Oil and Gas Investor

SPECIAL OGI REPORT

CLASSIC ROCK, NEW WELLS

Plenty to Produce in the Permian's Conventional Zones

25 YEARS SINCE THE BIG MERGER
Q&A With Exxon Mobil's Upstream President

HALL OF FAME 2024
Meet This Year's Elite Inductees

HAMM'S ADVICE FOR TRUMP
An Executive's List from A to LNG

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DECEMBER 2024

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Transactions Closed since 2009

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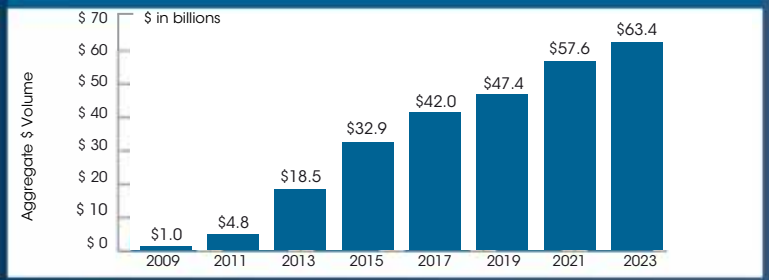

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Energy — November 2024 — Pending

Ovintiv

$2,000,000,000

Sale of Uinta Basin assets to **FourPoint Resources LLC**

Lead Financial Advisor

Energy — July 2024

GRAYSON MILL ENERGY

$5,000,000,000

Sale of Williston Basin business to **Devon Energy**

Sole Financial Advisor

Energy — June 2024

XCL RESOURCES

$2,550,000,000

Sale of Uinta Basin assets to **SM Energy Company**

Sole Financial Advisor

Energy — June 2024

CAERUS

$1,800,000,000

Sale to subsidiaries of **Quantum Capital Group**

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Exxon Mobil drilling and completions operations in New Mexico's Delaware Basin. Photo credit: Nolan Bourque, Exxon Mobil

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It's been an eventful year, and 2025 promises panache aplenty.

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Will VanLoh

Harold Hamm

Chris Wright

Liam Mallon

It's been quite a year.

What started in January in the form of a massive consolidation of the U.S. oil and gas E&P space has continued throughout 2024, shrinking the number of companies engaged but also growing the largest producers.

Access to capital, while still not easy, appears to be loosening as momentum behind the public panic against fossil fuels wanes with the realization that the energy transition really is more of an energy addition. And fossil fuels will continue to be part of the global energy mix.

We spoke to Quantum Capital Group founder and CEO Wil VanLoh, as well as leadership at EnCap Investments, about recent multibillion-dollar fund closings this year, indicating some capital is moving back to the space.

President-elect Donald Trump has promised to support the oil and gas industry with an eye toward greater development and fewer restrictions. His nominee for energy secretary, Liberty Energy CEO Chris Wright, is well-known to oil and gas players—Continental Resources Executive Chairman Harold Hamm recommended Wright—as an inventive business leader in the space. Frac pressure-pumping Wright was part of a mid-1990s team that suggested a slickwater—rather than gel—frac to George Mitchell, leading to the U.S. shale gas breakthrough.

We're closing out 2024 strong with in-depth reporting on power needs in the Permian Basin; exclusive interviews with the likes of Exxon Mobil's Liam Mallon, upstream president at the supermajor, and Vital Energy's CEO Jason Pigott; as well as an outlook on the new activity revving up in the Central Basin Platform.

And in this edition of *Oil and Gas Investor*, we continue the tradition of naming new honorees to our Hart Energy Hall of Fame and Agents of Change in Energy (ACEs), which began last year with the celebration of Hart Energy's 50th anniversary. This is a unique recognition based on our industry reporting during the last half-century on legendary business leaders and those who are poised to tackle the challenges ahead.

On the topic of well-earned recognition, James Milbrandt, our own senior art director, took first place for magazine redesign at the Houston Business Marketing Alliance's Lantern Awards.

And we'll begin 2025 with just as much panache. Look for Shale 2025, our annual industry outlook, in January's issue. This special report inside the magazine will bring you the list of the top 50 public shale producers within the Lower 48, as well as a roadmap of where activity is happening—and most likely to accelerate—in the coming 12 months.

We're honored by your loyalty as magazine readers, and we're committed to bringing you the most important business news on the oil and gas industry. The coming year will be an exciting one, and we look forward to engaging with you on key issues whether in the magazine, online or during conferences. Thank you for your support.

Our best wishes to you for an amazing 2025. OGI

DEON DAUGHERTY
EDITOR-IN-CHIEF

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Classic Rock, New Wells

Spurned or simply ignored by the big publics, the Permian Basin's conventional zones—the Central Basin Platform, Northwest Shelf and Eastern Shelf—remain playgrounds for independent producers.

CHRIS MATHEWS
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Ring Energy Chairman and CEO Paul McKinney, put it aptly: "The best place to find oil, oftentimes, is where you've already found it."

Oil is easy to find, but assets are expensive to buy in the core of the Permian Basin, which is locked up. The breakneck pace of consolidation in the past two years places the highest-quality acreage in the hands of the majors and a few massive E&Ps. Tier 1 Permian locations are expensive to buy through M&A and even more difficult to discover organically.

But the far edges of the Permian—the Central Basin Platform (CBP), the Northwest Shelf and the Eastern Shelf—remain accessible for independent producers that are pushing the play's boundaries and testing relatively unpopular zones.

Not the Spraberry, but the Strawn and San Andres. Not the Bone Spring, but the Blinebry. Think Paddock, Canyon, Clear Fork, Grayburg and Barnett Shale.

In these less popular benches, independent and family-owned producers are making wells with Permian Basin economics but outside the Permian's core.

These plays might never pique the interest of the majors, or even the large- and mid-sized public producers. But for the small public and private producers with the geological know-how and the risk appetite, bountiful oil and natural gas resource is the prize.

Of course, oil isn't hard to find in these conventional and semi-conventional reservoirs. Some of the earliest and most legendary discoveries in West Texas and New Mexico were made there.

And, as the Permian's shale rock gets drilled and matures over time, experts think producers will take harder looks at what's left on the CBP and the basin shelves in the future.

Old Rock, New Techniques

The Permian Basin is expected to drive U.S. oil production for the foreseeable future, but a century ago, the energy potential of West Texas and eastern New Mexico was only starting to be understood.

West Texas first made it to wildcatters' maps when the famed Santa Rita #1 came online in Reagan County in May 1923, marking the discovery of the Big Lake oil field.

Drilled to a depth of 3,050 ft into the "Big Lime" formation (later designated the San Andres), Santa Rita #1 produced for 67 years before being plugged in 1990.

The 1926 discovery of the Yates Oil Field in nearby Pecos County is credited as the first major oil discovery on what's known today as

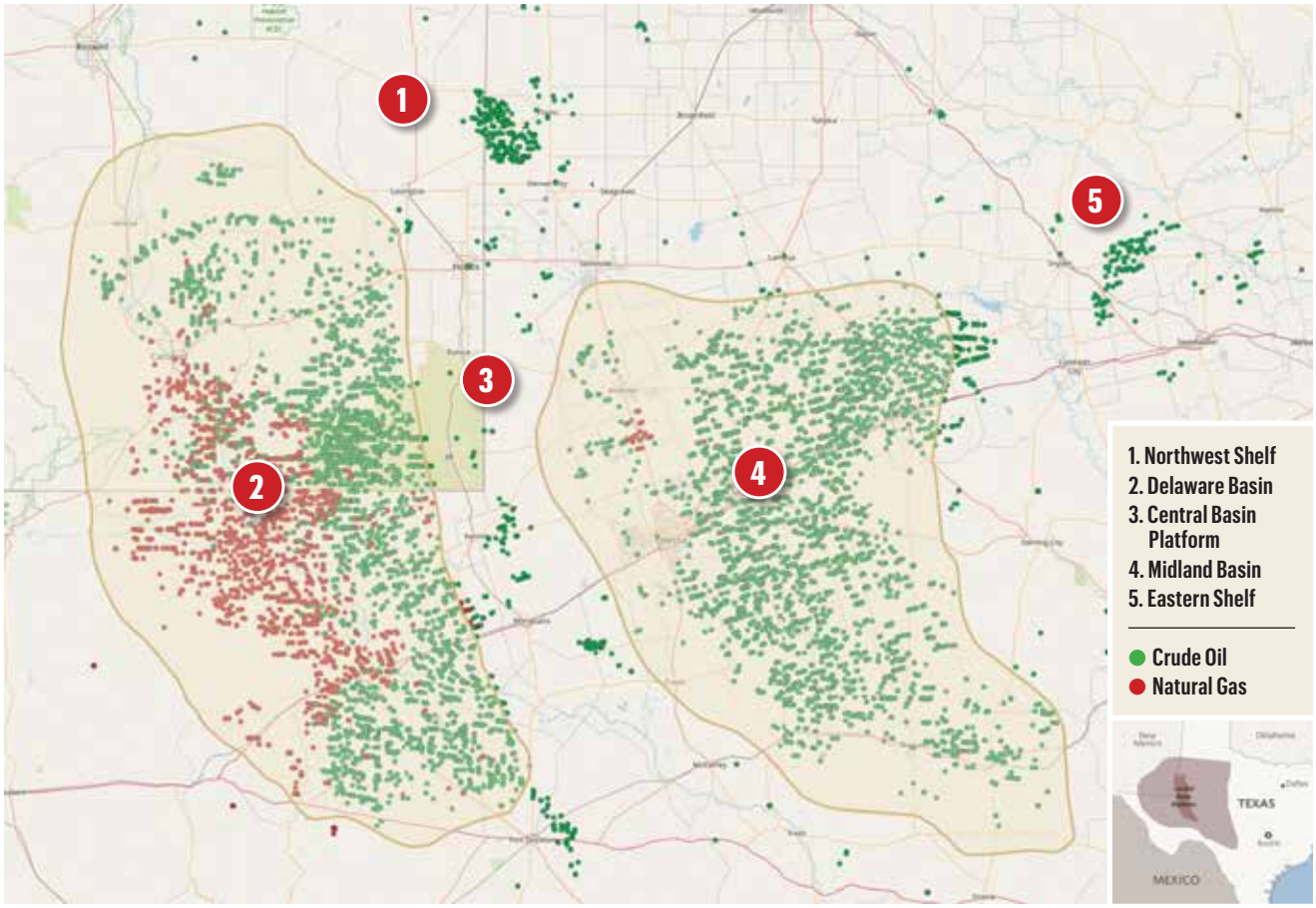
"Sometimes we bifurcate things into black and white: Is it unconventional? Is it conventional? The reality is, it's probably not quite so bifurcated and it's more of a spectrum."

PHILIP RILEY, EXECUTIVE VICE PRESIDENT AND CFO, RILEY PERMIAN

After kicking off the play with the Dessie 91 #1H well in 2015, Verado Energy has been among the most active E&Ps developing the Eastern Shelf's Strawn bench.

VERADO ENERGY

Major Sub-Basins of the Permian Basin



SOURCE: REXTAG

The Permian's Central Basin Platform, Northwest Shelf and Eastern Shelf have attracted less horizontal development than the core Midland and Delaware sub-basins. DISPLAYED: Horizontal wells online since Jan. 1, 2019.

the Permian's Central Basin Platform.

The Great Depression and the discovery of the massive East Texas Oil Field in 1930 delayed exploration of sparsely populated West Texas for some time. But other major discoveries along the CBP and Northwest Shelf include the Wasson (1937), Goldsmith (1935), Slaughter (1937) and Seminole (1936) fields.

The Wasson Field, in Yoakum and Gaines counties, Texas, was still the eighth-largest U.S. field by proved reserves in 2015, the last time the Energy Information Administration ranked oil field reserves. Ahead of Wasson were giants like Prudhoe Bay, Alaska, and Colorado's Wattenberg Field.

So, when Riley Exploration Permian leadership thought about drilling horizontal San Andres wells on Yoakum County acreage a stone's throw away from the Wasson Field, the company was pretty sure it would strike oil.

"We are offsetting one of the largest, legacy oil fields in America, which has produced over 2 billion barrels," Philip Riley, executive vice president and CFO at Riley Permian, told *Oil and Gas Investor (OGI)*. "We believe that's a good depositional setting."

Riley Permian started out with assets in Yoakum County, but has since expanded its footprint west on the Northwest Shelf. The company paid $330 million to acquire a largely undeveloped position in Eddy County, N.M., in early 2023.

Today, Riley Permian is one of the largest publicly traded companies operating on the Northwest Shelf, where unconventional drilling techniques are being applied to conventional rock.

"I truly believe the independents and the small, family-owned companies are going to play the biggest role going forward on unlocking new reserves."

GIDEON POWELL, CEO, CHOLLA PETROLEUM

"Sometimes we bifurcate things into black and white: Is it unconventional? Is it conventional?" Riley said. "The reality is, it's probably not quite so bifurcated and it's more of a spectrum."

Riley Permian's asset is categorized as conventional. But the company is developing that conventional rock with horizontal drilling and fracking processes largely associated with unconventional development.

"It's the combination of those two that's allowing this to work," he said.

VERADO ENERGY

Verado Energy's operations on the Eastern Shelf are concentrated in Scurry County, Texas.

Indeed, the marriage of unconventional drilling techniques and conventional oil-bearing zones is giving runway to independent producers all around the edges of the Midland and Delaware basins.

Gideon Powell, CEO of Cholla Petroleum, an Eastern Shelf E&P, calls them "hybrid" reservoirs.

"I truly believe the independents and the small, family-owned companies are going to play the biggest role going forward on unlocking new reserves," Powell said. "Exploration of these hybrid reservoirs, I think, is in its infancy."

In the Middle

The CBP and Northwest Shelf are garnering renewed interest by producers searching for future drilling locations, McKinney said.

Ring has grown in the CBP and Northwest Shelf through a string of acquisitions since McKinney joined the company as CEO in October 2020.

Until that point, the CBP and Northwest Shelf were "basically dominated by private companies," he said during Hart Energy's A&D Strategies and Opportunities Conference in October.

The area is still mostly dominated by private operators. Outside of Ring, the CBP's top producers include Blackbeard Operating, Elevation Resources, Formentera Partners, Maverick Permian and Lime Rock Resources, according to an analysis of Texas Railroad Commission (RRC) and Enverus data.

Occidental Petroleum, APA Corp., Exxon Mobil and Kinder Morgan Production Co. also produce large volumes from legacy assets on the CBP.

Lime Rock Resources' CBP asset in Andrews County, Texas, came with a mix of existing vertical and horizontal wells. Its 2017 acquisition of the Shafter Lake oil-weighted assets from seller Forge Energy signaled the company's entrance into the horizontal San Andres play.

Lime Rock has been focused on horizontal development on the platform since then, said Jonathan Hickman, COO at Lime Rock.

"We've largely moved away from legacy assets unless they have a significant amount of future horizontal development that makes sense for us," Hickman said.

Over the past year, most of Lime Rock's Permian oil production has come from the San Andres Formation, according to RRC data. The company has also drilled seven wells targeting the Devonian bench since entering the play, Hickman said.

Operators like Ring and Lime Rock enjoy the horizontal San Andres play because of its relatively low drilling costs and shallow production declines.

Ring can drill a San Andres well with a 1- to 1.5-mile lateral for between $2.3 million and $3.7 million, with costs ranging between $435 to $467 per lateral ft.

Diamondback Energy spends about $600/ft in the Midland Basin, even after combining with Endeavor Energy Resources, the company reported in third-quarter results. Permian Resources spends around $800/ft in the deeper Delaware Basin.

Ring is also drilling to vertical depths of around 5,000 ft, compared to the deeper Wolfcamp, Spraberry and Bone Spring shale formations that attract most of the Permian's investment.

Ring's San Andres wells don't have the same initial production spike than do a Spraberry or Wolfcamp well. Ring reports initial peak oil rates of 300 to 700 bbl/d. Wells in the core of the Permian can see IP rates of over 1,000 bbl/d.

But Ring says that San Andres horizontal wells have lower production declines and higher primary recovery than shale wells.

Producers are also searching in parts of the CBP for Barnett Shale upside. Elevation Resources has been drilling the Emma Barnett field on the CBP since 2016.

Lime Rock has drilled a single Barnett well, Hickman said. Larger operators like Occidental Petroleum and Continental Resources have also drilled in the Emma Barnett field recently.

"Typically, to the east side of the Central Basin Platform, we see more activity related to the Barnett," said Leslie Armentrout, president and co-founder of CBP producer Silver Cross Energy Partners, "and that has increased the value of stuff right on the edge of the platform."

Shelf Life

The San Andres play extends from the CBP into the nearby Northwest Shelf, which spans from the northern reaches of the New Mexico Delaware Basin into West Texas.

Ring and Riley Permian's San Andres assets in and around Yoakum County, Texas, are on the Northwest Shelf.

Riley Permian's 2023 acquisition gave the company a foothold in a different part of the Northwest Shelf: New Mexico's Yeso Formation. The company mainly targets the Yeso's Paddock and Blinebry formations, said President and CEO Bobby Riley.

Spur Energy Partners, another top producer in the Yeso trend, typically targets the same formations, said co-CEOs Jay Graham and Kyle Roane. Spur launched in 2019 with backing from KKR and a large team from WildHorse Resources Development, where Graham was formerly CEO.

WildHorse sold its Eagle Ford asset to Chesapeake Energy for nearly $4 billion in 2018.

Instead of acquiring land, drilling quickly and flipping the assets to a buyer, Spur aimed to develop a more sustainable, cash flow-focused business—acquiring PDP assets and using cash flow to fund a drilling program.

With a team with years of experience drilling horizontal wells in the South Texas Eagle Ford, East Texas and Louisiana, Spur liked the Northwest Shelf asset's existing base production and upside for future drilling.

"We like the ability to come into a conventional play and drill horizontal wells," Roane said.

Spur grew on the shelf through a series of acquisitions, including a $925 million deal with Concho Resources in 2019.

Spur is one of the top producers on the Northwest Shelf today. Production averaged approximately 32,000 boe/d in August, according to data from the State of New Mexico. Spur aims to exit 2025 at around 40,000 boe/d, Roane said.

"You could be standing on one location and a geologist would consider you in the Northwest Shelf and you can hit a golf ball to the Delaware Basin."

JAY GRAHAM, CO-CEO, SPUR ENERGY PARTNERS

Spur and Riley like the Northwest Shelf for similar reasons that Ring and Lime Rock like the CBP's San Andres conventional rock.

"Being a conventional play, our cycle times are much, much shorter than the shale plays—and it's shallower," Graham said. "We're drilling wells in five to six days."

On a dollar-per-foot basis, Spur's Yeso wells are "quite a bit cheaper" than shale wells landed in the Midland and Delaware basins, he said.

Spur's wells are coming in with IP rates at between 500 and 1,000 boe/d.

Plus, Graham said, the conventional play doesn't "have the same initial decline rates year over year that you see in the shale plays."

Riley Permian touted similar well results in its third-quarter earnings report.

And as Delaware Basin delineation and drilling activity moves north, producers think it's only a matter of time until that activity reaches the Northwest Shelf.

There is no "magical demarcation" or line in the sand between where the Delaware Basin stops and the Northwest Shelf starts, Graham said.

"You could be standing on one location and a geologist would consider you in the Northwest Shelf," he said, "and you can hit a golf ball to the Delaware Basin."

But the difference matters to public investors. E&Ps focused on the core of the Permian are typically more favored in the public markets.

Investors also like scale, which public producers on the CBP and shelves lack. Riley Permian ($733 million) and Ring Energy ($304 million) barely clear $1 billion in market value between them.

"I believe small cap valuations are not going to be the same when compared to large cap companies," Bobby Riley said. "We have observed that scale does impact valuation."

Riley Permian has demonstrated "solid" financial performance, a commitment to return capital to shareholders in the form of dividend distributions for the past five years and the ability to grow production year-over-year, all while lowering capital spending.

"We are among the leaders in our peer group with those numbers and our performance holds up well, even when compared to large-scale companies," Bobby Riley said. "Our objective is to match pace with larger companies as we continue to build scale."

RILEY PERMIAN

Riley Permian is one of the largest producers on the Northwest Shelf, spanning from New Mexico into West Texas.

M&A Interest

Dealmaking interest on the CBP and Northwest Shelf started heating up once again this summer, McKinney said.

In September, APA Corp., parent company of Apache, announced a $950 million sale of conventional assets on the CBP and Northwest Shelf to an undisclosed private buyer, reportedly Hilcorp Energy. The divested assets had estimated net production averaging 21,000 boe/d (57% oil). The non-core asset sale came after APA closed a $4.5 billion acquisition of Callon Petroleum, deepening Apache's portfolio in the core of the Midland and Delaware shale plays.

Exxon Mobil also is selling select conventional assets in the area to Hilcorp for roughly $1 billion. Exxon closed its own $60 billion acquisition of Midland Basin giant Pioneer Natural Resources earlier this year.

The Exxon and APA deals were for legacy, PDP-weighted assets with relatively limited future horizontal upside, executives said. But some E&Ps are searching for that kind of cash flow-boosting PDP through M&A.

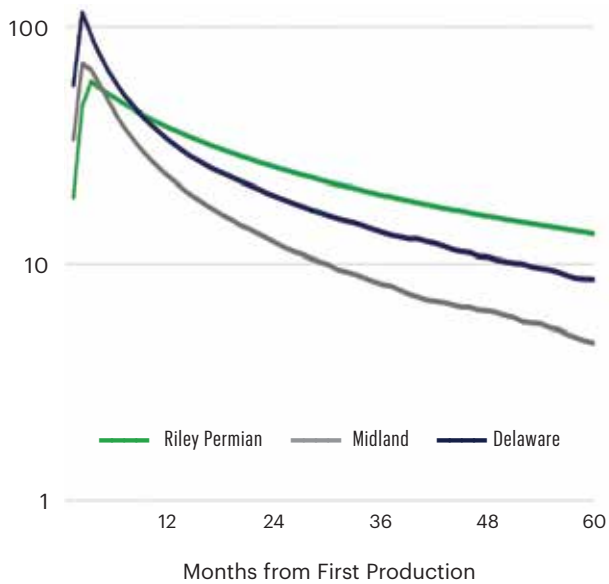
"It was extremely competitive on the Apache deal," Roane said. "We liked the level of interest that the Northwest Shelf got and the allocation of value that the Apache deal did have on the Northwest Shelf asset."

Interest for these assets was high because of the huge amount of resource left to be recovered, lowering operating costs and marginally improving production, Hickman said.

But legacy, PDP-weighted assets are of less interest to an

Oil Production Rates Over Time

Bbls/d per 1,000' of Lateral Length



SOURCE: RILEY EXPLORATION PERMIAN 3Q24 INVESTOR PRESENTATION

Riley Permian says its Northwest Shelf wells have lower initial production rates but shallower declines than Midland and Delaware shale wells.

operator like Lime Rock Resources.

"For us, the [plugging and abandonment] liability, the environmental liability of all those old assets, just kind of outweigh the benefits that we see for right now," Hickman said.

Chasing The Strawn

Industry veterans didn't believe Bob Eagle when he told them about the horizontal Strawn wells his company was drilling on the Permian's Eastern Shelf.

"They'd say, 'No you're not," Eagle told *OGI*. "You're not in the Strawn, you're in the Cline or the Wolfcamp Shale.'"

The Strawn Formation was already well-known to Eagle, president of Clear Fork Inc. of Abilene, Texas, and oilmen like him on the Eastern Shelf. Vertical oil production from the Strawn interval dates to 1920, according to state records.

"We've all drilled through it or for it our whole careers," said Eagle, who has operated Clear Fork on the Eastern Shelf since 1981.

But it was the horizontal development of the Strawn sands starting in 2015 that kicked off a frenzy of new investment, leasing and drilling activity in the area.

"Part of that is a lot of the old-timers in Midland just didn't believe these results could be happening on the Eastern Shelf," Eagle said.

Nearly a decade later, Clear Fork ranks among the top oil producers on the shelf, after drilling or participating in about 60 horizontal wells.

Clear Fork and other top operators have learned much about the Strawn sands–and the challenging variability drilling the interval across the play–over that period.

With the public E&Ps so focused on the Midland and Delaware basins, the Eastern Shelf Strawn play has emerged as a sort of "independent paradise," Eagle said.

"But I would say there's a fine line between paradise and a graveyard," he added. "Most people would say it's a graveyard, but that's what makes it interesting."

Other top producers on the Eastern Shelf include Moriah Energy Investments, Verado Energy, and Cholla Petroleum.

Chris Graham, president and CEO of Verado Energy, remembers well the Eastern Shelf's leasing frenzy last decade. He helped kick it off.

Historically active in the East Texas Oak Hill Field, Verado was looking for new runway when Graham was introduced to King Operating at an industry conference.

King Operating had acreage and vertical Strawn wells on the Eastern Shelf–but the company was looking to boost production, Graham recalled.

The two producers discussed Verado's experience fracking legacy vertical wells at Oak Hill and pondered how similar techniques could be applied on the Eastern Shelf.

"We decided it's not a good idea to frac the whole wellbore and try to get as many zones comingled at once," Graham said. "But since you know the Strawn's producing, it looks like it's got some characteristics where we said, 'Let's go horizontal on this.'"

With King as operator and Verado as a non-operated interest holder, the companies completed the Dessie 91 #1H well in Scurry County–near the town of Hermleigh, Texas–in August 2015, Texas Railroad Commission (RRC) filings show.

"It came in phenomenally, especially for a half-length horizontal well," Graham said. "After seeing the results on that, we said, 'Let's drill a full-length one.'"

Verado and King teamed up on a second well, the Kate 143 Unit #1H, which went to sales in 2016. Impressed by its performance, too, Verado bought out King's interest and took operatorship of the Hermleigh assets.

"Since you know the Strawn's producing, it looks like it's got some characteristics where we said, 'Let's go horizontal on this.'"

CHRIS GRAHAM, president and CEO, of Verado Energy

"We finished up that third well and we just kept going from there," Graham said.

Operators kicked off a land rush after seeing Dessie's impressive output, and the Eastern Shelf's horizontal Strawn play was born.

Since the Dessie well came online, operators have drilled nearly 200 new horizontal wells in Scurry and Fisher counties, according to RRC data.

And after nearly a decade of exploration, testing and drilling, producers are looking for new upside on the Eastern Shelf.

Moriah has been active on the shelf since 2015, but started a new leasing effort the next year, spudding its first horizontal in 2018, Moriah President Tyler Harris said.

The company still has a few locations left to drill in the core Scurry-Fisher part of the shelf. Moriah completed a 10,500-ft lateral, the Hannah #1H, in Scurry County last year. Verado contributed some of its acreage to Moriah to make the 2-mile well fit, Graham said.

But Moriah has also been active to the south, in Tom Green and Irion counties, Texas, near San Angelo, RRC data show.

Moriah's first horizontal in Irion County, Tullos Unit #1H (~8,000-ft lateral), was completed in November 2023 targeting the Canyon bench. RRC records show production from Tullos Unit #1H peaked at approximately 712 bbl/d in January.

A Strawn well completed in Tom Green County last December–Mozelle Unit #1H (~10,500-ft lateral)–produced over 600 bbl/d in April.

Harris was tight-lipped on the recent activity in the southern Eastern Shelf.

"That play is very early on its life cycle and we're still evaluating results to assess the return profile and attractiveness of that area," he said.

Moriah is delineating the play along with Rising Star Energy Partners, which has submitted data on five wells drilled in Irion County.

Clear Fork has ventured into that part of the Eastern Shelf yet, but Eagle acknowledges that "they're making really, really nice wells there."

"It's two-tiered–it's a Strawn and Canyon sand," he said.

Repeatability and Scale

Producers on the CBP or Eastern or Northwest shelves have fewer shots on goal and smaller sandboxes to play in, compared to the core Permian plays.

Permian producers and their public investors favor the Permian's stacked pay of multiple productive benches: From the popular Wolfcamps, Spraberrys and Bone Springs to the

MORIAH ENERGY INVESTMENTS

Lasso Drilling Corp.'s Rig 101 drills the Mozelle Unit #1H for Moriah Operating in Tom Green County, Texas, in October 2023.

more exploratory Avalons, Deans, Barnetts, Woodfords and Devonians.

On the Eastern Shelf, a producer might be able to land a lateral in a single zone, Eagle said. Two, if you're lucky. In the Yeso trend in New Mexico, producers mainly target the Paddock and Blinebry zones. It's a similar situation on the CBP, where the San Andres has been a top producing interval.

There is stacked pay potential further to the south of the platform, where Ring is drilling vertical wells from the shallow Clear Fork to the deeper Wolfcamp zone in Ector and Crane counties, Texas. But drilling a 21-well pad targeting six different benches really isn't an option for producers on the platform or shelves.

Differences in rock quality and well spacing also constrain these plays.

Wells can typically be drilled closer together in the tight shale rock plays. Producers on the CBP, Eastern Shelf and Northwest Shelf have generally gone with wider, conservative well spacing to reduce interference through the porous, permeable conventional rock.

"Overspacing is just as much acceleration in reserves as it is finding new reserves," Bobby Riley said. "Our approach has been to avoid overspending dollars unless there is a high degree of certainly as to what we're doing."

That reduces the amount of white space on a map for an E&P to work with, so to speak. And it's why they're considered small plays.

Replicating success from well to well across these small plays has also been challenging in certain areas.

What the shale revolution brought was the concept of a resource play being repeatable, Riley said.

"Shale resource plays took out some of that risk and uncertainty," he said. "Whereas, people historically associated 'conventional' rock with more uncertainty and less repeatability. You don't know what you're going to get from one well to the next."

Producers on the Eastern Shelf report significant variances from well to well across the play.

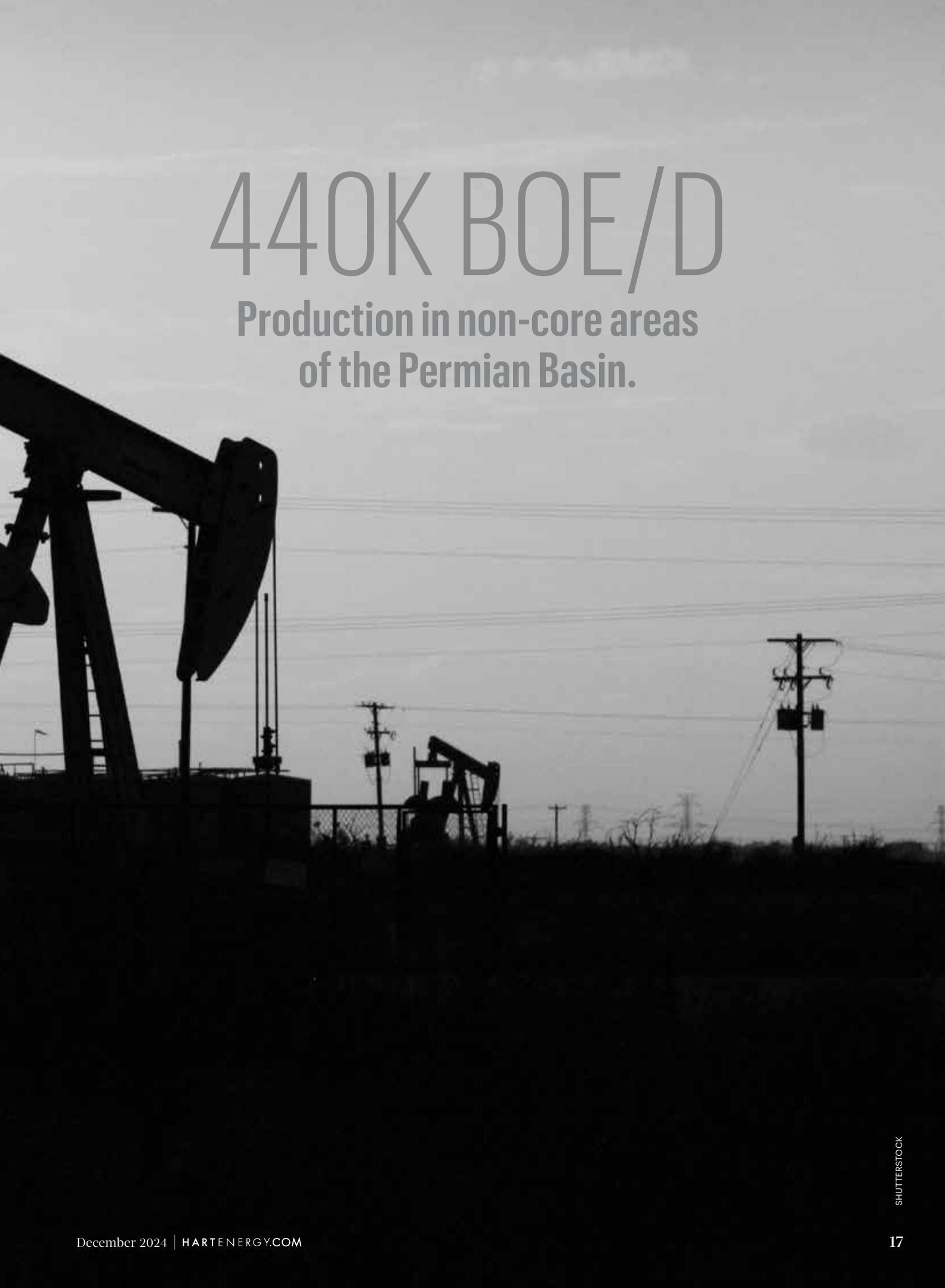
"We can't sell anything," said Powell at Cholla. "No one's going to give any value to the upside because we can't even internally explain why it works sometimes."

And it's not just the shelves and the CBP. Even bigger plays like Wyoming's Powder River Basin are notorious for variability in the deeper stacked pay zones.

But as U.S. shale matures, producers will increasingly consider the smaller plays, said Continental Resources Executive Chairman Harold Hamm in an interview with *OGI*.

The reality is the industry probably won't find another Permian Basin or Bakken Shale that's yet to be discovered, Hamm said.

"There are going to be smaller targets that people go look for," Hamm said. "There'll be some other ideas, but the magnitude is not going to be the same." OGI

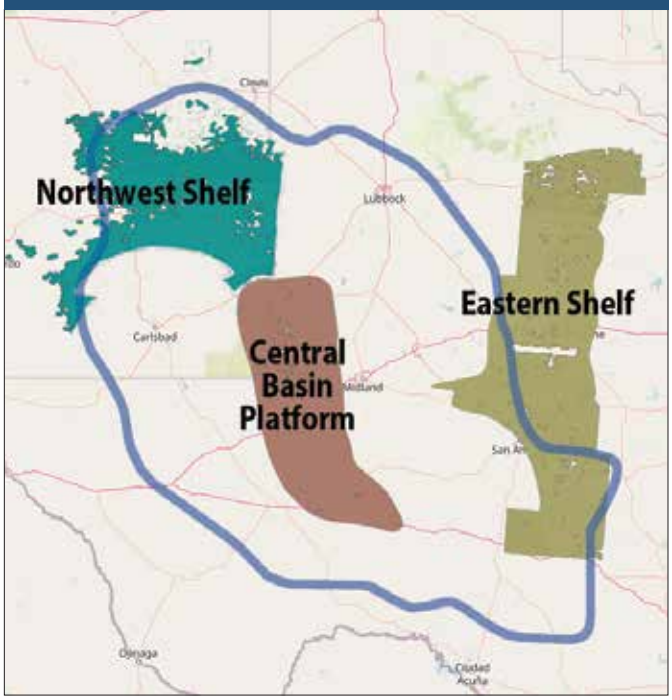


SHUTTERSTOCK

BASIN FOCUS: NON-CORE PERMIAN

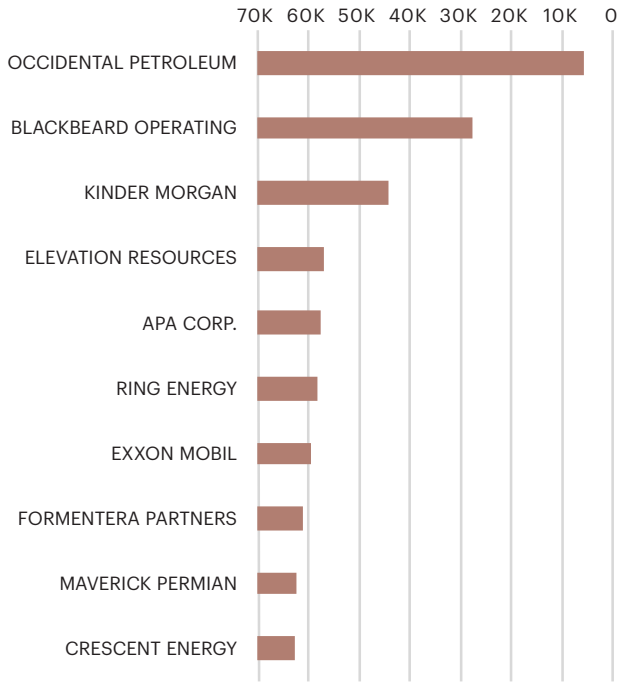
Production in the Central Basin Platform, Northwest Shelf and Eastern Shelf of the Permian Basin.

NON-CORE PERMIAN BASIN PLAYS



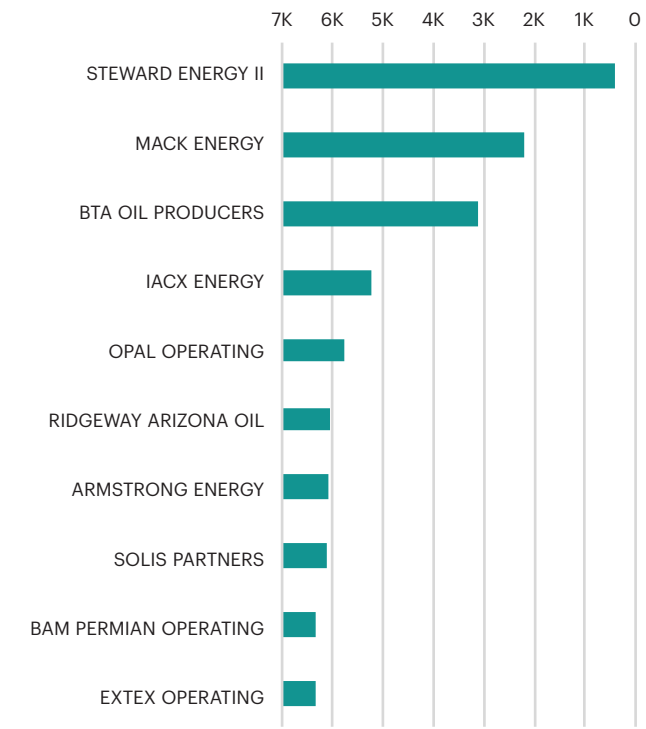
Leading Central Basin Platform Operators

boe/d, 2025-2024



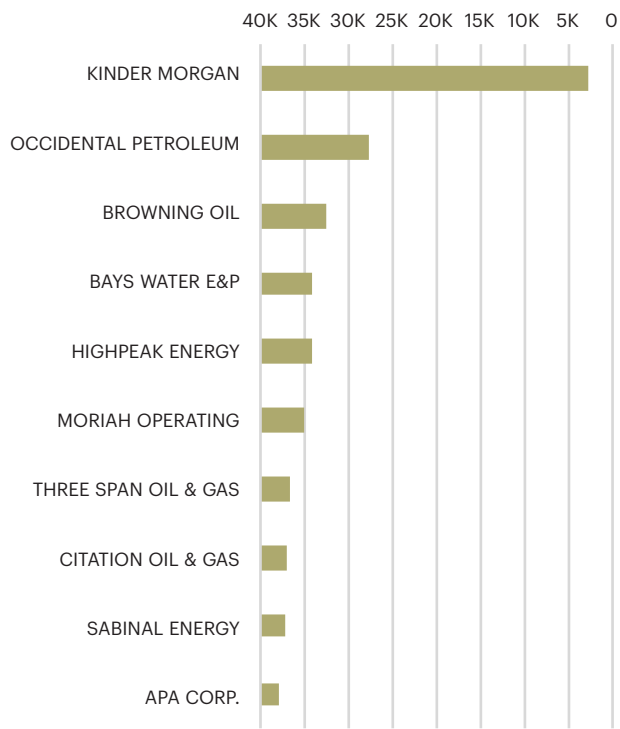
Leading Northwest Shelf Operators

boe/d, 2015-2024



Leading Eastern Shelf Operators

boe/d, 2015-2024



SOURCE FOR CHARTS AND MAPS: ENVERUS

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PERMITS

Texas and Colorado led all states in well permit approvals.

