

# Oil and Gas Investor

MARCH 2022



M&A, once stuck on future value, has shifted to the here and now.

**HART**ENERGY

# BUILDING BLOCKS OF A STRONGER OIL & GAS INDUSTRY

As an active participant in the energy industry with a principal mentality for over 50 years, we understand that capital and ideas are indispensable to a thriving oil and gas industry. Our advisory assignments demonstrate how an independent investment bank, backed by extensive industry knowledge and innovative ideas, can help build stronger, more prosperous energy companies.

<p><b>\$53 MILLION</b></p>  <p>FOLLOW-ON OFFERING</p> <p>Co-Manager</p>	<p><b>UNDISCLOSED</b></p> <p><b>MULTI-BASIN MINERALS PLATFORM</b></p> <p>ASSET DIVESTITURE</p> <p>Financial Advisor</p>	<p><b>\$207 MILLION</b></p>  <p>INITIAL PUBLIC OFFERING</p> <p>Joint Bookrunner</p>	<p><b>\$276 MILLION</b></p>  <p>INITIAL PUBLIC OFFERING</p> <p>Joint Bookrunner</p>	<p><b>UNDISCLOSED</b></p> <p><b>BAKKEN SHALE E&amp;P COMPANY</b></p> <p>ASSET DIVESTITURE</p> <p>Financial Advisor</p>
<p><b>\$370 MILLION</b></p>  <p>ACQUIRED BY PENN VIRGINIA CORPORATION</p> <p>Fairness Opinion</p>	<p><b>\$199 MILLION</b></p>  <p>FOLLOW-ON OFFERING</p> <p>Co-Manager</p>	<p><b>\$650 MILLION</b></p>  <p>SENIOR SECURED NOTES</p> <p>Senior Co-Manager</p>	<p><b>\$560 MILLION</b></p>  <p>HAS SUCCESSFULLY CONSUMMATED ITS DEBT EXCHANGE, FINANCING, AND CASH TENDER</p> <p>Financial Advisor</p>	<p><b>\$535 MILLION</b></p>  <p>CHAPTER 11 RESTRUCTURING</p> <p>Financial Advisor</p>
<p><b>UNDISCLOSED</b></p> <p><b>NORTH AMERICAN TRANSPORTATION AND SERVICE PLATFORM</b></p> <p>CORPORATE CARVE OUT</p> <p>Financial Advisor</p>	<p><b>\$270 MILLION</b></p>  <p>ADVISOR TO THE AD HOC CROSSOVER LENDER</p> <p>Financial Advisor</p>	<p><b>UNDISCLOSED</b></p> <p><b>EAGLE FORD MINERALS PLATFORM</b></p> <p>PRIVATE PLACEMENT OF EQUITY</p> <p>Financial Advisor</p>	<p><b>UNDISCLOSED</b></p>  <p>ASSET DIVESTITURE</p> <p>Financial Advisor</p>	<p><b>UNDISCLOSED</b></p> <p><b>VIKING MINERALS</b></p> <p>ASSET DIVESTITURE</p> <p>Financial Advisor</p>

## ENERGY GROUP KEY STATISTICS

**\$57+ Billion**

Aggregate Transaction Volume since 2009

**\$310 Million**

Average Transaction Size

**181**

Transactions Closed since 2009

## ENERGY GROUP AGGREGATE TRANSACTION VOLUME



**Keith Behrens**, Managing Director, Head of the Energy Group • 214-258-2762 • keith.behrens@stephens.com

**Charles Lapeyre**, Managing Director • 214-258-2784 • charlie.lapeyre@stephens.com

**Paul Moorman**, Managing Director • 214-258-2773 • paul.moorman@stephens.com

**Brad Nelson**, Managing Director • 214-258-2763 • brad.nelson@stephens.com

**Jim Wicklund**, Managing Director • 214-258-2798 • jim.wicklund@stephens.com

**300 Crescent Court | Suite 600 | Dallas, TX 75201**

For the most recent list of our transactions, visit [stephens.com/buildingblocks](https://stephens.com/buildingblocks)

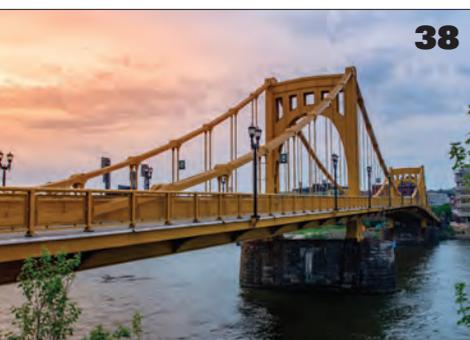
**Stephens**  
Investment Banking

STEPHENS INC. • MEMBER NYSE, SIPC • 877-749-9991

 @Stephens\_Inc

STEPHENSINVESTMENTBANKING.COM

This material has been prepared solely for informative purposes as of its stated date and is not a solicitation, or an offer, to buy or sell any security. It does not purport to be a complete description of the securities, markets or developments referred to in the material. This material is not intended to recommend the purchase or sale of any securities or to provide information on which an investment decision to purchase or sell any securities could be based. Additional information is available upon request. "Stephens" (the company brand name) is a leading family-owned investment firm comprising the businesses of investment banking, advisory, sales and trading, research, insurance and wealth management. Founded in 1933, Stephens' US operations are headquartered in Little Rock, AR, with additional locations in strategic domestic markets and a European presence in England and Germany. Stephens is committed to building long-term value for corporations, state and local governments, financial institutions, and institutional and individual investors. Stephens' affiliates include (among others): Stephens Inc. (offers securities products; member NYSE SIPC), Stephens Investment Management Group, Stephens Insurance, LLC, Stephens Capital Partners LLC, and Stephens Europe Limited. © 2021 Stephens. For more information, visit <https://www.stephens.com>



24

## **HOW DEALS WORK NOW**

Just as the E&P sector changed its focus from growth and even sprawling net acreage to capital discipline, dealmaking in 2021 and beyond has been altered into a single question: Does it make money?

