment has been positive, including wells, side tracks and regulatory submissions being approved on time by regulators during the appraisal phase," the Woodside spokesperson said. "We collaborated with CNH [Mexico's National Hydrocarbons Commission] during the drafting of the field development plan to help with alignment prior to submission."

Win-win for Woodside, Pemex

Trion—located in a water depth of 2,500 m, approximately 180 km off the Mexican coastline and 30 km south of the Mexico-U.S. maritime border—is among Mexico's first deepwater developments.

The Trion JV comprises Woodside's Mexican affiliate Woodside Petróleo Operaciones de México, S. de R.L. de C.V., the operator with a 60% interest and Pemex's upstream affiliate Pemex Exploración y Producción (PEP), with the remaining 40%.

The companies will target development of an estimated 479 MMboe of unrisked contingent resource (287 MMboe net to Woodside), according to Woodside's spokesperson.

Trion is expected to contribute to meeting the world's energy needs. Additionally, the Australian company expects Trion will deliver strong returns to its shareholders and economic and social benefits to Mexico.

Woodside views Trion as a disciplined investment that fits its strategic and capital allocation framework and is consistent with the company's vision to build a low-cost, lower-carbon, profitable, resilient and diversified portfolio.

"Developing Trion delivers value for

"We have developed a strong partnership with Pemex. They benefit from our deepwater capability and we benefit from their technical input and understanding of the regulatory environment."

—**Meg O'Neill,** ***CEO, Woodside***

Woodside

The Trion project in offshore Mexico is located in a water depth of 2,500 m, approximately 180 km off the Mexican coastline and 30 km south of the Mexico-U.S. border.

Woodside shareholders and significant benefits for Mexico including jobs, taxation revenue and social benefits," O'Neill said. "We have developed a strong partnership with Pemex. They benefit from our deepwater capability and we benefit from their technical input and understanding of the regulatory environment."

Trion will have an all-in breakeven below $50/bbl. Excluding the capital carry of Pemex, the breakeven is below $43/bbl.

"The investment is expected to deliver an internal rate of return [IRR] greater than 16% with a payback period of less than four years," according to O'Neill. "The forecast IRR excluding the capital carry is greater than 19%," she said.

"Trion has an expected carbon intensity of 11.8 kg CO2e/boe average over the life of the field, which is lower than the global deepwater oil average, and will be subject to Woodside's corporate net equity Scope 1 and 2 emissions reduction targets," O'Neill said.

"We have considered a range of oil demand forecasts and believe Trion can help satisfy the world's energy requirements," O'Neill said. "Two-thirds of the Trion resource is expected to be produced within the first 10 years after start-up."

Additionally, Woodside's targets for greenhouse-gas emissions reduction are unchanged by the Trion FID. The starting base for the target will not be adjusted as a result of the investment decision.

Pemex stands to benefit from additional oil and gas production from Trion as it looks to offset production declines at mature fields as part of its plan to see liquids production exceed the 2 MMbbl/d mark over the near term.

According to Woodside, Trion is well aligned with Pemex's plans to grow production. Financially, the development will also be positive for Mexico, a major trading partner with the U.S., which looks to collect some $10 billion in cumulative taxes and royalties.

However, the project is not without its hazards, Wellingence's analyst warned—especially when it comes to Pemex.

"Pemex remains the most indebted E&P in the world and has significant debt amortizations looming in the short-term, which may place pressures on its ability to finance its part of the project," Rios said.

Trion development

Geologically, well productivity remains uncertain. Rios said Trion will also exploit new reservoirs in Mexico's deepwater Lower Eocene.

"Analog fields in the Perdido in the deepwater U.S. Gulf of Mexico can provide valuable insight into Trion's potential. Woodside's public plans for Trion suggest it is expecting the asset to outperform the historical well performance at the analog fields on the U.S. side of the border," Rios said.

Trion was initially discovered by Pemex in 2012. In 2017, BHP Petroleum and Pemex inked an agreement to develop the Trion discovery. Following Woodside's merger with BHP Petroleum, the Australian company continued with the Trion agreement with Pemex.

"[After 2017] we subsequently completed our appraisal program to inform the development. This included three additional well penetrations and acquisition of seismic," according to Woodside's spokesperson. "We now have the right development plan and are confident in the cost and execution plan following 30 months of engineering to inform front-end engineering design. We re-tendered following the merger given the prevailing inflationary environment to ensure bids reflected the current market conditions."

Trion will be developed through an FPU that will be connected to a leased FSO vessel with a Suezmax size hull and a capacity to store 950,000 bbl of oil. Development of Trion will include 18 wells (nine producers, seven water injectors and two gas injectors) drilled in the initial phase. Over the life of the project, a total of 24 wells are planned to be drilled. The expected $7.2 billion capital expenditure includes all 24 wells.

Peak spending on Trion is expected in 2025, according to Woodside. And consultancy Wood Mackenzie estimates 80% of the required capex will be spent by 2033, when the field will be on its production plateau.