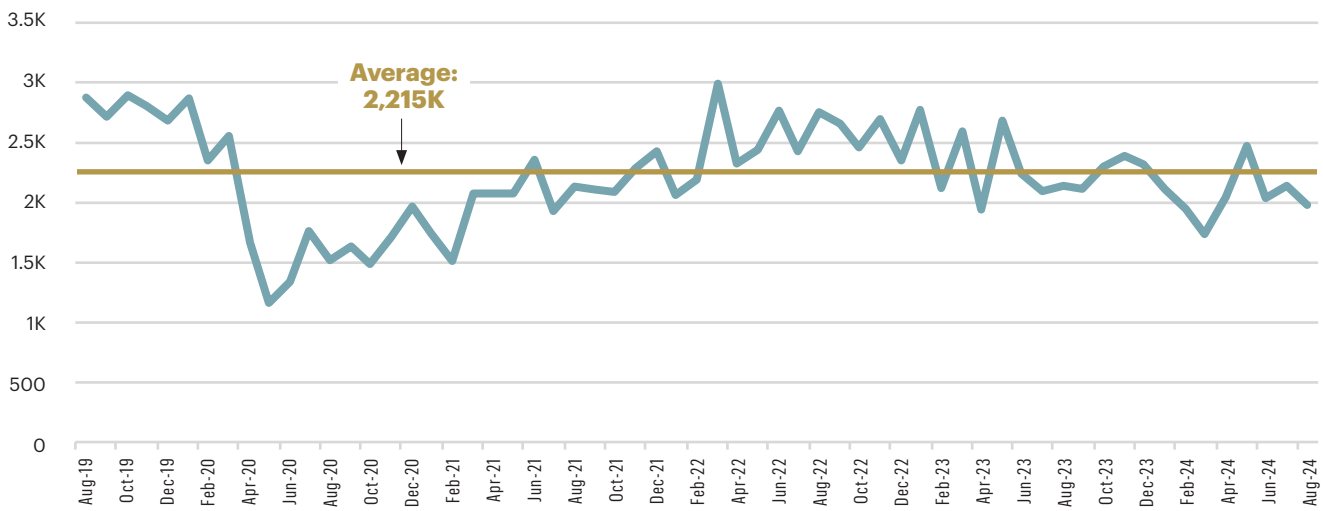
Permitted Wells by County

Rank	County	Well Count
1	Martin, Texas	73
2	Johnson, Wyo.	34
3	Lea, N.M.	29
4	Eddy, N.M.	21
5	Midland, Texas	21
6	Converse, Wyo.	20
7	Weld, Colo.	18
8	Reeves, Texas	17
9	Mountrail, N.D.	16
10	Uintah, Utah	16

Permitted Wells by State

Operator	Well Count
Texas	283
Colorado	163
Wyoming	79
North Dakota	54
New Mexico	50
Louisiana	25
Utah	21
Kansas	19
Oklahoma	17

Permitted Wells



SOURCE: REXTAG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Exxon Mobil Pioneers the Permian and Guyana

Liam Mallon, Exxon Mobil's upstream president, discusses how XOM liquids production has hit a 40-year high on the 25th anniversary of the Exxon-Mobil merger, and plans for the future.

JORDAN BLUM
EDITORIAL DIRECTOR
jblum@hartenergy.com

The Exxon and Mobil merger closed 25 years ago on Nov. 30, 1999, marking the biggest corporate merger ever at the time.

This year, Exxon Mobil closed its biggest acquisition since then with its purchase of Pioneer Natural Resources in the Midland Basin for $60 billion.

In November, Exxon Mobil announced its highest liquids production in more than 40 years, hitting almost 3.2 MMbbl/d. Overall production also spiked to nearly 4.6 MMboe/d.

Led by the Permian and deepwater Guyana, volumes are expected to surge to more than 5 MMboe/d by 2027.

This growth is overseen by Liam Mallon, Exxon Mobil's upstream president. A native of Ireland, Mallon joined Mobil in 1990 in Aberdeen, Scotland, later serving in Nigeria, Australia, Canada, Malaysia and, now, in Texas overseeing Exxon Mobil's global upstream operations.

Mallon sat down with Hart Energy Editorial Director Jordan Blum at Exxon's Spring, Texas, headquarters to discuss the upstream growth and much more.

Jordan Blum: It's the 25th anniversary of the Exxon and Mobil merger. How revolutionary was that for the company, and how do you see things evolving from then to today as the biggest oil and gas producer in the Americas?

Liam Mallon: I was in Nigeria with Mobil when it was announced. You still remember these moments in your life when you look back. As you can imagine at that time, for many of us it was filled with excitement but also anxiety. Here we are 25 years later, and here I am personally, and truthfully probably never would've envisioned that at that time. So, it is pretty exciting. I'm a career oil and gas upstream petroleum engineer. I'm passionate about what we do. I'm passionate about this industry, and was as passionate then 25 years ago.

For me, personally, being part of that, and then several years later acquiring XTO [Energy]. And then, of course, the Pioneer transaction. During all those periods, if I go back, we were producing around 4.5 MMboe/d. Today, we're producing around [4.6 MMboe/d in the third quarter], and we're going to grow that substantially as we go forward. It's a testament, I think, to the people, the ingenuity that this is a depletion business if you think about it. This is a depletion business–depleting at 5% to 7% to 10%–depending on how much investment you include in the calculation. And it depletes at that rate every year. And, yet, here we are 25 years later producing, as Exxon Mobil, about the same. It's pretty staggering when you look at it from that perspective. Particularly in recent years, doing that and reducing our emissions intensity dramatically makes it a very satisfying proposition. Many things have changed, but many things are the same. It's 40 years for me in the industry this year in October.

JB: Congrats.

LM: And it feels like yesterday when I walked in at my first petroleum engineering job. Quite a journey.

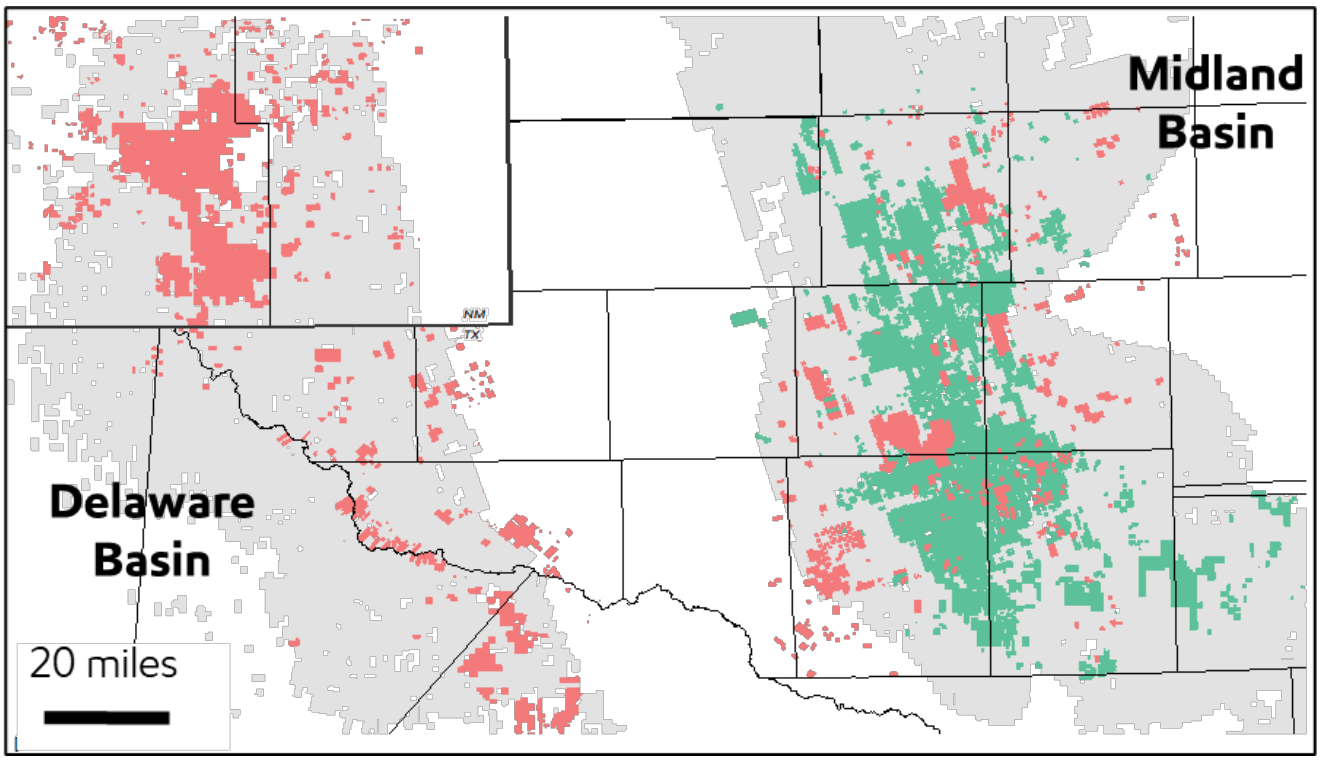
JB: You were in Nigeria at the time. Of course, Exxon Mobil is still very big globally, but increasingly maybe Americas-centric with all things shale and Guyana. I wanted to just hone in on the Pioneer deal a little bit and

"The inventory position, the quality is all well above our investment thresholds with what the industry would call Tier 1, and that lasts for a long time."

LIAM MALLON, upstream president, Exxon Mobil

DANIEL ORTIZ

Pioneer's Contiguous, High-Quality Acreage Enhances Exxon Mobil's Permian Position



SOURCE: EXXON MOBIL

Exxon Mobil Acreage Pioneer Acreage Others' Acreage

get your take on just how transformational this is for the company, and how everything's going with integration, assessing acreage and everything involved?

LM: Obviously, the Permian is very significant, but we still have a very large global footprint with a very large footprint even in Nigeria as we talked about. We still have a very large, very diverse portfolio that is across all the resource themes, whether it's tight oil, tight gas, conventional oil, conventional gas, LNG, deepwater, etc.

As it relates to the Permian and Pioneer, I would use the word that you used–I do believe this will be transformational. This, for us, was strategic M&A, and we are very selective about those kinds of opportunities. We really look to find an opportunity where we can bring our competitive advantages and, in this particular case, bring our unique competitive advantages to a great, great company with great people that have their own unique competitive advantages.

So, what we talk a lot about is bringing the best of both, and that was a very clear principle in this Pioneer-Exxon Mobil combination. We didn't really view it as an acquisition. We viewed it as a merger of equals within the Permian from a size perspective and volume perspective. What it allowed us to do was to establish, most importantly, a hugely critical, contiguous acreage position. It's given us the largest inventory of undeveloped wells by far in the industry. That gives us some very unique opportunities to apply our development approaches, our technologies, and bring together the best of both capabilities that you really couldn't do separately until you stitched all this together.

The contiguous nature and the quality of the inventory really sets the foundation for everything we'll do from here. It allowed us to bring our net-zero ambitions and apply it to an even bigger footprint, and now produce a significantly larger quantity of Permian oil with net-zero emissions. I think all of those combinations made this a two plus two equals five type of opportunity. I would tell you the speed at which we closed on this was quicker than most expected, and I would tell you the speed at which we've been integrated is quicker than most expected. It's going better than expected.

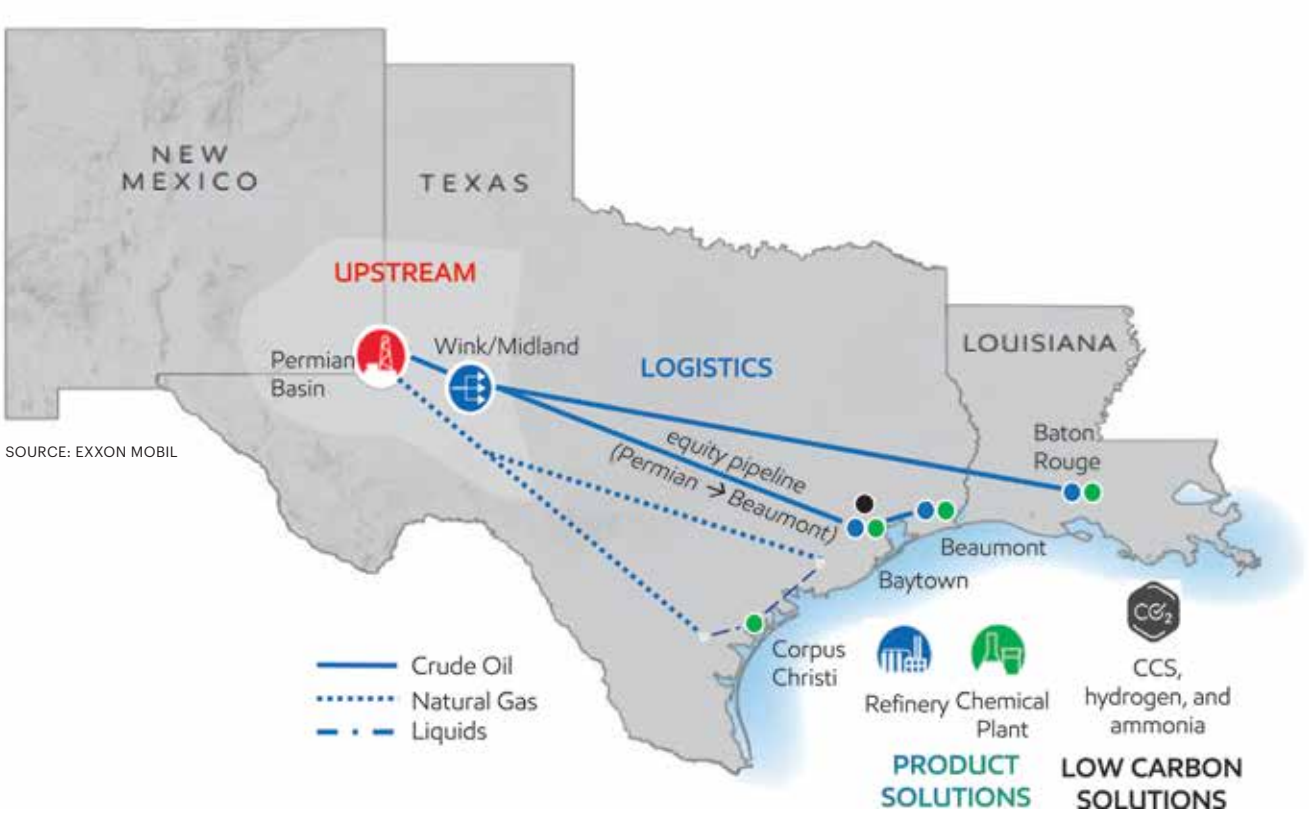
Particularly pleasingly, the vast majority of [Pioneer] people came and stayed. The focus and the effort on ensuring that we bring that best of both, and we make everybody feel welcome and integrate them into one team and one common approach will pay huge dividends for us. The capabilities we see in the Pioneer people exceed even what we expected, and there were high expectations going in. We match that with our people and our capabilities, and I think we built something truly transformational.

JB: You talked about having that massive contiguous footprint, so, obviously, you can do more with longer laterals...

LM: The longer laterals, you can apply higher frac intensities. We take our cube approach, our development approach, which of course industry continues to evolve that approach to optimum. We take that, and we can apply it at scale now to a much bigger footprint. Being able to drill longer laterals, we've now drilled several 4-milers this year, and being able to up-space and drive improved frac intensity. We believe we'll ultimately drive significantly higher recovery than

Maximizing Permian Value Across Exxon Mobil's Full Value Chain

Integrated logistics connect high-value, light Permian crude from both companies to Exxon Mobil's premier refinery and chemical footprint on the U.S. Gulf Coast



SOURCE: EXXON MOBIL

before. We're a strong proponent of that and bringing our technologies to bear on that. I will tell you though that, equally encouraging, we've seen many things on the Pioneer side in terms of practices and approaches that are equally compelling. It will be bringing the best of both to deliver something that I think will be beyond even what we thought going in.

JB: A lot of companies right now have to look more at Tier 2 or 3 acreage. They're dealing with higher expenses, lower cash flow per boe. That's not really something you have to be concerned about at this point?

LM: The inventory position, the quality is all well above our investment thresholds with what the industry would call Tier 1, and that lasts for a long time. There is also significant inventory in the lower tiers that I'm confident we will ultimately improve efficiency over time and make that quality work as well. Obviously, two critical things are to lead on an efficiency perspective, to have the optimum development plan from both efficiency and a recovery.

We believe that our approach has always been the most value driven, and that's always been our objective. We've been very clear that we were chasing the highest NPV (net present value) or the highest value development. When we can combine that with the leading efficiency and leading recovery, then you're going to create a step up. In the early days, I think you'll see our efficiency metrics are very, very strong on both the drilling side and the completion side. It is always hard to normalize that data because it depends on the efficiency. It's pretty easy to measure it consistently. We feel confident on that.

JB: Is there anything you can say in terms of melding the cube development with some of the best practices of Pioneer, and any tweaks or adjustments that are being made?

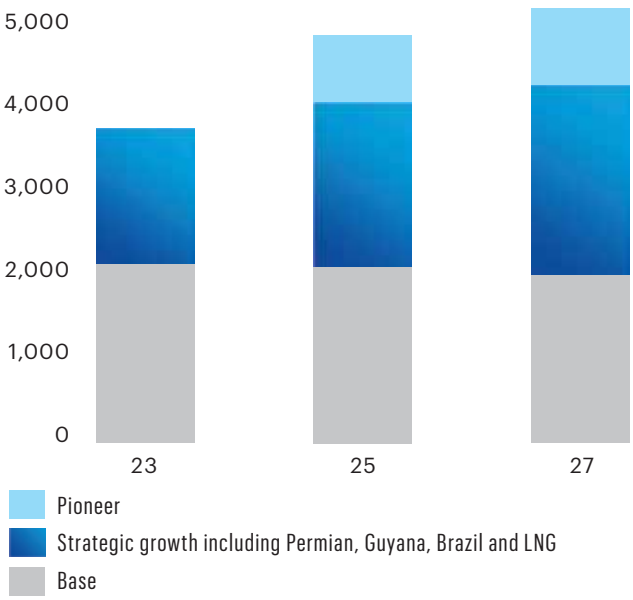
LM: I think what you're going to see is continued tweaks in spacing and in frac density. We talk openly about our cube approach. Industry tends to use these terms. Some best benching, although less so these days. A lot of people talk about co-development, which is sort of a pseudo-cube, but not necessarily the whole stack. And then we're going after the whole stack in a cube, and you'll have evolution of cubes as you optimize within that stack and learn as you go. What is the optimum spacing? What's the optimum frac intensity? What's the optimum execution development plan? I would just say that's the magic sauce that we bring that won't be the same as others bring. What I think we've been able to pivot to very quickly is an integrated plan on all the acreage, and it's well ahead of where we thought we would be. We thought it would take us just a little longer to get to where we could normalize both approaches to what we think is optimum. We've very quickly gotten to that point. The optimum will always evolve, but we've been quicker to get to that point than we had expected. I think it's partly because of that whole people integration.

JB: Now that you're much, much bigger in the Midland Basin of course, are there any thoughts about emerging zones, such as the Barnett-Woodford? Or is that just something you don't have to worry about quite yet?

LM: Of course, we would look at that. But we're focused on bringing these two organizations together, do that

Compound Annual Production Growth Rate of >8% for 2023 - 2027

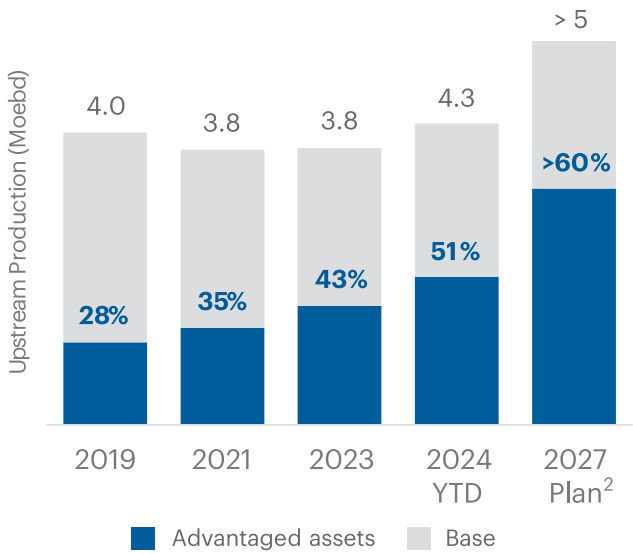
Koebd, net, $60/bbl real Brent



SOURCE: EXXON MOBIL

Growing Value from Advantaged Assets

Percentage of advantaged assets of total upstream production (including Pioneer)



Upstream unit earnings (excluding Pioneer) (per oeb; $60/bbl real Brent)[3]				
~$5	~$7	~$9	~$10	~$13

SOURCE: EXXON MOBIL
1 PRODUCTION ADJUSTED TO $60/BBL REAL BRENT. DIFFERENCES VERSUS ACTUAL PRODUCTION INCLUDE ENTITLEMENTS AND OTHER PRICE-LINKED VOLUME IMPACTS.
2 ESTIMATES FOR UPSTREAM PRODUCTION COMBINE PIONEER 2027 S-4 ESTIMATES AND EXXONMOBIL'S 2027 PLAN.
3 UPSTREAM UNIT EARNINGS ($/oeb) EXCLUDES PIONEER'S CONTRIBUTIONS.

- **4Q24 OUTLOOK:** seasonal scheduled maintenance to lower volumes by ~30 Koebd
- **Full year 2024 outlook:** production, including eight months from Pioneer, expected to be ~4.3 Moebd
  - Full year 2024 total Permian production expected to be ~ 1.2 Moebd

safely, fulfill our commitments on net zero, and get the value out of the integrated development. There are other benches of interest. We remain active across many basins in the U.S. We're still producing over 100,000 boe/d in the Bakken. We're still active in the Eagle Ford. We're still active in Appalachia and Haynesville. Maybe other than the D-J (Denver-Julesburg Basin), we're pretty much active in all the basins. Obviously, the focus is the Permian given the significance. I'd say we continue to test that, but we have so much on our plate. Today, we're running close to 40 rigs combined. It's a massive scale of activity that we're focused on executing.

JB: Before I pivot away from the Permian, can I get you to compare and contrast Exxon's Midland and Delaware positions? You've obviously been huge in New Mexico, but now much bigger in the Midland.

LM: The Pioneer acreage is all Midland, which was the driver for the acquisition. Our [Midland] inventory was getting low. We have an incredible position in the Delaware and we've been primarily focused on Poker Lake, but there are other Delaware areas. Big Eddy is a very prospective, well-appraised area that is part of our future development plans. The Delaware is a little deeper on some of the zones, a little higher pressure, and that also means it's a little higher cost. But, from a quality and profitability perspective, they're both world-class, advantaged assets. Our focus is equally on our position in the Delaware as it is on the Midland acreage. I'd say the undrilled or undeveloped inventory is higher in the Delaware, but now you start to see that inventory getting more equalized as we brought in Pioneer. But, no question, Delaware is earlier.

There are vast differences in one state versus the other in terms of access to infrastructure. In Delaware, we elected to largely control our own destiny. We built out our own gas processing. We've participated in pipeline equity offtake, and I think that's going to pay huge dividends to us as we go forward and develop that resource. I think that was a key strategic decision to build that Cowboy plant, and it's performing very, very well.

JB: And then you brought on the Wink to Webster Pipeline not too long ago, and you have the Sentinel Midstream joint venture now.

LM: It gives us an advantage because we're integrated the whole way through the refining system. We can and will use those assets to our advantage, either blending or trading or other activities that you can't do if you're isolated from all that. We still have a reliance on third parties. We don't have total control over our own destiny. Primarily, we do out of the Delaware. In the Midland, it's less important because there is so much infrastructure that's built. You don't necessarily need to be all the way through that value chain. That advantage was always part of our value proposition. We see it evolving, and it's linked to some of the expansions we've made in our refining systems to be able to take advantage of that both on the gas and the crude side.

JB: Switching gears just a little bit. Obviously, you got ahead of things with the Pioneer deal. But there's clearly been a big wave of energy M&A overall. How do you see that continuing to unfold as the industry continues to consolidate and, not get smaller, but have fewer players?

EXXON MOBIL

Exxon Mobil's operations in the Permian Basin.

4.3M boe/d
2024 production outlook

30k
Lower volumes in Q4 due to scheduled maintenance

1.2M boe/d
Full-year 2024 Permian production outlook

LM: From an Exxon Mobil perspective, we continue to see a vital role for oil and gas. As such, we continue to project growth. That's what we've been doing and that's what we aim to continue to do. At the same time, continue to commit to our emission intensity goals. Back to where I started, it is depletion business. So, to grow, you have to not only offset depletion. And, as has always been the case in the upstream, exploration remains important and, certainly, we strategically remain very active in that space. Continuing to find and develop technology remains important to achieving that objective. Historically, much of the industry's growth has come from technology breakthroughs, whether it's those that unlocked tight oil and tight gas, or seismic processing or reservoir management techniques. If you look at the large fields in the world, they've largely gotten bigger due to technology breakthroughs over the years. So, exploration, technology breakthroughs and then, of course, the role that acquisitions may play depending on your individual objective.

I think acquisitions will continue to play an important role for us, but we would only have interest where we saw a strategic proposition that allowed us to take advantage in a unique way. That is absolutely the key. Finding that opportunity and then pursuing it at the right time is something that we will always look to see where those opportunities exist. You can debate consolidation. Does that lessen those [opportunities]? I would say that continually changes, but more important for us, is there a unique value proposition? And can we exploit it in a way that really does make sense beyond straight valuation?

JB: I want to pivot in a minute to some of those exploration successes. But continuing on M&A quickly. Obviously, not just from Exxon-Pioneer, but from lots of other deals, you'll have lots of non-core divestments, a lot of companies are doing that. You're looking at possible Bakken sales? Maybe some non-core Permian and Central Basin Platform or parts of New Mexico? How much can you elaborate on what you are looking to do and what might happen in the not-so-distant future? *(Editor's note: Shortly after this interview, Exxon agreed to sell about $1 billion of mature, conventional Permian Basin assets in West Texas and New Mexico to Hilcorp Energy.)*

LM: We were very clear externally back in 2019 when we set a very ambitious goal of $15 billion of asset sales. We've largely achieved that. Again, we are in a growth business. I think divesting very, very mature assets where, frankly, others can bring advantages that might not play to our strengths, or we may not be able to resource everything we want to do, makes sense for us. Coring up in our unconventional position has made sense, and I think that's what you've seen us do is core up those assets that have enough scale, running room and potential for us to be able to continue to exploit our advantages.

To be clear, we're not [fully] exiting the Bakken. We're taking advantage of really good opportunities with some great partners. And the rest of it is fairly mature, a lot of dry gas. We've been exiting a lot of old dry gas. The Barnett [Shale] is a good example. Some of the recent stuff you've seen, Fayetteville and things like that. I would say very old, mature dry gas fields where we saw limited room for us to bring our unique competitive advantages.

I think you're going to see divestment continue to play a role based on what I've told you. But I would say, as you look at that 2019 period to today, we have more to do to tighten the portfolio. As we go forward, it'll be a question of balancing that growth objective with the applications of divestments. It'll still be an important piece of the strategy, but perhaps a little less than the last few years. That will change over time, too, as depletion sets in and maturity sets in and the markets adjust.

JB: Pivoting to South America, I wanted to go in on Guyana, which is obviously a huge success. But before we get into any of the details, I was hoping to get your

take on how the discovery almost didn't happen. Can you elaborate on that?

LM: It was not that it almost didn't happen. If you go back and trace the history of Guyana, this is the nature of exploration to some extent. As a basin, several wells were drilled in Guyana through the '60s, '70s. The proposition was that there were hydrocarbons there because there was a heavy oil field which still produces today in Suriname. So, the geologists, the geoscientists know there's a source rock somewhere. The question is where, right? People were postulating it was in the shallow waters and exploring there and found nothing. Then the hypothesis that our team came up in the early part of the 2000s was that it's potentially out in the deeper water. Of course, technology at that time wasn't where it is today. Imaging wasn't where it is today. And then the country, the activity was under force majeure for quite some time.

I think it was kind of a unique proposition hypothesis and the only way to test it was to go drill it. And these were expensive wells to drill and high risk. And people talk about the [government] contract. The contract is very fair relative to the risk that was taken. I think that's widely acknowledged. We put together a proposition. Shell exited; we were 50:50. We elected to seek partners to manage that risk. Hess (Corp.) and, at the time, Nexen came in, which soon became CNOOC, which it is today. When we marketed the seismic line in the data room, it's the same seismic line we drilled the first well on. A lot of companies came and looked at it, and the only two bidders were the ones that I told you about. Some of the biggest, best companies in the world.

And then we drill the success case. The story I tell is the second well we drilled was dry. It's the business we're in. Only time could tell, but if you had drilled that well first you might not have gone on. That's just a fact. So, to me, all it talks to is the nature of exploration. By definition, it is still a business that has high risk and takes unique capabilities to discern where that potential might lead to something like Guyana. So that's really the background. But, we made the discovery.

I've been with this from the very start. I was in Georgetown (capital of Guyana) in 2015, very early. And the pace at which we've developed this, we've gone from zero to now, today, greater than 600,000 bbl/d (660,000 bbl/d in September), and we'll grow to the 1.2 MMbbl/d capacity we talked about by 2027 in a very short period of time at a pace that we've never seen in the deepwater industry. I do put that down to capabilities, partnerships and, frankly, it's high quality. The rocks are very high quality, the subsurface is very good, but we've also done an incredible amount of things with our technologies to improve it. These boats (FPSOs), for example, let's say they're designed for 600,000 bbl/d. We're producing (almost) 100,000 bbl/d more today. We're optimizing debottlenecking, finding ways to do more than we thought we could do. And that just continues. It's an incredible success story.

The partnership, the government relationship, the way we contracted this with our partners, SBM (Offshore), MODEC, our subsea partners, TechnipFMC, and the quality of our partnership with Hess and the Chinese. You couple all that with the best we have with our capabilities, whether it's drilling, project management, operations, whatever it is. And you get the basics of what success looks like in our business. The end of the game would be to repeat that.

> *"We viewed it as a merger of equals within the Permian from a size perspective and volume perspective."*
>
> **LIAM MALLON,** upstream president, Exxon Mobil

JB: You have the three FPSOs on now, and then three more to go each of the next three years.

LM: They have been coming on roughly one a year, and we're still exploring. Of course, we hope to be able to also progress additional developments. We're not yet ready to talk about those. I think you've seen that we put in an environmental impact assessment for a seventh boat, *Hammerhead*. That's already in and progressing, and we're still exploring. We have five rigs down there today. It's a very large area. We continue to have confidence that there'll be more potential there.

JB: The fourth project, Yellowtail, is slated to come online next year. Do we know about when in 2025?

LM: By the end of the year is what we've said.

JB: Obviously, there's a lot of runway there. You're also working with Petronas in Suriname, and I think you've made three discoveries. Is there anything you can say about that progress?

LM: It's a little earlier in Suriname. It's a little higher GOR (gas-oil ratio). I think you saw TotalEnergies progressing the first of those. It's still early in that process. It needs more appraisal, needs more definition and further exploration, but it's much earlier in that process.

JB: We've talked more oil, but I wanted to get your take on your bullishness for gas and LNG, and how things are looking with Golden Pass LNG. Obviously, it's nice getting that (FERC) time extension.

LM: Yes, the FERC extension. Our strategic upstream, big growth areas for us were tight oil, deepwater and LNG. That's on top of a very large base that we're continuing to optimize. But, from the growth areas, that's where we see our advantages and the potential. LNG, it's unbelievably efficient, it's low emissions, it's very versatile and we believe the market will remain very, very strong well into the future. There's not a lot of big LNG projects, so being in the critical ones is really important to us. We've stated an objective to grow our total sales to about 40 mtpa (million tonnes per annum) by 2030. Today, we're sitting around mid-20s mtpa, but that's critical. Golden Pass is a key piece of that growth

Also, there's our interest in some of the Qatar new expansions, the Mozambiques (Rovuma LNG) and the PNGs (PNG LNG in Papua New Guinea), they start to come on right at the end of that period. So, they're not really in that number that I talked about by 2030. We believe the versatility that LNG will bring in the energy transition is really, really high in any scenario you like to think about. So, in the near term, with Golden Pass we've had some delays. But first LNG is now end of 2025, we believe, and we're on track for that. The construction challenge that was publicized is largely behind us, and personnel have ramped back up at that site quite significantly. That first train is about 80% complete. We're on schedule with what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Exxon Mobil's Liza Unity *FPSO operates in the deep waters offshore Guyana.*

we've communicated externally for first LNG. That's an important source of growth because our partner is QatarEnergy, and we each access our own offtake. That was also a change from the original setup. This was going to be marketed by a separate entity. That was changed a year or two ago to where QatarEnergy and ourselves now offtake. That's important to us because those volumes, particularly given our trading growth, are key. We're continuing to be pretty active in the third-party purchases from some of the (LNG) developers. You've seen some of those announced as an offtaker.

Importantly and strategically is growing our equity position. We are participating in the NFE (North Field East) expansion in Qatar, not in the second one, NFS (North Field South), but in the first one. That's under construction. Of course, Mozambique and PNG are really important to us and both material. Area 4 in Mozambique is almost 90 Tcf of gas. You think about materiality and scale, which is what we need, the kind of growth objectives we've got, they're really important. Accessing equity and being able to develop that and take it into a portfolio is really what the objective is. These are huge projects, huge potential. We know how to do those really difficult developments. That's the kind of thing strategically we like to lean into.

JB: Obviously, in the U.S. you have plenty of gas–associated gas in the Permian, Haynesville and Appalachia.
LM: We have a huge gas resource. All of those things. They are all going to be, I suspect in time, vital supplies to many low-carbon products, whether it's LNG conversion, lower-carbon power, data centers.

JB: Yes, rising domestic demand.
LM: The demand outlook is very, very strong. We're very well positioned with those assets, frankly, into multiple end uses. That makes it even more compelling. There is significant remaining resource in the U.S., and it's pretty advantaged.

JB: What more can you highlight about the future of Exxon upstream–domestically and frontier exploration?
LM: Strategically, we are continuing to stay focused, disciplined through the cycle. We've created a very resilient portfolio, and you've seen it play out. It's a fantastic set of advantaged opportunities that we're still executing on. Our results are pretty extraordinary. The upstream results we've met or exceeded, and they were very ambitious [targets]. It's been transformational since we put the upstream strategy together back in 2018 when we were starting from a pretty tough position.

What I see us doing is continuing to extend that. We've created, and we'll need to continue to refresh, an extremely resilient portfolio. No one can predict price cycles, but being able to create that resilience positions us very, very well. Obviously, there's unknowns in that. We are highly focused as a technology company and continuing to find ways to improve recovery in the Permian and other places we've talked about strategically. This is really important because I think it's actually driven a lot of innovation, is doing all this while achieving our emissions intensity reduction objectives. We are on track or ahead on that. It's a very motivational strategy and is resonating. We're really proud of our leadership role in the energy transition. But we still believe oil and gas will be fundamental. As long as we stay disciplined and stay on the left-hand side of the supply curve and keep that portfolio very resilient, that should be a very successful business case. OGI

NOG CLOSES DEALS

~$4B of deals signed across the Permian, Williston, Marcellus and Utica since 2018

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INCLINE ENERGY PARTNERS
W Energy Partners
ALPHA PERMIAN
COMSTOCK RESOURCES
PIVOTAL PETROLEUM PARTNERS
VERITAS ENERGY, LLC
Undisclosed Majors
Private Sellers

Drilling Partnerships

$180M

Hibernia resources
Undisclosed Majors
Private Sellers

Operated Co-Purchase and Buydowns

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Coterra's Taking Harkey Sand 'Row' Show on the Road

With success to date in Harkey sandstone overlying the Wolfcamp, the company aims to make mega-DSUs in New Mexico with the 49,000-net-acre bolt-on of adjacent sections.

NISSA DARBONNE
EXECUTIVE EDITOR-AT-LARGE
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Coterra Energy is taking its promising dual-landing Harkey sandstone and Wolfcamp shale "row" development on the road, adding 49,000 net acres contiguous to its own blocked-up sections in the northern Delaware Basin.

The E&P's Culberson County, Texas, monster-sized multiple drilling-spacing-unit (DSU) row projects are landing laterals in the Harkey, which is at about 8,000 feet of the roughly 3,000-foot Bone Spring series of benches, overlying laterals in Wolfcamp at about 9,000 feet.

The additional Lea County, N.M., leasehold it is adding now will come from Franklin Mountain Energy and Avant Natural Resources for $4 billion of cash and stock.

To date, Coterra's dual-zone, row developments have focused exclusively on Culberson County.

And the latest—73 2-mile wells across 12 sections in six DSUs—is underway with 51 wells in Wolfcamp and 22 in Harkey.

Coterra reported in November that 36 of the first 57 wells are online now and 10 more will be turned in line (TIL) by year-end with the last 11 going into sales in the first quarter.

The company expects to follow this with 16 more wells—all in Harkey—in 2025.

Prewit-Barbaro 23 Row

While results are not yet available from that project, known as "Windham Row," first-10-month production data from an initial Harkey-Wolfcamp dual-development row test, Prewit-Barbaro 23, suggest success.

"Our Windham Row has confirmed what we have stated all along: These projects are well calibrated and highly predictable."

TOM JORDEN, chairman, president and CEO, Coterra Energy

The 13-well project in Culberson County put four 2-mile laterals in Harkey and the other nine in Wolfcamp, according to Texas Railroad Commission (RRC) files.

In the four Harkey wells' first 10 months through August—the latest month for which the RRC reported data by mid-November—they produced a total of 885,357 bbl of condensate or about 726 bbl/d each.

The nine in Wolfcamp produced 2.15 MMbbl of condensate combined in their first 10 months online for an average of 784 bbl/d each.

What differentiates the two zones is the associated gas. From the Wolfcamp, gas averaged 3.7 MMcf/d per well, while the

Coterra Energy's Culberson County, Texas, Mega-DSU Projects

Row	Leases	# Wells	# Upper Wolfcamp	# Harkey	Working Interest	All Wells Online
Windham Phase 1	Clyde Van Dusen, Donerail, Hoop JR, Leonatus, Lookout, Riva Ridge	57	51	6	50%	1Q 2025
Windham Phase 2	Clyde Van Dusen, Hoop JR, Leonatus, Riva Ridge	16	0	16	50%	2Q 2025
Barba-Row Phase 1	Macbeth, Rich Strike	28	20	8	80%	2H 2025
Bowler Row	NA	62	42	20	50%	4Q 2025

SOURCE: COTERRA ENERGY

A Coterra Energy pad in the Delaware Basin, including a large tank battery.

COTERRA ENERGY

Harkey wells made 3 MMcf/d each or about 19% less.

Also different is the gas and condensate Mcf-to-bbl ratio in the wells' 10th month online. The four Harkey wells' ratios in August ranged from 3:1 to 8:1, while the Wolfcamp wells averaged 7:1 to 10:1.

In November 2023, the 13 wells' first full month online, each began with a ratio of between 3:1 and 4:1, according to RRC data.

Meanwhile, the full first-10-month average for the Harkey wells was between 3:1 and 5:1, while the Wolfcamp wells averaged between 4:1 and 5:1.

Staged TILs

Based on the Prewit-Barbaro 23 project and Coterra's early findings from Windham Row's first 36 wells, "in a nutshell, our results have been outstanding and we expect similar projects to be a part of our program for many years to come," Coterra Chairman, President and CEO Tom Jorden told investors in early November.

"Our Windham Row has confirmed what we have stated all along: These projects are well calibrated and highly predictable."

When plans for Windham were announced in 2023, he said "this is exactly what our shale era is needing.

"We can take advantage of infrastructure. We can take advantage of operational efficiencies, … our electrification and … minimizing any kind of parent-child interference."

With Windham, Coterra is bringing wells online in time rather than all at once, he added in an investor call this spring.

"Doing them in stages allows us to … not have to build facilities for absolute peak production–because these wells do decline."

If tank batteries are built for peak production, "you find that very early in their life they're underutilized."

'All A-grade'

Coterra hasn't made data public yet on returns from the Harkey interval versus the Upper Wolfcamp and the first and second Bone Spring.

Jordan said in early November, "Averaging is always difficult. Basin-wide, we would say the Harkey is outstanding but slightly less than the Upper Wolfcamp. It depends on where you are."