While Trion is primarily an oil development, there will be some gas available for Mexico's domestic market, according to the Woodside spokesperson. "The development includes two gas injection wells, and gas that is not reinjected or used on the FPU will be shipped to Mexican markets. There is operational flexibility to increase gas export." OGJ

Bringing the Beetaloo to Life

Tamboran makes alliances to advance its goal of producing 1.5 Bcf/d by 2035 from the Australian shale play.

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The Beetaloo Basin in Australia shows promise, but it will take teamwork to bring the gas reserves to market.

Dick Stoneburner, Tamboran Resources chairman and Petrohawk Energy co-founder, said Tamboran is developing "a major, major" gas resource and is working with the government and companies like Helmerich & Payne (H&P) and APA Corp. to move the discovery toward production.

Tamboran, which is listed on the Australian Stock Exchange in 2021, operates about 4.7 million acres in the Beetaloo Basin. The play compares strongly to prolific plays in the U.S., such as the Marcellus, Stoneburner said during Hart Energy's America's Natural Gas conference in September.

The company's Shenandoah South 1H well, drilled by the H&P Flex 3 rig, found about 300 ft (90 m) of high-quality shale with strong dry gas shows. Two Beetaloo wells operated by Santos, in which Tamboran holds an interest, delivered "very good results" with "nice reserve bases," he said.

As promising as the wells to date have been, Stoneburner believes it's possible to do better.

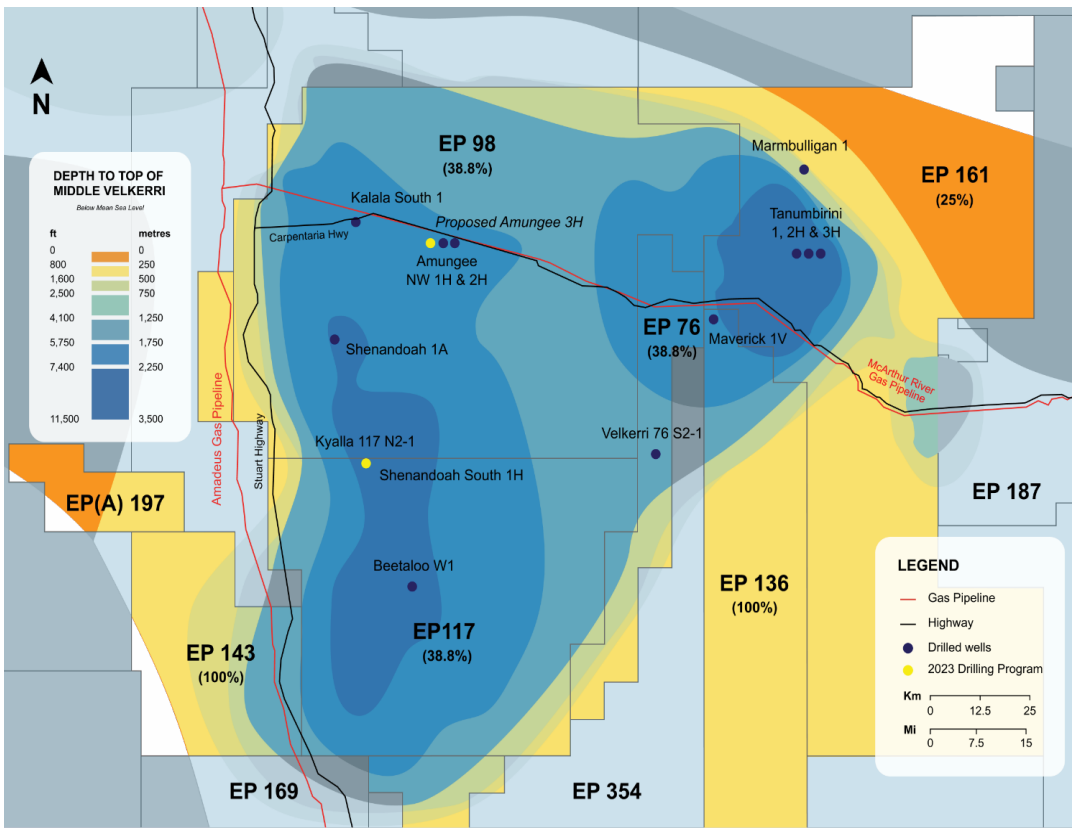
"The two best wells for the basin, we have drilled more effectively than any of the others. That's not saying much," he said.

Some wells have been slow and expensive, and the stimulation jobs on others haven't been optimal, he added.

"We're confident that with what we've learned on the last well and having H&P on our team, we can knock this down from 21 days" to 15 to 18 days through efficiencies and borrowing from best practices in American shale plays, Stoneburner said.

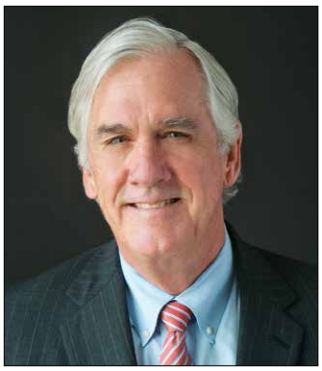
Stoneburner said Tamboran aims to produce 1.5 Bcf/d from the Beetaloo Basin

Shenandoah South 1H & offsets' locations



Source: Tamboran

Tamboran's Beetaloo Basin asset locations



"We're out here kind of by ourselves. This is not like you've got the Permian Basin with 100 different operators and acreage scattered all over the place."