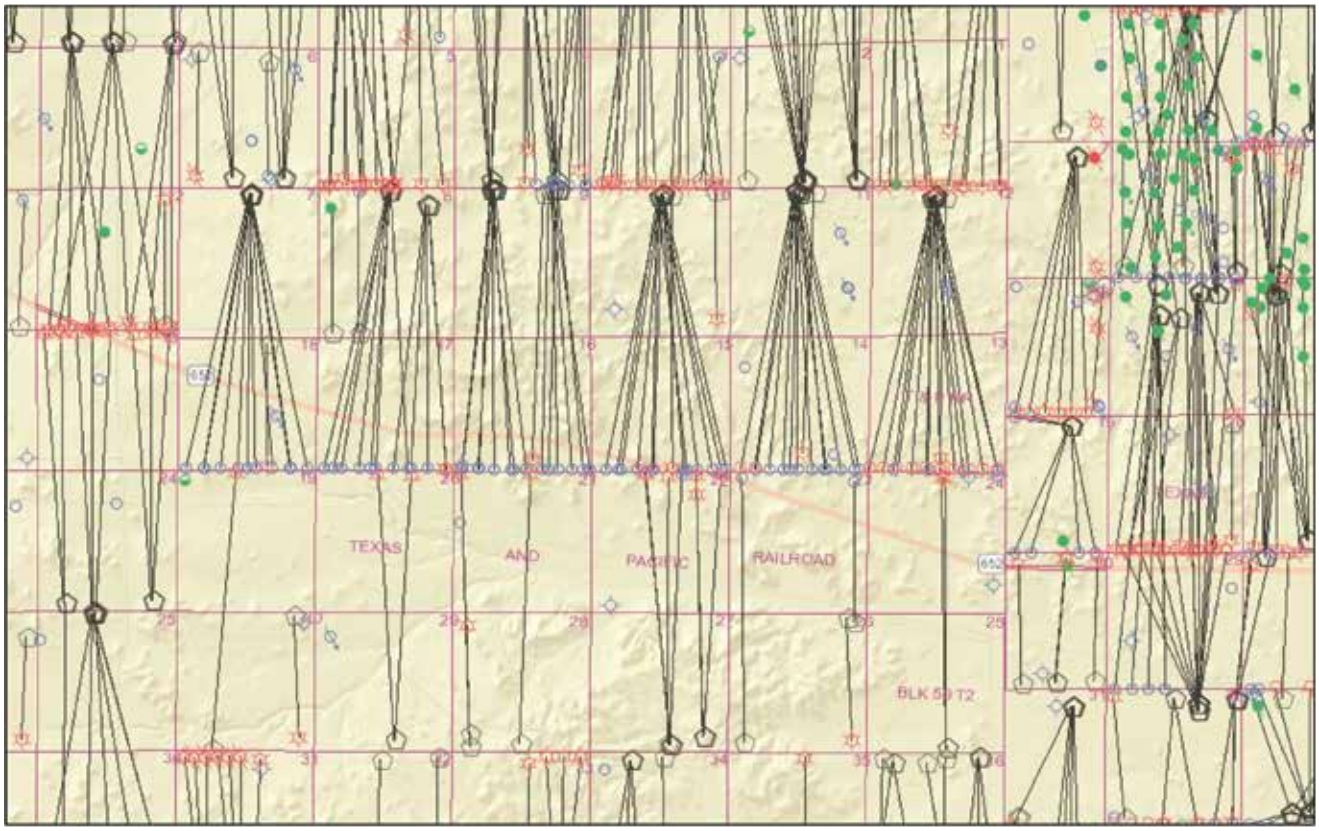
But they're all good wells, he added. "We're also seeing some … really nice results from that section above the Harkey–the Second Bone Spring and First Bone Spring–

Coterra's Windham Row Phase 1 Well Placement by DSU

SOURCE: COTERRA ENERGY

Coterra's 57-well Windham Row Phase 1 project involves six DSU's with up to 10 Upper Wolfcamp wells per section and three overlying Harkey wells in each of two DSU's. A second phase, Windham 2, will add 16 wells, all in Harkey. Wells shown in black are pre-existing.

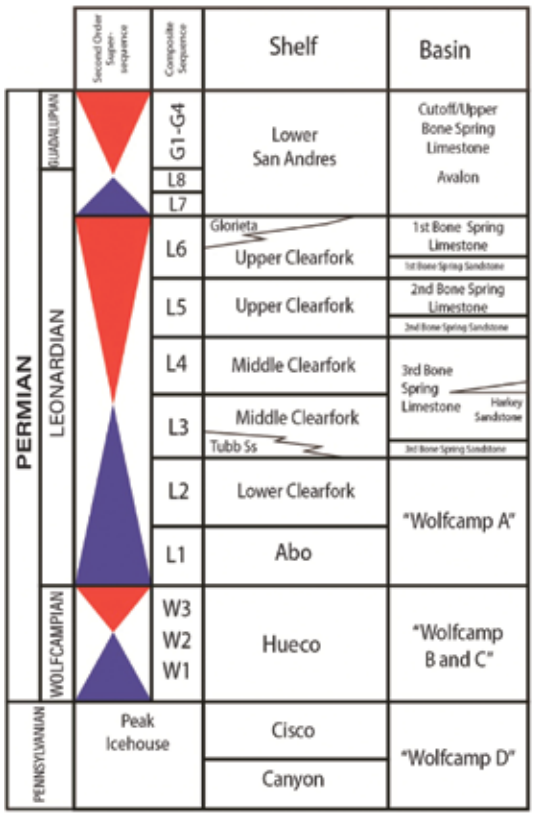
Coterra's Mega Windham Row Project, Culberson County, Texas

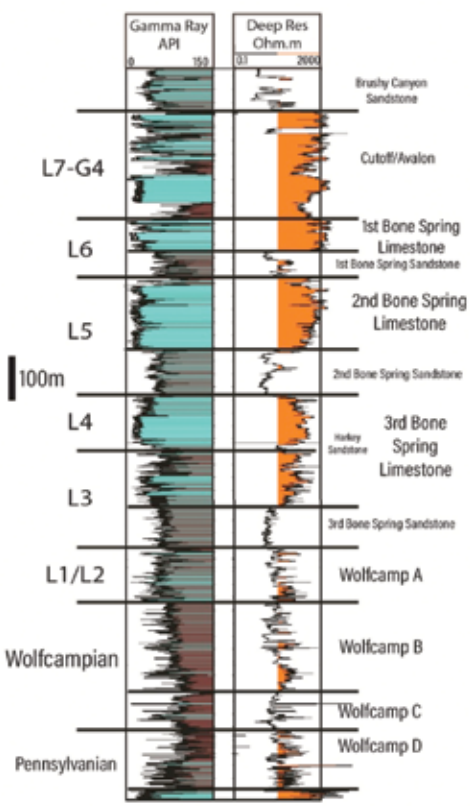


SOURCE: TEXAS RAILROAD COMMISSION

The first Windham Row phase consists of 57 wells. A second phase is 16 additional wells, totaling 73 wells in addition to pre-existing wells that were made to hold the leases.

Delaware Basin Harkey Sandstone





SOURCE: UNIVERSITY OF TEXAS AT AUSTIN VIA MARINE AND PETROLEUM GEOLOGY, SEPTEMBER 2022

Harkey sandstone sits within the Third Bone Spring in the Delaware Basin, overlying Wolfcamp.

in particular areas of the basin," Jorden said.

"So, look: It is just a question of A++, A+ or A. These are all A-grade returns and we're delighted to have them."

Blake Sirgo, Coterra senior vice president, operations, said data would be shared when all 57 wells in Windham's first phase are online. Meanwhile, the project is "ahead of schedule, below cost and initial production results look strong."

Row Science-ing

As for completing in the Harkey, "we've learned to do a little different completion, whether we're in a sand or shale," Jorden said in a 2023 call.

As for losing some well-by-well subsurface learnings as a large row project is being made, "that is a two-edge sword," he added.

On the one hand, Coterra can make it a science project since 73 wells in a row creates a rare opportunity for a control-and-variable test.

"One of the things that is vexing in our space is, if you have an individual small project and you march off and change some parameters, you don't always have that control experiment to compare it to," Jorden said.

But a 73-well project "will have the opportunity to have several subtests within that and have good offset control [to] really normalize out some of the geologic and other attributes that can cloud your conclusions."

Row-ing North

Sirgo wished in the Nov. 1 call that Coterra could take the row projects on the road. It's been unique for Coterra in Culberson County where it and Chevron control four contiguous townships in a joint development area.

Coterra is the county's No. 1 producer with 14.2 MMbbl of condensate this year through August, with Chevron following at No. 2 with 9.2 MMbbl, according to RRC data.

The pair have the county mostly locked up as the No. 3 producer made 1 MMbbl through August.

Sirgo's wish was granted Nov. 13 as Franklin and Avant signed to sell, creating a large, blocked-up Coterra leasehold in Lea County where Coterra has made laterals since 2010, operating as Cimarex Energy.

The Franklin and Avant purchases are Coterra's first M&A deals since it emerged from the merger of Cimarex and Cabot Oil & Gas in October 2021.

The November deal comes with 49,000 net acres, 85% operated, and between 400 and 550 future well locations. The acres are adjacent to existing Coterra leasehold.

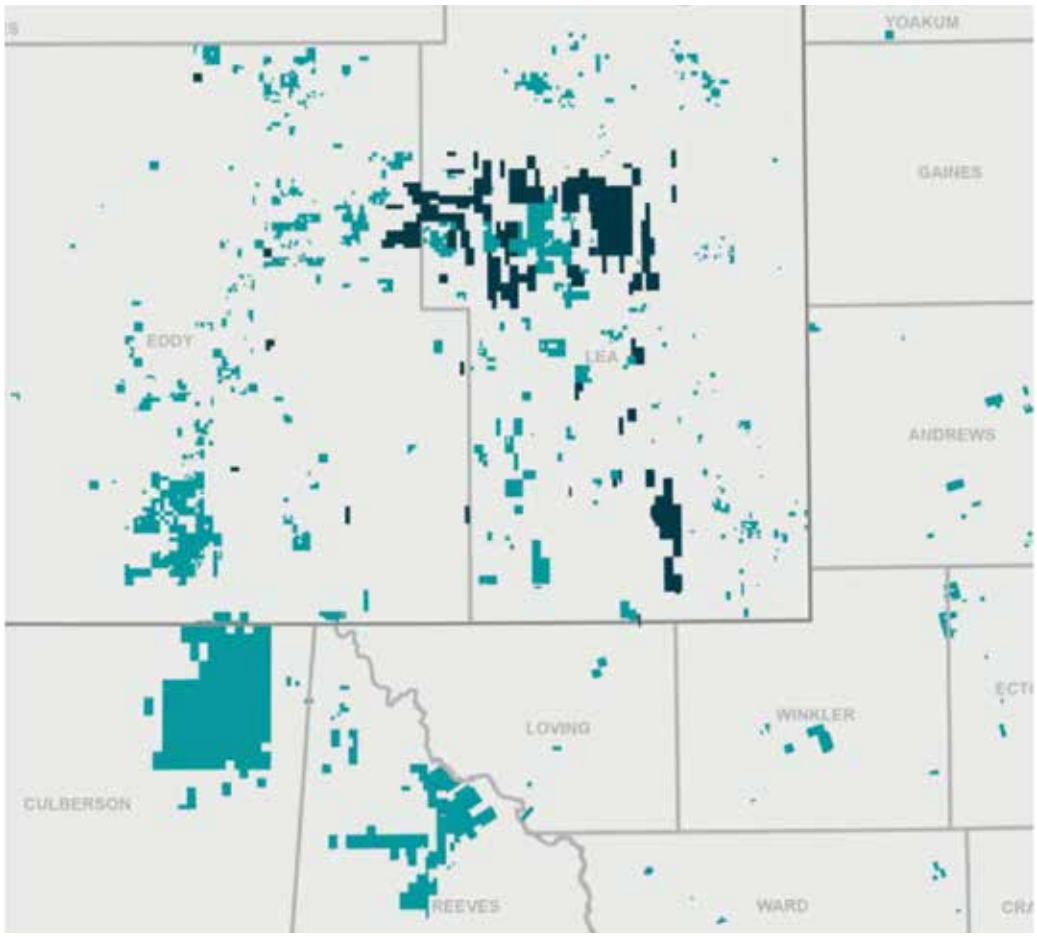
Targets are Bone Spring, Harkey and Avalon, as well as the underlying Lower Wolfcamp and potential for Pennsylvanian shale development.

The future-well count assumes between four and eight wells per section and an average lateral of 9,500 feet.

Sirgo said in the Nov. 13 call that reduced drilling and completion (D&C) costs from applying row development to the combined Coterra, Franklin and Avant property is "the reason we put this asset together."

Coterra's Culberson County D&C costs average $730 per lateral foot. Adding facility and post-completion expenses, all-in cost is $850 per lateral foot.

Coterra's Delaware Basin Lease Profile Post-Closing on Franklin, Avant



In deals to buy two fellow Delaware Basin operators, Coterra will add stacked pay at the basin's northern end that includes Harkey sandstone in contiguous acreage it aims to develop with mega-DSU row pads.

SOURCE: COTERRA ENERGY

"I mean, we have a playbook for this," Sirgo said.

Efficiency gains come from shared infrastructure and marketing, simul-fracs and making multi-DSU row developments.

"It's a lot of work to do before we can start quoting cost savings on the [acquisitions], but we have a playbook for this," Sirgo said.

In Culberson County, "which is kind of the epitome of getting to take advantage of every single one of these efficiencies, we ultimately drove 15% of cost out of it. I don't know if we'll get that far here, but we're sure going to try."

Harkey Vertical Control

The Harkey—a "low-stand submarine fan deposit" that is also known as the Harkey Mills—has seen laterals dating back more than a decade in Lea and Eddy counties, according to Marshall D. Davis, whose master's thesis in 2014 was based on the Harkey.

Davis wrote "Petroleum Geology of the Leonardian Age, Harkey Mills Sandstone: A New Horizontal Target in the Permian Bone Spring Formation, Eddy and Lea Counties, Southeast New Mexico" while studying at the University of Texas at Arlington.

He was working at the Bass family's Bopco LP at the time and cited its data in his research. Exxon Mobil purchased Bopco for $6.6 billion in cash and stock in 2017, gaining 250,000 Permian acres.

Davis' analysis of 625 old Harkey verticals found "the best reservoir rock occurs within the apex of turbidite channel deposits proximal to the slope fan." Net thickness is up to 80 ft; porosity, at least 8%.

Earthstone Energy put laterals in Harkey in two Lea County wells before selling to Permian Resources in 2023.

The wells averaged some 1,600 boe/d each, 87% oil, in their first 24 days online from 7,500-foot laterals, Earthstone reported. It expected payout within four months from first production.

Randy Nickerson, COO of another Permian operator, Caza Petroleum, told Hart Energy in 2019 that Eddy County's Harkey "is a little more highly oil saturated than the other [zones].

"I think you're going to see that's going to be a new bench out there that people are going to start building. There are some older wells on it that maybe discourage people, but it's a pretty good zone."

As to interference, Coterra's Jorden said that "when it comes to the Wolfcamp and Harkey, we generally see that as one petroleum system."

Thus, there will be some communication. "But we do not see that as a factor that degrades overall well productivity."

Findings were that "having the two landing zones does not interrupt or impede your overall recovery out of that drilling spacing unit. So, we don't see that as a significant issue for the Wolfcamp/Harkey." OGI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Here Come the Funds

In a 10-day period, private equity firms announced almost $20 billion in energy funding. Is an end in sight for the fossil fuel capital drought?

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Almost $20 billion worth of private equity funding—most of it targeting oil, gas and midstream development—was announced during the last 10 days of October, a sum that dramatically dwarfs the totals raised in previous post-pandemic years.

Indeed, the industry's ability to access capital of any kind took a walloping from the demand decimation of COVID-19, combined with years of poor returns and a global anti-fossil fuel sentiment.

Between 2010 and 2019, some $21 billion in private equity was raised every year; since 2020, the annual figure is closer to $3 billion, said Quantum Capital Group founder and CEO Wil VanLoh.

But as the weather in Houston finally began to cool in October, the private equity news heated up.

On Oct. 21, EnCap Investments revealed the successful closing of the EnCap Energy Capital Fund XII with commitments of $5.25 billion—a figure exceeding its initial target and hitting its hard cap. Combined with $1.2 billion in co-investments, Fund XII raised a total of $6.4 billion in funds. Including recently finalized fund raises for EnCap Energy Transition Fund II and EnCap Flatrock Midstream Fund V, the three EnCap platforms raised approximately $9 billion of capital.

In announcing the news, EnCap Managing Partner Doug Swanson called the fundraising a strong demonstration of support for its longstanding investment strategy. Interestingly, he added, about 40% of the capital commitments stemmed from new relationships with institutional investors and large family offices.

A week later, on Oct. 29, Quantum announced it had raised more than $10 billion in aggregate capital commitments for the energy industry. Of the total, $5.25 billion is in its private equity flagship, Quantum Energy Partners VIII.

The funds were raised for its private equity, structured capital and private credit platforms. Quantum has a flexible mandate to invest where needed in the capital structure, and the firm invests across the entire energy value chain, including oil and gas, midstream, thermal and renewable power generation, energy infrastructure and the energy transition.

The total raised includes: $5.25 billion for the firm's private equity flagship Quantum Energy Partners VIII; $2.8 billion for the firm's structured capital fund Quantum Capital Solutions II; and approximately $2 billion for other associated funds on the Quantum platform.

For both firms, closing on more than $5 billion for oil and gas placements is a success. In recent years, as VanLoh said, there have been significantly fewer closings. And both took longer, too.

"We started raising our flagship fund a couple of years ago. [Pre-pandemic] these funds would take about six to 12 months," VanLoh said. "This one took two years."

At EnCap, the fund closing took about 18 months compared to the six months required in pre-pandemic years, said Mark Burroughs, managing partner at EnCap, during Hart Energy's DUG Appalachia conference in November.

Some 40% of EnCap's previous investors have exited oil and gas, Burroughs said. That includes college endowments and West Coast institutions, which won't be back. Family offices are making the difference.

"We've partnered with a lot of just awesome families that want to be in oil and gas for many decades," Burroughs said. "So net, it was a hard fund raise, but we are very happy and blessed that we got it done."

Flexible Structures

Investors now have specific areas within energy in which they want to invest, he said. Instead of one large fund, Quantum and similarly energy-focused firms raise multiple funds to give investors flexibility to choose where they want to participate.

"We raised almost a third more capital [with this closing] than we raised in our last fund-raise cycle, which was really—I'm not saying to toot our own horn—it was a huge accomplishment, given the commitments the institutional limited partners are making to private equity and structured capital funds today," VanLoh said.

Compounding the investor flight in recent years was the lack of returns that many investors earned on their oil and gas investments between 2010 and 2020.

"The problem is a lot of investors around the world and in certain parts of the U.S. have basically taken the position that oil and gas is not an investable asset class," VanLoh said.

"It was easy [for investors] to kind of walk away from oil and gas, actually, both in the public and the private markets, between 2010 and 2020. I think it

HART ENERGY

Oil and Gas Investor *Editor-in-Chief Deon Daugherty moderates a panel during Hart Energy's DUG Appalachia conference in November. Left to right: Daugherty; Mark Burroughs (managing partner, EnCap Investments); Jay Salitza (managing director, KeyBanc Capital Markets); and Evan Smity (SVP of investment banking, Stephens).*

► ENCAP'S STABLE

EnCap's Fund XII currently includes investments in 12 portfolio companies, 10 of which are managed by teams the firm has successfully partnered with in previous funds. These portfolio companies are working across major U.S. oil and gas basins. They include:

- Grayson Mill III
- Double Eagle
- Ridge Runner Resources
- Black Swan II
- Paloma Resources VII
- Novo II
- Pegasus Resources III
- Verdun Oil Co. III

► QUANTUM'S STABLE

E&Ps, midstream companies and energy transition firms that have already been backed by Quantum's Energy Partners VIII fund:

- Bison Oil & Gas
- Firebird Energy
- HEQ Deepwater
- QB Energy
- Western Basin
- Vickery Energy
- Rockcliff Energy
- Trace Midstream
- Haventus

was fair to say if it wasn't the worst, it was in the bottom 10% of all performing asset classes in the investable universe," he said. "Now, a few of us that have raised money, the reason we've been able to raise it is our returns were really good during that period of time."

The ESG movement didn't help. Many institutional investors discouraged by poor returns, along with the idea that fossil fuels were passé, fled the sector.

"It sounds ludicrous to you and I, but many investors who don't know the space well and who don't understand how ingrained energy is in every aspect of what we do in society and business, they were saying, 'Well, if climate change is an issue and we got to go green, that means we're going to move away from oil and gas and coal.'"

But VanLoh notes that throughout history, forms of energy haven't gone away. More variety is simply added to the mix.

"We use more of all forms of energy today than we've ever used before. We use more coal today, more natural gas, more oil, more nuclear, more hydro, more wind, more solar," he said. "And energy transitions take a really long time."

Consequently, the success at Quantum and EnCap, VanLoh said, is the result of the broader industry making money again, and the realization that oil and gas isn't a stranded asset class.

"The fundraising environment was really difficult in 2022 when we started, and in 2023. But I'd say it got much more favorable as we moved through 2024," VanLoh said.

About 20% of its fund investors in the past were international. Most of those were European banks and, like the institutional investors in blue states like New York who moved to the sidelines, they won't return to the space.

But for some limited partners (LPs), the pendulum is starting to swing back.

VanLoh declined to name specific LPs, but he said, "It's a fair number of LPs that had hit the pause button a few years ago or are taken their finger off the pause button now."

New investors are coming in the form of family offices, including European groups, a dynamic apparent throughout the oil and gas industry in 2024.

"The wealthiest families in Europe are actually coming in at scale. They look around Europe and realize, 'We've got an energy crisis over here,' which was really made evident when Russia went into Ukraine and energy prices went up," VanLoh said. "We've doubled gas, tripled oil and liquids, and their same production has gone down by 40% during that period of time. So, that sums it up how the Europeans think about investing in energy." OGI

Harold Hamm's Wish List for Trump's Next Term

The Continental Resources executive chairman helped raise millions for the president-elect's campaign, and he and other energy executives know what they want his administration to tackle.

CHRIS MATHEWS
SENIOR EDITOR, SHALE/A&D
cmathews@hartenergy.com

When Harold Hamm talks U.S. energy, President-elect Donald Trump listens.

Hamm, the founder and executive chairman of privately held Continental Resources, ran point on drumming up oil and gas industry support and funding for Trump's 2024 presidential campaign.

The president-elect may also have been listening when Hamm shared his preference for energy secretary: Chris Wright, co-founder, chairman and CEO of Liberty Energy. Trump chose Wright to head the Department of Energy just four days after Hart Energy broke that story.

In an exclusive interview with Hart Energy, Hamm refused to take any credit for Trump's election victory, but acknowledged the role he played in getting the U.S. energy industry to rally behind the former president.

"Obviously, it's no secret that I helped gather the industry up, oil and gas producers and the entire industry," Hamm said. "They got really broad coverage about the meeting at Mar-a-Lago with the president–[I] had dinner with him with the entire group."

It was an "interesting" and productive dinner with Trump, with influential energy executives sharing their take on the health and direction of the oil and gas sector.

"And also, he got to listen to all the bad things that the Biden administration had brought forward in the last four years–that they were still bringing forward," Hamm said.

But after Trump's resounding victory, and with the Senate and possibly the House under Republican control, Hamm expects to see results for the U.S. energy industry.

From a laundry list of hundreds of items that need to be done, or undone, a handful stick out to Hamm.

Permitting Reform

Impediments put in place by the Biden administration to slow or halt oil and gas leasing activity on federal lands or in the Gulf of Mexico should be removed, Hamm said.

"The mineral wealth of the U.S. government is tremendous, but you have to develop that," he said. "Certainly, Trump will do that. Our economy needs it, [the] federal government needs it."

The Biden administration eventually resumed auctioning drilling leases on federal lands in 2022–when costs for fuel and power were skyrocketing–but with smaller acreage packages offered and higher royalties for producers.

But it's not just upstream. The permitting process needs to be simplified and streamlined to build out pipelines, downstream facilities or even infrastructure like new housing, Hamm said.

"Permitting affects everything," he said. "You've got to turn that loose, and you just need some new people to do it."

Un-pausing LNG

The Biden administration also drew the ire of the oil and gas industry earlier this year for "pausing" the issuance of LNG export licenses to non-free trade agreement countries.

The administration said the pause would allow time to study the impacts of U.S. LNG exports on the climate, economy and national security.

Industry executives and analysts say the pause has negatively impacted the nation's reputation as a reliable exporter at a time when competitors like Qatar and Australia are actively expanding global LNG market share.

Many oil and gas executives have lobbied for Trump to lift the LNG pause, Hamm included.

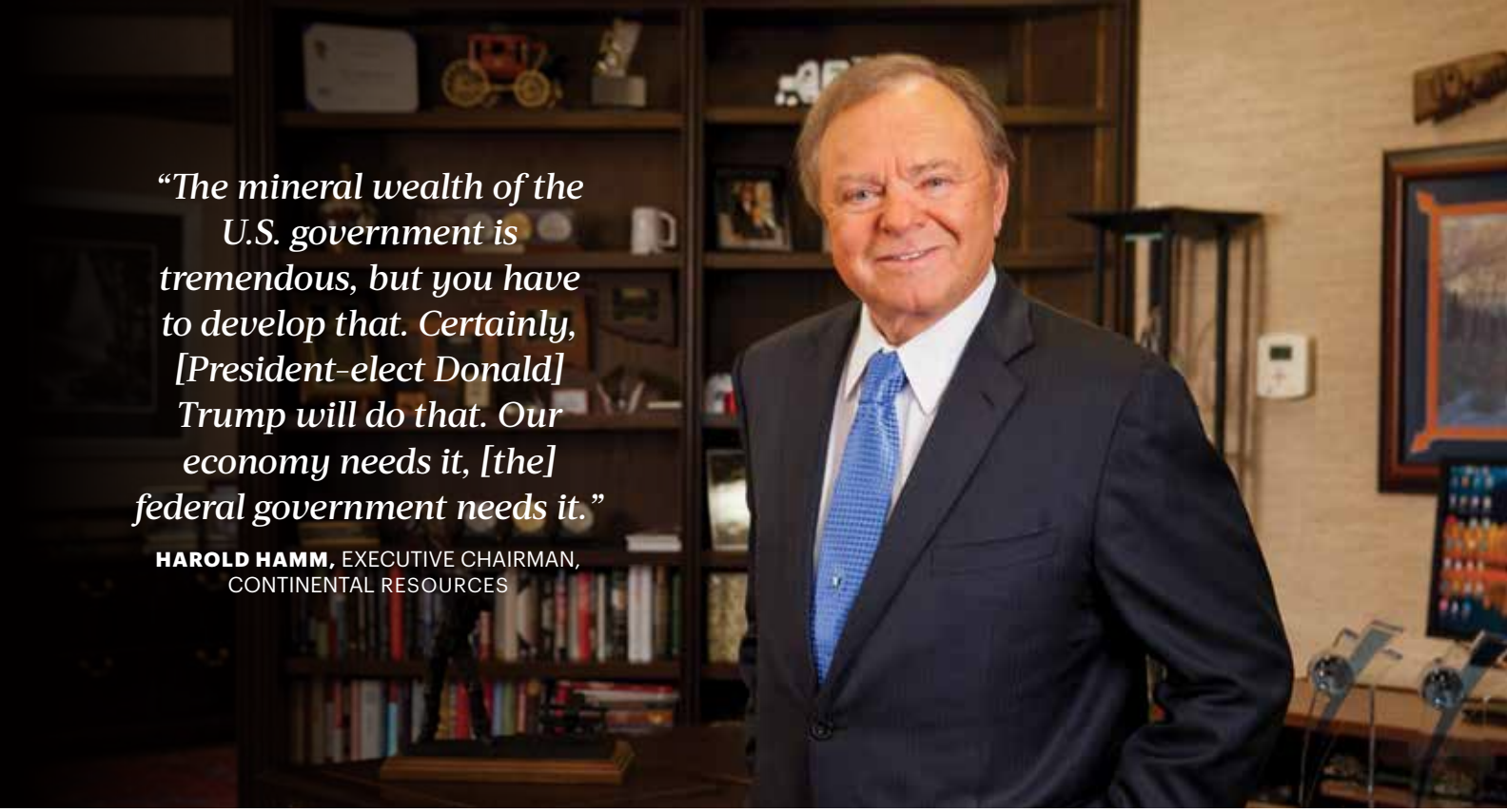
"In the U.S., we've certainly got a whole lot of natural gas," Hamm said.

Defanging Federal Agencies

Hamm also pushed back on the outgoing administration's use of federal agencies to stymie the oil and gas industry's day-to-day business.

The U.S. Federal Trade Commission (FTC) intervened in several large-scale upstream M&A transactions, including Exxon Mobil's $60 billion acquisition of Permian Basin giant Pioneer Natural Resources, Chevron's $55 billion acquisition of Hess Corp. and the merger between gas producers Chesapeake Energy and Southwestern Energy.

The FTC barred Pioneer CEO Scott Sheffield from serving on the Exxon board and Hess CEO John Hess from serving on the Chevron board, alleging the executives colluded with OPEC to fix global commodity prices.



HART ENERGY

The U.S. Environmental Protection Agency also intervened in matters related to power plant pollution, methane emissions from upstream production and vehicle tailpipe emissions standards, he said.

"They used every single agency as much as they could to deter the industry, delay the industry," Hamm said, "and basically live up to their promise to get us off fossil fuels going forward."

Don't Undo Everything

There's a lot for the new Trump administration to undo when it takes office in January, Hamm argues. But he added that there are things President Joe Biden did that should probably stay in place.

One might be tax subsidies for emerging technologies and infrastructure projects for carbon capture, utilization and storage (CCUS). The Inflation Reduction Act (IRA) included substantial improvements to the 45Q tax credit for capturing and storing carbon emissions from industrial facilities and power plants.

In 2022, Hamm's Continental Resources made a strategic investment in Summit Carbon Solutions, a company building CCUS transport and storage projects across the Midwest. And prospects for Summit's projects have reportedly been encouraged by the enhanced tax credits passed under the IRA.

Hamm's industry peers also hope to tap IRA tax credits for CCUS projects, like Occidental's direct air capture (DAC) facility under construction in the West Texas Permian Basin.

"I would be thinking that some of these [tax subsidies] would stay in place," Hamm said.

While the U.S. should probably allow new tax subsidies for emerging CCUS technologies, it should review decades-old tax breaks for mature technologies like wind and solar, he argued.

"If you're going to start whacking subsidies, start there," he said. OGJ

▸ CLOSER LOOK

ENERGY'S LAUNDRY LIST FOR TRUMP

PROCEED WITH PERMITS

- Allow oil and gas leasing on federal lands and the Gulf of Mexico.
- Speed up permitting for midstream infrastructure.

LNG ASAP

- Lift the "pause" on the issuance of LNG export licenses to non-free trade agreement countries.

RESTRAIN THE FEDS

- Don't allow the FTC to overzealously interfere with M&A.
- Have the EPA ease up on emissions.

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HARTENERGY
HALL OF FAME
2024

All Photos Hart Energy

1) During the Hart Energy 50th Anniversary celebration in 2023, a fireside chat was moderated by Agent of Change in Energy honoree Dan Pickering of Pickering Energy Partners, left, and featured Hall of Fame honoree Harold Hamm of Continental Resources; Hall of Fame honoree Tom Petrie, formerly of Petrie Partners; and Agent of Change in Energy honoree Chris Wright of Liberty Energy. 2) Cupcakes with the anniversary logo served during the 2023 celebration. 3) Hall of Fame honoree Ronnie Irani and Mewbourne Oil CEO Ken Waits celebrate at the Hart Energy 50th Anniversary celebration in 2023. 4) Hall of Fame honoree Mohamed Soliman and Syed Farouq-Ali of the University of Houston during the Hart Energy 50th Anniversary celebration in 2023. 5) Hall of Fame honoree Ronnie Irani points to where his image is displayed on a graphic at the Hart Energy 50th Anniversary celebration in 2023.

RECOGNIZING THE BEST OF THE BEST

It's our pleasure to celebrate Hart Energy's 2024 Hall of Fame and Agents of Change in Energy honorees. In this annual endeavor, we recognize legendary oil and gas titans who have shaped the industry, as well as contemporary superstars who are guiding it into the future.

Since 1973, Hart Energy has witnessed and reported on the biggest trends and events impacting the oil and gas industry. Our mission has been to convey a greater understanding of how fossil fuels, U.S. prosperity and the global marketplace are interconnected.

The history of this industry is full of pioneering men and women who have expanded and reinvented the sector time and time again. They triggered both an offshore boom in the Gulf of Mexico and an onshore revolution in shale plays, restoring the U.S. to global leadership in oil and gas production.

The U.S. energy industry has a multi-dimensional purpose at home and abroad.

As a major employer, the industry created more than 250,000 jobs in 2023, with the growth rate of clean energy jobs doubling that of the economy as a whole. As an enabler of global change, it is alleviating energy poverty around the world by providing access to low-cost, abundant fuel.

We initiated the Hall of Fame and ACEs in 2023 to coincide with the 50th anniversary of Hart Energy. Each year, we will continue to honor the industry's legends and those who are picking up the torch and lighting the way forward, so to speak.

It's our honor to present this exemplary group to you.

—Deon Daugherty, Editor-in-Chief

Fueling forward momentum

For over a century, BOK Financial has been a steadfast partner to the energy industry. Our deep-rooted history has given us unparalleled insight into the market's complexities, challenges, and opportunities; as well as the foresight to navigate the future. With a team of experienced bankers, petroleum engineers, and data analysts, we offer a comprehensive suite of financial solutions designed to keep our clients ahead of the competition.

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Hall of Fame

Red Adair
The Red Adair Co.

Bill Britain
EnergyNet

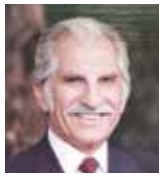
Leslie Haines
Hart Energy

Jeff Hildebrand
Hilcorp Energy

Lamar Hunt
Hunt Oil, Petro-Hunt

Robert "Bob" Allison, Jr.
Anadarko Petroleum

Steve Chazen
Occidental Petroleum



Michel Halbouty
Halbouty Energy

Bunker Hunt
Hunt Oil, Petro-Hunt

Margaret Hunt
Hunt Oil, Petro-Hunt

Bill Armstrong
Armstrong Oil & Gas

Dan Duncan
Enterprise Products Partners

Harold Hamm
Continental Resources

Caroline Hunt
Hunt Oil, Petro-Hunt

Ronni Irani
RKI Energy Resources

William J. "Bill" Barrett
Barrett Resources

Archie Dunham
ConocoPhillips

Hans Helmerich
Helmerich & Payne

Hassie Hunt
Hunt Oil, Petro-Hunt

Rich Kinder
Kinder Morgan

Bud Brigham
Brigham Exploration

Joe B. Foster
Newfield Exploration

Ken Hersh
NGP Energy Capital

Herbert Hunt
Hunt Oil, Petro-Hunt

Alden "Doc" Laborde
ODECO

Dave Lesar
Halliburton, CenterPoint

George Mitchell
Mitchell Energy & Development Corp.

Mark Papa
EOG Resources

T. Boone Pickens
BP Capital Management

Bob Simpson
XTO Energy

Rod Lewis
Lewis Energy Group

James "Jim Bob" Moffett
Freeport-McMoRan

James Parkman
Petrie Parkman & Co.

Raymond Plank
Apache Oil (APA)

George Solich
FourPoint Energy

Aubrey McClendon
Chesapeake Energy, American Energy Partners

Rick Muncrief
Devon Energy

Gary Petersen
EnCap Investments

Lee R. Raymond
Exxon Mobil

Mohamed Soliman
Halliburton, University of Houston

Curtis Mewbourne
Mewbourne Oil Co.

Jim Musselman
Kosmos Energy, Caelus Energy

Tom Petrie
Petrie Parkman & Co.

C.H. Scott Rees
Netherland, Sewell & Associates

Charif Souki
Cheniere Energy, Tellurian

David Miller
EnCap Investments

Larry Nichols
Devon Energy

Martin Phillips
EnCap Investments

Scott Sheffield
Pioneer Natural Resources

Autry C. Stephens
Endeavor Energy Resources

Hall of Fame continued on page 48

Hall of Fame (continued)

Dick Stoneburner
Petrohawk Energy

Cindy Yeilding
BP

Kelcy Warren
Energy Transfer

Daniel Yergin
Cambridge Energy Research Associates

Floyd Wilson
Petrohawk Energy

Bill Zagorski
Range Resources

Irene S. Wischer
Panhandle Producing

Robert Zorich
EnCap Investments

John Ashby Yates
Yates Petroleum

Agents of Change in Energy

Jesse Arenivas
EnLink Midstream

Kimberly Dang
Kinder Morgan

Chris Kalnin
BKV Corp.

Allyson Anderson Book
Baker Hughes

Ben Dell
Kimmeridge

Chris Kendall
Denbury

Skye Callantine
Validus Energy

Tim Duncan
Talos Energy

Reg Manhas
Lapis Energy

Cody Campbell
Double Eagle Energy Holdings

Will Hickey
Permian Resources

Nick O'Grady
Northern Oil & Gas

Lyndal Cissell
SLB

Vicki Hollub
Occidental Petroleum

Dan Pickering
Pickering Energy Partners

Daniel Rice
EQT/Rice Investment

Toby Rice
EQT/Rice Investment

John Sellers
Double Eagle Energy Holdings

James Walter
Permian Resources

Derek Rice
EQT/Rice Investment

Vanessa Ryan
Chevron

Ryan Sitton
Pinnacle

Chris Wright
Liberty Energy

Executive of All Trades

CHUCK DAVIDSON

NOBLE ENERGY, QUANTUM CAPITAL GROUP

The first half of Charles "Chuck" Davidson's career felt, at times, like a series of out-of-body experiences, he said.

"It's a little bit of a funny, lucky story," Davidson told *Oil and Gas Investor (OGI)*.

For the first half of his career, the former CEO and chairman of Noble Energy was not quite backed into corners by his mentor, William E. Wade Jr., the former president of Atlantic Richfield Co. (ARCO).

Typically, these moments, which in hindsight were career-building moments, involved Davidson candidly admitting he didn't know anything about a job being offered to him. Somehow, Wade got him to go along with whatever new job he threw at Davidson.

Davidson grew up in Michigan and attended Purdue University to earn his bachelor's degree in chemical engineering. He'd known since junior high he wanted to be a chemical engineer and, he hoped, land a job in a research setting.

In 1972, a recruiter for ARCO's Harvey, Ill., technical center told Davidson there weren't any jobs along those lines. But ARCO's upstream business had just made a discovery in Prudhoe Bay, Alaska, and was trying to fill positions.

"And so, all I know is I know nothing about the upstream oil and gas business, nothing, zero," Davidson said. "And so I get a call from this HR person in Dallas. He says, why don't you come down here? They called it a plant visit, but it's basically to visit the office and we've got some possibilities here. Just give us a try."

Davidson went to Dallas, interviewed, and got a call back a couple of weeks later with a pick of five jobs. Davidson went to work as a natural gas engineer, building gas processing plants.

"So that's how I ended up in the upstream, just luck of the draw."

Davidson crisscrossed Texas, east to west, then came back to Dallas for a short stint in production engineering when he was asked to take on a role as an engineering manager.

Outside of three or four weeks of training in reservoir engineering, Davidson said he didn't know anything about the job.

Davidson ended up in Tyler, Texas, working on Cotton Valley downspacing, drilling and some deep Wilcox drilling in southeast Texas. Around 1985, the office closed. By 1986, the oil markets were in deep crisis.

"The bottom completely fell out," he said. "We shut down every drilling rig in the district."

SHUTTERSTOCK

Among the challenges that Chuck Davidson took on during his illustrious career was director of operations for the Trans-Alaska Pipeline System.

Davidson survived a flurry of layoffs and was asked to move to Alaska.

"Almost everybody in ARCO sooner or later gets somehow involved in the Alaskan project," he said.

He headed to Prudhoe Bay, where he worked as the field manager for the Kuparuk River Unit, which was pumping about 330,000 bbl/d. Prices were so low that the field generated cash flow on volume rather than by margin.

The job lasted about a year and half before he got another call. Davidson's first thought was, now what?

The job was not what he'd expected. Wade wanted him to take on the role of vice president for external affairs and government affairs.

Which led to Davidson's refrain: "But I don't know anything about public affairs and government affairs."

Davidson remembers the conversation happening on a

"The hand that we started with (at Noble Energy) was not really good from an asset standpoint, but ultimately we built it out as a nice position in deepwater Gulf of Mexico."

—Chuck Davidson, *Quantum Capital Group*

Wednesday. He spoke with his wife, said the job would be a full-time role in Anchorage, and she told him to take the job if he wanted it.

On Thursday, he called Wade back and told him he would take it.

On Friday, the *Exxon Valdez* hit a reef and spilled 11 million gallons of oil into Prince William Sound.

"Just chaos," Davidson said. Everyone affiliated with the oil and gas industry was affected by the spill.

"You're telling your employees, strip all your logos off anything, any external clothing you've got, strip your logos off baggage before you get on a plane at the Anchorage airport," he said. "Our president, Bill Wade, had to have security in his home living with him because of the threats."

Davidson set about rebuilding ARCO's brand with local television commercials that showed how that company was doing things differently, and how it was helping the state.

"By that time, I drunk all the Kool-Aid I could, and I said, 'Look, this is all about rebuilding our brand' because the whole industry lost their brand and a lot of their reputation during the spill."