—**Dick Stoneburner,** ***chairman, Tamboran Resources***

by 2030 or 2035, with some production going to gas markets and some to the proposed Northern Territory LNG (NTLNG) project. Early production could start in 2025 from Phase One at a rate of 40 MMcf/d from seven wells sending gas to the Northern Territory and East Coast gas markets. Phase Two would deliver 500 MMcf/d from 90 wells in 2028. Phase Three would see 55 wells delivering an additional 2.2 million tonnes per annum (mtpa), or 300 MMcf/d, to NTLNG as of 2030, and ultimately reaching 6.6 mtpa, or 1 Bcf/d.

Stoneburner said alliances are important for working in the Beetaloo.

"We're out here kind of by ourselves," he said. "This is not like you've got the Permian Basin with 100 different operators and acreage scattered all over the place. We've got 4 million acres sitting there right next to each other, so we need some help to get this done."

One of the most critical alliances was with H&P, which moved a drilling rig from Texas to Australia.

"Having somebody like H&P not only invest in equity into the company, but commit iron in a part of the world where they've never been before" was important for Tamboran, he said.

Under a midstream alliance with APA, the companies will jointly develop gas transmission pipelines connecting Tamboran's Beetaloo Basin assets to the East Coast gas market and Darwin.

The Northern Territory government awarded Tamboran a 420-acre site at Middle Arm Sustainable Development Precinct for the proposed NTLNG project, which is between three and seven days from gas markets, he said.

"This is the most advantaged gas molecule from a transport standpoint in the world," Stoneburner said. "We're closer to more demand centers than anybody else." OGJ

Shale's Big Role in Meeting Global LNG Demand

McKinsey sees a supply gap emerging in the 2030s, providing U.S. producers with an opening.

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U.S. gas producers can compete to fill a looming supply gap for LNG as global demand grows, according to an analysis by McKinsey & Co.

Across a myriad of different energy transition scenarios, global demand for LNG is forecast to see robust demand growth through at least 2040, McKinsey Partner Dumitru Dediu said during Hart Energy's America's Natural Gas conference in September.

Dumitru Dediu

European demand is expected to drive that growth in the near term as the continent moves to replace volumes of piped Russian gas with other supply.

In the medium to long term, demand growth is expected to come from nations in Southeast Asia seeking access to more reliable, affordable and cleaner energy sources.

"Asia beyond China," he said. "China will have a big role to play—but beyond China, there are a lot of countries out there."

U.S. producers and LNG developers are investing billions of dollars to meet some of the growing global demand.

Gas demand for U.S. LNG exports is expected to grow by 17.4 Bcf/d between 2023 and 2030, said Justin Carlson, co-founder and chief commercial officer at East Daley Analytics; LNG will make up more than one-fifth of total U.S. gas demand by that time.

More than a half-dozen new liquefaction projects are under construction in the U.S., according to the Energy Information Administration.

But into the 2030s and beyond, a global LNG supply gap begins to open. And there are questions about whether U.S. gas supply—hampered in some regions by litigation and regulatory red tape—can meet the growing demand.

"Many of these scenarios actually show even higher demand, showing a gap of at least 50 million tons [of LNG capacity]," Dediu said.

"In some scenarios, 150 to 200 million tons of LNG capacity … will need to come onstream in the 2030s to meet the growing LNG demand out there," he said.

Cost and security

U.S. LNG is expected to meet a portion of the growing global demand for several reasons, including cost competitiveness and security of supply.

McKinsey's survey of LNG buyers, which accounted for more than 70% of the global LNG market, found that buyers see U.S. LNG as one of the most cost-competitive sources of supply worldwide.

"Especially in the current environment, with Henry Hub below $3/MMBtu, you can bring the LNG from the U.S. at below $8/MMBtu in Europe or in Asia—compared to prices north of $10/MMBtu to $15/MMBtu," Dediu said.

But many factors could lead to U.S. LNG's competitive edge waning on the global scale over time, such as takeaway infrastructure constraints.

A lot of the most cost-competitive gas is produced in the Permian Basin and in Appalachian plays like the Marcellus Shale. Additional gas pipeline capacity is needed to move the gas from the shale patch to the growing number of U.S. LNG export facilities.

But building new interstate gas pipelines is pretty difficult to do, as the travails of the Mountain Valley Pipeline affirm.

It's much easier to develop an intrastate pipeline in Texas or Louisiana, which is why a significant portion of the gas for LNG exports is expected to come from the Haynesville Shale, the Eagle Ford Shale and the Permian.

"Without new infrastructure, we may see Henry Hub prices increasing and, respectively, other less competitive basins supplying these LNG projects," Dediu said.

Other factors that could lead to rising costs include engineering, procurement and construction, and supply chain constraints, as well as access to commercial financing and long-term sale and purchase agreements.

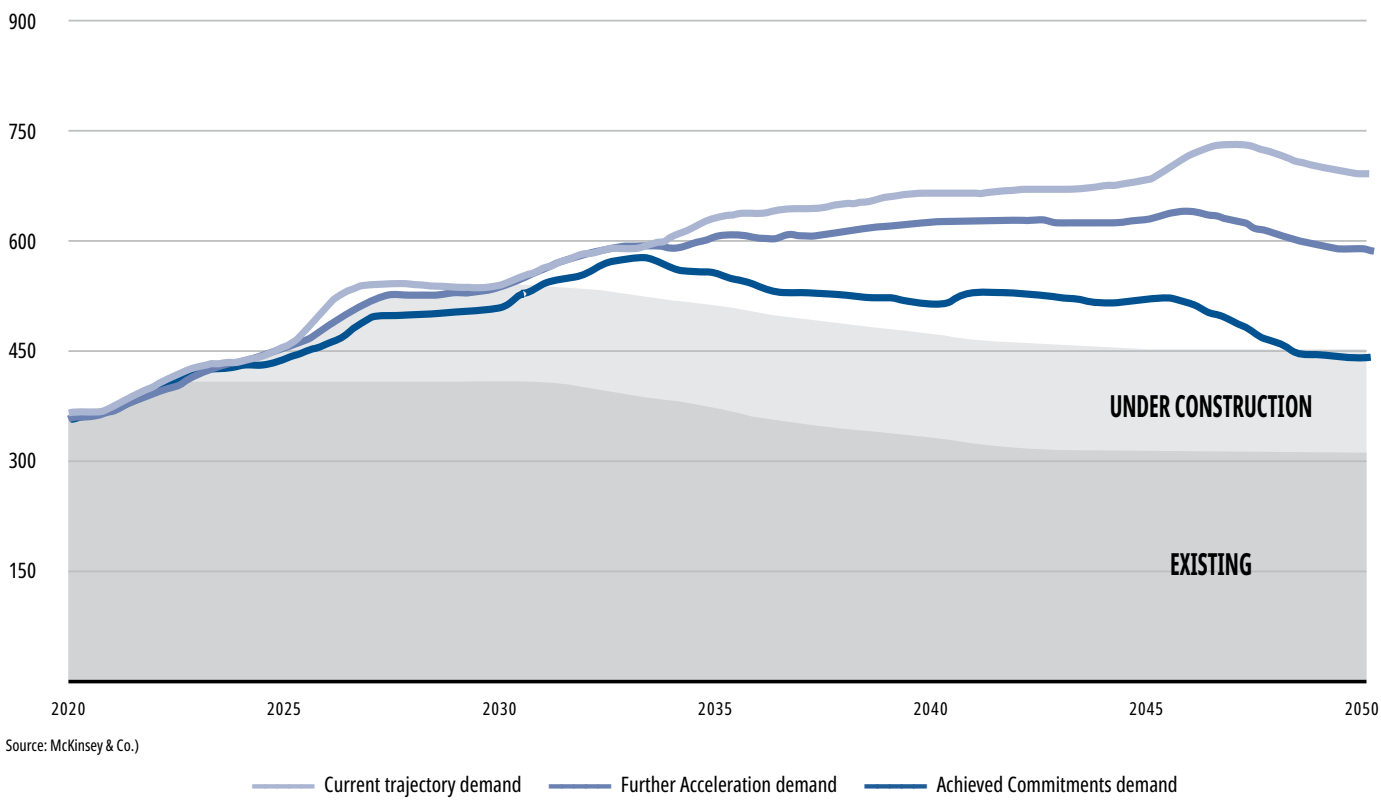
Buyers also see the U.S. as one of the most reliable sources of gas globally—more reliable than Canada, Australia and Mexico, according to the McKinsey survey.

"The world needs more gas, more LNG, to support growth," he said. "LNG will also play a major role in helping switch away from coal to a cleaner-burning fuel like gas." OGI

Shutterstoc

A global LNG supply gap will begin to open up in the 2030s, according to a McKinsey & Co. analysis, but the U.S. might lose its competitive edge if red tape, particularly around pipeline permitting, isn't addressed.

McKinsey LNG supply gap



Source: McKinsey & Co.)

Service Providers Struggle with Guyana Law

The Local Content Act favors Guyanese nationals and companies in business related to the country's nascent oil, according to local experts.

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An Exxon Mobil-led consortium offshore Guyana with international oil companies Hess Corp. and China's CNOOC has not been impacted by a content law that favors locals in the procurement of goods and services, attorneys familiar with the statutes told Hart Energy.

It's a different story for service providers.

"Experienced IOCs, from an outsider's perspective, do not have a real issue with obtaining labor, transferring skill sets and technology and complying with local content laws; it is the service providers—the mid- and lower-tier companies servicing the petroleum sector—that struggle with procuring skilled labor," Jones Walker LLP partner Marc Hebert and Keiana Palmer, an associate from the firm, wrote in a joint response to Hart Energy via email.