Soon, a new job offer came his way: head of operations for the Trans-Alaska Pipeline. ARCO had helped to build the pipeline and, while it hadn't been involved in the oil spill, the company was heavily criticized for its response, Davidson said.

"It was usually a fire burning every day in that system because of all the government challenges, regulatory audits, things like that. But we pretty much rebuilt the system," he said.

Davidson next moved to Houston, where he ran ARCO's upstream division. In 1994, the company went public as Vastar Resources, where he served as CEO beginning in 1997. At the end of 1999, BP bought ARCO and Davidson retired from BP.

Two weeks later, he started work at a company called Noble Affiliates, later renamed Noble Energy.

The move to Noble was "just another one of those flukes," he said. A headhunter had called with the offer but Davidson begged off, wanting to shepherd Vastar through its acquisition by BP. But Noble was still looking for a CEO when BP finalized buying the public shares of Vastar.

Vastar had grown from an initial public valuation of $2.8 billion to $8.3 billion when it was bought by BP.

Noble was smaller. The company was struggling with deepwater and it had far-flung assets across the world.

"The hand that we started with was not really good from an asset standpoint, but ultimately we built it out as a nice position in deepwater Gulf of Mexico," Davidson said. "Onshore Noble was very weak and early on we acquired a company called Patina Oil & Gas."

That gave the company a position in the Denver-Julesburg Basin. A third pillar of the company was in Equatorial Guinea. And then the company made major gas discoveries offshore Israel in the Mediterranean.

Davidson shed assets in the North Sea, China's Bohai Bay, Vietnam and Argentina. The company's assets in Ecuador were nationalized and Noble went through arbitration before getting some of its money back.

"A lot of it was portfolio cleanup, but it was great organization," he said. The company grew from about 600 employees in 2000 to about 2,800 in 2014, when Davidson retired.

But while Davidson retired in May 2015 to give CEO Dave Stover a chance to run the company, he wasn't ready to leave the industry. That August, he joined Quantum Energy Partners (now Quantum Capital Group) as a venture partner.

Davidson was also courted by New York-based private equity firms but figured he'd only be relevant for about six months before losing touch with the industry.

"What really attracted me to Quantum was that Quantum was closer to an oil and gas company than probably any other private equity company," he said. And the reason is [President and CEO] Wil VanLoh's belief that if you're going to be a good investor in oil and gas, you better have a strong technical understanding of oil and gas. And so, he always supported a very strong technical team within Quantum."

Still very much active with several Quantum portfolio companies—he's chair of LNG company Mexico Pacific—Davidson sticks to the mission statement of Noble Energy, which was to better people's lives.

What stands out over his long career is completely changing the energy independence of the State of Israel through Noble's discoveries.

"They were literally burning coal and fuel oil for electricity before we made the natural gas discoveries in Israel," he said.

Noble also was the first offshore operator in the Gulf of Mexico to win a permit to drill, despite the possibility of litigation, after BP's Macondo spill. (Only later was it revealed that Noble's non-operating partner in the project was BP.)

And Noble partnered with the Environmental Defense Fund and former Colorado Gov. John Hickenlooper for the first tests to measure methane emissions in any state.

"Some others of the industry were upset, but what it did was it gave enough confidence in the industry in Colorado, which some days they're not too friendly to the industry, that they pulled back on some very bad potential legislation," he said.

Davidson said he's tackled all of his assignments the same way—making sure the values of the organization are right, "that you're encouraging everyone" and doing the right thing for the right reasons.

"The outcome," he said. "is usually much better."

—Darren Barbee, Senior Managing Editor, Digital

A Serial Dealmaking Success

PETER DEA

BARRETT RESOURCES

A job in Exxon's production department is a fairly typical start in the petrochemical industry.

Peter Dea's path to that first job in the early 1980s, however, was not typical.

After earning his master's degree in geology at the University of Montana in 1981, Dea spent his time in mineral exploration, land-use studies and teaching. "All kinds of different things," he said.

Then, he and some friends spent a month as the first skiers to completely traverse Canada's Mount Logan, the country's highest peak (19,850 ft). He followed the trip with a few weeks in Anchorage, Alaska, recovering from frostbite. Then, he and friends spent 42 days on a multimodal expedition climbing, hiking and kayaking across the Arctic National Wildlife Refuge.

After that, he was off to Exxon, where he started work in a windowless office in sun-blasted Corpus Christi, Texas.

"It was a bit of a rough transition," he said.

Dea, however, made it work. He pursued sailing, triathlons and used his education and growing job skills to help him learn the industry and climb the ladder in the energy business.

The longtime oil and gas executive, who has led some of the most successful deals in the industry, says a key to his career was applying the lessons he learned from his passions to his job.

"I've given, over the years, leadership talks, and one thing I always encourage people to do is to pursue their passions, whatever they are," he said. "Whether it's piano, golf, skiing or soccer, etc., they all are building one's character, and they involve discipline, organization, leadership, teamwork and confidence building—all helpful in careers."

Dea enjoyed his time at Exxon, but his independent streak eventually led him toward the smaller businesses working in the undeveloped spaces, where he felt like he could have a larger effect on a company's overall success.

His connections brought him to Barrett Resources in 1993. Bill Barrett, the company's founder, and Paul Rady, head of exploration, recruited Dea because of his geologic knowledge of the Rockies, where the company was based.

At the time, Barrett was focused on exploiting the Piceance Basin but also had an eye on expanding into new fields. Dea was one of the lead geologists in Barrett's exploration group.

The team was looking for potential prospects to explore when Cave Gulch came up.

"It was literally on the shelf in the file room," Dea said.

Dea remapped the prospect and found his boss was willing to drill a shallow wildcat well for natural gas surrounded by dry holes. The discovery was the "best well in the Rockies" that year. That set up a deep test toward 20,000 feet.

The second deep well hit so much overpressured gas that the well blew out. Fortunately, no one was injured and the well was brought under control. It produced 40 MMcf/d for 100 days before the pressure fell off.

It was a huge discovery and company-builder for Barrett. The company's assets in the Piceance had been collectively producing about 25 MMcf/d, and a single well in the Cave Gulch field produced more than one-and-a-half times that amount for 100 days.

"Cave Gulch was a 50 Bcf prospect that turned into a 500 Bcf accumulation of gas," Dea said. "So, it was pretty exciting and successful."

Winning the Shell Game

Dea's climb at Barrett continued. After finishing the Harvard Business School Advanced Management Program in 1999, he took over as CEO. The company continued its expansion, and inevitably caught the eye of some of larger players in the industry.

One Monday afternoon in 2001, he received a phone call from the CEO of Shell America. Shell wanted to buy Barrett. Dea responded it wasn't for sale.

"He said, 'Well, I want to buy your company, and I'd like to come up and meet you.' And I said, 'Well, with all due respect, sir, we do have a board meeting coming up this week and, obviously, this will be added to our agenda.'"

Shell was not that patient. Two days later, Barrett executives learned from Reuters that Shell was moving forward with a tender offer—27% premium, all cash.

"The complexion of the board meeting changed quite a bit," Dea said.

Barrett immediately hired a team of advisers, attorneys and public relations experts. While Dea had initially hoped to avoid a sale, he ran into a hard reality of public companies.

"I realized really quickly what they don't tell you in graduate school or at the Harvard AMP—that you cannot say no to an all-cash high-premium offer," he said.

Barrett could, however, find a better deal. Dea believed that Shell was undervaluing the company and took

OVINTIV

Peter Dea and his team at Ovintiv make a field trip to the Permian Basin.

Barrett to market, eventually making a deal with The Williams Cos. for a much higher 67% premium.

During his time at Barrett, the company grew in value from $200 million to $2.8 billion. The Wall Street Journal recognized Barrett for delivering the best 10-year average compounded annual return in a comparison with 33 major oil and gas companies.

And, with Barrett sold, Dea found himself unemployed.

"Of course, in a merger like that, the first one out the door is the CEO," he said. "So, I took some time with my wife and tried to figure out my next move."

He didn't have long to wait. Western Gas Resources, a primarily midstream company that wanted to expand into E&P, hired Dea as CEO. The company's value jumped from $1 billion to $5.3 billion within five years, when Anadarko Petroleum bought the company in 2006 in an amicable process, as opposed to Shell's hostile takeover attempt at Barrett.

The Sell-Out Strategy

At that point, Dea decided to follow his passion for exploration and founded private Cirque Resources in 2007. The new company was dedicated to generating prospects and selling an interest to partners to spread risk. The company would then drill wells, prove up the value and sell out. Cirque focused in the Rockies, where the team had the most experience.

"One of the reasons we went private is because, in the past, I had been running two public companies with the aspiration that we would grow these into the indefinite future," he said. "And yet, they got bought out from underneath us.

"I figured, why don't we start a company where the strategy is to sell out?"

Dea drew investment from several large insurance companies that tended to invest in public companies, a sign of their faith in his plan. Cirque's last asset was sold in the mid-2010s, after which Dea co-founded Confluence Resources in 2016. At that point, he decided to step away from the day-to-day management and took the role as executive chairman, which he holds today.

He otherwise remains busy. He sits on the boards of Ovintiv, Antero Resources and Liberty Energy. He's active with several civic groups and co-founded the Explorers' Club (Denver). He's sponsored geology programs at his alma maters. He was named Wildcatter of the Year in 2010 (Rockies focused) and was inducted into the All-American Wildcatters in 2014.

He, his wife Cathy and their three sons established the Dea Family Foundation to support education, science and conservation efforts. He and Cathy live in Crested Butte, Colo., where skiing is readily available. And he still enjoys a good adventure.

A few years ago, he and Cathy went to Baffin Island in the Canadian Arctic. They camped on the ice, 6 miles from shore, saw 39 polar bears and observed narwhals swimming and a bowhead whale breaching the surface.

"We keep our passions active with these trips we love to do together," Dea said.

—Sandy Segrist,
Senior Editor, Gas and Midstream

Energy Authority of Appalachia

JOHN PINKERTON

RANGE RESOURCES, ENCINO ENERGY

After leading Range Resources to discovering the largest U.S. gas field—the Marcellus Shale—John Pinkerton "retired" to co-lead what is now Appalachia's No. 1 oil producer, Utica-focused Encino Energy.

Pinkerton's oil and gas career began with Snyder Oil Corp. in 1980, where he was senior vice president of acquisitions. He had joined the E&P after working at Arthur Andersen upon completing his BBA from Texas Christian University and MBA from the University of Texas.

In 1988, he became a director at Appalachia-focused producer Lomak Petroleum that was headquartered in Hartville, Ohio, along the Utica oil fairway.

Lomak was in the midst of thousands of old oil and gas wells, drilling on leases farmed out to it by the nearly century-old gas distributor East Ohio Gas Co.

Pinkerton became president in 1990, CEO in 1992, renamed it Range in 1998 and took over the chairman and CEO posts in 2008.

In the operator's 2000 annual report, he discussed the state of the Appalachian oil and gas business. Production from properties Range acquired between 1988 and 1997 "fell more rapidly than anticipated and further development of the principal fields proved far less attractive than expected."

Like E&Ps across the Lower 48, Range was struggling to find highly economic new reserves. And oil and gas prices collapsed in late 1997 into 1999.

Range's stock was trading in early 2000 at less than in 1990.

But shale happened.

Mitchell Energy & Development had made a breakthrough in the late 1990s in producing economic amounts of gas from the Barnett Shale in North Texas under Range's Fort Worth Basin headquarters.

Encino Energy

Frac operations underway for Marcellus gas that Range Resources cracked the code on under John Pinkerton's leadership.

While Range didn't have leasehold over the Barnett at the time, it had 1.9 million gross, 1.7 million net, acres over the Marcellus in the Appalachian Basin.

With its team at its Ohio office in 2004, it decided to reenter a vertical that was scheduled for plug and abandonment and perforate it in the Marcellus instead.

And it put a slickwater frac on it.

The Renz #1 demonstrated sufficient production—a 24-hour IP of 800 Mcf. In 2005, two more Marcellus verticals—Deiseroth #1 and Renz #2—came on with similarly encouraging results.

In 2007, it took the wildcats horizontal with the Gulla #9H. That well came on with 3.2 MMcf/d—as much at the time as a good Barnett horizontal and very economic in the premium-priced, northeastern U.S. gas market.

Three more horizontals before year-end performed even better, coming on with 3.7-, 4.3- and 4.7 MMcf/d.

Range's market cap in 2000 was about $400 million. Today, its enterprise value is $9.5 billion.

Its production in 2000 was 152 MMcfe/d. Third-quarter 2024 production was 2.2 Bcfe/d.

In 2012, Pinkerton retired as Range's CEO, becoming chairman exclusively. He retired from that post in 2015 and continued on the board, departing in early 2016 after 28 years with the company.

But his E&P days were not done.

Advantage Video & Marketing

Encino Energy's Utica Shale play in Ohio is a formation John Pinkerton knew well from his early Range Resources days when it was often drilled through for Trenton Limestone pay.

"EAP's ... success is a reflection of John's vision, ability to organize great assets and even better people, all with an eye toward operational excellence."

—Hardy Murchison, *Encino Energy*

He joined Encino Acquisition Partners (EAP) as executive chairman. There, Hardy Murchison, who had worked with Pinkerton in the 1990s, was looking for an oil target.

The pair settled on one they both knew well from their time at Range years before: Ohio oil.

Pinkerton had drilled through Ohio's Utica plenty of times in much of his early career when putting verticals in the underlying Trenton Limestone. Among all operators, some 16,000 verticals targeted that formation in nearly 150 years of Ohio drilling into the early 2000s.

In the early 2010s, Chesapeake Energy amassed a large leasehold and began putting horizontals in the Utica. But oil prices plummeted in late 2014 into 2016 and gas futures, in particular, were overwhelmed by new Marcellus and other supply, resulting in capital retreat.

From that exodus, Pinkerton and Murchison saw an Ohio entry opportunity. In 2017, behemoth CPP Investments backed EAP with a $1 billion commitment. EAP then bought Chesapeake's 900,000 net Ohio acres for $2 billion.

"The Canada Pension Plan (CPP) was key to the story," Ray Walker, Encino Energy COO, said. "They were really attracted to the fact that John and Hardy had a big idea."

Walker had joined Pinkerton at EAP in 2017 after retiring from Range where Pinkerton had hired him to open the Marcellus office in 2007 in Pennsylvania.

Today, EAP has 1.2 million net Ohio acres and more than 1,000 wells, making 43,000 bbl/d of oil and 913 MMcf/d of gas. The leasehold is more than 90% HBP.

It was running four rigs and two completion crews—the most among all operators in Appalachia, including those drilling the Marcellus in Pennsylvania and West Virginia.

Earlier this year, CPP Investments committed another $300 million toward accelerating development.

Pinkerton retired from EAP's executive chairman post in 2022 but continues with the company as chairman of Encino Energy.

Murchison said, "EAP's strong foundation and continued success is a reflection of John's vision, ability to organize great assets and even better people, all with an eye toward operational excellence."

—Nissa Darbonne,
Executive Editor-at-Large

A Paragon of Persistence

TREVOR REES-JONES

CHIEF ENERGY

Trevor Rees-Jones has been in the oil and gas business for decades, and he doesn't plan on leaving anytime soon.

"I'll retire when I'm no longer breathing," Rees-Jones, founder of Chief Energy, told *Oil and Gas Investor (OGI)*. "Until then, I'll carry on."

The Dallas native got his start in the oil and gas business in 1984. Prior to that, Rees-Jones was an oil and gas lawyer. However, he found the inner workings of the oil and gas business itself to be more interesting than the legal work, so he made the change after a few years. He has never entertained any other careers since.

"I pretty much had to make it in the oil and gas business or go back to being a lawyer," Rees-Jones said.

Times got tougher for the oil industry in the years that immediately followed. An oversupply of crude oil, falling demand and slowing economic activity contributed to lower oil prices.

Historical data from the U.S. Energy Information Administration show the purchase price for U.S. crude oil was around $26/bbl in 1984. That slid to about $10.75/bbl by mid-1986.

The natural gas wellhead price was about $2.65/Mcf in 1984. That fell to about $1.85/Mcf by mid-1986.

Rees-Jones laughed about those early days in the business in an interview with *OGI* in 2007. According to the article, he said "it was a good thing he was single at the time or he never could have done it. And he didn't think the law profession would take him back."

The tide eventually turned—not only in the industry's favor but also for the wildcatter.

"I think it's very exciting work and it can be very rewarding if you stay the course and are lucky enough to find yourself well situated like I did."

—Trevor Rees-Jones on careers in oil and gas

Wildcatting Wonder

Rees-Jones began investing in minerals and royalty rights, according to Chief Energy's website. His Chief Oil & Gas was formed in 1994 and went on to make its mark in the Barnett Shale. Rees-Jones once called the Fort Worth Basin the "sorriest and most depleted basin around" before its heyday. But he kept at it, motivated by several factors.

"No. 1, I really enjoyed the search for oil and gas even though I was in a heavily depleted area. I was just trying to find a lower risk way to go about it," Rees-Jones said. "And I just enjoyed what I was doing.... I enjoyed drilling wells. And another motivation was that, as I mentioned before, it would have been a nightmare to bust it out and have to go back [to] being a lawyer. I didn't have any choice, but I had to stay the course and find a way to succeed."

He did.

Rees-Jones said one of the most memorable moments of his career came when he began drilling Barnett Shale wells in the 1990s and started seeing some success.

"That was about 15 years after I'd gotten into the oil and gas business with very little to show for it," he said. "To be able to start making some good wells on a fairly consistent basis was definitely a high point."

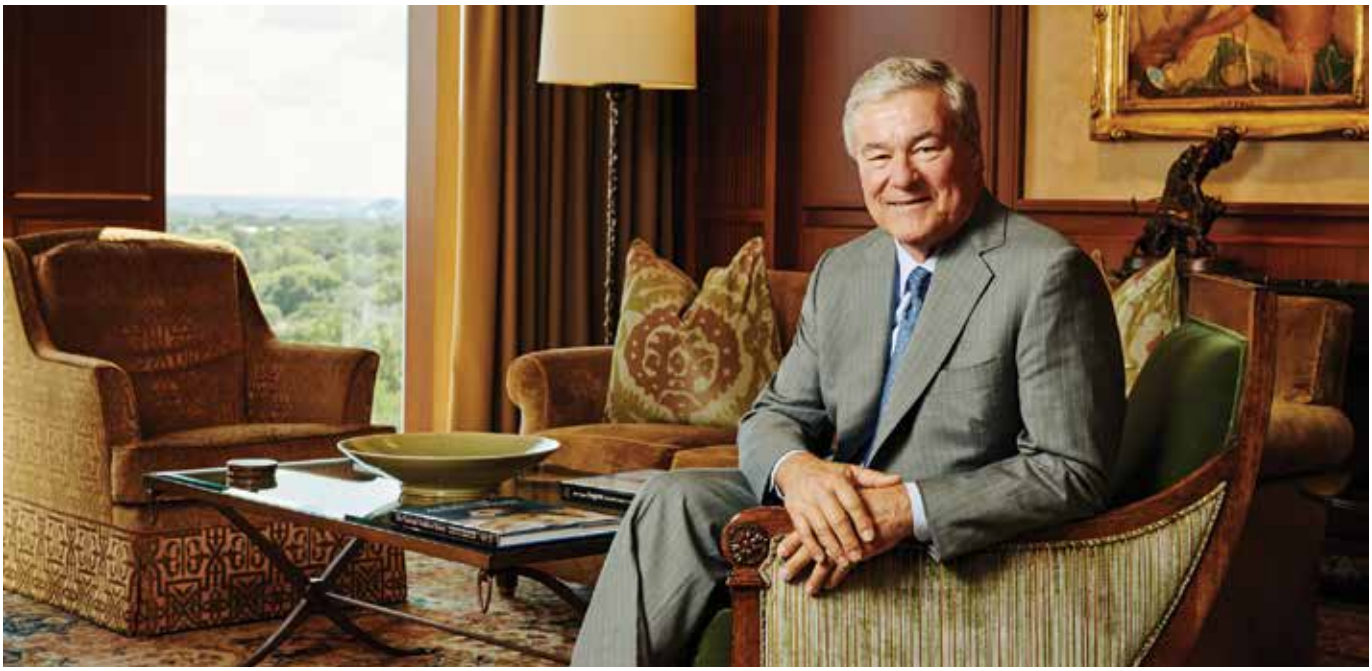
Those days marked the beginning of the shale revolution. Chief Oil and Gas was among the early movers of what he called the first of the great new shale plays.

"Of course, Mitchell Energy and Development/George Mitchell had pioneered the Barnett Shale, but we had identified what we called a second prong to the south of where Mitchell was concentrating its activity," Rees-Jones said. "And it ended up drilling out very, very well. So, the Barnett was what started it all. Being able to figure out how to bust hydrocarbons out of that tight rock, in that instance natural gas, was groundbreaking and revolutionary and kicked off what's now termed the shale revolution."

Bust to Boom

The area of Wise County in the Fort Worth Basin was crowded with operators at the time, he recalled, noting Chief was fortunate enough to not only be there but to have jumped into the Barnett fairly early.

The value of that move paid off in 2006 when Chief Oil & Gas sold most of its Barnett properties. The $2.63 billion deal included the sale of E&P assets to Devon Energy for $2.15 billion and selling the midstream assets to Crosstex Energy for $480 million. Looking at the bids was another memorable moment for Rees-Jones.



CHIEF ENERGY

Trevor Rees-Jones, founder of Chief Energy, is recognized as not only a wildcatter but a deal-maker and philanthropist.

"A couple of them were far beyond anything any of us could have possibly imagined," he said.

He had come a long way from worrying about having to seal a deal each month to buy his family groceries and pay his bills, which Rees-Jones called another memorable moment.

By 2006, gas prices had risen to $8/Mcf, far from the $1.93/Mcf in early 1994.

Oil and gas prices kept climbing. By 2008, the shale boom was in full effect: the Henry Hub natural gas spot price reached $12.69/Mcf and WTI hit $145.31/bbl.

Several more million- and billion-dollar deals followed, including the $1.3 billion sale of some Barnett Shale assets with Ross Perot's Hillwood Oil and Gas to Quicksilver Resources in 2008.

Chief began operating in the Marcellus Shale in 2007 and about four years later, the company sold about 228,000 net acres to Chevron. In 2012, Rees-Jones sold the company's pipeline network in the Marcellus for about $1 billion to Penn Virginia Resources.

Rees-Jones sold Chief Oil and Gas itself, along with associated non-operated interests held by affiliates of Tug Hill, in 2022 to Chesapeake Energy for about $2 billion.

He believes natural gas has a promising future, including in a lower-carbon world.

"The reason that the United States has lower carbon emissions today than 10-15 years ago is because of natural gas," Rees-Jones said. "And I think until the so-called renewable fuels infrastructure and everything there is built out, natural gas is going to remain a large part of what generates our electricity."

Giving Back

Rees-Jones has been recognized for his perseverance. His recent honors include the 2023 Horatio Alger Award, which is awarded by the Horatio Alger Association of Distinguished Americans to leaders who have overcome adversity to accomplish remarkable successes.

"Mr. Rees-Jones exemplifies the importance of believing in yourself and refusing to give up when success isn't happening quickly or easily," Terrence J. Giroux, the association's executive director, said in a 2023 news release about the award. "He took a risk leaving a steady law career because he knew his passion was elsewhere and showed tremendous dedication. By trusting his intuition and following a dream, he founded one of the most successful natural gas companies in the world. Mr. Rees-Jones will serve as a great source of inspiration to our Scholars and we are delighted to welcome him as a member."

Rees-Jones and his wife, Jan, are also supporting youth and others via the Rees-Jones Foundation, which was founded in 2006. Its most recent contributions included a $100 million gift to support construction of a new pediatric campus by Children's Health and UT Southwestern Medical Center in Dallas. The central hospital tower will be named Rees-Jones Tower, according to an October 2024 news release.

Today, Chief Energy is mostly active in the biggest oil and gas basin in the U.S.

"We are doing a lot of drilling of non-operated interest. Our primary focus is in the Permian," Rees-Jones said. "But we're also involved in many other plays throughout the United States."

To people considering careers in oil and gas, Rees-Jones said it's a great industry.

"It's been a wonderful business and career for me," he said. "I think it's very exciting work and it can be very rewarding if you stay the course and are lucky enough to find yourself well situated like I did."

—Velda Addison, Senior Editor, Energy Transition

Builder of a Powerhouse Private Equity Firm

WIL VANLOH

QUANTUM CAPITAL GROUP

Window washing. Lawn mowing. Directory advertising. Wil VanLoh did it all while working to put himself and his wife through college at Texas Christian University in Fort Worth, Texas, in the 1990s.

That work ethic would serve him well. At 28, VanLoh founded what would become Quantum Capital Group, which was among the first private equity firms focused on energy.

"I was very entrepreneurial. I loved being creative and figuring out how to solve people's problems and build businesses that solve people's problems," VanLoh told *Oil and Gas Investor*. "Some guys liked to goof off when they were in college. My hobby was trying to figure out businesses that would make money. I didn't really have other hobbies in college."

He graduated in 1992 with a bachelor of business administration degree in finance. VanLoh didn't set out to work in energy, but his interest in investment banking landed him a job with the energy team at NCNB—now Bank of America Merrill Lynch. Then it was on to Kidder, Peabody & Co., which had a larger, more active energy investment group. There, VanLoh learned about the E&P and midstream businesses.

"After a couple years of doing that, normally you go back and get an MBA," he said. "I decided that I didn't really want to go back and get an MBA and I was going to start my own boutique investment banking firm."

After a few years of taking deals to firms the likes of EnCap Investments and NGP Energy Capital, VanLoh decided to try his luck at raising a fund himself. He teamed up with A.V. Jones, even then an industry legend. VanLoh raised his first private equity fund.

Hart Energy

Wil VanLoh speaks at Hart Energy's Energy Transition Capital conference in October 2021.

"He was the only person that was in a real position to influence and mentor me. When we got into business, I was 28 and he was 62," VanLoh said. "But he was an entrepreneur, too."

Entrepreneurs typically have a knack for recognizing talent and letting people learn from their mistakes, he said.

"He'd always say, 'you go figure it out,' but he was always there to talk through things and bounce ideas off of and give advice when asked—but never when not asked," VanLoh said.

Most Valuable Asset

In the years since the founding of Quantum, VanLoh has built a powerhouse. The firm has grown with the industry, pivoting to include sustainable investment funds in its enormous portfolio while still supporting fossil fuel production and transmission within its assets under management, now worth some $28 billion.

"It takes a career, a lifetime, to build a reputation," VanLoh said. "You can lose it literally in a minute by doing something that you shouldn't do or compromising your integrity."

During its 26 years, Quantum has backed more than 150 companies. That wouldn't be possible without a winning track record, as well as a knack for treating people well.

"One of the things that really attracts management teams and entrepreneurs to do business with us is the reputation that we've developed over many years. We have a history of doing what we say we're going to do—even when it costs us something, even when it hurts us. Your word is your bond," he said. "People will really only do business with you over the long run

HARTENERGY HALL OF FAME

Congratulations
Wil VanLoh

Quantum Capital Group Founder & CEO

on being named to the Hart Energy Hall of Fame alongside fellow entrepreneurs, trailblazers and industry leaders from America's great energy industry.

QUANTUM CAPITAL GROUP

"We never had a desire to be the biggest. We always had a desire to be the best in terms of generating the best risk-adjusted returns for LPs."

—Wil VanLoh, *CEO and founder, Quantum Capital Group*

if they trust you."

The philosophy extends to those who work internally at Quantum, too. The oil and gas industry has faced new challenges in recent years, subject to changing public whims on ESG matters and its own need for fiscal discipline. Among the net effects is a profound drop in accessible capital and a reduced workforce.

VanLoh encourages a "servant leadership" model at Quantum, which is part of the firm's success, he said.

"When you, as a leader, serve the people that work for you, they love you, they love the company, they will run through walls," VanLoh said. "Business is tough. You want people that feel like, 'hey, I'm going to go the extra mile here because I'm appreciated, I'm respected, I'm encouraged and empowered and treated well.'"

As a result, during the lean years, Quantum's team didn't flee the space—or the firm.

"The rest of the industry probably wasn't having a lot of profits either, but (Quantum employees) were much more committed and bought in because they knew over the long term, they were part of the winning team and that we would have some really good years ahead," he said.

Core Competency

Many banks, generalist and institutional investors and private equity firms have exited the energy industry as fossil fuels have come under a barrage of social backlash in recent years. Quantum is one of a handful of firms that remain in the energy industry, but it, too, has grown with the times.

From its inception, Quantum engaged in the E&P space, as well as making some investments in the midstream and oilfield services sectors. But in 2010, the firm broadened its portfolio to include power. Then, in 2017, Quantum entered the renewables space.

"We've stayed focused on energy.

Shutterstock

Included among the firms that Quantum is currently backing is Bison Oil & Gas, which operates in the D-J Basin and Greater Rocky Mountain areas of Colorado and Wyoming.

I think that what's key and core is we are energy experts. We know what we're good at and we know what we're not good at," VanLoh said. "It's taken a lifetime to really become an expert in the energy space, and I'm a big believer as an investor, you have to have a core competency. You have to have a competitive advantage."

Instead of delving into industries with other hard assets like timber or real estate, Quantum opted to build on its advantage. Following the example of Warren Buffet's "moat-building" style, Quantum hunkered down in the energy space.

Closing in on three decades in the sector, the firm has in-house experts on every vertical within the energy space. Between the collective knowledge and industry insight—and enormous amounts of data—Quantum has "built a mote around our business that makes it very hard for people to come in and compete."

Indeed, Quantum announced in October the closing of a $10.5 billion raise covering investments in oil and gas, midstream and the energy transition businesses.

The firm's flexible mandate means it can invest where needed in the capital structure through private equity, structured capital and private credit platforms. The total raise includes $5.25 billion for the firm's private equity flagship Quantum Energy Partners VIII; $2.8 billion for the firm's structured capital fund Quantum Capital Solutions II; and approximately $2 billion for other associated funds on the Quantum platform.

Included among the firms that Quantum is backing through the recent raise is Bison Oil & Gas, Firebird Energy, HEQ Deepwater, QB Energy, Western Basin Energy, Vickery Energy, Rockcliff Energy, Trace Midstream and Haventus.

"We never had a desire to be the biggest. We always had a desire to be the best in terms of generating the best risk-adjusted returns for LPs," VanLoh said. "Our customers are the investors that put money in our fund and the management teams that we give money. We think about how to serve them best."

—Deon Daugherty, Editor-in-Chief

Oklahoma's Humblest Oil and Gas Icon

TOM WARD

CHESAPEAKE ENERGY, SANDRIDGE ENERGY, MACH NATURAL RESOURCES

Tom Ward was just 16 when his father passed away, leaving him adrift and in need of guidance on what to do with his life. His uncle was a successful landman in western Oklahoma; his brother and grandfather were in the energy business, too. The industry held an allure.

"Just following in their footsteps, this is basically what I was doing at the time," he told *Oil and Gas Investor*.

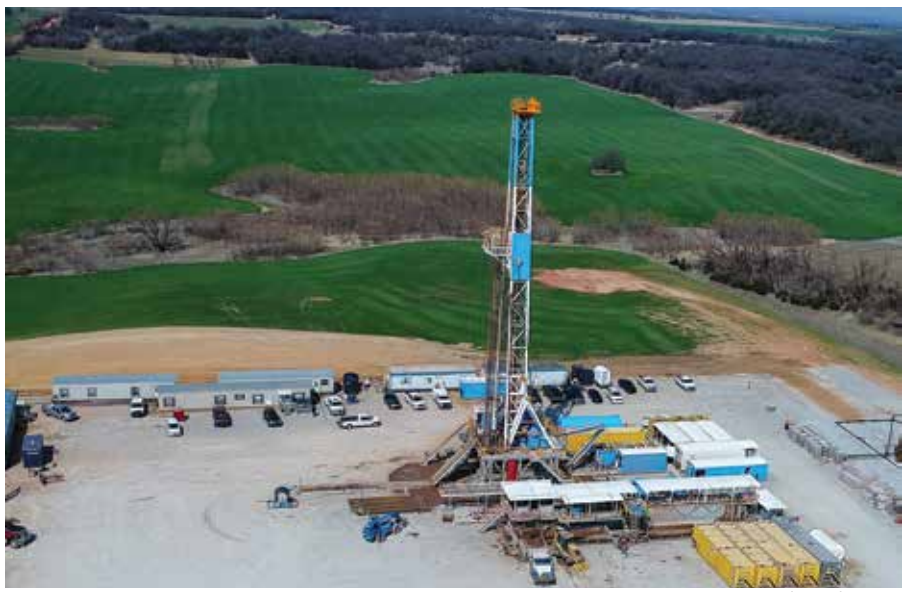
Ward found a job working the summers as a swamper, a general roustabout, at a saltwater disposal trucking firm for $4/hour. He was one of 42 graduates at Seiling High School in 1977, intent on studying petroleum land management at the University of Oklahoma.

Ward and his wife worked their way through school, and he graduated in 1981. The couple moved to Clinton, in western Oklahoma, after he was hired at Mewbourne Oil.

"I really never wanted to leave my hometown, so the idea of moving off to one of the big cities was never really anything I was too interested in," he said. "I chose to work in western Oklahoma because that's where I was from. I enjoyed the small-town atmosphere, and I wanted to be close to our families."

The decision represented a path that was contrary to the one that many others were taking, but as Ward says, "I was never like most others. I loved living in a small town."

At the time, Clinton had a population of 10,000—small by big city standards, but still eclipsing the current population of Ward's hometown in Seiling, Okla., by a factor of 10.



Mach Natural Resources

Tom Ward has grown Mach Natural Resources through acquisitions from companies like Chesapeake, Alta Mesa and Paloma Partners.

At the Crossroads

Seiling is the largest city in Dewey County. Its location in northwestern Oklahoma marks the intersection of four highways—270, 60, 281 and 51—and makes Seiling the "Crossroads of Northwest Oklahoma," according to the Seiling Chamber of Commerce.

Ward lives in Oklahoma City today, an easy drive from his place to those of his children and grandchildren.

He came to the big city by way of Chesapeake Energy, the iconic shale gas producer that Ward founded with Aubrey McClendon.

"We did quite well as non-operators in about 600 wells that we participated in together," he said. "Then we decided to move into the drilling phase and form Chesapeake at that time in 1989."

Ward was president and COO; McClendon was CEO and chairman of the board.

McClendon was "extremely good at being able to raise capital," Ward said.

"He took care of more of the financial side, and I was more in operations, but he taught me a lot of ways and just how financially to run a business. It was inspiring to see him be able to really communicate well with lenders, potential lenders and equity holders."

There were plenty of opportunities to drill productive wells and grow the company, but access to capital was difficult. In February 1993, Chesapeake was one of the first E&Ps out of the gate to file an IPO. No others had been filed since the 1980s.

"There had been a long period of time without any new money coming in. And as that market opened up, it allowed us access then to high-yield

Chesapeake Energy

Chesapeake Energy's operations in the Marcellus Shale. The natural gas giant, now known as Expand Energy, was founded by Tom Ward and Aubrey McClendon.

investments and more equity offerings as we did better," he said.

Growing the company took time and years to build, "but then we did have some enterprising people that we worked with that were able to unlock some of the early keys of horizontal drilling," Ward said.

In 2006, Ward left Chesapeake and, with $500 million, bought Riata Energy and renamed the company SandRidge Energy.

Ward and McClendon had worked together for 24 years when Ward chose to pull up stakes. McClendon said in 2007 that he had known the day might come when Ward would choose a simpler life.

"I admire Tom for lots of different reasons," McClendon said in an interview with The Journal Record, an Oklahoma business publication. "The words that describe him best would be intelligent, very hard working, ethical and determined. At the end of the day, he has excellent business sense."

Leaving Chesapeake was a tough decision, Ward said, but the company had grown so large—with almost 100 rigs running—that his management style no longer fit.

"It just became untenable for me personally to be able to keep up with all the activity that was going on," Ward said. "We'd had a very good run. It was a very difficult decision because I loved the company and I loved the people that I worked with, but it was just better for me personally to move on."

Inside of five years, SandRidge was a $10 billion company and Ward chose to move on again. In 2018, he launched Mach Natural Resources with capital partner Bayou City Energy.

He has grown Mach through a series of acquisitions. In April 2018, Mach purchased Mississippi Lime assets in Oklahoma from Chesapeake, including producing properties concentrated in Woods and Alfalfa counties.

In 2020, Mach acquired upstream assets from Alta Mesa Holdings and midstream assets from Kingfisher Midstream as part of Alta Mesa's Chapter 11 bankruptcy process. Mach followed up in 2023 with an $815 million acquisition of central Oklahoma assets from EnCap-backed Paloma Partners IV.

The company holds about 1 million net acres of Midcontinent leasehold in its portfolio today, and it has consistently outperformed Wall Street estimates since it went public in 2023.

Mach runs a tight ship, modestly growing production while keeping costs down. At the midpoint of this year, the MLP's capital expenditures were coming in 30% below Wall Street forecasts. The end result was distributable cash flow close to $67 million and a declared distribution of 90 cents/share, which equated to an annualized yield of 19% for its unitholders, a value that analysts at Raymond James described as "whopping."

The years haven't worn down Ward's work ethic.

"I think, by design, I put in my time. I still work diligently and understand our company. I expect others around me to do the same," he said. "I want us all to be able to work with humility and not be arrogant.

"The two different roads that a person can travel are either of arrogance or humility. And the arrogant company can do very well where everybody sharpens their elbows and works their way up and competes with each other. But I also think that the companies that work together can also bring a company forward and achieve their goals."

—Deon Daugherty, Editor-in-Chief

Expanding Horizons

NICK DELL'OSSO

EXPAND ENERGY

Expand Energy CEO Nick Dell'Osso joined Chesapeake Energy four years after earning an MBA in finance from The University of Texas' McCombs School of Business and two jobs as an investment banker at Jefferies and Banc of America Securities Holding Corp.

Then came Chesapeake with an offer in 2008 to lead finance at its midstream business.

"Given, up to that point I had been a consultant and banker, I call this my first 'real job' and have loved every minute of it," he told *Oil and Gas Investor*.

Dell'Osso took his first "real job" and ran with it. After two years running Chesapeake's midstream finance division, he was promoted to executive vice president and CFO in 2010. He earned the top job in 2021, replacing Doug Lawler as CEO.

During the years in between, Chesapeake, the world and the energy industry changed dramatically.

The company, a game-changing natural gas producer founded by Aubrey McClendon and Tom Ward, pivoted toward diversifying in the way of adding oily assets to its portfolio in 2018. Chesapeake bought Wildhorse Resource Development, a newly public producer in the South Texas Eagle Ford Shale, for almost $4 billion.

The COVID pandemic that began in 2019 shook the global economy—and energy with it—to its core. The following year, Chesapeake was one of dozens of E&Ps that filed for bankruptcy.

Then Lawler moved on, Chesapeake emerged from bankruptcy with a renewed focus on gas and Dell'Osso stepped up in 2021. He set out to clear Chesapeake's debt, retool its corporate strategy and fine-tune its natural gas operations. Within 24 months, Chesapeake had achieved all of that and more. The firm generated more than $1 billion worth of free cash flow by the midpoint of 2022.

> ***"Merging Chesapeake and Southwestern to form Expand Energy has been the biggest challenge of my career and my greatest highlight."***
>
> **—Nick Dell'Osso, *CEO, Expand Energy***

But Dell'Osso and his team weren't finished with Chesapeake's makeover.

Amid a wild run of consolidation that has consumed the upstream sector for more than a year, Chesapeake announced its $7.4 billion merger with Southwestern Energy. The deal closed in October, completing the transformation of Chesapeake from its post-bankruptcy doldrums into a powerhouse rebranded as Expand Energy, the largest gas producer in the U.S.

"Merging Chesapeake and Southwestern to form Expand Energy has been the biggest challenge of my career and my greatest highlight," Dell'Osso said.

Having to close the deal under the Biden administration's aggressive Federal Trade Commission (FTC) scrutiny slowed the merger's roll.

"Driving the deal was difficult, but bringing together two company cultures is the larger task. We used the delayed time with the FTC approval process to work together on our integration and the result is a talented team focused on synergies and thoughtful disruption of standard practices," Dell'Osso said. "We're taking a 'best of both' approach to help ensure we integrate the premier programs, practices and policies from each organization. We are absolutely focused on and expect to achieve a 1+1=3 result."

Steady in a Cycle

Dell'Osso's focused, cool-under-pressure manner is evident throughout the major events of his career. When he was appointed CEO, he accepted the role with confidence in the company's team.

"Chesapeake has always had strong talent, and that's the foundation we built upon as we've formed Expand Energy," he said. "With the right people, we can overcome anything, including remaining steady in a cyclical industry."

His leadership style is designed to inspire the right people.

"I believe you get the best outcomes when everyone has a seat at the table. I don't focus on hierarchy or titles; I want the right people in the room, and I want to listen to and learn from all levels of our organization," Dell'Osso said.