Marc Hebert

Keiana Palmer

Guyana boasts one of the fastest-growing economies worldwide. The country, with population of about 814,000, according to Worldometer, saw its average annual GDP grow over 50% in the past couple of years due to rapidly rising oil production, starting in December 2019 from the offshore Stabroek Block. There, two Exxon developments are producing about 375,000 bbl/d and a third, with a production capacity of 220,000 bbl/d, will start in fourth-quarter 2023.

"The need for skilled labor such as welders, pipefitters, pilots and oilfield workers increases commensurately with increased petroleum production," Hebert and Palmer said. "Consequently, one must scrutinize the restrictions that the local content laws create and how they impact the mid- and lower-tier service providers' abilities to grow with the fast pace of the market."

The Guyanese government anticipates its petroleum sector will need at least 150,000 skilled laborers over the next two to five years to meet this demand. Ongoing development of Guyana's oil sector and its economy will require the construction of roads, bridges, port facilities, hotels, clinics, hospitals, housing, grocery stores and schools. A build-out of the country's public transportation sector is also necessary.

Guyana must rely heavily on "construction companies, concrete and ready-mix or asphalt companies, waste management, food distribution and cold storage providers, as well as workers to provide such services," according to the Jones Walker lawyers.

Exxon and partners have discovered estimated gross recoverable resources of more than 11 Bboe in Stabroek, the company says on its website. According to accelerated development plans, three FPSO units will be in operation in the block by year-end 2023, according to Hess. Looking forward, six FPSOs with a capacity of more than 1.2 MMbbl/d could be online in the block by year-end 2027, while there is potential for up to 10 units to develop the resources.

"Therefore, the difficulties service providers face may inevitably become a concern for IOCs contracting with those service providers," Hebert and Palmer said. "Nevertheless, the jury is out on the local content laws, and we wait to see any true 'concerns' IOCs may have with continued market expansion and subsequent amendments to the Local Contact Act (LCA) [of 2021]."

Guyana's Local Content Act

Guyana's Local Content Act (LCA) gives priority to Guyanese nationals and companies in the procurement of goods and services related to the country's nascent oil sector to enhance the sector's value chain. It also mandates companies and others involved in petroleum-related activities comply with local content rules.

Under the LCA, local content is defined as "the monetary value of inputs from the supply of goods or the provision of services by Guyanese nationals or Guyanese companies and includes local capacity development," according to details published Dec. 31, 2021, in Guyana's Official Gazette.

The LCA applies to local content related to all operations and activities in Guyana's oil sector. Consequently, like other countries' laws, the LCA's overarching purpose is to ensure the transfer of skills, technology and opportunities to Guyana's residents to improve the quality of life, according to Hebert and Palmer.

Aerial view of Georgetown, Guyana, near the Demerara River

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370K
Barrels of oil per day produced by two Exxon Mobil offshore developments in the Stabroek Block

150K
Skilled laborers needed to meet demand in Guyana's petroleum sector by 2028

814K
People who live in Guyana

11B
Barrels of oil equivalent that Exxon and its partners estimate gross recoverable resources in Stabroek

50%
Percentage growth in Guyana's gross domestic product since December 2019 and largely attributed to the Stabroek development

Additionally, the LCA aims to promote competitiveness and encourage the creation of related industries that will sustain Guyana's social and economic development and allow the country to compete in the global market.

Guyana's government is cognizant of "Dutch disease," a situation in which one industry flourishes to the detriment of local ones in the same sector, mainly due to consumer preference. Imports increase for nearly all goods and services instead of being developed domestically to generate revenue.

For joint ventures, Guyana's LCA requires foreign investors to partner with local companies that hold at least 50% ownership, among other considerations. Also, within the strategic sectors, there are corresponding targets that contractors, licensees and subcontractors must meet to ensure the maximum Guyanese participation.

Sectors with the highest minimum local content requirements include immigration support services (100%), rental of office space (90%), catering services (90%) and equipment rental (50%). These percentages drop drastically for services such as onshore pipe sand blasting and coating (30%), hazardous waste management (25%), aviation support services (20%), dredging services (10%) and engineering and machining (5%), according to the details in the Official Gazette.

While enforcement of the LCA has resulted in a significant uptick in local value capture, the seemingly strict compliance terms beg the question of how companies are faring with local content, Hebert and Palmer said.

"In the private sector, the Guyanese government is challenged with 'rent-a-citizen' or 'fronting' practices, wherein foreign entities utilize Guyanese businesses or Guyanese nationals to circumvent provisions of the LCA to capitalize on opportunities," Hebert and Palmer said. "The local content secretariat and the Georgetown Chamber of Commerce and industry continue to advocate against such practices, stating that operating under the guise of local participation undermines the overall objective of local content and will cause capital flight. However, these practices are the result of cooperative endeavors by foreign and local partners," they said. OGJ

Pitts: Venezuela's 'Devil in the Details'

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Geopolitical events in the Middle East (specifically the Hamas attacks in Israel) could benefit Venezuela indirectly from a run-up in oil prices or directly through a further easing of U.S. sanctions on its oil sector.

On the latter in particular, there's always the issue of the U.S.'s much wanted "free and fair" presidential elections in 2024 that still factor heavily on any decisions to come from Washington.

At the most basic level, both scenarios could translate into higher revenues for the coffers of Venezuela's President Nicolás Maduro, whom the U.S. sought to topple in 2019 by imposing sanctions. Venezuela's oil production averaged 733,000 bbl/d in September 2023, according to secondary source data from OPEC'S Monthly Oil Market Report (MOMR). Venezuela's current production is up from a low of 500,000 bbl/d in 2020 but still far from a peak of 3.2 MMbbl/d in 1997.

Higher oil prices from global oil supply uncertainties would surely benefit Venezuela, which continues to sell its oil, primarily heavy oil, at a discount to the major benchmarks, owing to sanctions. Currently, Venezuela's benchmark Merey crude is the cheapest of all the crudes that comprise the OPEC reference basket. So, higher prices would be a welcome boost to a Venezuelan economy still struggling under the weight of U.S. sanctions and the global economic downturned caused by the COVID-19 pandemic.

An easing of sanctions on Venezuela's oil sector could allow international oil companies (IOCs) to boost investments and production. Chevron, which remains in Venezuela, has been the main company behind recent production increases, and the U.S.-based producer is the company mostly likely to contribute to near-term production increases if Washington further eases sanctions. Other IOCs with potential to expand oil production include Italy's Eni and Spain's Repsol, partners in the offshore Cardón IV gas project.

But, an easing of sanctions on Venezuela's oil sector before elections next year and without a guarantee of "free and fair" elections could backfire on Washington. At the time of this writing, both the Washington Post and Reuters reported that talks between Washington and Caracas were advancing.

The former said an agreement had been reached "in which the U.S. would ease sanctions on Venezuela's oil industry and the authoritarian state would allow a competitive, internationally monitored presidential election next year." The latter said the U.S. had "reached a preliminary deal to ease sanctions if Maduro follows through on a commitment related to a 2024 election."

Datanalisis president Luis Vicente León said during an October interview with Globovision that the "devil is in the details" regarding the talks. But he did say he expected some additional positive advances related to Venezuela oil and gas sectors, without being specific.

Only time will tell where the negotiations between the U.S. and Venezuela's ruling party go as well as talks between the ruling party and the opposition. Maduro is definitely in a much better negotiating position than he was two years ago and the window of opportunities for the oil and gas markets have seemingly opened again for Venezuela to benefit. But Washington still holds the keys that represent Venezuela's access to both markets.

A recent OFAC amendment allows Trinidad and Tobago to pay for Venezuelan gas with a fiat currency or via humanitarian aid.

For what it's worth, the fate of U.S.-based refiner Citgo Petroleum, owned by state-owned Petróleos de Venezuela SA (PDVSA), seemingly remains a key indicator of the direction presidential elections could go in 2024. If the potential for a free and fair elections is positive, the U.S. court system could conceivably extend protection afforded to Citgo from creditors seeking around $23 billion until a winner is decided. On the flip side, if the potential is negative, Citgo's assets could relatively soon be put up for auction.

While there has been positive noise coming out of Venezuela in recent months, it's still too early to claim victory on either the sanction or election fronts. Besides, Maduro remains buddy-buddy with leaders in Russia, Iran, China, Cuba and Turkey. And an Oct. 15 telephone call between Maduro and his Palestine counterpart Mahmud Abbas may not be seen favorably by some countries and especially one in specific that is a major U.S. ally in the Middle East.

Whether it's time to "buy the rumor, sell the news" in Venezuela depends on your aversion to risk. The only thing I can offer you is to continue to watch this space. OGI

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Events Calendar

The following events present investment and networking opportunities for industry executives and financiers.