It's also important that the team understands the company's purpose

EXPANDING OPPORTUNITY

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Nick Dell'Osso

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expand

Chesapeake Energy

Nick Dell'Osso, Expand Energy CEO, visits a Chesapeake E-Fleet site in the Marcellus in 2022.

and feel a sense of ownership over its future.

"We're delivering critical energy to markets in need and helping address one of the great threats to human prosperity. We need to put people in positions to be successful, trusting their expertise to help us collectively reach our goals," he said.

Having spent the vast majority of his career as a producer, Dell'Osso has faith in the industry's ability to make an important impact in the world. And that's a key selling point the oil and gas business can use to attract a top-notch workforce and excite young talent.

"There's no better place to be than the energy industry if you want to make a difference. Our industry needs the best and brightest working together to solve global energy poverty," he said. "Beyond encouraging them with our purpose, I would recommend they dive into their roles, work in different areas to gain experience and take ownership of their responsibilities. Also, I've found that the most innovative thinkers are well-rounded people with full lives. A thriving career and an enriching personal life should not be mutually exclusive."

That's something he learned from his father. Dell'Osso said his family has always been the biggest influence on his life, but his father particularly made an impression by demonstrating the value of hard work and a serious approach to responsibilities. At the same time, he added, work-life balance is important.

Dell'Osso's commitment to the cause of alleviating energy poverty is palpable. He believes in the ability of natural gas to make transformative change. The industry never ceases to surprise him, with its constant rate of change and ability to innovate and evolve. From where he began in 2008 at Chesapeake to now as Expand's CEO, he has seen remarkable improvements in safety, efficiency and potential to move humanity forward.

"Billions of people across the globe lack access to affordable, reliable, lower carbon energy, which is critical to human quality of life and prosperity. Addressing this crisis is arguably one of the world's most defining challenges," he said.

"As the largest natural gas producer in the U.S. and a top producer globally, Expand Energy has a responsibility to lead. We have some incredible advantages to help us deliver—specifically our scale, balance sheet and talent. However, these opportunities will not be enough to meet our objective. We must disrupt our own business model, using our strong foundation as a catalyst to more efficiently reach markets in need."

—Deon Daugherty, Editor-in-Chief

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Financial Force of Nature

MARIANELLA FOSCHI

CIVITAS RESOURCES

Civitas's CFO Marianella Foschi helped the Denver E&P more than double in size, scope and production within just a few years.

Foschi is young and savvy, a woman of color with dual degrees in finance and economics, and a coming-of-age story that started in Colombia.

In many ways, she is the future of the U.S. industry. By the time she graduated from high school at 18, Foschi knew she wanted to pursue an education in the U.S., where she found "fascinating" opportunities for someone willing to work hard.

Within 10 years of graduating from The University of Texas at Austin, Foschi had held key finance roles at two public companies, managed debt and equity investing at The Blackstone Group—the world's largest alternative investment firm with more than $880 billion in assets under management (AUM)—and worked on oil and gas deals at Credit Suisse, where AUM value is upward of $1.5 trillion.

She was finance director, then CFO at Extraction Oil & Gas when the Denver-Julesberg Basin-focused E&P went bankrupt in 2020, along with dozens of other independent producers around the country. Civitas was born of a triple merger of Extraction, Bonanza Creek Energy and Crestone Peak; then two private companies came into the business. Inside of two years, Civitas began trading on the public markets with a $5 billion to $6 billion enterprise value, and Foschi was its finance chief.

But none of this was easy. Nor was it for the faint of heart.

"It takes courage, more than I realized at the time (probably for the better!), to leave behind everything you have ever known and start a new life in another country," she told *Oil and Gas Investor*. "As an immigrant, I always had to work harder, and I knew that. Looking for my first job immediately following the 2008 financial crisis didn't help, as work visa sponsorship budgets were slashed. I was trying to thrive as a non-citizen immigrant, in a highly complex male-dominated industry, immediately following the financial crisis. It doesn't get much harder than that to start off your career."

But Foschi had learned the lessons her parents had sought to instill in their family. Her father worked in manufacturing and her mother in the telecom business. She grew up in an environment in which academics were prioritized, and her academic performance helped as she began a career in the U.S.

"My parents both worked very hard and had successful careers, which allowed us to have a better lifestyle than they had for themselves," she said.

Energy had piqued her interest while she still lived in Colombia, because it was a key source of revenue for the country's coffers.

"I was attracted by how powerful it is," she said of the industry. "We take it for granted, but the modern world and the lifestyle we know and enjoy daily is powered by the energy we produce. Access to affordable and reliable energy is a key factor differentiating developed countries from undeveloped ones."

Challenges = Opportunities

As CFO, Foschi has helped usher in a period of tremendous growth at Civitas. Soon after the firm became Colorado's first carbon-neutral producer, Civitas ventured outside of the state to grow its portfolio in the Permian Basin. Last year, Civitas spent close to $7 billion to purchase three Permian Basin producers, which doubled its cash flow, more than doubled production and made it a $12 billion enterprise value company.

The company is evolving in other ways, too.

"A few short years ago, we believed 2-mile horizontal wells to be pushing the limits of drilling technology. We just recently drilled and completed 13 4-mile wells [in the D-J Basin]," she said. "In a quest to continue lowering the cost it takes to get hydrocarbons out of the ground, the industry is constantly beating its own records, and that continuous evolution is fascinating."

That evolution is part of functioning in a cyclical industry, Foschi said.

"The highs are very high, and the lows are very low, and every high and low feels very different from prior iterations. It is a very complex, global industry with lots of macro implications."

Moreover, the industry's cyclicality also has implications for the micro side of the business for those who work in it.

"There is no such thing as 'status quo' in such a cyclical industry. The industry is always changing and evolving, whether due to technological advancements, global supply/demand dynamics, availability of capital, etcetera, and as industry execs we always have to be 'on our toes,'" Foschi said. "We

Courtesy of Marianella Foschi

Marianella Foschi joined other Civitas executives at the NYSE to ring the opening bell in celebration of the company's listing.

"We take it for granted, but the modern world and the lifestyle we know and enjoy daily is powered by the energy we produce. Access to affordable and reliable energy is a key factor differentiating developed countries from undeveloped ones."

—Marianella Foschi, *CFO, Civitas Resources*

have a long-term mindset but have to be responsive to market dynamics that play out along the way."

For E&Ps and the executives who work for them, new challenges routinely emerge. But Foschi said that both she and Civitas are up to prevailing over any obstacles.

"Challenges always present opportunities to those that know how to capitalize on them."

Periods of low commodity prices may be a recurring challenge depending on a variety of factors, but Civitas found those cycles "present an opportunity to lower our cost structure, which we have always successfully navigated," Foschi said. "Separately, the steep rate of change Civitas has had in 2021 and then again in 2023 presented all sorts of challenges, but we were able to remain focused as a management team and prove all the skeptics wrong by putting our head down and executing on our business plan."

On the personal side, Foschi's challenge is being a female in a male-dominated industry.

However, she said, "I've been fortunate to work at companies that truly value diversity, without lowering the standards to meet a certain quota, which in my view is doing a bigger disservice to females."

—Deon Daugherty, Editor-In-Chief

Born to Wildcat

BRYAN SHEFFIELD

FORMENTERA PARTNERS

Bryan Sheffield is going to wildcat.

He tried to shake it in 2001, starting an investment banking career after completing an undergrad degree in finance at Southern Methodist University.

And he went somewhat as far away as possible from the Permian Basin, immediately taking a position in Sydney, Australia, with Credit Suisse First Boston.

From his lifelong experience, the oil and gas business was unabatingly heartbreaking.

In the first decade of his life, Sheffield's late grandfather, Joe Parsley, ran a Midland Basin-focused oil company, Parker & Parsley, in the 1980s oil bust.

He was in pre-school and grade school as his father, Scott Sheffield, was trying to grow the company after Joe Parsley retired in 1984.

"These were very tough times and very depressing times. I remember huge layoffs. Some of them were my dad's friends," Bryan Sheffield said.

Oil was roughly $20/bbl for more than a decade—and that was if it was a good day, as hindsight showed in late 1998 and early 1999 when oil collapsed to as little as $11/bbl.

"It was very difficult watching my father and his friends in the business barely survive," he recalled.

So, Australia or bust. Parker & Parsley had become Pioneer Natural Resources and bought a property Down Under in the 1990s. "My father brought us a couple of times while he was growing the asset there."

Bryan Sheffield was anxious to return as soon as possible.

But meanwhile, this shale thing happened back home, beginning with the Barnett in the Fort Worth Basin and the Bakken in the Williston Basin.

Bryan Sheffield

Bryan Sheffield with Pioneer Natural Resources' chairman Scott Sheffield (Hall of Fame, 2023) and pressure-pumper Liberty Energy chairman and CEO Chris Wright (ACE, 2023).

In 2006, his oil and gas wildcatting genes awakened. He went to oil and gas school at Pioneer and in 2008 formed his own E&P, contract operating his grandfather's legacy vertical wells and leasehold in the Midland Basin.

In 2014, Joe Parsley was interviewed by the Cockrell School of Engineering at the University of Texas, his alma mater. He said he had wanted Bryan to take over his Permian wells, but he "didn't know much about the oil business.

"So Scott [Sheffield] hired him at Pioneer and let him work with the engineers for a few months, with the geologists for a few months, out in the field for a few months, in accounting—he worked in all the departments that make up an oil company."

Bryan Sheffield leased around the contract operations, building his own position. By 2014, he took his Parsley Energy public and sold it in 2021 for $7.6 billion, including debt assumption.

Today, he's found a way to merge his love of Australia with his oil and gas wildcatting atavism. He's the largest shareholder in Tamboran Resources, a shale E&P operating in Australia's Beetaloo Basin. The company had its U.S. IPO on the New York Stock Exchange this past summer.

With private funds he's formed under his Formentera Partners,

Bryan Sheffield

Bryan Sheffield (left), Tamboran Resources' largest shareholder, with Joel Riddle, Tamboran CEO, at the Shenandoah South #1H shale drillsite in Australia.

he's producing proved developed producing reserves across the Lower 48, while also wildcatting in other funds, such as in the Pearsall Formation under the Eagle Ford Shale in South Texas.

It's an example of where he sees new oil and gas potential going in the U.S. onshore: Smaller fields that are also more complicated.

He doesn't expect large E&Ps will take the time. "They're probably more for smaller independents to prove up. I think there's a lot of money to be made in these smaller fields—these old vertical fields where the shale hasn't been tested."

Also, vintage shale plays could use refracs on their old-design wells. "You're hearing a lot of about refracs here and there.

"There needs to be a better understanding of how it was completed before and how we should frac it now," he said. "That's another opportunity for more small independents."

And older fields likely have downspacing potential.

"Typically, when commodity prices go up—let's say oil above $100 and stable or gas above $4—you can go back into all these old fields and downspace and accelerate drilling programs."

As for all new plays, even at a higher oil price, these are mostly under federal land or in unfriendly states.

"So, there are plays, but it's just going to be less friendly for oil and gas operators. It seems like we're all focused in more oil- and gas-friendly states. If there is a push to new plays, it will have to be in less friendly operating areas."

And U.S.-focused E&Ps should begin to prepare to operate abroad.

"I truly think in 20 years the industry will go international. It's going to be well before 20 years by the way—I think in five to seven years," he said.

Both the long-only energy investors and hedge funds in New York and Boston "all think we're going to run out of inventory in five to seven years."

The U.S.-focused industry will pivot and international is "going to be the path of least resistance."

With an energy-friendly government, Australia's shale-gas resources is one new area. "Now, they do have a reputation of [more] regulation and [slow] permitting, but they are improving significantly," Sheffield said.

"You can get things done in Australia."

Argentina has oily unconventional resources in its Vaca Muerta play, but "you worry about nationalization. The president does not have control of the country to get things done.

"So, you worry about him getting kicked out and the country reverting to ... nationalization again."

In time, he added, Europe will be more open to oil and gas development ("as long as we're good stewards to the environment") because of the cost of energy there.

And there are tremendous resources in North Africa that have been tapped with vertical wells. "There's shale everywhere in North Africa."

There is also shale in China and Mexico, but "I have a hard time seeing us moving there. I see us developing in places like Australia, Argentina and North Africa versus China and Mexico."

Sheffield is excited about new explorers entering the business who will be producing the oil and gas for the world in 30 years.

"There's this whole new younger generation," he said. "They're all interested in getting into energy. We're getting lots of resumes for internships."

He confirmed, "I'm much more optimistic versus in the 1990s."

—Nissa Darbonne,
Executive Editor-at-Large

Serving Up a Leading Position in the Permian Basin

KAES VAN'T HOF

DIAMONDBACK ENERGY

A native of Newport Beach, south of Los Angeles, Kaes Van't Hof excelled at tennis for the University of Southern California and played professionally for two years around the world.

But his unique background in athletics, business and accounting still shaped him as the ideal person to help lead upstart Diamondback Energy as the choice consolidator in the Permian Basin. Today, Diamondback, or FANG, is the top pure-play producer in the Permian and the basin's third-largest overall producer, trailing only Exxon Mobil and ConocoPhillips, after the blockbuster deal this year to acquire Endeavor Energy Resources, the crown jewel in the Midland Basin.

As Diamondback's president and CFO, Van't Hof, 38, teams with Chairman and CEO Travis Stice, who carries the traditional petroleum engineering bona fides as a Midland native.

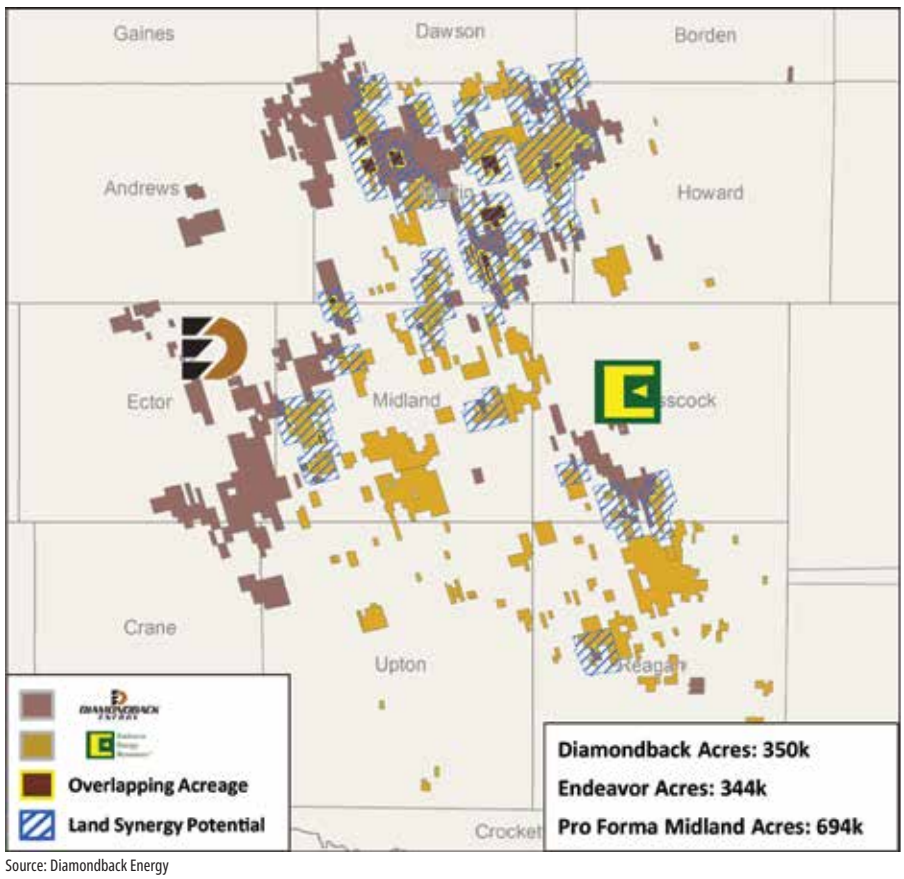
"I certainly know a lot more about the subsurface today than I did eight years ago when I joined Diamondback," Van't Hof said with a laugh in an interview with *Oil and Gas Investor*. "I think, overall, the business comes down to capital allocation and people. Our team is really, really good on the technical side and really, really good on the operations side. What I brought to the table was, 'Hey, how do we finance this deal? How do we structure this deal? Should we go after this company or that company? Why should we do it?' So, I was kind of providing more of that strategic side to the execution part of the business, which they were already so good at.

"I like to say I've had a front row seat for eight years to the best ever to do it. Travis would probably go down, certainly from a returns perspective, as one of the greatest, if not the greatest independent CEO of all time," Van't Hof continued before pausing and laughing. "That means there's big shoes to fill at some point. He's always been very good at letting us do what we do best and trusting the management team. He built this culture of Diamondback kind of being the underdog story that had to scratch and claw. Today, it's a $50 billion-plus company."

Much of Diamondback's and Van't Hof's success comes from having a plan to grow through Permian dealmaking early on, executing and becoming the preferred buyers of investors and potential sellers, said David Deckelbaum, managing director at TD Cowen.

"A lot of that was just doing intelligent deals and, obviously, well-timed deals," Deckelbaum said. "I think a lot of his career has been hallmarked by being opportunistic,

World Class Assets in a World Class Basin



Source: Diamondback Energy

DIAMONDBACK ENERGY

CONGRATULATIONS

to Diamondback CFO **Kaes Van't Hof** on being recognized by Hart Energy as an **Agent of Change in Energy.**

by acting quickly and always sort of having a very holistic view of being an E&P company, not just an acreage-flipping company or top IP rate drilling company."

Backhand Path to the Permian

The story of Diamondback in the Permian officially starts in late 2007 when the newly formed, Wexford Capital-backed Windsor Permian and Gulfport Energy Corp. teamed up to buy a 4,100-acre Permian position from Midland-based ExL Petroleum for a mere $85 million.

Van't Hof decided to give up pro tennis and try his hand in finance, living in New York City and commuting to Connecticut as an analyst at Wexford starting in 2011.

The Wexford-backed, Windsor-Gulfport partnership vehicle became Diamondback Energy before it went public in 2012. Van't Hof helped lead the IPO in New York.

"I was kind of a kid that didn't know anything about oil and gas, but I knew how to model these businesses," Van't Hof said. "And, so, I was kind of the model monkey that had to go down to Midland and learn how to model an oil and gas company. That was Diamondback before it went public."

However, Van't Hof's Diamondback journey wasn't ready to continue just yet. "It was such a small company, there wasn't a role for me there at the time."

Instead, Wexford promoted Van't Hof to lead as CEO of Windsor Drilling as it became Midland-based Bison Drilling and Field Services. He'd lead Bison until 2016.

"I was commuting from New York City to Midland, certainly the only person that's ever done that," Van't Hof said, laughing. "So, I would come down to Midland on Monday morning, go back to New York Thursday night, and then check in at the Wexford offices Friday, but also live my 20s in Manhattan.

"That ran out when I moved to Diamondback full time. Travis wasn't going to allow me [to commute] any more after that," he said with a laugh.

But he also quickly grew to embrace West Texas living after initially making the move to Diamondback as its vice president of strategy and corporate development.

"Once you get involved in the community in Midland, it rewards you," Van't Hof said. "It rewards you what you put into it. Get out there, play golf, join the clubs, go to restaurants with friends, meet new people. It was a lot more social when I started at Diamondback than when I was at Bison because, at Bison, it was just me and a bunch of drillers in the field."

At the time, Diamondback's projected 2016 production was about 35,000 boe/d after making several modest, under-the-radar acreage deals in 2013 and 2014 that still combined to total about $1.4 billion.

Around the time Van't Hof joined, however, Diamondback's dealmaking really took off. Today, Diamondback is approaching 850,000 boe/d in the fourth quarter after the Endeavor deal.

Serving Aces

Starting in 2016, Diamondback launched a barrage of acquisitions that has continued through today, while balancing spending, cash flow and a fixed dividend, Deckelbaum said.

First came Luxe Energy for $560 million, then the first really big splash in December 2016 with the purchase of Brigham Resources for about $2.5 billion.

Next, Van't Hof helped lead the IPO of Diamondback's minerals and royalties business, Viper Energy, in 2017. Viper is now itself a $10 billion business.

In 2018, within a week of each other, came the Ajax Resources deal for $1.2 billion, followed by the massive move for Energen Corp. for $9.2 billion.

Amid the pandemic in December 2020, Diamondback went on the offensive again, buying QEP Resources and Guidon Operating for a combined $3 billion.

And, in the fall of 2022, came the acquisitions of FireBird Energy for $1.75 billion and Lario Permian for $1.55 billion.

It all led to February 2024 and winning the bidding—and the confidence—of Endeavor and its legendary founder Autry Stephens, who died months later. The $26 billion deal, including debt, for Endeavor was by far Diamondback's biggest move yet.

"They knew what they liked, and they kept going after it," Deckelbaum said. "I look at Energen and QEP as both very classic opportunities where they were able to really get in there with initial scale and have this argument of, 'I can do it better.' It showed that they know how to integrate deals and they know how to integrate large deals. I think the two of those deals paved the way for them to do Endeavor. Investors have a history of looking back and being like, 'Well, these guys actually know how to do these things.'

"I think that they had kind of firmly cemented their place as being the preferred acquirer for attractive companies that would be looking to exit," he added. "To be perfectly frank, my view was always that Endeavor belongs with Diamondback. I think you really saw the will of these two organizations to combine and make something that worked."

There have also been smaller moves of late, such as forming the Deep Blue water infrastructure joint venture, buying a stake in the EPIC Crude Pipeline and, in November, paying $238 million and swapping some Delaware Basin acreage for TRP Energy's Midland position.

Now, Diamondback can focus on executing on its scale and inventory with longer laterals, simul-frac completions, and testing the Barnett Shale in the Midland Basin.

"Investors are all asking about shale longevity and how long can we do this?" Van't Hof said. "I think, on a relative basis, we put ourselves in a really good position to do this for a long time.

"We've continued to see more zones get economic in this basin, more consistent output on well results, and that's just a concerted effort by us to try to find the best rock available, and Midland has provided that for us."

But he doesn't want to take much personal credit.

"It's not just about me. Our management team is all very young. I think the next generation of leadership is certainly starting to come into its own as more CEOs of legacy companies either sell or retire. There's a new wave of youth in this business that's going to be here for a long time and wants to promote American energy and prove that this is a lasting industry."

—Jordan Blum, Editorial Director

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Moelis' Cantor: Trump to Make American Energy Investable Again

The former House GOP majority leader also told attendees at ADIPEC that EV subsidies are likely to be in the next president's crosshairs.

DARREN BARBEE
SENIOR MANAGING EDITOR, DIGITAL
dbarbee@hartenergy.com

Even before all of the votes were counted, Eric Cantor was beaming.

A second Trump administration, said the former Republican majority leader of the U.S. House of Representatives and now vice chairman and managing partner at Moelis & Co., is key to making U.S. energy investable again.

Cantor, speaking at the ADIPEC Exhibition & Conference in the United Arab Emirates on Nov. 6, as battleground state Pennsylvania's votes were still being tallied, said Donald Trump looked likely to become the next president. About four hours later, the Associated Press confirmed his prediction.

A second Trump administration will bode well for oil, gas and LNG, and badly for electric vehicle (EV) subsidies and, possibly, the Inflation Reduction Act (IRA), Cantor said.

"I think what we have to do is, we have to take away the disincentives right now that exist in terms of investing in conventional energy," Cantor said. "And I do think a Trump administration will satisfy that in the United States."

Cantor said all things energy will be examined under a second Trump administration. That includes excising provisions in the IRA, such as carbon tax credits, which global energy executives at ADIPEC roundly applauded as a model piece of legislation.

Trump offers energy producers a much less burdensome and ideological regulatory environment that is more growth oriented, Cantor said.

"First off, we'll see the lifting of the LNG pause that the Biden administration had imposed, and that'll be a signal to investors that we can sort of count on a government in Washington that's not going to impede the continued development and export of LNG as a necessary component of the energy mix," Cantor said.

In a later session at ADIPEC, Robert McNally, founder and president of the Rapidan Energy Group and a former energy adviser to President George W. Bush, said Trump's election is unlikely to add production–market fundamentals and investment factors make that happen, not the president.

But as Biden showed, "a president has the power to hurt production, and the main way a president can do that is through export restrictions," he said.

"I think there's going to be a strong signal to investors and the players in the EV world that the subsidies that are in place now probably, I would guess, [will not be] going to go forward."

ERIC CANTOR, VICE CHAIRMAN AND MANAGING PARTNER, MOELIS & CO.

Trump's victory removes the threat of export restrictions, although McNally added, "there may be an issue of whether we curtail our LNG exports to China, for example."

Are IRA and EV Subsidies DOA?

McNally said he expects to see sweeping changes to climate policy, including leaving the Paris Agreement and possibly the United Nations Framework Convention on Climate Change, known as COP.

"There's a small number of Republicans, members of the House particularly, who feel that we should be fully engaged on climate, but just in a more pre-market way," McNally said. "But they're a minority and they really have no influence in the Trump administration."

Cantor said climate funding is likely to be addressed next year as part of budgetary talks.

"There's [an] imperative to try and address the exploration of many of the tax rates that were part of President Trump's tax package back in 2017 and as they affect working families."

Baked into that will be the funding of the government and the growing national debt. Cantor said that would lead to EV credits falling under the axe.

"There'll be a real push to try and look for, how do you pay for all this? And one of the natural go-tos in terms of pay-fors is going to be the electric vehicle industry," he said. "And I think there's going to be a strong signal to investors and the players in the EV world that

Robert McNally, founder and president of Rapidan Energy Group, speaks at ADIPEC in early November.

ADIPEC

the subsidies that are in place now probably, I would guess, [will not be] going to go forward."

McNally also pointed to Trump's interest in prioritizing domestic production of fossil fuels while ending EV subsidies and mandates.

"President Trump, he sees it not only as a waste of money, but as a way to basically subsidize China['s] takeover of [the] auto sector. He sees it as a national security issue," he said.

Cantor said renewables in general have been heavily subsidized, largely due to the IRA. Incentives in the bill have led to billions of dollars in announced solar, wind and carbon capture and sequestration projects.

"The taxpayers are contributing to the development of [the] renewables industry," he said. "I think that everything will be on the table in this fiscal discussion next year and there will be a lot of individuals who will want to say, 'we can just get rid of these subsidies.'"

However, members of Congress may take a different tack when it comes to the IRA.

"A lot of the renewables projects mean jobs to members of Congress in the House and the Senate. So, I wouldn't say all of them go by the wayside, but I'll go back to what I said before ... I think the EV component in particular, given how political that has become, will very likely not go forward."

International Outlook

A looming concern for energy producers is Trump's tariff policies. Biden has imposed tariffs on China's solar panels, which Trump will either keep or enhance, Cantor said. Additional tariffs, if enacted, "certainly that's going to be inflationary."

Trump would posit that countries exporting into the U.S. will pay the tariffs, but in the end "you're going to have some impact on prices and consumer prices in the U.S."

"So, it does worry me, but again, I think he is proposing the tariffs, No. 1, to try and level the playing field to say, 'Listen, we've got to go in and have some reciprocity as far as trade is concerned.'"

Partly, Trump may be posturing to some extent to get reciprocity from trading partners and renegotiate to achieve a better situation.

How that would ultimately affect interest rates is unclear.

"I do think that the bond markets are thinking that there's going to be inflationary policies coming out of Washington, which obviously can impact growth, can impact the M&A market. I'm at Moelis and that's what we do. We're all watching it very closely."

Asked whether anything in Trump's economic plans worried him, Cantor said his concern was "where we are right now in the United States with the complete animosity towards fossil fuels, even natural gas," he said.

Cantor instead said that what worries him is the pause imposed on LNG exports, especially given the "reliance Europe has and the need for LNG given what's going on in Russia and Ukraine."

Trump has said he could end the Russia-Ukraine war in one day.

Cantor said that a lot is said during campaigns and Trump's aim is to end conflicts so that the world can go back to "doing business and to growing together."

"And I do believe that there'll be real progress and there'll be some type of cessation, I believe, of activity in the Russian-Ukraine situation," he said.

McNally said his firm's sense is that the war will end in the same fashion as the Korean War, with an armistice along prevailing battle lines. However, he doesn't think the two sides are close to coming to terms.

"There's a sense that Trump is going to come in and basically force Ukraine to accept the deal on Putin's terms," he said. "I think that's wrong."

Trump will take a similar approach to Iran and Russia, working to gain leverage, McNally said. He and his advisers consider the maximum pressure campaign against Iran during his first administration as a huge success that drove Iran's exports down to about a 1 MMbbl/d.

Trump may threaten to increase arms supplies to Ukraine along with additional sanctions.

"Our sense is Ukrainians aren't ready to stop fighting," McNally said. "Even if Trump cut them off, they wouldn't stop fighting." OGJ

Hirs: The High Cost of Overreaching Regulation

Energy regulators have withheld critical information that's resulted in damage to markets and competition.

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Breaking regulatory capture and deregulating markets became a national priority during the Ford administration. Progress continued during succeeding administrations, both Republican and Democrat, but since the turn of the century, the regulation at the federal and state levels has become more costly for businesses and consumers alike as information is withheld. This is especially true of energy markets.

The purpose of regulations is to provide safeguards for public and private constituencies in the public interest. These regulations are used to level the playing field by limiting the exercise of asymmetric control by one party over another, such as employer over employee, or union over manufacturer, or polluter over society.

The primary characteristics of competitive markets are that neither buyers nor sellers can exercise market power, and that there is a free flow of information across the market, or transparency. Since the days of Rockefeller, energy market regulators have limited the exercise of market power under most circumstances by requiring transparency and candor from market participants.

But over the past several decades, energy regulators themselves have been responsible for limiting market information. This has created or worsened an already uneven playing field for shareholders, suppliers, partners, consumers and even the regulators themselves.

Regulators routinely withhold or approve the withholding of information regarding nuclear power, electricity markets, home solar, pipelines and the oil patch. What are the arguments for limiting the dissemination of information and who benefits?

The Department of Energy frequently withholds from public view information submitted to the DOE regarding one aspect or another of nuclear power. For example, in a letter to a prospective manufacturer of small modular reactors, the DOE stated: "We have reviewed the material in accordance with the requirements of 10 CFR 2.390 and, on the basis of the statements in the affidavit, have determined that the submitted information sought to be withheld contains proprietary commercial information and should be withheld from public disclosure."

Why? It is a national priority that nuclear power be advanced. Without question, everything in the realm of nuclear power in the U.S. derives from research funded by U.S. taxpayers. So, not only does the submitted information belong to the taxpayer, but there is also an argument that it already belongs to competitors.

Electricity markets are advertised as transparent but often suffer from opacity. The ERCOT market in Texas releases daily data after 60 days. This provides a tremendous advantage to market incumbents at the expense of consumers. ERCOT has justified holding back the data to protect competitive information about market participants.

The Railroad Commission of Texas (RRC) aggregates and averages price and quantity data over a month to avoid releasing any data that could reveal "proprietary" positions held by gas and crude traders. As a result, the public can only guess what is going on.

The CirclesX lawsuit regarding Texas gas market manipulation during the winter freeze of February 2021 could not have happened with RRC data because it does not exist. The CEO of CirclesX installed sensors on pipelines across Texas to compile the data. As a former senior director of Enron's trading operation, he knows the playbook of market manipulation but is now working to do the job that the RRC should have done in the first place.

State and federal regulators for the oil patch often approve withholding well production data. But why? In the case of EOG Resources' famous Jake well in the Niobrara Basin, the company was interested in acquiring more acreage before Jake's enormous success was known. It cost the State of Colorado itself in lower proceeds for state lands and lower tax collections as neighboring landowners traded leases at low values—at least for a time.

Enforcing asymmetrical relationships by restricting information prevents markets from working efficiently and is counter to public interest. As a matter of public policy, the nation should ban the practice of regulators withholding market information much as the Federal Trade Commission has banned noncompete agreements between employers and employees. Then, with transparency, market participants will be on a level playing field and the Ford administration's initiative of reducing regulatory capture and regulations can be renewed. OGI

Kissler: Wildcards That Could Impact Prices in 2025

Geopolitics and weather top the list of trends that will determine the direction of oil and gas.

DENNIS KISSLER
BOK FINANCIAL SECURITIES

Dennis Kissler is senior vice president of trading for BOK Financial Securities. He is based in Oklahoma City.

As we wrap up 2024, most of the energy industry is already looking forward to 2025, with the prevailing question of what will happen to oil and gas prices. The answer is, of course, "it depends," as there are many wildcards in both sectors. Nevertheless, there are some prevailing trends that can give us some insight into where prices are going.

Winter will set the tone for natural gas prices, but other factors will be at play.

Natural gas supplies remain ample coming into 2025. Although electricity demand was up during the summer, it still fell short of pulling hefty natural gas supplies down. Meanwhile, the hurricane season during the fourth quarter damaged demand more than it did natural gas supplies, especially in the case of Hurricane Milton.

Simply put, storage will need to contract substantially as we enter 2025 to give a significant lift to prices. Waha basis prices in Texas have weighed down prices; however, I do see that improving with added pipeline takeaway, such as through the Matterhorn Express Pipeline and increased flows into Mexico.

LNG takeaway will be the longer-term bullish driver, but it will do little to 2025 prices if we see a mild weather pattern. Currently, there looks to be between 1 Bcf/d and 2 Bcf/d of production shut-in in northern Appalachia due to low prices. This will be a burden on supply once it's released, unless, of course, cold weather in the area can take away supplies. The Mountain Valley Pipeline will help, but not at the level that's needed with additional production.

Nevertheless, as of this writing, I believe front-month natural gas prices of $2.30/MMBtu are too cheap and that higher prices are to come. Prices setting just north of $3/MMBtu in first-quarter 2025 and $2.90/MMBtu in the second quarter are fairly priced, but a colder-than-normal start to winter in late November of this year could easily propel prices north of $3.50/MMBtu. Then, I think the $4.00-$4.40 area will be a stopping point—unless, of course, we see geopolitical escalations in Russia or extended cold weather.

The last half of 2025 is currently priced at $3.30/MMBtu, but any significant weather demand could easily propel prices to the $4.00/MMBtu or $4.50/MMBtu area. That said, these price forecasts depend on the U.S. economy remaining in a soft-landing mode, as industrial demand will be a key factor in prices rising. LNG will be helpful but could underperform if Russia continues good flows of natural gas exports into Europe.

Longer-term technical bar charts show a slightly upward momentum, with $3.703/MMBtu being a heavy resistance area. A technical move above that area could target the $4.394-$4.40 area.

Geopolitical Tension Will Be Key for Crude

In this final stretch of 2024, crude oil prices have been in a battle between slacking demand from China applying downward pressure and geopolitical tension (in the Middle East and between Ukraine and Russia) applying upward pressure.

Many analysts, including myself, believe that at the current economic pace of China, crude will very likely be in an "oversupply situation" if we see OPEC increase production into 2025. However, if Saudi Aramco's current quarterly dividend payouts are exceeding cash generation and placing them in a debt situation when Brent prices are below $75/bbl, one would think they would be lobbying heavily not to increase production.

The biggest wildcard going into 2025 will be Iran's relationship with other world leaders if war continues to escalate with Israel. Keep in mind that Iran exports nearly 1.8 MMbbl/d. If we do see their oil infrastructure damaged, we could see a quick spike to the $90/bbl area for WTI. However, it would likely be short-lived, as the rest of OPEC probably would be happy to fill the void, especially at higher prices.

There's also the recent U.S. election and energy transition to consider. While the full range of implications are still to be seen, WTI prices below $60/bbl would move production levels lower, while prices north of $75/bbl will continue to encourage drilling.

WTI crude futures continue to consolidate between $63/bbl and $79/bbl. This sideways action probably will continue; however, geopolitical wildcards are very relevant and the consolidation of companies in the production industry will continue. Altogether, this should mean leaner operations, which are even more price sensitive, and more constrained supplies at lower prices. More production with less will be the name of the game, which should keep a positive tone for oil and gas stockholders. OGJ

Range Resources Content to Sit Out M&A Frenzy

The Appalachia E&P already has plenty of drilling inventory, CEO Dennis Degner says.

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HART ENERGY

Range Resources President and CEO Dennis Degner discusses his company's M&A strategy with Hart Energy's editorial director, Jordan Blum, at DUG Appalachia.

As the upstream E&P space bought, merged and consolidated at a breakneck pace, Range Resources chose to sit on the sidelines.

Fort Worth, Texas-based Range hasn't been an active participant in the record-breaking E&P M&A cycle, President and CEO Dennis Degner admits.

"For us, it boils down to one simple driver: We didn't have to," Degner said in November during Hart Energy's DUG Appalachia Conference & Expo in Pittsburgh.

E&Ps are consolidating in basins like the Permian, Williston and Eagle Ford for several reasons, but inventory duration and the efficiencies of scale are major drivers, he said.

Range isn't worried about its inventory runway in Appalachia, Degner said. The pure-play Appalachia producer holds more than 30 years of core Marcellus drilling inventory.

In the Marcellus alone, Range has around 24 million lateral ft of undrilled inventory capable of breaking even at a $2.50/MMBtu natural gas price. The company also gets a healthy uplift from higher NGL realizations.

And the core Marcellus inventory doesn't account for additional locations in the deeper Utica and Point Pleasant intervals, or in the shallower Upper Devonian formation.

"You're talking about being able to do this for between 30 [years] and 40 years before you even get to a point where you're needing to explore the Utica or the Upper Devonian," Degner said.

That's at the company's current cadence–drilling between 60 to 70 new wells per year, with production at around 2 Bcfe/d.

"If we were to be an active player in M&A, the question would be, when do you pull that inventory into the development conversation?" Degner said. "Year 17, 25, 30? And how does it compete?"

The blocky nature of Range's Appalachia asset also helps the company lower operating and drilling costs.

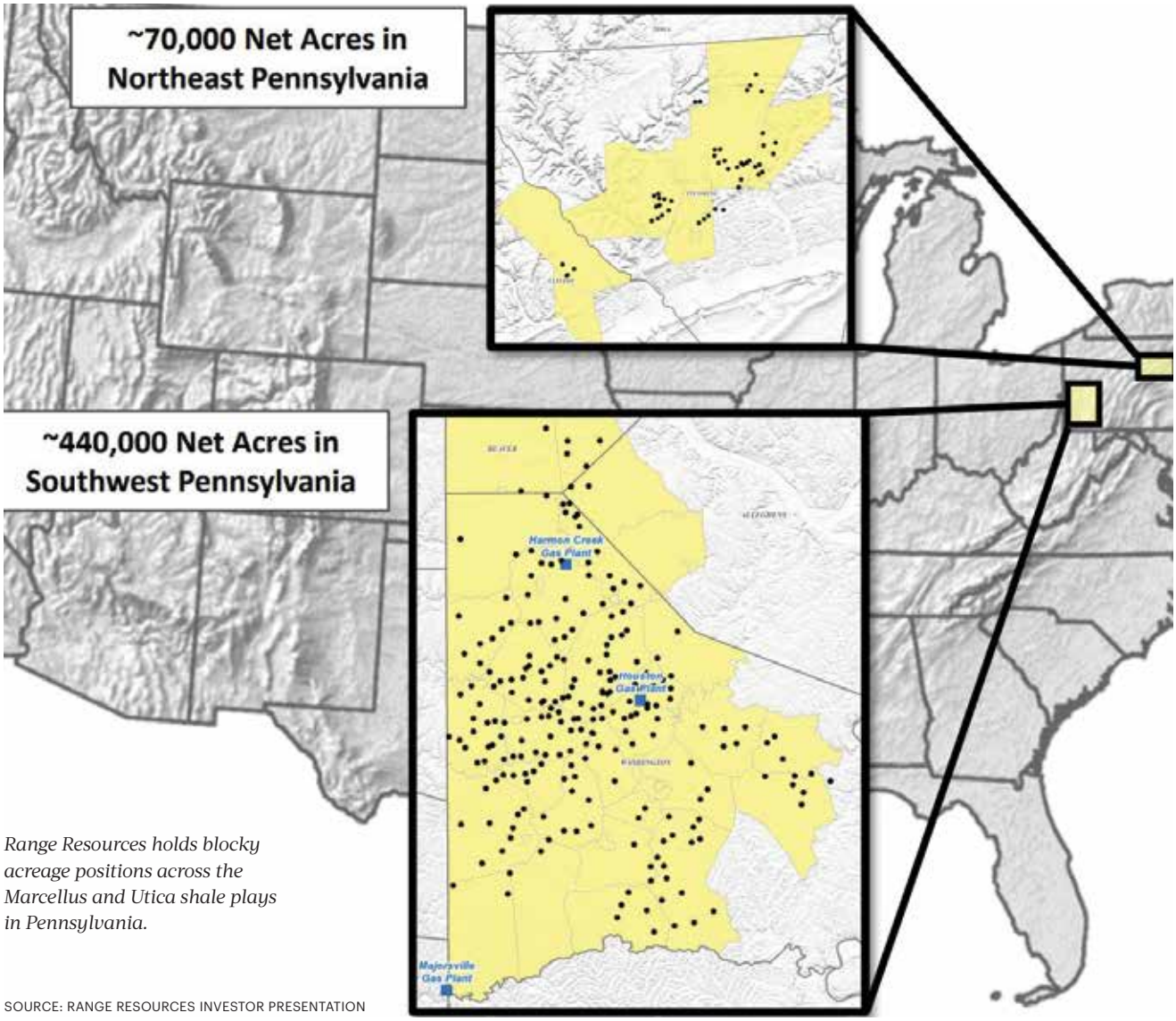
Early in Range's exploration and development of the Marcellus Shale, the company's horizontal wells were between 2,000 ft and 3,000 ft. That was the case when Degner joined Range as director of completions in 2010.