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EVENT	DATE	CITY	VENUE	CONTACT
2023				
WEA Wildcatter of the Year	Nov. 4	Denver	Sheraton Denver Downtown	westernenergyalliance.org
40th USAEE/IAEE North American Conference	Nov. 6-8	Chicago	Fairmont Chicago Millennium Park Hotel	usaee.org
IPAA Annual Meeting	Nov. 6-8	San Antonio	JW Marriott San Antonio Hill Country	ipaa.org
Energy Transition North America 2023	Nov. 7-8	Houston	Marriott Marquis	reutersevents.com
Rice Energy Finance Summit	Nov. 10	Houston	McNair Hall, Rice University	business.rice.edu
OK Petroleum Alliance Fall Conference	Nov. 15-16	Oklahoma City	The National Hotel	thepetroleumalliance.com
Executive Oil Conference & Exhibition	**Nov. 15-16**	**Midland, Texas**	**Midland County Horseshoe Arena**	**hartenergy.com/events**
DUG Appalachia	**Nov. 29-30**	**Pittsburgh**	**David L. Lawrence Convention Center**	**hartenergy.com/events**
URTeC Latin America	Dec. 4-6	Buenos Aires, Argentine	Hilton Buenos Aires	urtec.org/latinamerica/2023
2024				
IPAA Private Capital Conference	Jan. 17	Houston	The Post Oak	ipaa.org
Mexico Infrastructure Projects Forum	Jan. 24-25	Monterrey, Mexico	Camino Real San Pedro	mexicoinfrastructure.com
Floating Wind Solutions	Feb. 5-7	Houston	Hilton Americas	floatingwindsolutions.com
NAPE Summit	Feb. 7-9	Houston	George R. Brown Conv. Ctr.	napeexpo.com
Louisiana Oil & Gas Association Annual Meeting	Feb. 26	Lake Charles, La.	Golden Nugget Casino	loga.la
OTC Asia	Feb. 27 - March 1	Kuala Lumpur, Malaysia	Kuala Lumpur Convention Center	2024.otcasia.org
Influential Women in Energy Luncheon	**March 8**	**Houston**	**Hilton Americas**	**hartenergy.com/events**
CERAWeek by S&P Global	March 18-22	Houston	George R. Brown Conv. Ctr.	ceraweek.com
DUG Gas+	**March 27-28**	**Shreveport, La.**	**Shreveport Convention Center**	**hartenergy.com/events**
MCE Deepwater Development	Apr. 9-11	Amsterdam	Hôtel Mövenpick Amsterdam City Centre	mcedd.com
2024 AGA Operations Conference & Spring Committee Meetings	Apr. 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**
2024 AGA Financial Forum	May 18-21	Palm Desert, Calif.	TBD	aga.org
Louisiana Energy Conference	May 28-30	New Orleans	The Ritz-Carlton	louisianaenergyconference.com/
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
IPAA-Tipro Speaker Series	Third Tuesday	Houston	Petroleum Club of Houston	ipaa.org

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For more, see the calendar of all industry financial, business-building and networking events at HartEnergy.com/events.

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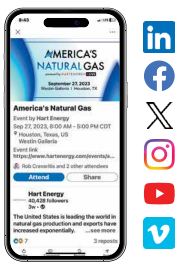

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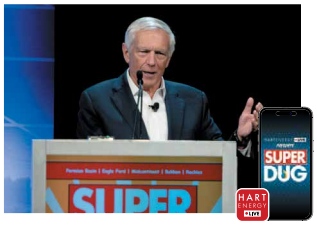

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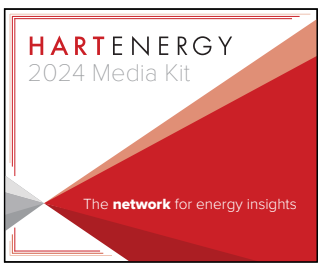

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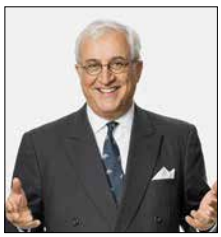
Varied takes on offshore drilling from government, an NGO and the industry

"It makes sense to use our own supplies from North Sea fields such as Rosebank. The jobs and billions of pounds this is worth to our economy will enable us to have greater energy independence, making us more secure against tyrants like Putin."

—**Claire Coutinho,** ***U.K. energy security secretary***

"Expanding dirty and dangerous offshore drilling only exacerbates the climate catastrophe that is already at our doorstep."

—**Beth Lowell,** ***vice president, Oceana***



"At the risk of hoodooing our crack explorationists, the string of recent discoveries validates DNO's offshore Norway exploration strategy."

—**Bijan Mossavar-Rahmani,** ***executive chairman, DNO***

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50 YEARS HARTENERGY SINCE 1973

How Goldman Sachs, FedEx See Oil and Gas

NISSA DARBONNE
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An energy transition is going to take time. But "it's a balance," according to Goldman Sachs chairman and CEO David Solomon.

"We have to support traditional energy. If we don't have appropriate [and] secure energy at an affordable price, society won't function," he said at the American Energy Security Summit hosted by the Hamm Institute for American Energy in Oklahoma City.

"I think it's very important for the U.S. that we have energy security. It's very important that we continue to invest in the industry."

In an energy transition, "One of the ways that we're in a better position … is if we have a strong independent energy economy here in the United States. We've said publicly that I think we're all going to continue to finance traditional companies for a long time."

How to strike a balance between traditional energy and sustainability goals? "There's no easy answer to the journey that we're all on," he said. Goldman Sachs' clients, "even if they're in the energy industry, also want to think about the next 10, 20, 30 years.

"How are they evolving their businesses? How are they transitioning appropriately?"

Carbon needs to be removed from the air. But this and other means of reducing the CO_2 in the atmosphere are "going to take time and it's something that requires a long-term view."

Now and in the future, traditional energy is still hugely important. "We have a lot of energy in this world that is necessary."

As for capitalizing the industry, he noted that the Fed is currently taking comments on new rules that "will make the financing of all activities more expensive and will also push more financing—capital-raising—outside the regulated banking industry.

"So, if you think about energy—[whether] it's traditional energy or it's new forms of energy—it's a capital-intensive industry…. And these new capital rules will make all that lending—and also the hedging that needs to be done to make those capital investments—more expensive."

FedEx Founder and Executive Chairman Fred Smith said the U.S. isn't using its energy-abundance ace correctly. Smith, whose international transportation company is celebrating its 50th year, was on the Energy Security Leadership Council during the George W. Bush Administration.