Today, the company is drilling laterals with average lengths of over 14,000 ft, with several exceeding 3 miles. Range drilled four laterals at 20,000 ft in 2023.

Longer lateral development allows Range to minimize its footprint, reduce the number of pad sites it needs and reuse existing infrastructure.

"This blocky acreage position that we have all

Range Resources Acreage



Range Resources holds blocky acreage positions across the Marcellus and Utica shale plays in Pennsylvania.

SOURCE: RANGE RESOURCES INVESTOR PRESENTATION

just spells better management of the asset, better harvesting of it and a more efficient process," Degner said.

And don't forget about the roughly 200,000 acres Range still has quietly within its portfolio, Degner said. It's an area that's on-trend with the delineation activity taking place across the border in the emerging Ohio Utica oil window.

There could be a chapter in Range's future where the company looks to develop the liquids-rich, oil-bearing window in northwest Pennsylvania. But Range continues to focus on southeast Pennsylvania's gas and NGL development for now, he said.

Energy industry M&A activity has concentrated in the prolific Permian Basin oil play. Fewer deals have been inked in Appalachia, apart from a handful of notable transactions:

- The merger of Chesapeake Energy and Southwestern Energy, yielding the newly named Expand Energy, consolidated huge swathes of land across Pennsylvania and the Louisiana Haynesville Shale.
- Appalachia gas giant EQT Corp. acquired Equitrans Midstream, the owner of the controversial Mountain Valley Pipeline, in a $5.4 billion all-stock transaction this summer.

Market Resilience

Despite its abundant natural gas reserves, growing production in Appalachia has been challenged by takeaway constraints and relatively tepid in-basin demand growth.

But producers and analysts say demand for natural gas is expected to rise in the coming decades to fuel U.S. LNG exports and power demand for AI computing.

The U.S. LNG export complex has proven to be "pretty resilient," despite interruptions from infrastructure turnarounds and storm-related issues, Degner said.

"You're still seeing a good, quality, resilient 12, 13, 14 Bcf/d-type LNG consumption," he said. "That just didn't exist a handful of years ago. That number was more like 0, or less than 1."

Producers are also excited about power demand to fuel AI computing and data center projects. But it's not yet clear just how much natural gas hyperscalers and AI developers will need to power their operations.

"I've seen everything from 16 Bcf/d to more like 3 to 5 Bcf/d," Degner said.

Range is a bit more conservative in its AI demand

outlook. The company sees consumption growing by between 3 Bcf/d and 5 Bcf/d for computing and data centers in the coming years.

Tech giants are eyeing other sources of energy to power their AI needs, too. Several are setting out to tap into existing nuclear power plants—or even restart shuttered nuclear reactors—as sources of emissions-free power.

But Big Tech's atomic dreams face red-tape hurdles. The U.S. Federal Energy Regulatory Commission recently rejected a bid to allow an Amazon data center to tie into power from a nearby nuclear plant in Pennsylvania.

It's not a death blow to the nuclear co-location project, industry watchers say, but it does complicate a growing number of AI-nuclear agreements around the country.

Outside of AI-specific demand, Range also sees an upside for natural gas in broader domestic power generation.

Incremental gas consumption for power burn is up around 1.4 Bcf/d to 1.5 Bcf/d this year compared to 2023 levels, Degner said.

Coal plant retirements will also stretch thin power supply at a time when power demand is rising.

Degner pointed to PJM Interconnection's latest capacity auction this summer, which hit record highs. Capacity prices for 2025-2026 rose to $270 per megawatt day, a more than 800% increase from the roughly $29 per megawatt day for the 2024-2025 auction.

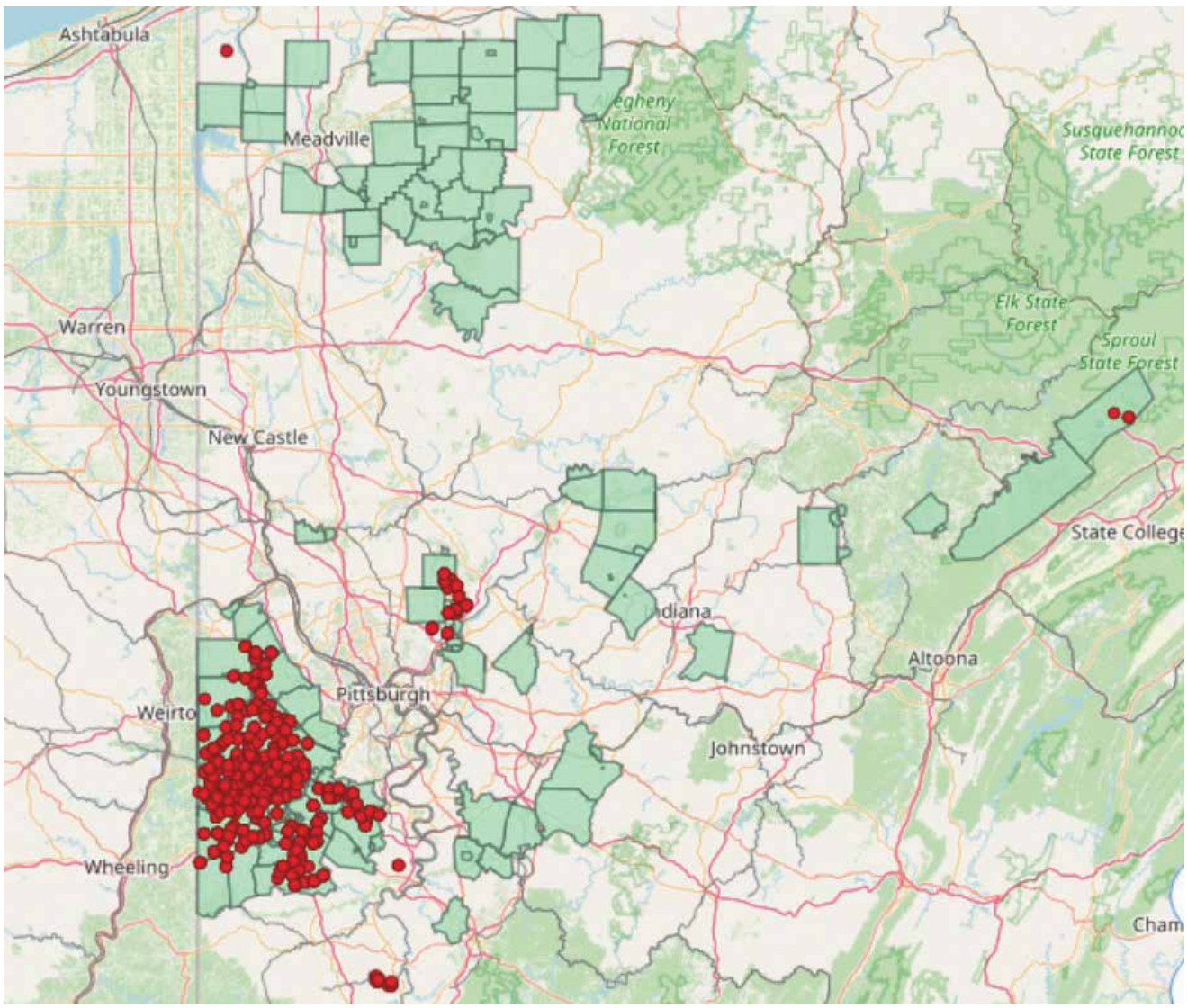
In a report, PJM said the significant decrease in overall supply from retirements may have impacted the results of the latest auction.

Experts say it's still unclear exactly how much ratepayer bills will increase due to the changes. Capacity costs account for only a portion of customer electric bills.

PJM is the grid operator for all or parts of Delaware, Illinois, Indiana, Kentucky, Maryland, Michigan, New Jersey, North Carolina, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia and Washington, D.C.

"[AI demand] is still emerging, but we're seeing that change in power pricing now," Degner said. "What's going to happen in the years to come?" OGI

Range Resources Northwest Pennsylvania Acreage



SOURCE: REXTAG

Range Resources still holds interests in around 200,000 acres in northwest Pennsylvania, CEO Dennis Degner said. DISPLAYED: Range Resources operated acreage and natural gas wells, according to available Rextag data.

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Entry is free, and winners will be featured in the May 2025 issue of *Oil and Gas Investor*. Additionally, the awards will be presented at SUPER DUG 2025, taking place from May 13-15 in Fort Worth, TX.

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Deadline for submissions is March 31, 2025.

Contact: meainfo@hartenergy.com with any questions.

HARTENERGY

Vital Energy Shifts from Dealmaking to Debt Reduction

After a slew of transactions, CEO Jason Pigott is focused on controlling expenses, he tells *Oil and Gas Investor.*

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Following a series of transactions that positioned Vital Energy with a decade of low-cost inventory, the company is hitting the pause button on A&D activity.

"The rapid increase in inventory, length and quality that we have delivered on over the last few years allows us to take a pause on M&A and put more emphasis on operational excellence instead of asset transitions," CEO Jason Pigott told analysts during Vital's third-quarter earnings call.

Vital and non-op E&P Northern Oil and Gas (NOG) closed a $1.1 billion cash purchase of Point Energy Partners' Delaware Basin assets in September. It was the second Delaware deal that Vital and NOG have teamed up on after completing a $540 million joint acquisition of Forge Energy II last year.

During Hart Energy's A&D Strategies and Opportunities conference in Dallas, Darren Barbee, senior managing editor for digital, caught up with Pigott to learn more about management's plans for the company.

Darren Barbee: Onstage you were talking about the fact that roughly in the period of five years, you've done about 10 transactions and now you're pausing. Is it time to digest all that you've acquired?

Jason Pigott: We have had a tremendous amount of success with the transactions that we've done. We're just taking some time to get them integrated and demonstrate our ability to extract more out of these assets. We've got some scale; we've doubled production since I started, so we've achieved that scale that we're looking for. We've got 10 years of inventory now with roughly five years of inventory below a $50 breakeven.

We've got good momentum and now we just want to demonstrate that we can get our operating expenses down, get our capital down, reduce our G&A costs. All those things together I think will ultimately help our shareholders.

DB: A couple of the recent deals you've done, some of the larger ones in fact, have been with Northern Oil and Gas. Can you talk a little bit about the relationship you've developed with them? Last year, you did the Forge acquisition and this year, the Point [Energy Partners] acquisition. Can you talk a little bit about how you all work together?

JP: In total, we've done three transactions with them. We sold some non-op to them from SM [Energy] that we had underneath.

Then when we came to the Forge transaction, it was an all-cash transaction for us. It's a way for us to punch a little bit above our weight. They'll bring some cash to the table, we'll bring some cash to the table. It lowers our net cost to do a deal.

The other thing they help us do is they do their own independent evaluation. We do ours. We compare notes [to know], "do we both get the same answer?" The hard part of this is that two companies have to agree on "this is the price we think we should purchase this asset for." We will look at PDP (proved developed producing) one way; they may look at it differently. They may look at inventory differently than we do. It really helps to have a company that you can partner with.

Then with Point, based on our great relationship, [we] brought them into that transaction as well. And it aligns us because with Forge, they [owned] 20% and with Point, they [own] 20%. We can drill wells in either area, and no one's getting upset because "you're not drilling on my stuff from a prior transaction." But Nick [O'Grady, NOG CEO] and the team have been on a great job over there and we have a wonderful relationship with them.

DB: Do you foresee similar kinds of transactional arrangements, a three-way partnership, if you

MARSHALL HAWKINS

will, between the two buyers and the seller in the future with NOG or maybe some other company?

JP: It really depends on the size of the transaction and what you're looking to accomplish there. When we did the smaller transactions that were in that $200 [million] to $300 million range, we didn't need them for that, and we could do it all ourselves. But when we went up to $1.1 billion, that's much larger than all the transactions we've done in the past. It's just a way to help us there.

So, I think there are some sizes where it's too small. But when you're looking at $500 million-ish deal for Forge and then $1.1 billion—they've [gotten] bigger and it's a great opportunity.

I think, how they've built their business [by] working with other operators, you've got to be good to work with or your model's broken. They're a great team.

DB: As you digest the assets that you've acquired, is there this thought in the back of your mind like, "Well, there's an inventory scramble going on, something good might come up that will fit perfectly with Vital's portfolio." Does that enter into your thinking at all? In other words, will you sort of un-pause the pause if you see something that's alluring enough?

JP: It could be, but it's not our focus right now. The last transaction we did for Point was all-cash. My priority is [to] pay down debt. That is the best thing I can do for my shareholders because I have inventory. If I miss out on a deal, we're going to be just fine.

We've added 185 wells, I believe, underneath our footprint from our prior transaction. That's two years' worth of inventory that has just been kind of free-ish inventory that we've added organically. I believe we have a great opportunity to continue doing that and bring things like exploration or exploitation into our fold and grow inventory in a different way. A lot of these deals, and you see it with Point, had more PDP coming with them. So, for us, if you want to build inventory, the cheapest way to do it is just getting wells and adding sticks, not having a big chunk of the cost with production.

[The Point deal] is different because it's just in our backyard, a great fit. And when we think about the future, the wells now need to be better than what I already own. That's one thing that they have to do. They have to be in close proximity and not be PDP heavy. That screening criteria is going to screen out a lot more things than it would have in the past. So, that changes. But if there's something right next to us, a great deal, we won't not do it. It's just not a priority for us right now.

DB: Just a few years ago, you were at a market cap of around $400 million. You've far more than doubled that. Where do you see the company going? Do you see the market beginning to realize the assets and the inventory that you have?

JP: You get your report card every quarter, and for us, just continuing to execute and demonstrate that we can pull costs out of the system. We had wells that were $1,200/ft, or $12 million for a 10,000-ft well. We've already reduced costs to $925/ft.

When you're cutting millions of dollars out of the well cost, that's a huge benefit for our shareholders because that translates to less capital that's going out the door and more that's going to debt reduction. So that's why that's such a priority for us right now. OGJ

Not Enough Shock for the System

Permian Basin producers wait years for Texas utilities to grow the grid.

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Since 2020, a lot of Permian Basin operators have made public commitments to reduce emissions, with electrification of field equipment a top priority.

That year, the United Nations Race to Zero campaign launched, encouraging companies and countries to pledge to make their operations neutral by 2050.

BP executives made a net-zero pledge, saying the company would eliminate all greenhouse gas (GHG) emissions from its oil and gas production and reduce the methane intensity of operations by 50%. Exxon Mobil and Chevron followed suit with similar pledges.

Since then, many in the basin's energy industry have faced the electric vehicle owner's nightmare: What happens if there's no place to plug in?

Electrification is a key factor in reducing GHG emissions. Operators sub out the diesel or gas-powered engines that typically drive operations, whether at a production site, a pump station or a processing facility.

Far West Texas and southern New Mexico are among the most sparsely populated areas on the continent, and the states' utilities built the electric grid to handle a smaller load.

Drilling for and transporting oil, however, is an energy-intensive business. A large rig may need 3,000 hp to operate. Power demands for a single production field run into the hundreds of megawatts (MW). A crude pipeline pump station can consume 15 MW a day.

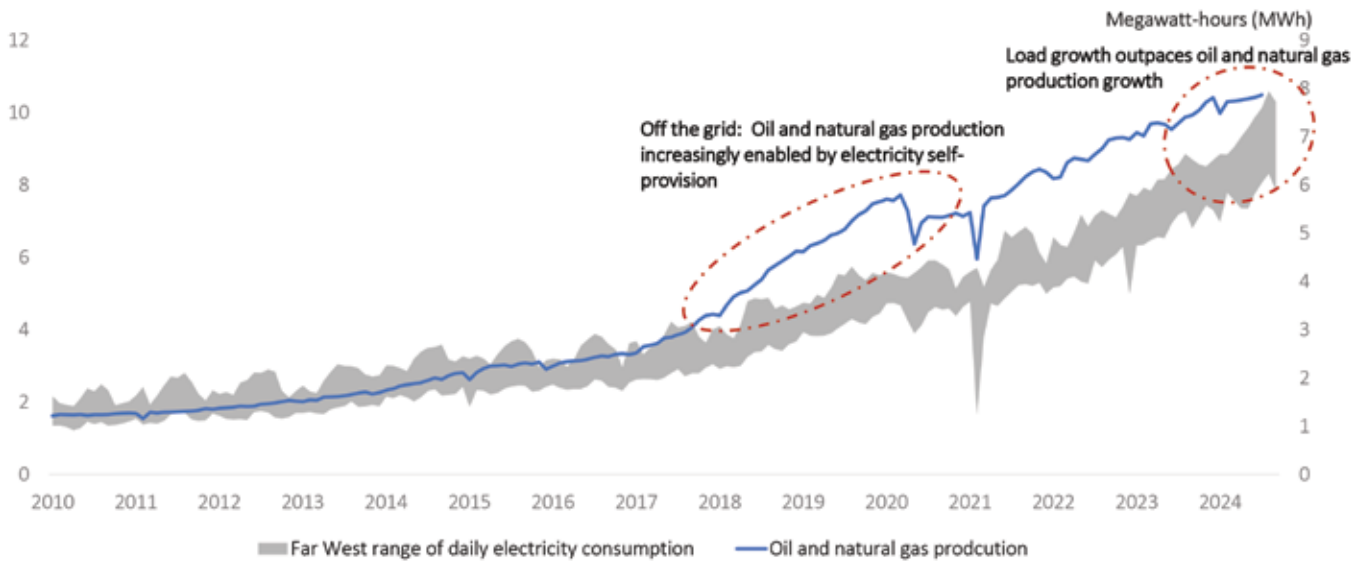
While overall power demand is ramping up nationwide, the Permian's electric utilities have started to ramp up their supply as well—though catching up is expected to take years.

In September, the Permian Basin Petroleum Association (PBPA) discussed the issue at a board meeting. Access to electricity is the biggest concern for the oil and gas industry in the area, Stephen Robertson, PBPA executive vice president, said in a local television interview.

"If you look at West Texas, we are greatly underserved by the ERCOT [Electric Reliability Council of Texas] grid with electricity delivery and where that impacts greatly is not just prices for people buying electricity for homes and for businesses, but specifically out in the oil and gas industry," Robertson said.

Oil and Natural Gas Production Versus Load Connected to the Grid

Million barrels per day oil-equivalent energy (mb/doe)



SOURCE: EIA; ERCOT; TXOGA ANALYSIS

As the Permian Basin's production has grown, the region's electricity load has increased.

BPX

The Grand Slam central delivery point is part of BPX's electrical network in the Permian. The company has electrified about 95% of its operated wells in the Permian, up from just 4% in 2018.

Light at the Site

RPower is a Houston-based power company that specializes in providing on-site electricity as a back-up, prime or bridge power while the operator waits for a utility plug-in.

The company has been busy in West Texas, said Ryan Rudnitzki, senior vice president of sales for energy. The electrification of the Permian kicked into high gear with the Inflation Reduction Act of 2022, which instituted taxes on methane emissions. Much of the equipment at energy sites–drilling, gas processing and pipeline pump stations–has been powered by fossil fuels.

"The kicker is, a lot of these locations are in very remote areas and it's hard to get grid power to them, and that's where we step up," Rudnitzki said.

Many oil and gas operations in the Permian faced a two-year wait for a connection to an electrical grid, according to a 2022 report from the Texas Public Utilities Commission. Rudnitzki says some clients now face twice the wait.

A common construction timeline for a gas processing plant can be about 18 months.

"It's very common to hear (gas processing) customers say that the power company or the transmission company is telling them it might be three to four years or longer, depending on the location and how much congestion there is in the area," he said.

The shortage of grid plug-ins has affected some of the largest players in the basin. Enbridge, one of North America's largest midstream companies, confirmed that the region has been affected by the delays.

"Given Enbridge's extensive transportation pipeline and export assets, as well as continued interest in new growth across Texas and the U.S. Gulf Coast, we are always vigilant about the reliability and connectivity to the grid," spokesman Michael Barnes told *Oil and Gas Investor*.

"It's very common to hear (gas processing) customers say that the power company or the transmission company is telling them it might be three to four years or longer, depending on the location and how much congestion there is in the area."

RYAN RUDNITZKI, senior vice president of sales for energy, RPower

"To date, some of our projects and facilities have been impacted by power availability and increased timelines for requests to connect to the electrical grid in the Permian. We have also been impacted by reliability issues at certain locations in the basin," he said.

The company said that electrical infrastructure is a crucial part of a midstream system and will be needed especially as the Permian continues to grow at a frenetic pace.

"As we assess all risks for new infrastructure, electrical power need is part of our long-term planning," Barnes said. "We are working with our partners and providers on connectivity but recognize that demands on the grid

RPOWER

An RPower generator provides electricity to oil and gas operations in West Texas.

continue to grow, and that current constraints could likely impact some timelines and projects."

Operators have some of the same options as they've always had with on-site generation: traditionally diesel-powered generators.

RPower has taken a different approach and operates typically gas-powered, long-term generation facilities that can electrify a site on its own and provide backup in future power outages after the grid connection is available. The company can also sell power to deregulated grids like ERCOT, splitting revenues with the customer.

The Behemoth Behind the Meter

The decisions made at each power plant add up to a massive homemade power supply, said Dean Foreman, chief economist with the Texas Oil and Gas Association (TXOGA).

Permian Basin operators were self-producing more than twice the electricity than they were getting from the grid, according to an S&P Global study in 2022. Today, the ratio is about the same, with operators producing about 12 GW on their own. One GW is enough to power about 750,000 homes.

"A lot of these were temporary solutions, diesel generators behind the meter," Foreman said. "They were meant to be put in place until ERCOT could expand both generation and transmission within the region, and months have become quarters, quarters have become years."

Historically, ERCOT has been able to keep pace with the demand for growth, Foreman said. ERCOT is responsible for the Texas part of the Permian; the Southwest Power Pool (SPP) oversees New Mexico. However, once the basin's production jumped in 2018, utilities started falling behind.

Overall U.S. consumption of electricity had been flat since 2010. The Permian Basin, thanks to the rapid development of the shale plays, bucked the trend. By 2022, S&P Global noted an 8.3-GW gap between the electric load demand and available grid power.

Congress passed the Inflation Reduction Act the same year, making electrification a priority. As users sought to meet the new GHG targets, the demand on the grid immediately rose by 50%, S&P reported.

In August, ERCOT's Far West Texas region, which includes the Permian, saw its peak load rise by 20% from 2023, hitting 7.942 GW. Total demand is estimated to be more than double the available load, Foreman said.

Higher Voltage

The utilities in Texas and New Mexico are working overtime to catch up.

"We're seeing now, in the last year, load growth really ramping up.... And it represents oil and gas getting rid of those temporary solutions and coming back to the grid as more is available," Foreman said.

The basin has seen several electrification success stories. BPX Energy reported in early 2023 that a successful hook-up to the grid allowed the company to reduce flaring on BP's Permian assets from 16% to less than 1%. BPX is spending about $1.4 billion in infrastructure costs to update its production to almost complete electrification.

The energy industry and electric providers in New Mexico have both come forward with plans that will allow other companies to replicate BPX's success.

In New Mexico, the SPP approved a $7.7 billion transmission plan to meet what the agency called "generational challenges" on its electrical grid. Among the list of projects is a 765-kilovolt power line connecting the southeast part of the state to available infrastructure in the Texas panhandle for "uniquely sharp load increases in New Mexico."

Last year, the Texas legislature approved House Bill 5066 to study the issue. In September, the Public Utilities Commission (PUC) of Texas passed a regional electric reliability plan estimated to cost $13.8 billion over the next 13 years.

ERCOT will direct the building of new and upgraded transmission lines for the region to bring in power from other regions of the state. The buildout will attempt to meet the region's demands up to 2038, when the PUC expects an additional 26 GW will be needed in the area.

While oil and gas are the primary drivers of the grid expansion, commissioners have also taken into account the growing needs of artificial intelligence data centers and cryptocurrency operations, according to the plan.

Todd Staples, TXOGA president, said in October that he hoped the public understood the immediate need to ship more electricity to the Permian.

"A lot of times, folks hear things that are speculative, and what might happen; an 'if-you-build-it-they-will-come' type of thing," Staples said. In the case of the Permian oil and gas industry, however, "they're here." OGI

Segrist: Cooling the Reaction

Nuclear power is awesome. Nuclear power is also hard—and a long way off from displacing natural gas as the primary source for the electricity the U.S. will desperately need.

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Autumn 2024 saw the start of a nuclear movement in the U.S.

After decades (and decades) of shrugging off the pathetic pace of the nation's nuclear power development, major corporations and the federal government put reactors in a warm embrace.

Still, the chances of nuclear making any kind of major contribution to the country's power needs over the next 15 years are slim, and some of these moves could be distractions for an oncoming battle for electricity.

Just about every behemoth tech company made announcements to bring nuclear online. Microsoft announced plans to restart part of the closed Three Mile Island Nuclear Generation Station on Sept. 20.

Google and Amazon then raced to make their announcements. On Oct. 14, Google published a deal with Kairos Power to develop small modular reactors (SMR). Two days later, Amazon announced a deal to develop the same technology with two companies, X-energy and Dominion Energy, leading two different projects.

The government also stepped in with the U.S. Department of Energy putting up $900 million in funding to help the deployment of the first commercial SMRs within the country.

The announcements are made in a time of a growing awareness of a growing problem. The U.S. does not have anywhere near the amount of power needed for an artificial intelligence (AI) boom, an increase in electric vehicles and a growing reshoring movement as more companies move their manufacturing operations back to the U.S.

An acceptance of nuclear power is great news. It will also not solve the problem, at least not anytime soon.

Critical Reactions

Full disclosure: I spent the first part of the 2020s trying to enter the nuclear industry. I'm still a fan of nuclear power. It has too much potential to ignore.

One 20-gram pellet of nuclear fuel produces as much energy as a ton of coal, 149 gallons of oil or 17,000 cf of natural gas. It produces no greenhouse gases. Once up and running, the plants require comparatively little in the way of maintenance or fuel.

I was lucky enough to land a job as an on-site administrative assistant for Bechtel when the contractor finished building Plant Vogtle, the first U.S. nuclear power plant in 30 years. The engineering and scale of the project amazed me. The 15-story reactor domes that are built to withstand a commercial airliner crashing into it. The 50-story concrete cooling towers and massive pipes needed to channel the water necessary to keep the nuclear reaction going.

The last reactor went online in spring 2024 and added about 2.4 gigawatts (GW) of electricity to the Southeast's power grid.

Neat—but it's also impossible to ignore the difficulties.

It had been more than 30 years since anyone in the U.S. had attempted to build a nuclear power plant. Southern Co. had to run a gauntlet of complications.

Construction started in 2009. Georgia Southern and contractors were suing each other over delays by 2015. The contractors and the Nuclear Regulatory Commission got sideways over new regulations, causing major rebuilds.

In 2017, the project bankrupted Westinghouse, the plant designer. One of Southern Co.'s partners, South Carolina Electric and Gas, decided the project was too expensive and dropped out. Two of the South Carolina power company's executives received prison sentences.

Bechtel, one of the few firms with nuclear experience, was eventually called in to figure out how to complete the project. And all that happened before COVID hit.

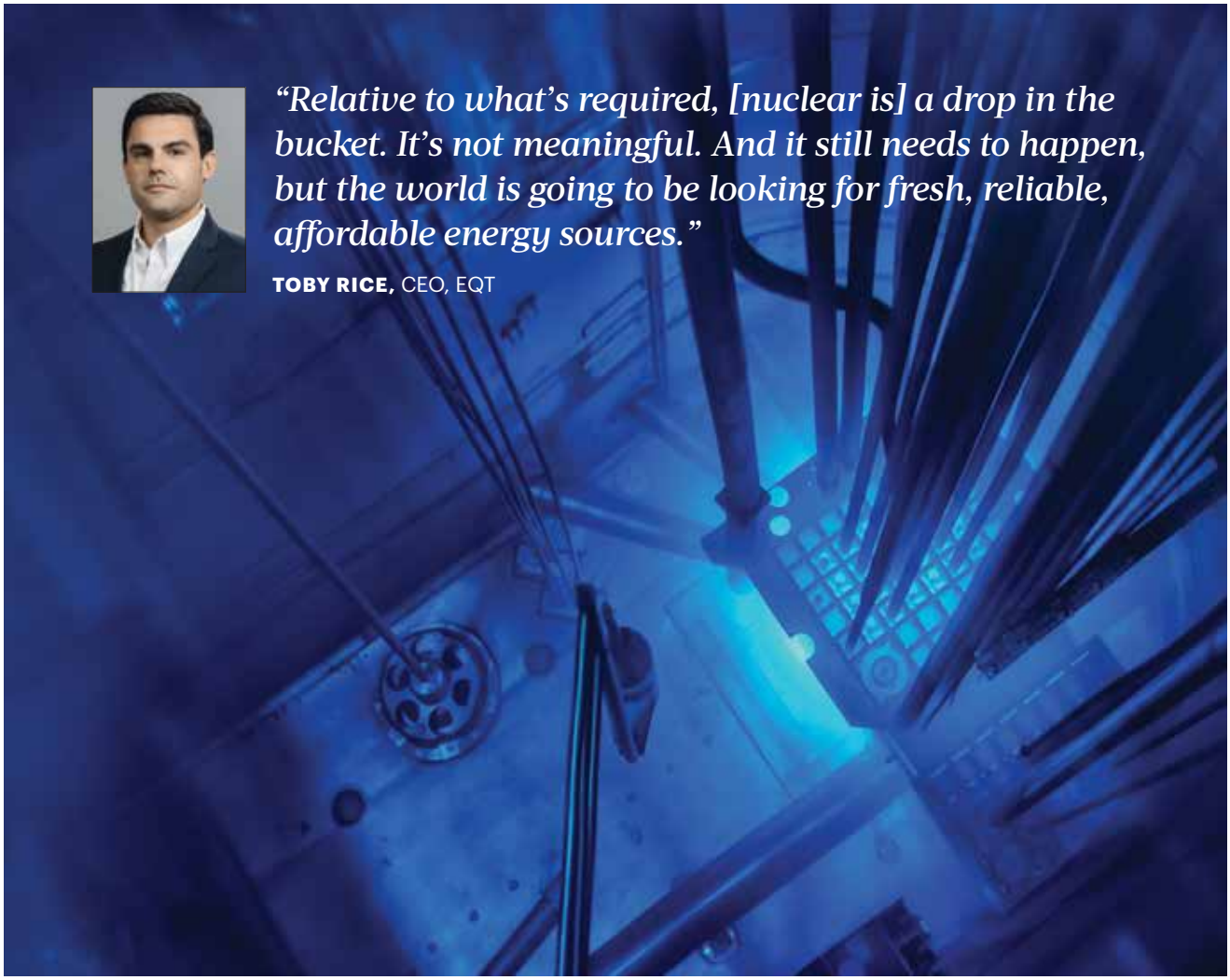
Vogtle missed its in-service date by seven years. The final cost surpassed $31 billion, well over twice the original estimate. Thanks to the construction costs and some other factors, Georgia residents, in some cases, have seen their electric bills rise by 50% over the last year, according to news reports.

Power Limits

Hopefully, the nuclear industry and government regulators learned lessons from Vogtle, and the next go-round won't be as difficult.

It will most likely still be difficult. The nuclear power projects announced by the U.S. tech industry's leaders look promising, but they also look like they are way behind the demand curve.

Microsoft's plan to restart the Three Mile Island facility looks the easiest. The facility



SHUTTERSTOCK

At its core, nuclear power is clean and efficient. It is also tremendously expensive.

is already built, the engineering is already done. (Reactor 2, which experienced the partial meltdown in 1979, will not be restarted.)

Even then, the cost is outrageous. East Daley analyst Nigel Gorbold told the audience at Hart Energy's A&D Strategies and Opportunities Conference in October that the project's estimated megawatt-hour (MWh) cost is around $130. Natural gas-fired power comes in at around $15-$25/MWh.

Besides the cost, adding Three Mile Island, or restarting some of the U.S.' other shuttered nuclear plants, will not come close to meeting the country's growing electrical demand, said EQT CEO Toby Rice during his company's third-quarter earnings call.

The company looked at the potential of shuttered nuclear facilities coming back online and found they added a potential 3 GW to the grid.

"Keep in mind, some of the power demand growth estimates are around 70 to 80 gigawatts," Rice said. "Relative to what's required, it's a drop in the bucket. It's not meaningful. And it still needs to happen, but the world is going to be looking for fresh, reliable, affordable energy sources. That's going to mean more natural gas."

Amazon's and Google's pledge to develop SMRs is a positive development. The technology is a viable option that should have been pursued decades ago.

The problem currently is that the technology is a long way off from commercial use. Google hopes to have its first SMR online by 2030, with additional deployments through 2035 that will add 500 megawatts of power. Amazon says it's aiming for deployment in the early 2030s.

All of it sounds good, but nuclear projects are notorious for falling behind schedule and going over budget, and SMRs are a developing technology. There are more than 80 SMR designs and concepts globally, according the International Atomic Energy Agency. There are three SMRs in commercial operation, none in the U.S.

The projects face a difficult regulatory process before making a dent in meeting the overall demand.

Though, as Rice said, they need to be done. According to most power regulators, the U.S. is heading toward a period when electrical demand is going to shoot well past supply.

A lot of techno-geeks have talked about the transformational nature of the coming AI revolution.

Maybe. And maybe in a few years, when everyone is creating hi-res images of their dogs and cats fighting with light sabers, they'll wonder why their electric bills have gone nuclear. OGI

Paisie: Trump's Impact on All Things Energy

The president-elect's policies are expected to benefit the U.S. oil and gas sector, but also bring economic and geopolitical risks.

JOHN PAISIE
STRATAS ADVISORS

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For several months, the price of WTI crude has been trading in a range between $67/bbl and $77/bbl and the price of Brent crude has been trading in the range between $70/bbl and $80/bbl.

The rangebound nature of oil prices is the result of the factors that have been governing the market. These factors include muted oil demand growth with China's economy sputtering. However, despite the tensions in the Middle East and the ongoing conflict between Russia and Ukraine, the oil market has dismissed, for the most part, the geopolitical risk because the flow of oil has continued, for the most part, unabated. These factors, along with the concerns about the level of oil supply that has been shut-in by OPEC+, are keeping a lid on oil prices.

The return of Donald Trump to the U.S. presidency has the potential to shift the oil market by affecting these factors, including the supply/demand fundamentals, as well as the macro-level factors—geopolitics and macroeconomics.

Oil Supply

Trump's energy policies will be more friendly to the oil and gas sector, including less-intrusive regulations, along with efforts to encourage allies to import more oil and gas from the U.S. The U.S. oil sector, however, does not exist in a vacuum—and signs that the U.S. is ramping up production could provoke a response from OPEC+ because of the perceived threat to its market share and ability to influence the oil market.

Members of OPEC+, notably Saudia Arabia, have been willing to reduce their supply to provide support for oil prices, but this approach will be reassessed if members of the cartel feel that their market position is being eroded. If the threat is viewed as being significant, OPEC+ could bring on additional supply to collapse oil prices in an attempt to inflict financial harm on non-OPEC producers, including U.S. producers, to make it more difficult to sustain capital investments.

Oil Demand

It is it is likely that Trump will push to reduce support for electric vehicles (EV) and for alternative fuels, which, in turn, should increase demand for oil and refined products. The impact on demand, however, is likely to be only on the margins—at least through the four years of the Trump administration—given the current momentum behind EVs and alternative fuels in Europe and Asia.

Geopolitics

The foreign policy approach of the Trump administration is likely to change the current geopolitical dynamics.

It is likely that the U.S. will put more pressure on Iran, including enforcement of sanctions on Iran's oil exports, and Israel is likely to have the opportunity to be more aggressive in confronting Iran.

The Ukraine-Russia conflict also is likely to be affected by the next administration, with a greater likelihood for a negotiated settlement. While Trump will face some resistance from his own party and others, it is our view that he will be inclined to push for a negotiated settlement at the beginning of his administration when he will have significant political power.

With a negotiated settlement, it is likely that some additional Russian crude (and refined products) will return to the European market and other OECD markets; however, the magnitude will be limited by new supply patterns that have been established in response to the sanctions that have been imposed on Russian oil exports.

Macroeconomics

Trump's trade policies will put further pressure on Europe's economy with the threat of a 10%-20% tariff on imports from Europe. Similarly, China is facing the threat of tariffs on its exports to the U.S that could be 60% and higher.

While the threat of tariffs could well be a negotiating tactic, it is likely that some additional targeted tariffs will be put in place. Additionally, since the election of Trump, the U.S. dollar has appreciated. At the end of the week of the election, the U.S. Dollar Index reached 105.00. In comparison, on Sept. 26 the U.S. Dollar Index was 100.38.

One reason for the increase in the U.S. Dollar Index is the weakness in the euro, which fell from 1.1178 USD on Sept. 26 to 1.0719. The Chinese Yuan has also weakened during this time, from 7.0117 to 7.1791. While there is an ongoing debate about the ultimate effect of Trump's tariffs policy on the dollar, at least for the short-term the stronger dollar will put downward pressure on oil prices. OGJ

OPEC Outlook: Failure to Invest Could Lead to Energy Crisis

Cartel's data show U.S. shale oil volumes reaching 16.7 MMbbl/d by 2030.

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Shale oil is poised to increase by 2.3 MMbbl/d through 2029, but tensions between the oil and gas industry and ESG-centric investors could spark a global energy crisis, the head of OPEC's energy studies department said.

U.S. tight oil will be the main driver behind supply growth, rising to 16.7 MMbbl/d in 2029 from 13.7 MMbbl/d in 2023, OPEC's Abderrezak Benyoucef said at the ADIPEC Exhibition & Conference in Abu Dhabi, United Arab Emirates in November.

However, tight oil will peak at the end of the decade and continue producing at an extended plateau above 16 MMbbl/d in the 2030s, he said. Further out, shale volumes decline to an average 14.8 MMbbl/d by 2050.

Benyoucef said that OPEC's World Oil Outlook shows the world's energy demand increasing by 24% through 2050. The outlook forecasts oil retaining the largest share in the global energy mix, meeting about 27% of energy needs.

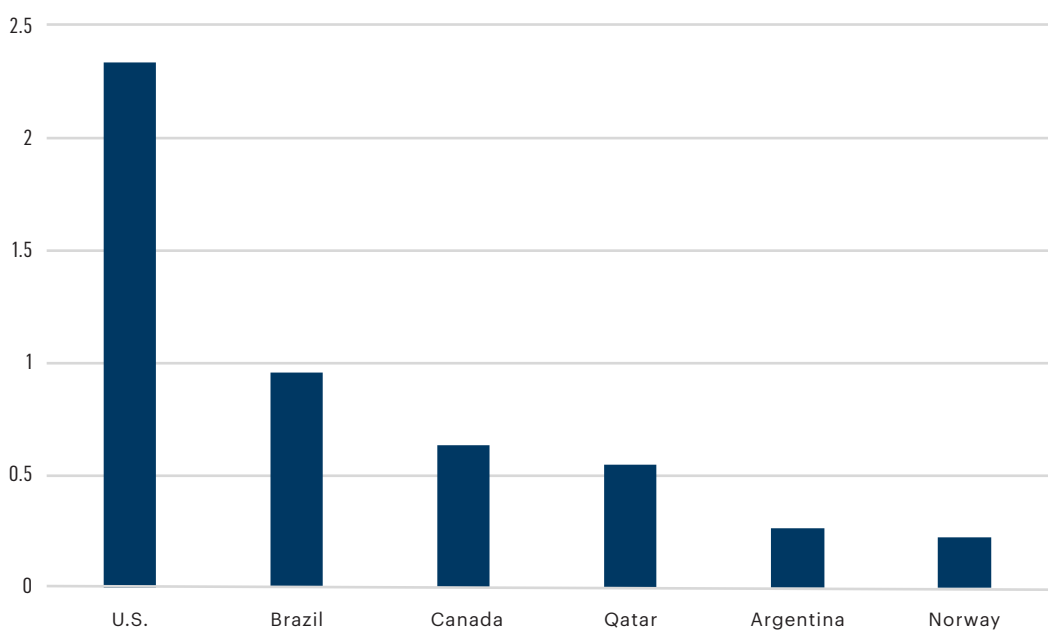
OPEC divides its outlook into short- and long-term pieces. By 2029, global oil demand is projected to reach 112.3 MMbbl/d. Longer term, demand increases by 18 MMbbl/d from 2023 levels and reaches 120 MMbbl/d in 2050, Benyoucef said.

OPEC's report, released on Oct. 31, stands in sharp contrast to the International Energy Agency's June forecast, which reported that oil demand would hit a high of 114 MMbbl/d in 2030 and decline thereafter.

"There [are] no signs of global demand peaking anytime soon and continued adequate investments are needed to meet further demand," Benyoucef, the editor of Outlook 2024, said. "Calls that oil demand has peaked have been proven wrong.

"On the contrary, oil demand continues to expand and is projected to maintain robust growth in the medium and long term. India, Asia, Africa and the Middle East remain the key oil demand growth centers.... India alone provides 50% incremental oil demand. Petrochemicals, road transport and aviation drive growth."

Total Liquids Change, 2023-2029
Non-OPEC countries, MMbbl/d



SOURCE: OPEC

By 2029, global oil demand is projected to reach 112.3 MMbbl/d. Longer term, demand increases by 18 MMbbl/d from 2023 levels and reaches 120 MMbbl/d in 2050.

SHUTTERSTOCK

Through 2030, the U.S. will lead growth in non-OPEC+ countries, followed by Brazil (1 MMbbl/d), Canada (600,000 bbl/d) and Qatar (500,000 bbl/d), as well as Argentina and Norway.

While shale reservoirs have potential for oil recovery elsewhere in the world, Benyoucef said the bulk of tight oil production is and will remain in the U.S.

"For the shale, the share including crude and NGLs is around 15 million barrels a day and could reach almost 17 million barrels a day," he said. That will peak and stay at current levels by 2050.

In other regions, including Argentina, Canada and China, "the huge potential is there, and they have not been explored yet," he said.

24%
Increase in world energy demand through 2050

While oil gains 17 MMboe/d, Benyoucef said that solar, wind and natural gas will add energy at the fastest clip. Renewables will have the largest growth, adding 43 MMboe/d in the next quarter century.

However, renewables currently represent only about 3% of the global energy mix and, even with meteoric growth, will account for about 14% by 2050, according to the outlook.

Trailing renewables, natural gas is projected to grow by 21 MMboe/d between 2023 and 2050. Coal, however, will decrease by 29 MMboe/d due to what Benyoucef called "restrictive policies," as well as a push for renewable energy.

120 MMbbl/d
OPEC's estimate of oil demand in 2050

Part of the assumptions underlying OPEC's forecast include pushback to "overly ambitious energy policies, even while many targets remain in place" from companies that produce hydrocarbons.

The report also cites a global population that will grow by about 1.6 billion people to 9.7 billion in 2050. OPEC sees global GDP more than doubling to $358 trillion in 2050 from $165 trillion in 2023. Growth is expected to average 2.9% per annum over the entire forecast period. The report also recognizes incremental progress in technological breakthroughs, but assumes nothing sudden.

"If we put this in context, if you see the [past] 25 years and historical data, the demand growth was more than 1 million barrels a day" each year, Benyoucef said.

Looking forward 25 years, the outlook sees oil demand slowing to a little more than half, or 600,000 bbl/d.

"If you compare two periods, we halve the growth, whether we are optimistic or pessimistic," he said.

The tab for oil-related investments is not cheap. Benyoucef said that total cumulative required capital to meet demand for the next 25 years is estimated at $17.4 trillion, or about $640 billion per year. More than 81% of the capital requirements, about $14.2 trillion, are needed for upstream oil and gas operations. Downstream investment needs are estimated at $1.9 trillion, and midstream at $1.3 trillion.

"The problem, the issue is ... where we can get this investment?" he said. He cited the reluctance to invest over ESG and other environmental concerns, but warned that a lack of money "could create an issue or energy crisis if you don't invest now in oil and gas."

In the U.S., where the oil and gas industry has considered itself under siege by the Biden administration, OPEC noted that U.S. liquids grew by 1.6 MMbbl/d in 2023. That's on par with the 2017-2019 pre-pandemic period. OGJ

Making CCS Work

For many, decisions on whether to capture and store CO_2 comes down to economics.

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With more carbon capture and storage (CCS) plants operating than any other place in the world, the U.S. knows what it needs to make CCS work and accelerate deployment.

Getting all the ingredients together for large-scale ramp-up remains the challenge.

CCS project developers have found geology favorable for sequestering captured carbon, including in the Gulf of Mexico Basin, home to the Haynesville Shale. They have pinpointed spots where tons of emissions exist. Some, particularly those in the U.S. Gulf Coast, also have access to CO_2 pipelines and other existing infrastructure. Many focused on capturing their own emissions are making some progress.

The U.S. and other parts of the world are counting on CCS to help lower greenhouse-gas emissions. However, locking in agreements with emitters willing to pay for costs associated with carbon capture may be a struggle.

For many, decisions on whether to capture comes down to economics, despite the environmental benefits. That, experts say, is contributing to the pace of growth for CCS—even as federal dollars arrive for some projects and long-awaited permitting milestones are reached for others. CCS technologies remain expensive, particularly for post-combustion processes such as for power plants and for cement and steel operations, according to Jeffery Jen, a senior associate with Enverus' energy transition research team. CO_2 purity and low concentration are making it more challenging and ultimately, more expensive to capture.

"Optimistically, we do think costs are coming down."

PETER FINDLAY, director of CCUS analytics, Wood Mackenzie

"As more CCUS (carbon capture utilization and sequestration) projects are put in-service, there will be operational learnings that will benefit the economics and execution of these projects," said Jen. "CCUS needs to go through the same learning cycles as mature industries such as oil and gas before it reaches its 'plateau of productivity.'"

Lingering Cost Concerns

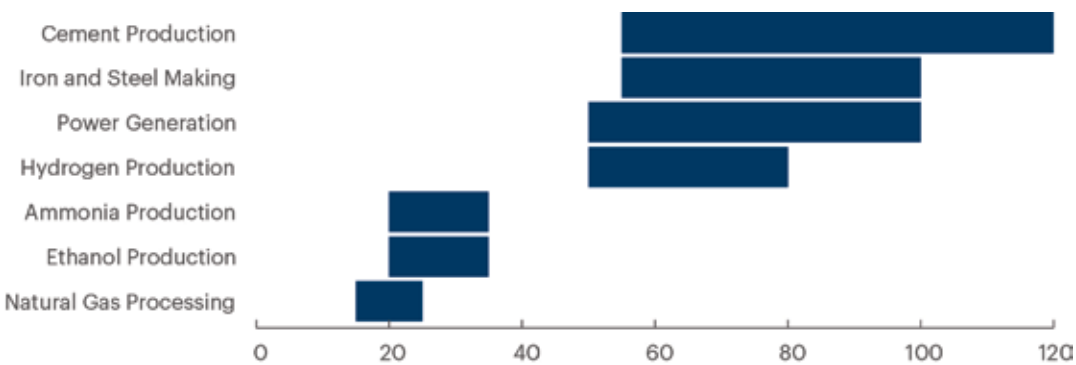
There were only 15 CCS facilities operating in the U.S. in December 2023, according to a Congressional Budget Office (CBO) report. The Global CCS Institute reported that the U.S. was home to 260 of 564 CCS projects worldwide in various stages of development as of March 2024.

Analysts forecast those numbers to grow amid the continued drive to lower emissions, but costs are a deterrent for most of the heavy emitters that need CCS the most. In many instances, costs outweigh value.

"Estimates of the cost to capture CO_2 come mainly from engineering and economic modeling and can vary widely depending on

Estimated Range of Costs for Capturing a Metric Ton of CO_2 in the United States in 2019, by Source

2019 Dollars



Estimates of the cost to capture a ton of CO_2 vary by industry and by such factors as the amount of exhaust gas from a plant, the concentration of CO_2 in that exhaust, and its pressure.

SOURCE: CONGRESSIONAL BUDGET OFFICE, USING DATA FROM INTERNATIONAL ENERGY ADMINISTRATION, ENERGY TECHNOLOGY PERSPECTIVES 2020—SPECIAL REPORT ON CARBON CAPTURE, UTILIZATION, AND STORAGE: CCUS IN CLEAN ENERGY TRANSITIONS (SEPTEMBER 2020), P. 101, HTTPS://TINYURL.COM/2WB55RZM. SEE WWW.CBO.GOV/PUBLICATION/59345#DATA.

ESTIMATES OF CAPTURE COSTS INCLUDE THE COST TO COMPRESS CAPTURED CO2 FOR TRANSPORT.

CO2 = CARBON DIOXIDE.

NORTHERN LIGHTS/EQUINOR

The Northern Lights Carbon Capture and Storage facilities at Øygarden outside of Bergen.

the assumptions made in that modeling," the CBO Office said in its report. "An indicative range of estimates is from about $15 to $120 per metric ton of CO_2 captured, with additional costs for transporting and storing the CO_2. Sectors at the lower end of that range provide fewer opportunities for capturing significant amounts of CO_2."

Power generation and industrial production capture projects are on the pricier side, leaving the sectors little financial incentive to pursue such projects. "The main financial incentives to use CCS are revenues from enhanced oil recovery and a federal tax credit for capturing and storing CO_2," the CBO said. It later added that costs may fall as more CCS projects come online and illustrate best practices. Plus, researchers are studying ways to make CO_2 capture less expensive.

"Optimistically, we do think costs are coming down," said Peter Findlay, director of CCUS analytics for Wood Mackenzie. Speaking during the consultancy's Houston conference, he pointed out the falling levelized cost for CCS. "We think most of what's shown will be incremental, but transformational technologies are possible. There's lots of companies working on them. There's lots of startups, venture capital money ... and we do think with scale and some modularization and transformational technologies, it could probably come down lower than this."

Tapping Tech, 'Low-Hanging Fruit'

Targeting lower post-combustion capture costs, some companies are developing new amines, metal organic frameworks and other novel capture methods, Jen said. Federal tax incentives such as the 45Q tax credit for CCUS is not enough to move some big emitters into CCS action.

"With only $85/tonne from the 45Q to work with, many of these post-combustion applications are left uneconomic before accounting for the cost of transporting and storing the CO_2. This is further exasperated by the fact that post-combustion industries are typically the ones that have the highest emissions and the ones that should install CCUS," Jen said. "However, the way the 45Q and U.S. policies are structured, there are no penalties for emitting (other than California, which has a cap-and-trade system), so if emitters cannot capture their emissions, transport it and store it for under $85/tonne, then they will not."

"We have these existing pure streams of CO_2 being emitted that can easily be captured and then transported."

GORDON HUDDLESTON, president and partner, Aethon Energy

Many companies moving forward with CCS projects are targeting pre-combustion capture, which is more efficient than post-combustion capture because the CO_2 is more concentrated and at a higher pressure. That makes pre-combustion capture more attractive, said Aethon Energy President and Partner Gordon Huddleston, calling it low-hanging fruit.

"We have these existing pure streams of CO_2 being emitted that can easily be captured and then transported, and the nature of the basin is that there's a lot of geology that is prospective for carbon sequestration," Huddleston said. "The industry needs to prioritize these types of projects [as] the lower hanging fruit as well as make sure they do it correctly."

Dallas-based Aethon is perhaps best known for being one of the largest natural gas producers in the Haynesville Shale. But the company, which got a little bigger with its $260 million acquisition of Tellurian's upstream and midstream assets, is positioning itself to become a major carbon capture player in the South. With 10 amine plants in its midstream portfolio, Aethon is focused on pre-combustion capture from its own assets and third parties.

Like bigger CCS players, Aethon plans to handle the capture, transport and storage of CO_2 on its own. The company is early on the permitting process. Others are already marking milestones.

Gaining Project, Permit Momentum

A monumental moment for the global CCS sector was marked overseas in September when the Northern Lights CCS project officially opened in Norway. The first phase capacity of 1.5 million tons of CO_2 per year is fully booked, according to Equinor and JV partners Shell and TotalEnergies. CO_2 is captured from industrial sources and stored underground in the North Sea.

Chevron is pursuing CCS projects onshore and offshore in the U.S., with experience gained from operating one of the world's largest CCS projects–Gorgon offshore Australia. More than 10 million tonnes of CO_2 has been injected since the system started up in 2019, according to Chevron's website. CO_2 is taken from offshore gas reservoirs and injected into a huge sandstone formation 2 km beneath Barrow Island.

In the U.S., Chevron's signature CCS Bayou Bend project in southeast Texas is progressing. Two stratigraphic wells, one offshore and one onshore, have been drilled for the project that is being developed as Bayou Bend East (offshore) and Bayou Bend West (onshore).

Majors are not the only ones marking milestones.

California Resources Corp.'s carbon management arm Carbon TerraVault (CTV) expects to receive its Class VI permit from the U.S. Environmental Protection Agency (EPA) in December, moving closer to establishing the state's first commercial-scale CCS facility.

"Shortly after receipt of the EPA permit, we expect to FID and break ground on our first carbon capture to storage project at our Elk Hills gas processing plant," California Resources CEO Francisco Leon said during the company's third-quarter earnings call.

CTV's first capture-to-storage project at California Resources' Elk Hills cryogenic gas plant is part of the CalCapture project, which aims to capture and permanently store 1.5 million metric tons of CO_2 annually. It is a targeted milestone that CRC has been discussing for about three years as it works to decarbonize California's hard-to-abate industrial sectors, including power. The company has about 3 MMtpa of brownfield CCS projects under consideration along with about 1.2 MMtpa of greenfield projects.

Due to the significant amount of time and staff it takes to understand Class VI wells and to ensure no public harm comes from such wells, it historically takes about 42 months for Class VI permit approvals, Jen said. In North Dakota, which has primacy, it's about an eight-month approval process.

But permits for Class VI wells are starting to trickle in, including a draft permit to Oxy Low Carbon Ventures for three proposed geologic CO_2 sequestration wells in Ector County, Texas.

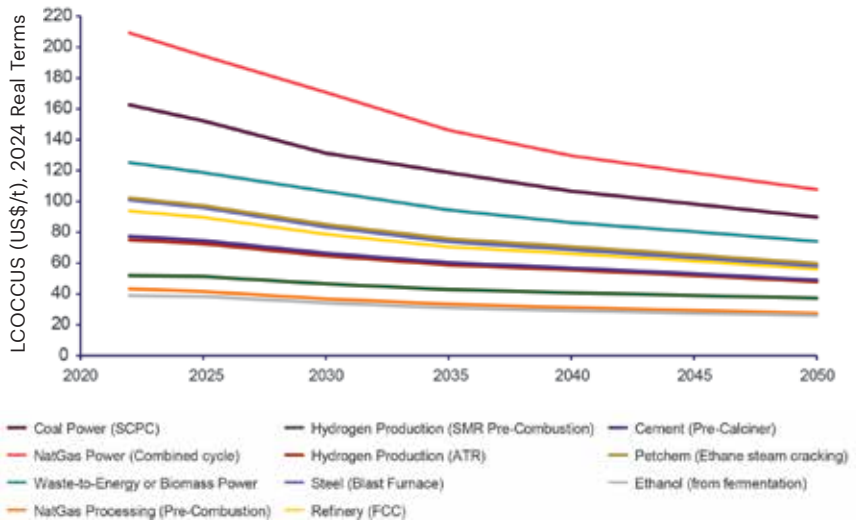
Chevron's permit application is in the technical review phase, expected to take a couple years. It received the EPA's "administratively complete" acknowledgement for its offshore Class VI well earlier this year, Chris Powers, vice president of CCUS and emerging for Chevron New Energies, told *Oil and Gas Investor*. Work continued at the time on progressing the permit process for the onshore project.

"The technical review remains the longest portion of the Class VI review process," Jen said, "and there is an effort between the EPA and industry to standardize the applications to streamline the application process."

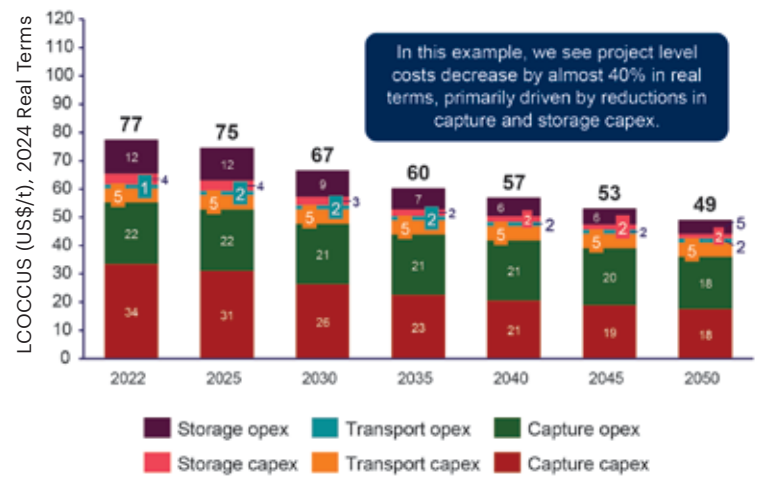
Dealing With 'Massive Influx'

In Louisiana, legislators and regulators are working to strengthen the sector, having enacted laws that give pipeline companies authority to expropriate property rights for pipelines transporting CO_2 for CCS projects and another that authorizes unitization for CO_2 sequestration. But it'll take some time to move projects through the

LCOCCUS for Selected Industries Over Time by FID Year



LCOCCUS Breakdown for a Reference Cement Project



SOURCE: WOOD MACKENZIE LENS CARBON

SHUTTERSTOCK

CCS facilities capture CO_2 emissions from industrial processes and power plants, then store it underground to prevent it from entering the atmosphere, helping to reduce greenhouse gas emissions.

"The critical path will flow through the customer signing up."

CHRIS POWERS, vice president of CCUS and emerging, Chevron New Energies

Class VI permit approval process.

When the state got Class VI primacy it wanted to re-evaluate pending applications from the beginning, Jen said.

"With [Louisiana] being one of the highest quality storage locations for CO_2 sequestration, specifically along the Gulf Coast, the Louisiana Department of Energy and Natural Resources is dealing with a large permit queue of 26 projects, totaling to 65 Class VI wells," he added. "Since [Louisiana] was awarded primacy in December 2023, we have not seen any Class VI permits be approved from the state.... [Louisiana] is still dealing with the massive influx of projects that were in the queue from the EPA and we expect that it will still benefit from primacy, issuing permits faster than the historical 42-month timeline from the EPA."

Aethon Energy is in pursuit of permits needed to jumpstart its CCS project targeting the capture and sequestration of 3 million tons per annum (mtpa) in Louisiana and Texas. "The reservoirs where we're looking at will have further ability to take additional CO_2, but that's kind of how we're scoping the project today," Huddleston said. "We want to expand it. We'll have to increase the overall plume size but I think the key is the geology is there to support that."

As of early November, Aethon's permit applications for Class V wells in Louisiana were in the public hearing phase. If secured, the permit will give Aethon permission to start drilling stratigraphic wells, which are typically drilled to gather geologic data, before Class VI wells are drilled for CO_2 injection. Public hearings set by the Louisiana Department of Energy and Natural Resources could take place in early 2025. The company will seek Class VI afterward.

In Texas, Aethon has a wildcat permit that essentially allows the company to drill the so-called strat wells anytime, the company said. Here, Aethon is nearing the last step to obtain a Class II Permit from the Texas Railroad Commission, allowing the company to inject CO_2 for enhanced oil recovery. The permit is being pursued as Aethon also works to obtain a Class VI well permit from the EPA to sequester CO_2 in Texas.

Aethon hopes to eventually scale to 10 Mtpa, but its focus today is on getting permits and lining up CO_2 offtake and transportation agreements.

Locking in Offtake

Getting permits is only part of the journey. Locking in offtake is essential to making CCS projects happen, and first injection depends on customers.

"The critical path will flow through the customer signing up. So, the dates will be driven by when we get commercial certainty on the contracts, and that's one of the biggest challenges, I think, for the industry broadly," Powers said of Chevron's projects. "45Q is helpful. But what we're seeing—and again, remember, Bayou Bend is a customer-facing sequestration project as opposed to our own equity emissions—the customers are being thoughtful and methodical about how they're deciding when they want to

sign up to sequester the CO_2."

Costs remain a major factor for customers with emissions, especially those requiring more expensive post-combustion capture. Post-combustion capture is considered more difficult because the concentration of CO_2 in flue gas is low, which means more energy is needed to separate it. This, in turn, makes the process more expensive.

Powers pointed out that capture costs for a refinery, power or chemical facility could be between 60% and 70% of the project's overall cost. That could be an investment of hundreds of millions of dollars.

"The customers, the emitters, have to have the wherewithal and fortitude to say we're going to make that capital investment on our own facility to capture the CO_2," Powers said. "It's a relatively smaller investment on the transportation and sequestration side. I think that's what's really causing this to pace a little bit. These emitters … they're working to figure out, 'hey, does the math work for me with the current rubric and construct?'"

Chevron has been in talks with many counterparties and is "making good progress," he said.

In November, California Resources said CTV inked its first third-party brownfield emissions agreement: a memorandum of understanding with Hull Street Energy for a post-combustion CCS project targeting about 1.5 MMtpa of CO_2 emissions.

The agreement with Hull Street Energy shows there is market appetite for such projects, California Resources CEO Francisco Leon said during the company's third-quarter earnings call. The MOU is CTV's first third-party brownfield emissions project.

"Our new MOU with Hull Street Energy, a leading power provider in a state that desperately needs more clean power today, is aligned with ours and the state's climate objectives," he said. "Natural gas is necessary to powering California today and combining it with CCS will deliver net-zero power, which is needed to achieve the state's climate goals."

Overcoming Hurdles

The business case still doesn't work for some emitters.

Some recent hurdles on building the business up is how lukewarm some folks are, according to Joe Colletti, a U.S. Gulf Coast CCUS venture executive for Exxon Mobil Low Carbon Solutions.

"They get excited to want to move forward on an opportunity but then maybe hold because they start thinking about policy risk or what happens with this election cycle," Colletti said during Wood Mackenzie's energy conference in Houston.

The energy giant is developing a CCS project as part of its planned low-carbon hydrogen plant in Baytown, Texas. It will store up to 10 million metric tons (mt) of CO_2 per year–equal to the emissions from more than 2 million cars.

The company in October signed its largest U.S. offshore CO_2 storage lease with the Texas General Land Office. The agreement is for a site larger than 271,000 acres.

Exxon, which strengthened its CCS business with its acquisition of Denbury, has more than 6.7 million tons of CO_2 under definitive agreements where it's either the capturer, transporter and/or storage provider, according to Colletti. Exxon has lined up definitive agreements with customers from three industries: Linde, industrial gases; CF Industries, fertilizer manufacturing; and Nucor Corp., steel.

Findlay pointed out that companies like Exxon have made FID on projects, in part by building the whole value chain themselves or having one partner and a straightforward commercial agreement that works for both parties.

"They get excited to want to move forward on an opportunity but then maybe hold because they start thinking about policy risk or what happens with this election cycle."

JOE COLLETTI, U.S. Gulf Coast CCUS venture executive, Exxon Mobil Low Carbon Solutions

Community support is also part of the picture. Resistance is strong in some areas.

Public Resistance

Carbon capture projects, including CO_2 pipelines, have already faced resistance for a variety of reasons. Safety–along with land rights and environmental concerns–is among them. Archer Daniel Midland's (ADM) discovery of a potential underground CO_2 leak at its Decatur, Ill., CCS site this year prompted the company to pause injection, sparking outcries from environmentalists and angst for CCS developers looking to get their projects off the ground.

The EPA in September issued a proposed enforcement order against ADM for alleged violation of its Class VI permit when injected fluid migrated into an unauthorized zone about 5,000 ft deep. The EPA said in a news release that the fluid migration was caused by holes in one of ADM's monitoring wells. The lower portion of the well was plugged to halt further fluid migration, the company said.

Public opinion concerning safety of CO_2 pipelines and storage is among the biggest obstacles to development of CCS projects in the U.S., Jen said. Another public opinion obstacle is a belief by many that CCS is an idea propped up by the oil and gas industry to prolong its lifespan, though it will help decarbonize oil and gas as well as many hard-to-abate industries such as cement and steel.

"It will be up to the CCUS industry to continue to engage the public and educate them on not just the benefits but also the risks and how they are addressing the risks of CO_2 to the public," he said.

Huddleston said Aethon has worked with Louisiana regulatory agencies as far back as 2018-2019 on carbon capture. The relationship included discussions on which types of reservoirs are suitable for storage and ensuring other safeguards are put in place. Among its suggestions was requiring developers take casing all the way to surface, spending the additional capital to guard against any shallow encroachment of CO_2.

"It's a relatively small amount of incremental cost when you look at overall project economics," Huddleston said. "While technically it could be viewed as unnecessary, it provides an additional layer of safeguards that should give more comfort to adjacent landowners and residents."

Companies should develop these projects as if they are living next to them. "I think that's a very responsible way to think about it," he said. OGI

Belcher: Meeting the Talent Demand

How to build up the supply of skilled workers to keep up with rising energy demand.

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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.

U.S. energy demand is soaring. A recent report by Syracuse University's Dynamic Sustainability Lab and the Sustainability and Energy Value Advisors highlighted a doubling of five-year demand growth and the need for new generation capacity, transmission lines and grid infrastructure, grid security, battery storage and an electrical system supply chain to avoid serious issues in terms of future electricity reliability.

That demand growth is being led by artificial intelligence (AI) and the proliferation of data centers, as well as manufacturing growth and consumer demand. The oil and gas industry continues to grow as an energy provider and consumer. Global natural gas demand is also a significant factor as contracts expire for piped gas to Europe and LNG demand continues to grow.

All of this demand—for power, AI and data centers, infrastructure, LNG/natural gas, a domestic supply chain and manufacturing facilities—will require a huge amount of specialized labor in the form of engineers and technical trades, something we are currently lacking in the U.S. In 2025, the U.S. economy will need about 1 million more STEM professionals than it can produce, according to the U.S. Bureau of Labor Statistics. STEM jobs are projected to grow by 13% between 2017 and 2027, outpacing non-STEM jobs.

The U.S. needs approximately 400,000 new engineers each year moving forward but is currently only able to fill about one-third of the engineering positions available through at least 2030. Recent workforce development studies have identified shortages in trades and crafts occupations, with severe problems in recruiting welders and electricians.

Exacerbating this problem are retirements. Older workers have been hanging on to make up for shortages in skilled trades, but this has been going on for years. More and more workers are reaching the end of their careers and the shortfalls are becoming daunting.

We all know this to be true in the oil and gas industry, which has for years been struggling with the big "crew change," replacing older seasoned technical workers with younger ones. The burgeoning U.S. LNG industry is desperately seeking qualified engineers and skilled workers as its facilities come online.

The U.S. nuclear renaissance, which is initially focused on the reopening or expansion of traditional large-scale nuclear facilities and is expected to include the deployment of numerous small modular reactors (SMRs), or microreactors, to provide localized power to support industrial, commercial and residential development, will necessitate the employment of highly-skilled and specialized workers with experience in radiation physics and radiation protection. Currently, training for those skills is limited.

At the same time, the sector will also need large numbers of skilled workers such as electricians and welders, adding further strain to recruitment of these workers. If the U.S. were to build our its supply chain to support the industry, even more technical and skilled workers would be needed.

"We have a generation that is retiring. We have a lack of specialist engineering and geoscience graduates," said Charles Philpott, global natural resources leader at risk capital and human capital solutions provider Aon. "But at the same time, there are new sub-sectors and technologies that are developing, with roles that have never existed before. We're missing a generation of workers with the skills to supply the global population with energy."

Keep Productive Workers Working

Finally, the space defined as the energy transition is also creating demand for engineers and technically skilled workers for renewable energy projects and infrastructure, carbon capture and storage projects, hydrogen projects and other decarbonization projects. The Inflation Reduction Act, which was signed into law in 2022, directed $500 billion in spending and tax breaks for clean energy and decarbonization projects, of which $75 billion has been invested into 42 online and operating manufacturing facilities in solar, energy storage, wind, offshore wind and transmission. In the past two years alone, 160 new "clean energy facilities" have been built.

One way to meet this demand is through the process of reskilling, in which workers with a particular set of skills are trained with new skills so that they can take on a new job or set of responsibilities. It is an investment by individual companies to enable their employees to stay in an organization that focuses in another area.

For society, it is an opportunity to keep

Keeping up with global energy demand will require a huge amount of specialized labor.

SHELL INTERNATIONAL

productive workers employed in a changing environment. Studies have shown that as employees are encouraged to take advantage of reskilling opportunities for their professional and personal growth, people metrics, such as employee engagement and retention, also increase.

According to the World Economic Forum, 50% of workers will need reskilling in the next five years, but only 18% of companies have made "significant progress" in establishing a reskilling program. The organization noted that reskilling can significantly boost global GDP, with estimates suggesting an $11.5 trillion increase by 2028 through enhanced workforce productivity.

'Toolbelt Generation'

Another interesting development that addresses the skilled labor shortfall has been a noticeable rise in enrollment in vocational training in trade schools and community colleges. This trend was highlighted in a Wall Street Journal article earlier this year entitled, "How Gen Z is Becoming the Toolbelt Generation."

The newspaper interviewed students who have opted not to attend traditional four-year colleges in favor of a trade skills education. The article cited the growing number of college graduates with non-technical or business-based degrees who can't find stable careers and are often saddled with tremendous student loan debt. Many feel that trade school offers them opportunities to pursue skills and careers that will not be easily replaced by AI.

So, while the trade school trend is a move in a positive direction, there remains a daunting gap that the oil and gas industry, and society-at-large, needs to address. Policymakers need to be better informed about the significance of the skills gap in terms of its ability to thwart the U.S. oil and gas industry, the energy transition and a manufacturing and supply chain renaissance.

This involves industry taking the time to vocalize the gap and the potential impacts. We also need to take a long look at our overall education system. Emphasis on STEM education needs to start in elementary school and continue all the way through high school and college. It needs to be better encouraged in underrepresented communities and for female students.

As for higher education, we need to better inform young people about the degree programs that they are following with realistic expectations about the job opportunities and earning potential of many programs with a non-technical or non-financial focus. They need to understand the potential consequences of taking out student loans for a degree that offers few viable career paths. We also need to shine a light on the opportunities that technical education at trade schools and community colleges can offer and their alignment with the future needs of our economy.

As a society, we need to stop looking at the skills gap as an industry-by-industry phenomenon, but rather as an issue impacting the entire U.S. and global economy. There isn't one solution to the problem. It requires a concerted effort, by industry and government, to identify the gaps in skills and training, rethink how our education system works, emphasize and incentivize STEM and technical degrees and trade school training, and put our people to work building the energy and manufacturing economy of the future.

This shouldn't be a partisan issue. It is in the interest of all of us to educate, train and employ a new generation of workers who can get the work done. OGI

Bioenergy

PE Firm KKR Buys Stake in Eni's Biofuels Business for $3.2B

U.S.-based private equity investor KKR will buy a 25% stake in Eni's biofuels unit Enilive for about $3.17 billion (€2.938 billion), the Italian energy company said.

The deal, which valued the biofuels company at about $12.7 billion, took shape as Eni continued to strengthen its capital structure and lower its debt.

Demand for biofuels has been growing as companies seek out lower-emissions energy sources to shrink carbon footprints.

Described by Eni as a mobility transformation company, Enilive specializes in biorefining, biomethane production, smart mobility solutions, and the marketing and distribution of energy carriers such as hydrogen and other products.

As part of the deal with KKR, Eni will pump about €500 million into Enilive before the transaction closes, erasing the unit's debt. KKR will purchase Enilive's shares from Eni for a value of €2.438 billion, corresponding to a post-money valuation of €11.75 billion of equity value for 100% of Enilive's share capital, Eni said in a news release.

The transaction's closing is subject to customary regulatory approvals.

Carbon Management

NatGas Powerhouse EQT Reaches Net Zero Feat Ahead of Schedule

Natural gas producer EQT Corp. hit its net-zero target ahead of its 2025 goal for Scope 1 and 2 emissions from legacy upstream operations and recently acquired assets.

EQT highlighted the accomplishment on its third-quarter earnings call, saying the company is the world's first traditional energy producer of scale to achieve the milestone. The company said it lowered Scope 1 and Scope 2 greenhouse gas emissions by more than 900,000 tons, which is equivalent to taking about 195,000 cars off the road annually.

"Not only did we accomplish this ahead of our 2025 goal, but we achieved this net-zero status across the entirety of our upstream operations, inclusive of the recently acquired Tug Hill/XCL Midstream and Alta [Resources] assets, which were not included in the target originally set in 2021," EQT CEO Toby Rice said.

EQT's emissions reductions efforts included replacing more than 9,000 pneumatic devices, which led to an annual emissions reduction of about 300,000 mt CO_2e, and shifting its conventional diesel frac fleets to electric fleets powered by natural gas-fired turbines. The move, which utilized gas produced by EQT, lowered the company's carbon footprint by an estimated 35,000 mt CO_2e to 50,000 mt CO_2e, EQT said.

Other steps taken included taking a combo-development approach using digital technologies and long-range well planning and installing advanced emissions control devices.

1PointFive Taps Enterprise Products for CO_2 Pipeline Network

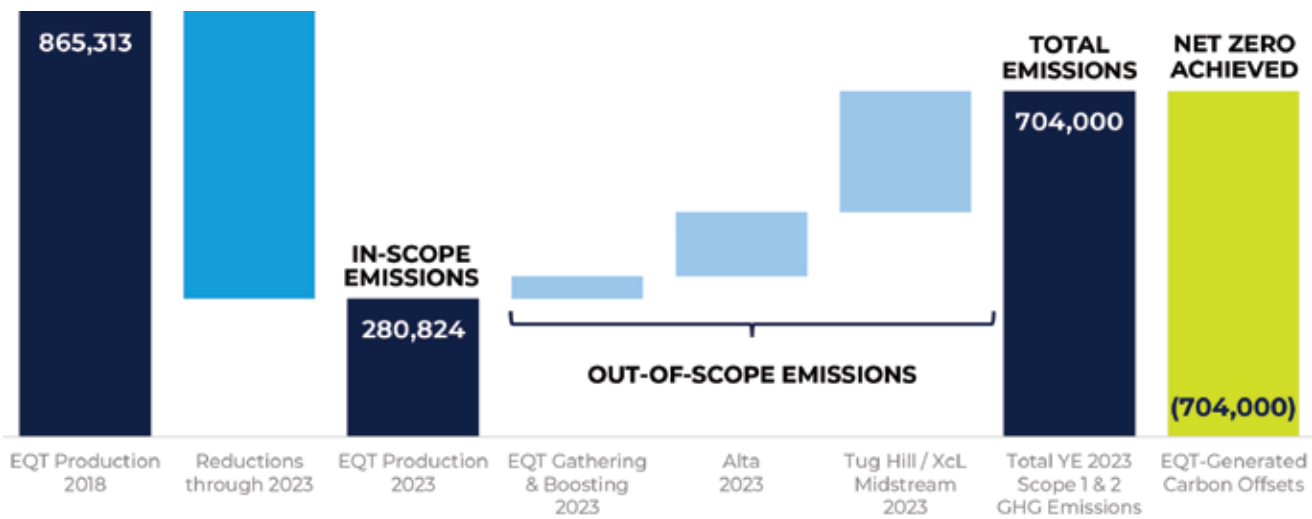
Occidental's subsidiary 1PointFive and Enterprise Products Partners teamed up to develop a transportation network that will carry CO_2 emissions captured in the Houston Ship Channel area to a sequestration hub in southeast Texas.

As part of the agreement, Enterprise will develop a new pipeline network and transport the captured CO_2 emissions from third parties in the Houston Ship Channel to 1PointFive's Bluebonnet Sequestration Hub, according to a news release.

The agreement was announced as Occidental continued

EQT Achieves 2025 Net-Zero Target

Scope 1 and 2 GHG Emissions - MT CO_2e



SOURCE: EQT

taking steps to lower global greenhouse gas emissions. Carbon capture and sequestration is viewed as a promising way for industrial emitters to reduce such emissions.

"This agreement pairs our expertise managing large volumes of CO_2 with Enterprise's decades of midstream experience to bring confidence to industrial customers seeking a decarbonization solution," said Jeff Alvarez, president of 1PointFive Sequestration.

The hub, which was awarded funding from the U.S. Department of Energy in October, is being developed in Chambers County, Texas. The new network will be co-located with existing pipeline infrastructure, according to the release.

Energy Storage

Equinor, Standard Lithium JV Sign DLE Agreement

Standard Lithium and Equinor's joint venture (JV) company SWA Lithium entered a license agreement to use Koch Technology Solutions (KTS) technology for the JV's South West Arkansas Phase 1 project, according to a news release.

The commercial-scale direct lithium extraction (DLE) project will use KTS' Li-Pro Lithium Selective Sorption technology at the JV's commercial plant, Standard Lithium said in a news release.

"The Li-Pro LSS technology is now sufficiently scaled-up, tested and derisked, so not only is the JV comfortable committing to its use at commercial scale," said Andy Robinson, Standard Lithium's director, president and COO, "but KTS is also able to offer performance guarantees for its commercial deployment. We view this as a significant derisking event for the project, and it points to the successful ongoing partnership with the KTS team."

The license agreement is the culmination of more than two years of work, Robinson said.

USGS Study Points to Massive Lithium Reserves in Arkansas

A study led by the U.S. Geological Survey (USGS) shows southwestern Arkansas may be home to up to 19 million tons (MMton) of lithium reserves, enough to meet the world's projected 2030 electric vehicle (EV) battery lithium needs nine times over.

That is, if it is commercially recoverable.

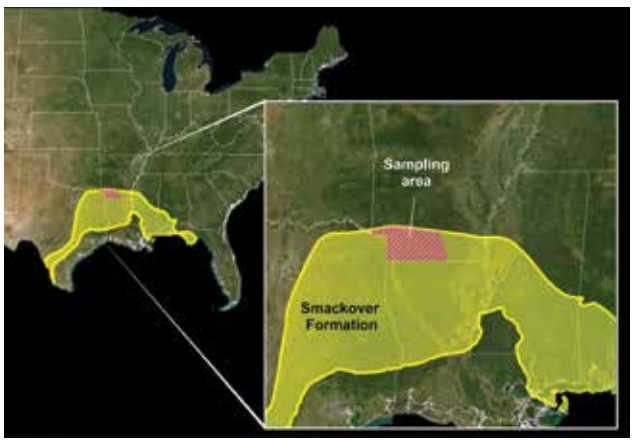
Working with the Arkansas Department of Energy and Environment's Office of the State Geologist, USGS said it used machine learning and water testing to estimate potential resources that could be extracted from brines in the Smackover Formation, an area known for its oil and gas operations.

The U.S. has stepped up efforts to source its own lithium to reduce reliance on foreign countries as it aims to lower global greenhouse-gas emissions. Lithium is a key ingredient for not only rechargeable batteries used to power items such as laptops and cell phones, but also for energy storage and EVs. Currently, the U.S. depends on imports to meet more than 25% of its lithium needs.

As part of the study, an artificial intelligence predictive model was used. Samples taken from Arkansas were analyzed by the USGS Brine Research Instrumentation and Experimental lab in Reston, Va. That data was then compared with data from historic samples within the USGS Produced Waters Geochemical Database of water from hydrocarbon production, the USGS said. Lithium concentrations in brines were combined with geological data, using the machine learning model, to create maps that predict lithium concentrations across the region.

Results reveal Smackover brines in southern Arkansas could contain from 5 MMton to 19 MMton of lithium reserves, the USGS said.

Smackover Formation



SOURCE: U.S. GEOLOGICAL SURVEY

Geothermal

Fervo Energy, Partners Launch Geothermal Apprenticeship Program

Geothermal energy company Fervo Energy partnered with

FERVO ENERGY

Fervo Energy's Cape Station geothermal project in Utah is expected to begin delivering electricity to the grid in 2026.

Southern Utah University (SUU) and nonprofit investing platform Elemental Impact to launch a geothermal apprenticeship program.

The program announced by Fervo aims to help oil and gas workers along with Southwest Utah residents join the enhanced geothermal industry.

As part of the first-of-a-kind geothermal program spurred by the Inflation Reduction Act, participants will have a chance to learn geothermal directional drilling and well completions while getting on-the-job training and

taking college-level coursework on geology and energy systems, Fervo said in a news release.

"Thousands of Americans work in upstream oil and gas, and with the right tools, they can easily apply their skill sets to geothermal production," said Fervo Energy CEO Tim Latimer. "We can harness the full potential of this existing talent pool and attract new talent beyond current fossil fuel workers by providing on-the-ground and in-classroom training opportunities."

The program will be administered by SUU and partially funded by Elemental Impact, which invests in climate technology and community initiatives, according to the release.

Solar

Enbridge Takes FID on Sequoia Solar, Advances Fox Squirrel Solar

Calgary, Alberta-based Enbridge sanctioned its $1.1 billion Sequoia solar project west of Dallas, the company said, having lined up power purchase agreements (PPAs) with AT&T and Toyota.