"The prescription we gave, which they adopted, was to, No. 1, promote the maximum amount of oil and gas production in North America," Smith said.

"That's when the [fracture-stimulation] revolution [grew] and—beyond our wildest dreams—we became the most prolific producer, just like during World War II."

And the U.S. isn't taking "advantage of it to the extent we should," he said.

Smith earned his undergraduate degree in economics at Yale before serving two deployments in Vietnam as a U.S. Marine, receiving two Purple Hearts, before he was discharged in 1970 and moved on to found FedEx in 1973.

"You've got to embrace these free-market principles in oil and gas," he said. "If you want to use less of it, then incent people not to use it. But let the free market work and produce as much oil and gas as you can."

Smith is a proponent of a carbon tax—incentivizing those who use it to use less of it.

"No company could be more committed to reducing its environmental footprint than FedEx is," he said. But the point of its effort isn't to "greenwash;" instead, it's just math.

"What we're doing is trying to become more profitable and more efficient. That's why we retired MD-11 airplanes and replaced them with [Boeing] 777s. We've got the biggest fleet of 777 freighters in the world because they use 20% less fuel."

With a carbon tax, "if you want to make a capital investment to buy a 777 and use less fuel over the MD-11 and make it into beer cans, everybody wins."

Stephen Moore, distinguished fellow at the Hamm Institute, said a worry could be that a carbon tax is enacted but the massive web of U.S. energy-regulatory framework didn't go away.

Smith said, "At the end of the day, the problem is the media business … is built largely around outrage. You develop more outrage, [you get] more clicks …

"So, I just do not think that we can continue to go forward unless there's some sort of grand compromise." OGI

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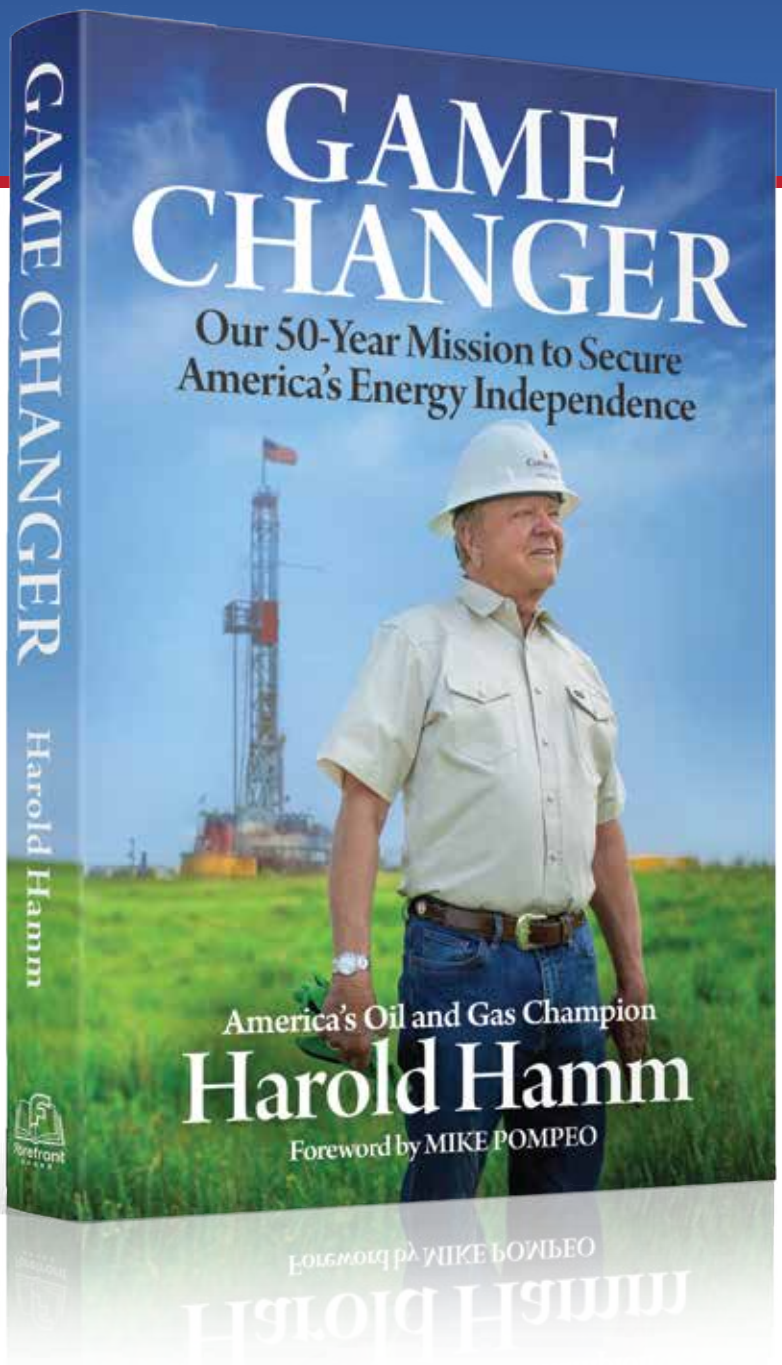

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