The 815-MW solar farm will be developed in two phases and is expected to enter service in 2025 and 2026, the company said in its third-quarter earnings release.

The energy infrastructure company known for transporting and distributing oil, natural gas and NGL has been growing its presence in the renewable energy and power sector. Enbridge has interests in more than 2.5 gigawatts of net renewable generating capacity across North America, according to the company's website.

SHUTTERSTOCK

Enbridge has invested in 14 solar energy operations, according to the company's website.

"In renewable power, we continue to execute on our disciplined growth strategy," Enbridge CEO Greg Ebel said in the release.

During the third quarter, the company and partner EDF Renewables put the 250-MW Fox Solar Phase II project into service in Ohio. Construction of the 177-MW Phase III is underway, and the project is scheduled to enter service in the fourth quarter. A long-term PPA is in place with Amazon for 100% of the solar farm's production, Enbridge said. OGJ

EthosEnergy CEO on Powering the Oil and Gas Industry

The power demands and tools are evolving onshore, offshore and for LNG and AI.

JORDAN BLUM
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The U.S. is producing more oil and gas than ever, and global demand has continued to tick up. But it takes a lot of planning and equipment to power these operations, and that's where EthosEnergy steps in.

Ten-year-old EthosEnergy, based in Aberdeen, Scotland, and Houston, is a services provider with a worldwide footprint specializing in rotating equipment for the power, oil and gas, and industrial sectors. The firm focuses on gas and steam turbines, generators, compressors, transformers, field services, operations and maintenance.

The company is a joint venture between Wood and Siemens AG, but change is in the air with Wood announcing earlier this year it plans to sell its controlling 51% stake in EthosEnergy.

That change was announced Aug. 28 when private equity firm One Equity Partners (OEP) agreed to buy Ethos for an undisclosed sum, including Ethos' 3,600 employees across 23 global sites. OEP, founded in 2001, spun out of JP Morgan in 2015.

Ana Amicarella joined EthosEnergy as CEO five years ago after previously working at Aggreko and GE.

She knows a lot about teamwork and leadership after representing Venezuela in the Olympics as a synchronized swimmer following an All-American collegiate career at Ohio State.

She spoke with Jordan Blum, Hart Energy's editorial director, about the technologies and trends powering the energy sector.

Jordan Blum: Starting off broadly, what's your overview of how Ethos operates as a specialized joint venture for Wood and Siemens?

Ana Amicarella: The joint venture was started simply because I think Siemens wanted to exit what is called the non-OEM (original equipment manufacturing) piece of their business. They had a business called TurboCare that they put into the joint venture. On the other hand, Wood had a gas turbine services group that did a lot of GE work, but with other OEMs, as well. Neither of them saw that as a strategic business for them. So, they put them together and created in 2014 what is today EthosEnergy. That was the beginning of the joint venture. Advance to today, they still feel that it's not strategic to their core and they've actually put us up for sale. So, we are in the midst of a sale of the business. I'm very excited.

This company is made up of many, many acquisitions of businesses [some of which date back 100 years]. With many, many businesses, what I inherited five years ago was a [combined] business that was not properly integrated. It was so many different cultures, different things. I remember walking through my first year at EthosEnergy and people telling me, "Oh, I work for TurboCare" or "I work for GTS," and I'm like, "Who? I thought you worked for EthosEnergy." Everybody was in a silo. We would have five people go to a customer in the same week and they didn't talk to each other, and it created massive confusion.

So, we have evolved from being a very poorly integrated business to an enormous transformation that we've undertaken in the last four and a half years to become what I call the "One Ethos." We have to understand what the customer is looking for. What is the problem we're trying to solve? Then, take your parts and pieces, put them together and, in turn, provide a solution to the customer. It's about understanding their pain points, understanding how the customer makes money, and then tailoring a solution with our tools that will bring the customers quantifiable value. And that's how we differentiate ourselves. We'll give you a customized solution with the entirety of the portfolio that I have behind the curtain.

JB: Can I get you to elaborate on the often, I'd say, overlooked importance of the parts for powering and servicing all the energy operations, upstream and downstream? And what are the biggest challenges?

AA: Let me talk to the industries that we work with. Utilities–their responsibility is to generate power. That's a very simple model. You have units; they're running just like your

EthosEnergy CEO Ana Amicarella discusses the company's turbine engine technology with a group of investors.

ETHOSENERGY

"As much as I want to help my customers decarbonize, they're asking me for help to give them more power. And it's not a little bit—it's enormous."

ANA AMICARELLA, CEO, EthosEnergy

car. At some point, you need to stop and give them service. When I say industrials, it will be continuous processes mostly. So, something like a paper mill or a steel mill requires constant energy, and you can't have an outage. Those people over the last 20, 40 years have invested in their own power plants, which are smaller. It has to continue to rotate.

For the oil and gas industry, it's the same thing, often continuous. It's a necessity, right? In upstream, you're drilling; sometimes you're drilling in remote areas. Midstream, you've got to transfer the gas. Downstream, you've got petrochem and refining. You have safety issues. It's an enormity of things. These people have power plants, but they're great customers because they don't know anything about turbines versus the utilities. The utility knows turbines. These people, they don't know turbines, but they have to have them. It's like they bought it, but then they don't know how to operate it.

And then you have the other set of customers, which are the IPPs (independent power producers). IPPs have the money, but they don't have the know-how, they don't have shops, they don't have operators, they don't have technicians. They just have the money. So, they hire us to come and run their facilities. We are their brain. On top of that, we do the maintenance. When I speak about maintenance, it's four parts: parts, field services, repairs and upgrades.

The beautiful thing happening with the energy transition is that people have realized they need their assets to run longer. They need new life because, as it turns out, the renewables are not coming in at the speed that people would like, and not to mention they're intermittent power sources. We go to the customer with a customized solution. If you only need the power to run for three years, it's one solution. But, if you wanted to run for 20, it's a very different solution. That's how we bring a lot of value.

JB: On the oil and gas side of things, I know you do a lot of both, so can you elaborate on the differences and challenges of powering and servicing onshore versus offshore oil and gas?

AA: We do quite a bit of offshore North Sea, very big in Kazakhstan, very big in the Gulf [of Mexico]. With offshore, you have to be extremely good because it is an island, and when you go, you need to have everything on hand. You've got to plan a whole lot better. We had a customer with very lousy reliability of its rotating equipment on the platform, like 50%. It was the most painful asset they owned. They said, "Ethos, we need you to fix this." I said, "Measure us on our ability to go from 50% to over high 90s." We've done that. They said, "It has gone from being the most troubled asset in our portfolio to our best asset." And it's old. When you go offshore, you've got to fly a helicopter to get people there. You've got to think about the parts and how you are going

Amicarella surveys turbine equipment with investors.

ETHOSENERGY

to get in there. So, your planning for the materials and personnel is enormous. You've got specialty training, the preparedness, the safety, the planning. And, of course, with that comes a [price] premium, which is beautiful for us. But they need things to work. Everyone has read in the news what happens when things don't, right?

JB: What trends or interesting developments are we seeing in terms of gas versus steam turbines? Compressors and other critical equipment?

AA: I've been around for quite a long time, and it is just so fascinating to see how some of these customers are shifting their models, especially the small independents. They're saying, "Look, instead of extracting gas and oil, we're going to reinject CO_2." That's a blow-your-mind sort of example. But, it turns out you need the same equipment. You need the compressor and the turbine to do that operation, and the compressor and the turbine, frankly, couldn't care less if you're going out or going in. It's just a reverse operation. Customers are coming to us and saying they need to repurpose this equipment because they are shifting their business model. I'm like, "No problem. We have a solution for you because we have repurposed the equipment."

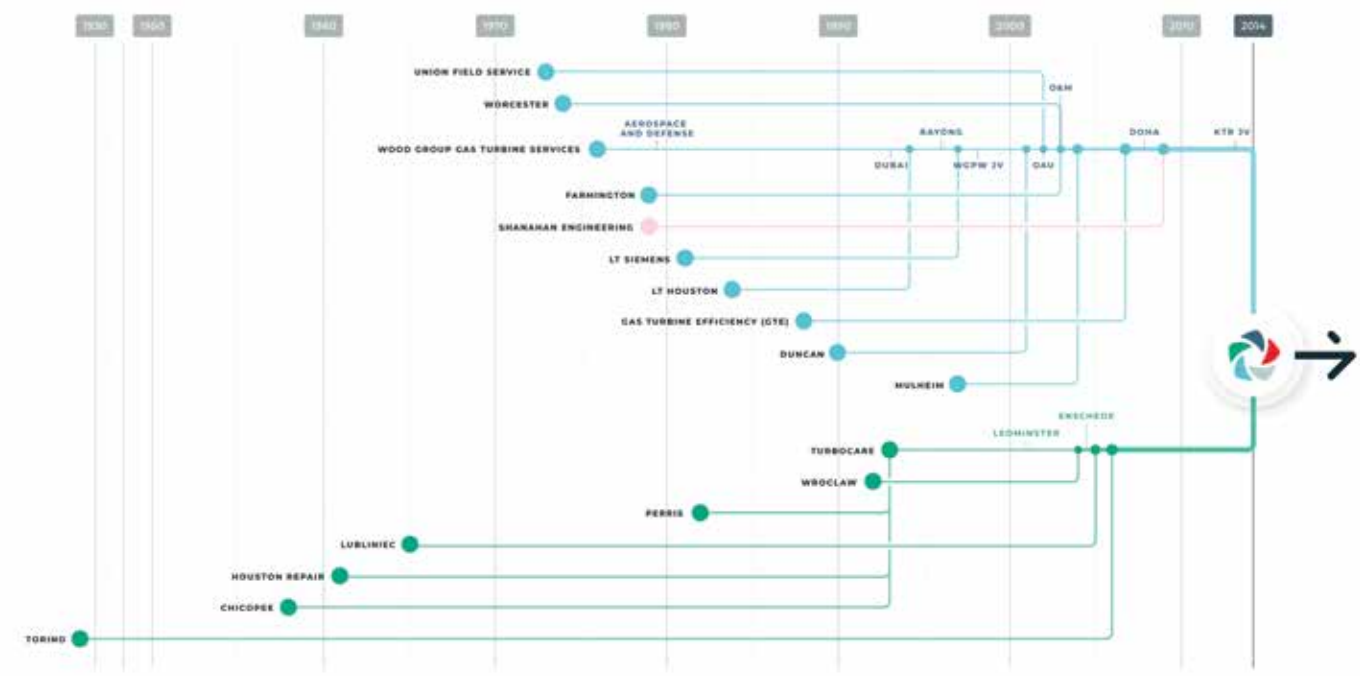
Another thing that I'm seeing is the enormous need for power. I was with one of the majors a couple of months ago, and they need more big power. These people are now getting into bigger power production to [keep] their assets running. They have a [greater need for] power to satisfy some of these carbon capture projects. And, of course, everything that is going on with some of the customers that are building artificial intelligence and cloud facilities. Let's say a big resort hotel may have a need for 1 MW [megawatt]. What these people are building is these complexes for AI and cloud computing where they have not one building, but maybe have three to eight buildings. Instead of a 1 MW load, it's an 80 MW load. How can a utility that's slow at getting approvals deal with this enormous pent-up demand that this AI revolution is bringing? They're building these complexes. In the U.S., it is a huge transformation, and that's why all these assets need to keep running. They're saying, "Remember that nuclear plant we were decommissioning? Remember that coal plant we were decommissioning? We need to bring those back."

As much as I want to help my customers decarbonize, they're asking me for help to give them more power. And it's not a little bit–it's enormous. The Microsoft guys say this is the biggest revolution we've seen, this AI revolution. And that's going to need a lot more natural gas and other supplies. And natural gas is pretty clean. The OEMs have come up with incredible technology to make that power pretty clean. And what customers are saying is, "We need more power, more reliability, more availability, more megawatts."

JB: How is the ongoing electrification of the oil field impacting the business?

AA: A lot of the big oil companies are electrifying their fields. But what does that mean? What that means is you're going to need more power. You are putting a motor instead of a compressor to run. Now, you have a load, and that load requires megawatts, and those megawatts require a turbine. It's the same end results–you need more power. It's a trend that's driving up the demand for power.

EthosEnergy's Evolution



SOURCE: ETHOSENERGY

EthosEnergy is the result of many mergers and acquisitions. The first company, Torino, was started in the late 1920s.

JB: Switching to Europe, I know you've grown a lot in the North Sea. How is that evolving?
AA: I'll give you an example. In the North Sea, a company (Harbour Energy) bought assets, brought them together … and it happens to be the largest producer now in the North Sea. So, when I first went to see them, I said, "Look, you have all these disparate assets, and these assets are from all the different OEMs. If you want to simplify your supply chain, nobody can work in all the OEMs that EthosEnergy can." I'm able to bring the whole of those disparate assets to life and bring you reliability, or more power, etc.

JB: Moving geographically, what about the work you're doing with KTR and Kazakhstan as well?
AA: We probably handle 60% of the oil extraction in Kazakhstan. Multiple majors and some medium-sized companies like Eni and Shell pull together and they operate in different platforms there. We formed a joint venture in Kazakhstan with a local partner, KTR, where we have inserted our intellectual property into their shop, and we're able to operate right from Kazakhstan. We have an enormous advantage versus the OEMs to do that kind of work. We bring people in from the outside, but we have a sizable team locally in Kazakhstan that travels to the platforms and operations to make sure the rotating equipment is operated to the conditions that they want.

JB: Back in the U.S.–but feeding the rest of the world–you're growing a lot in LNG as well, right?
AA: We have positioned our business to go eat the competition's lunch as it relates to LNG. Why? A, it's a continuous process. B, they tend to pay a premium because it has such a need for power. It requires highly specialized knowledge, and very high expectations on service. It's a space where we have more expertise than our big competitors because we own the intellectual property [rights] for the parts and machines. We've made great inroads in LNG, and I suspect that will continue to grow because of the energy security needs.

JB: What are some of the main technical challenges that stand out when it comes to the specialization work for powering LNG facilities?
AA: It goes back to the continuous processes. They don't want to have an outage. They need to run longer. So, you need to have parts that–instead of being changed every 16,000 hours–can be changed every 24,000 hours. Remember, these are hot gas parts, so there's a lot of wear and tear. I like to use the car example because it's frankly just the same. It's just a little bit more sophisticated. You're running hot, you need specialty metals, you have a combustor, you have very extreme amounts of energy, so you need different coatings and different materials so that parts can run to 24,000.

JB: I just wanted to squeeze in one more personal question. You have the background as an Olympic athlete as well. How does that experience translate to the energy sector and to leadership roles as well?
AA: You don't have to go to the Olympics, but I believe very strongly that sports give you a unique advantage in leadership. I look at my children and sports give you discipline. You've got to get up early every day, and then you give it your best, and then rinse and repeat. You go to bed early, you can't eat junk and drink and smoke. You build this level of discipline, this ability to work when you're tired, the ability to have teamwork built into your DNA. It's all of the things that you need to be a leader and win, yet be humble. OGJ

What Chevron's Anchor Breakthrough Means to the GoM's Future

WoodMac weighs in on the 20k production outlook.

PAUL WISEMAN
CONTRIBUTING EDITOR

On Aug. 12, Chevron announced first oil from its Anchor project in the Gulf of Mexico. It was the first production from any of the region's super high-pressure formations, at 20,000 lbs psi. Heralded as a breakthrough, the company announced that its new technology would release 2 Bbbl of GoM oil that had been unreachable with older technology.

How will that 2 Bbbl in production happen? How long before 20,000 psi production ramps up, and what will it look like in 2030? It's likely that other related technologies will play a part, as BP and others are also working to reach those plays. Chevron and Wood Mackenzie provide some insight into how this may play out.

Chevron's Ideas

Anchor is a joint project between operator Chevron (62.86%) and TotalEnergies (37.14%), located in the Green Canyon area about 140 miles off the Louisiana Coast. Chevron reports that the Anchor semi-submersible floating production unit (FPU)'s design capacity is 75,000 gross bbl/d of oil and 28 million gross cu ft/d of natural gas. The overall development will include seven subsea wells.

Estimated total recoverable resources from the field may be as much as 440 MMboe. Once production ramps up, Chevron expects Anchor to produce more than 75,000 boe/d for 30 years. And because the Anchor FPU is all-electric, Chevron says its production will be among the lowest-carbon intensity in the world.

Anchor is Chevron's sixth operated GoM facility. The company expects its total production in the region, operated and non-operated, to reach 300,000 boe/d by 2026. Chevron is among the largest GoM leaseholders, with 393 leases as of the second quarter, having added almost 100 leases in lease sales 259 and 261.

Engulfed in Change

WoodMac is tracking several other 20,000 boe/d projects that are underway in Paleogene

Anchor deepwater project

CHEVRON

CHEVRON

The Anchor development will consist of seven subsea wells tied to the semi-submersible floating production unit in the Green Canyon area.

up to 440MM
estimated barrels of recoverable oil-equivalent

20K
pounds per square inch rated at wellhead

34K
approximate feet from water surface to reservoir

75K
net barrels of oil production per day design capacity

formations. They include:

Blackstone Energy Partners' Beacon: The Shenandoah project was first sanctioned in 2021. In 2026, Beacon expects first oil from Monument to tie into Shenandoah. Both are about 160 miles off the Louisiana coast.

Shell Offshore's Sparta: Sparta was sanctioned in December 2023 and is expecting first oil in 2028. A Shell release says it (51% operator) and Equinor Gulf of Mexico (49%) expect Sparta to reach peak production of about 90,000 boe/d at some point. Estimated discoverable resources are 244 MMboe. It will be Shell's 15th deepwater host in the GoM.

BP's Kaskida: The project expects first oil in 2029. Wood Mackenzie looks for BP to sanction Tiber in 2025, with first oil in 2030. Wood Mackenzie looks for BP to start drilling Tiber two to three years before first production. BP is 100% owner of both blocks.

Kaskida is in the Keathley Canyon block 292, 250 miles southeast of New Orleans. BP estimates recoverable resources at around 275 MMbbl of oil equivalent from the initial phase. Additional wells could be drilled in future phases.

Tiber is also in Keathley Canyon, in block 102, 250 miles southeast of Houston and 300 miles southwest of New Orleans. BP has yet to estimate this field's total recoverable resources.

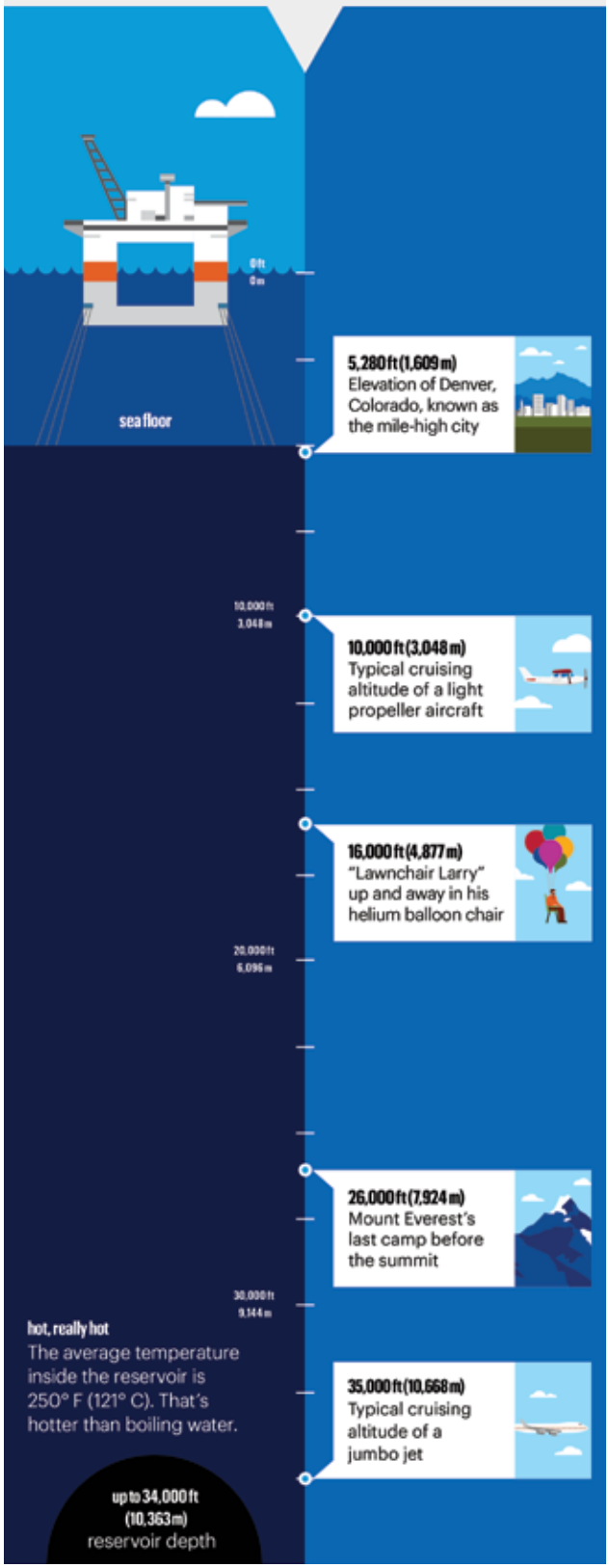
Economics and Technology

The amount of economically recoverable resources in any area depends on technology and pricing. Technology is usually steady in its advance, but prices may vary widely depending on geopolitics, economic health of various countries and other unforeseen factors, like the COVID pandemic.

For Wood Mackenzie, the 2 Bbbl is based on current technology, but the impetus for further improvement is

Going Deep to Help Meet Energy Demand

Oil and gas production from Chevron's Anchor floating production unit began in 2024. Anchor operates in water depths of more than 6 miles. Here is how the reservoir depth compares to above-the-surface heights.



SOURCE: CHEVRON

based on rising expenses as much as market prices for oil. Rising daily rig rates will push companies to focus their advances in drilling and completions technology on improving efficiencies to reduce operational costs, the analysts said.

Operators in Paleogene GoM projects have been economizing by using multi-zone completions, artificial lift and waterflooding, much as is done on land, WoodMac said, and Anchor is among those designed with future waterflooding in mind.

Average breakeven prices for the fields–Shenandoah, Monument, Tiber, Kaskida and Sparta–is estimated at about $37/bbl, said Wood Mackenzie. A significant price drop could endanger new projects, but those that are already in progress would likely continue.

Most development is likely to be infrastructure-led exploration to take advantage of existing pipelines. But, Wood Mackenzie noted, improved imaging could uncover future high-impact prospects in what it called "more frontier areas" of the Paleogene play.

Based on already-discovered fields of this size and those which Wood Mackenzie expects to reach that level, production could reach 130,000 boe/d in 2025 and more than double to 300,000 boe/d by 2030.

Court Ruling Could Muddy the Waters

In August, a federal judge in Maryland ruled that a key 2020 National Marine Fisheries Service (NMFS) environmental review of Gulf of Mexico oil and gas operations, known as a biological opinion or BiOp, violated the Endangered Species Act. Saying that the NMFS "underestimated the risk and harms of oil spills to protected species," it vacated that BiOp, effective Dec 20.

Without intervention from a higher court or Congress, Wood MacKenzie Senior Research Analyst Miles Sasser said, "Once the ruling goes into effect, operators must decide whether to proceed with exploration and development activity in the GoM at their own risk or suspend operations until a new review is issued."

The previous ruling had provided E&Ps with a framework for operating under leases and permits they had been issued. As long as they abided by that BiOp, operators were free to move forward without risk of fines or sanctions for incidental harm to endangered species under the Endangered Species Act.

Further, the BiOp serves as a blanket review of activity, streamlining the permitting process and lessening the burden on government agencies, Sasser explained

Lacking an active BiOp, he said that regulators would need to evaluate each permit on a case-by-case basis that could create a massive backlog, effectively shutting down the permitting process.

While all Gulf operators should keep their eyes glued to the case's progress, Sasser sees "companies with large pre-production projects or phased developments as the most at risk given the high up-front capital that has already been invested–certainly 20K falls into this bucket."

As concerning as this is, Sasser believes there are several possible off ramps as the December date approaches. Most likely, "a stay by an appeals court allowing permitting to continue while the legal challenges play out. The revised BiOp from NMFS is already in the works and expected early in 2025, but it is likely that a new BiOp will face its own legal challenges." OGI

Integrating OCTG Management from Planning to Well

Rig Direct provides improved collaboration and communication, and more uptime.

PAUL WISEMAN
CONTRIBUTING EDITOR

Inventory undersupply. Inventory oversupply. Delivery delays. Miscommunications.

Customers struggling with those issues were looking for efficiencies in managing oil country tubular goods (OCTG) from planning through drilling. International pipe supplier Tenaris devised a solution that would place the entire process under one umbrella, creating efficiencies in time and inventory, reducing personnel, cutting road traffic and, perhaps most importantly, making the rig site safer, said Chief Commercial Officer Guillermo Moreno.

"We understood that, in order to serve our clients properly, we needed to understand their operations, their needs at the time, what their future needs would be in terms of products and services, and see in which way we could integrate the operations in order to make them simpler, faster and, particularly, more efficient," he said.

The Path to Rig Direct

Tenaris is not new to the U.S. The company began its U.S. operations in the 1980s and brought in its direct delivery options around 2015. It had begun working closely with end-users in the 1990s, Moreno said, mostly in Mexico and Argentina where the company had a strong industrial presence in manufacturing.

Its U.S. footprint increased significantly with the acquisitions of OCTG and premium connections manufacturers Maverick Tube Corp. in 2006 and Hydril in 2007. But the main driver for introducing its new supply chain solution in the U.S. was its investment in a greenfield seamless mill in Bay City, Texas, which started operations in 2017. In 2020, Tenaris also acquired IPSCO.

Before developing its Rig Direct system, Moreno said, there were sometimes issues involving inventory oversupply/undersupply, delivery delays when pipe orders had to be changed and other miscommunications that could lead to excess pipe being scrapped–at great cost.

"Our clients were asking us for more. They needed to improve their operations. They needed to reduce their costs," he said. "Because of the shales, they were confronting a new reality, due to the different plays but also because of the different technologies. New products were needed and changes in design happened faster than before, so it was clear that it was the time, and now we were prepared, because we had a strong industrial footprint, to be able to bring the Rig Direct model to the U.S. and Canada."

How it Works

The process starts with Tenaris joining the client in well planning and supply chain forecasting. The exact amount of involvement depends on the specific needs of the customer, Moreno said.

"With visibility into drilling projects, we define the best material for the well and we can evaluate and anticipate potential challenges downhole," he said. "This brings more accuracy and avoids what in the past was miscommunication–what I need, where I need it, the quantity–so now everything is traceable; communication is clear and more efficient."

With Rig Direct, all data about the pipe, order, delivery and other aspects are integrated into a single platform. "We have streamlined and simplified administrative workflows digitally," Moreno noted.

Site Management

There are no third-party distributors. Instead, Tenaris manages its own yards and service centers, delivering the pipe directly to the rig site. Site delivery, geared it to the client's requested schedule, is planned through the Rig Direct portal.

In addition to manufacturing and delivery efficiencies, this system results in fewer people handling the pipe at the site, Moreno said. There is no longer a need for a clean, visual and

"We understood that, in order to serve our clients properly, we needed to understand their operations, their needs at the time, what their future needs would be in terms of products and services, and see in which way we could integrate the operations in order to make them simpler, faster and, particularly, more efficient."

GUILLERMO MORENO, chief commercial officer, Tenaris

TENARIS

1. Tenaris' Rig Direct tracks pipe from production to installation. 2. The Rig Direct Portal gives clients all their OCTG information in one place, on a cell phone or other smart device. 3. With Tenaris' PipeTracer technology, every pipe is tagged with a unique reference code (URC) that gives clients complete pipe information, including length, weight, the pipe's history and more.

drift crew. "We developed RunReady, a service that delivers pipes to the well ready to be run. With this unique offering, our technicians manage material preparation, performing visual inspections of the pipe and applying a dual-purpose compound at the mill."

At the rig site, the Tenaris team oversees delivery and offloading with digital tallies, which was another system initiated by client request. A major operator told the Tenaris team that there were too many people on the rig, leading to safety issues. The client asked, "If you could send us pipe that is ready to be run, this will not only reduce our cost but it will also make our operations safer."

There is also remote monitoring, developing a torque turn service to guide the make-up of each pipe that allows Tenaris to bring more accuracy to the operation, remotely get feedback on the process and use that data for making further improvements.

Improving Along the Way

The first phase of Rig Direct involved the logistics management of getting pipe from mill to yard to well, synchronizing production with the end user's drilling programs. The second phase included additional development of services for customers such as digital integration (Pipe Tracer, RunReady, Rig Direct Portal).

The newest version, phase three, involves the development of remote monitoring tools.

"We're going to have a direct communication with the rig where we're going to see torque turn monitoring system, and leverage the iRun Casing tool for real-time casing installation," Moreno said. "That will mean even fewer people on the rig."

Another safety improvement is Tenaris' own people handling the pipe from the mill to delivery at the rig.

"This is how to make sure you have the right people, they're properly trained," he said. "There's so much information, so much knowledge, so many people coming onsite, it is so difficult for operators to maintain that level of consistency. But when we send these operations to a central area, they use their expertise to monitor, wherever the location is. This is where we are headed today."

"We have put together all the services so the end user only needs to deal with one company," Moreno said. "And if there is a question, they know they can come to us."

Further Improvements

As part of its commitment to ongoing system maximization, Tenaris in early November announced a multifaceted addition to the Rig Direct package. Called WISer, the new suite is designed to enhance well integrity, safety, efficiency and reliability in the well construction process.

WISer includes two digital features:

iRun Casing cloud-based tool. This enables real-time monitoring of casing installation to minimize the risk of lost lateral length and production. It also aims to prevent accessibility issues caused by fatigue damage, buckling, overtorque or stuck pipes.

Torque turn monitoring system. With this system, Tenaris field service experts collect and analyze real-time torque data at the well using advanced equipment. The plan is to improve connection make-up reliability, reduce errors and enhance the overall integrity of the assembly. OGI

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SPE Thermal Well Integrity and Production Symposium	Dec. 2-5	Banff, Alberta, Canada	The Fairmont Banff Springs	spe-events.org
2025				
Floating Wind Solutions 2025	Jan. 15-17	Houston	Marriott Marquis Houston	floatingwindsolutions.com
Mexico Infrastructure Projects Forum	Jan. 22-23	Monterrey, Mexico	Hotel Camino Real Monterrey	mexicoinfrastructure.com
SPE Hydraulic Fracturing Tech Conference and Exhibition	Feb. 4-6	The Woodlands, Texas	The Woodlands Waterway Marriott & Convention Center	spe-events.org
NAPE	Feb. 5-7	Houston	George R. Brown Conv. Ctr.	napeexpo.com
6th American LNG Forum	Feb. 10-11	Houston	Westin Galleria	americanlngforum.com
Oil & Gas Automation and Technology Week	Feb. 11-12	Houston	Hyatt Regency Intercontinental Airport Hotel	oilandgasautomationandtechnology.com
Influential Women in Energy Luncheon	**Feb. 27**	**Houston**	**Hilton Americas-Houston**	**hartenergy.com/events**
SGA 2025 Spring Gas Conference	March 2-5	Charlotte, N.C.	TBD	southerngas.org
SPE/IADC International Drilling Conference and Exhibition	March 4-6	Stavanger, Norway	Stavenger Forum	drillingconference.org
CERAWeek	March 10-14	Houston	Hilton Americas-Houston	ceraweek.com
DUG Gas Conference & Expo	**March 19-20**	**Shreveport, La.**	**Shreveport Convention Center**	**hartenergy.com/events**
SPE/ICoTA Well Intervention Conference & Exhibition	March 25-26	The Woodlands, Texas	The Woodlands Waterway Marriott & Convention Center	spe-events.org
AI in Oil & Gas Conference	April 8-9	Houston	Hyatt Regency Houston West	aioilandgas.energyconferencenetwork.com
Energy Workforce & Technology Council Annual Meeting	April 9-10	Frisco, Texas	The Westin Dallas Stonebriar Golf Resort	energyworkforce.org
SPE Improved Oil Recovery Conference	April 23-25	Tulsa, Okla.	River Spirit Casino and Resort	speior.org
Offshore Technology Conference	May 5-8	Houston	NRG Park	2025.otcnet.org
Canada Gas Exhibition & Conference	May 6-8	Vancouver, Canada	Vancouver Convention Center	canadagalng.com
SUPER DUG Conference & Expo	**May 13-15**	**Fort Worth, Texas**	**Fort Worth Convention Center**	**hartenergy.com/events**
World Hydrogen 2025 Summit & Exhibition	May 20-22	Rotterdam, Netherlands	Rotterdam Ahoy	world-hydrogen-summit.com
SGA Energy Symposium	May 22	Houston	TBD	southerngas.org
URTeC	June 9-11	Houston	George R. Brown Conv. Ctr.	urtec.org/2025
IADC World Drilling Conference & Exhibition	June 10-11	Amsterdam	Beurs van Berlage	iadc.org
Global Energy Show Canada	June 10-12	Calgary, Alberta	BMO Centre at Stampede Park	globalenergyshow.com
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ADAM-Houston	Third Friday	Houston	Brennan's	adamhouston.org
ADAM-OKC	Bi-monthly (Feb.-Oct.)	Oklahoma City	Park House	adamokc.org
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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
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Oil and Gas Investor

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Wildcatting is Back: The New Lower 48 Oil Plays of 2024

Operators wanting to grow oil inventory organically are finding promising potential as modern D&C costs are lower than in the past and adding inventory via M&A is increasingly costly.

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Lower 48 onshore oil and gas producers have been proving large new plays in 2024, looking to grow their inventory organically.

Utica oil. In Ohio, EOG Resources has advanced its Utica volatile oil play to down-spacing tests. In its first, the five-well Shadow pad surfaced 72,022 bbl its first 13 days online, averaging 1,108 bbl/d, according to Ohio Department of Natural Resources (DNR) files.

The 700-ft test in Carroll County is near EOG's four-well, 1,000-ft spaced Timberwolf pad, which came online in August 2023.

At Timberwolf, the first three of its wells produced 137,632 bbl in their first 37 days, averaging 1,239 bbl/d each. A fourth was turned into sales four months later for 658 bbl/d in its first three months.

EOG has roughly 445,000 net acres in the volatile oil and the black oil fairways in a roughly 140-mile north-south stretch through eastern Ohio.

It joined privately held Encino Energy, which rebooted in 2018 the circa 2012 wildcatting that succumbed to the post-2014 oil price collapse in the face of the higher drilling and completion (D&C) costs across the Lower 48 of the time.

The No. 1 Ohio oil producer, now with more than 40,000 bbl/d, Encino's recent four-well Sproul pad's wells in Tuscarawas County made 507,712 bbl, averaging about 1,587 bbl/d each, in their first 80 days online, according to the Ohio DNR.

Also privately held, Infinity Natural Resources' Casper #5HU in Carroll County averaged 1,361 bbl/d in its first 88 days. Ohio's No. 3 producer now, Infinity is planning an IPO.

Dean oil. In southern Dawson County, Texas, in the oil-heavy northern Midland Basin, operators are landing laterals in the Dean sandstone overlying Wolfcamp and finding promising returns.

SM Energy, which picked up leasehold there in 2023, made the Joey MacDonald #2182DN with 21,684 bbl in its first days through Aug. 31. Casinghead gas was 13.8 MMcf, according to Texas Railroad Commission (RRC) data.

An adjacent well, Joey MacDonald A #2181DN, produced 35,199 bbl. Casinghead gas was 18 MMcf.

Privately held Birch Resources brought two giant Dean wells on with more than 216,863 bbl combined in their first two months online.

CHATGPT DALL-E AI

Hot Pie A #2DN made 118,973 bbl in June and July, according to the RRC. Its first-24-hour IP in April was 2,342 bbl from a 10,404-ft lateral in the Dean at about 8,700 ft.

Alongside it, Hot Pie C #6DN tested 2,768 bbl in its first 24 hours, also in April, from a 10,229-ft lateral. It made 97,890 bbl in its first two months through July.

The two Hot Pie wells' combined 103,093 bbl in July brought Birch's Dawson County output to 414,620 bbl in that 31-day period, or 13,375 bbl/d, according to RRC data.

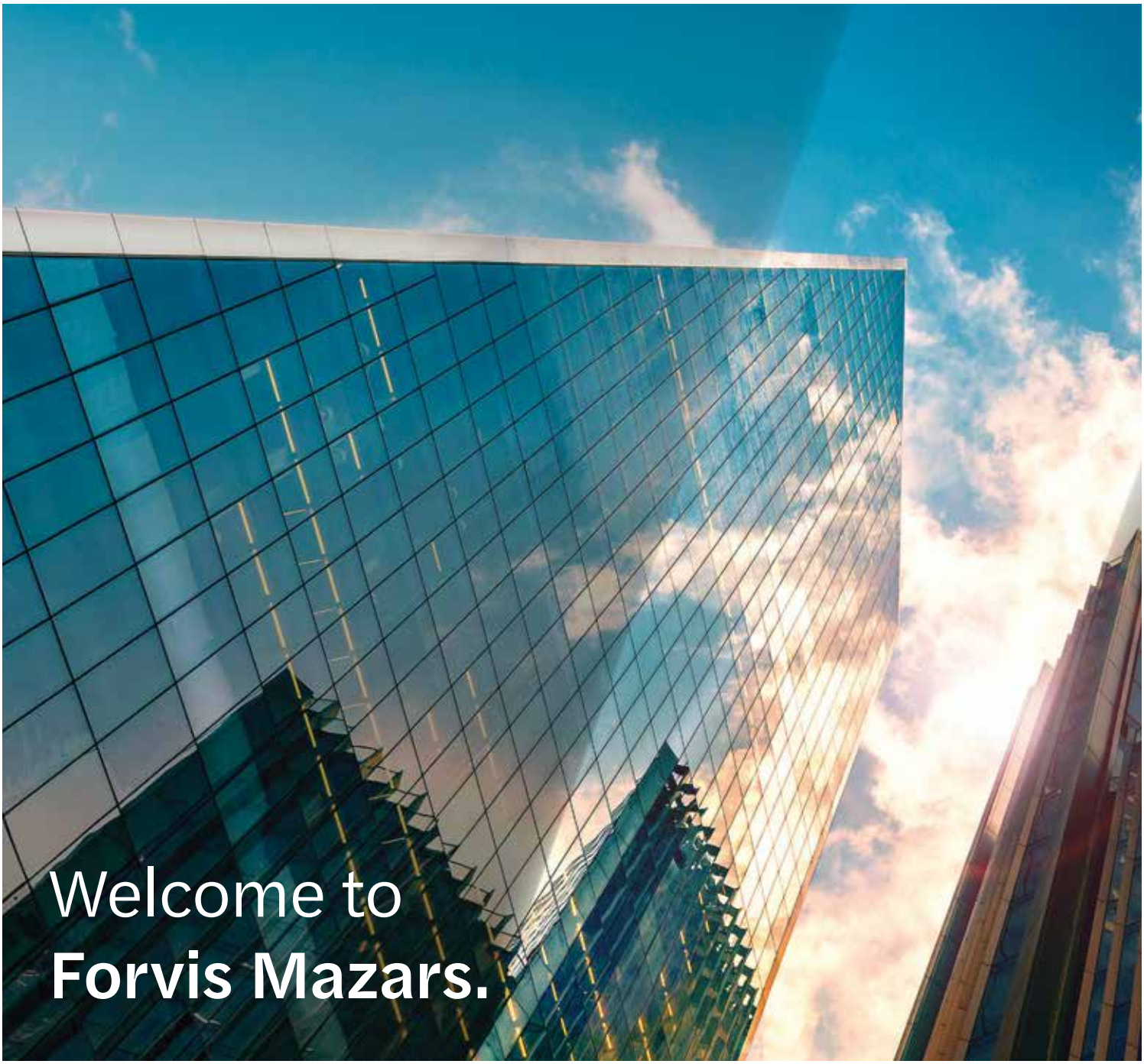
Utah oil. In the Uinta Basin, Finley Resources' development of a rail-takeaway terminal has lifted the production ceiling past its roughly 90,000 bbl/d traditional cap.

With output now unleashed, producers are landing laterals, surfacing more than 170,000 bbl/d.

SM Energy entered this year, buying out XCL Resources and Altamont Energy. It counts as many as 17 potential lateral targets in the stacked pay in the Uinta's western window that is more than 80% oil-weighted.

Longtime Uinta operator Ovintiv reported in early November that it has resumed drilling its largely undeveloped 137,000 net acres there where it estimates it has about 1,000 feet of pay.

Takeaway was constrained because the Uinta's crude is waxy, requiring transportation in insulated tanks rather than pipe. With rail capacity opening up as fewer coal cars are using the tracks—due to growth in natural gas use in power generation—operators are able to ship production to Wyoming, Oklahoma and the Gulf Coast after satisfying Salt Lake City refineries' demand via truck. OGI



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