34

## **THE NEW ROUTE TO OIL AND GAS OWNERSHIP**

EnergyFunders CEO Laura Pommer spoke with Hart Energy about a new private equity model for oil and gas that also offers access to bitcoin mining.

38

## **THE ALLEGHENY'S ANTIHEROES**

Pittsburgh, perhaps the easternmost outpost of the shale world, is home to some of the largest natural gas companies, and their leaders have plenty to say about the “biggest green initiative” on Earth.

45

## **CURBING METHANE**

Emission monitoring technologies have emerged, offering ground- and air-based leak detection to the industry.

48

## **ENERGY SCHOOLS ARE GETTING DOWN TO BUSINESS**

Energy MBA programs are keeping up with the times by adapting their curriculum to suit the changing climate of the sector.

52

## **GRADUATE ENERGY PROGRAMS REPORT**

Graduate energy education takes multiple forms, and it could help industry professionals, including executives, address the sector’s present and future challenges.

64

## **EXPLORING RESERVOIR CHARACTERIZATION**

Students at the Colorado School of Mines seek to improve unconventional and conventional reservoir characterization for onshore and offshore field production and development through integrated research.

67

## **WHY OIL AND GAS REMAINS A GOOD INVESTMENT**

Jason Reimbold, managing director of energy investment banking at BOK Financial, gives his take on the state of energy finance and dealmaking.

70

## **CARBON CAPTURE'S PIVOTAL ROLE**

Carbon capture and storage is showing a promising future in curbing greenhouse-gas emissions, but there are costs and risks involved.



Worldwide Petroleum Consultants  
Engineering • Geology • Geophysics • Petrophysics

## **MORE THAN A CONSULTANT, A TRUSTED ADVISOR.**

At NSAI, we are focused on building long-term relationships with our clients and providing the highest level of technical expertise backed by sound professional judgment and exceptional service.

- Reserves Certifications
- Technical Due Diligence
- Carbon and Gas Storage
- Midstream Services
- Equity and Litigation Support
- Reservoir Simulation
- Exploration Studies

**NETHERLAND, SEWELL & ASSOCIATES, INC.**

Dallas 214.969.5401 | Houston 713.654.4950

email: [info@nsai-petro.com](mailto:info@nsai-petro.com)

[www.netherlandsewell.com](http://www.netherlandsewell.com)

**REPUTATION.  
EXPERTISE.  
SERVICE.**

# Oil and Gas Investor

1616 S. Voss Rd., Suite 1000  
Houston, TX 77057  
1.713.260.6400 Fax: 1.713.840-8585  
**HartEnergy.com**

## Editorial Director

Len Vermillion  
lvermillion@hartenergy.com

**Managing Editor** Brandy Fidler  
bfidler@hartenergy.com

**Senior Editor** Darren Barbee  
dbarbee@hartenergy.com

**Senior Editor** Velda Addison  
vaddison@hartenergy.com

**Senior Editor** Brian Walzel  
bwalzel@hartenergy.com

**Senior Editor** Joseph Markman  
jmarkman@hartenergy.com

**Senior Editor, ESG** Faiza Rizvi  
frizvi@hartenergy.com

## Associate Editors

Mary Holcomb, Madison Ratcliff

**Editor-at-Large** Nissa Darbonne  
ndarbonne@hartenergy.com

**Senior Managing Editor, Publications** Ariana Hurtado  
ahurtado@hartenergy.com

**Senior Managing Editor, Digital Media** Emily Patsy  
epatsy@hartenergy.com

**Creative Director**, Alexa Sanders  
asanders@hartenergy.com

**Art Director**, Robert D. Avila  
ravila@hartenergy.com

**Marketing Art Director**, Melissa Ritchie  
mritchie@hartenergy.com

**Director, Business Development** Chantal Hagen  
chagen@hartenergy.com • 713.260.5204

**Director, Business Development** Taylor Moser  
tmoser@hartenergy.com • 713.260.4612

**Ad Materials Coordinator** Carol Nunez  
iosubmissions@hartenergy.com

## HART ENERGY

EVENTS | MEDIA | DATA | INSIGHTS

## Chief Executive Officer

John Hartig

## Senior Vice President, Events

Russell Laas

## Senior Vice President, Digital Media

Mark Chiles

## Chairman of the Board

Richard A. Eichler

## COLUMNS

### 7 NO ONE ASKED ME, BUT ...

As much as oil and gas executives might not like to admit it, they have the job interview of a lifetime.

### 9 A&D TRENDS

Chesapeake Energy Corp.'s recent vibe, to put a word to it, has been decidedly bubbly.

### 11 ENERGY POLICY

It is clear that the administration is facing considerable pressure when it comes to its policies toward natural gas.

### 88 AT CLOSING

New England burns oil to generate electricity when it doesn't have enough natural gas—and it doesn't have enough natural gas.

## DEPARTMENTS

### 12 EVENTS CALENDAR

### 15 NEWSWELL

With gas prices soaring to record highs coupled with additional pipeline capacity, the Marcellus and Utica shale plays are showing strong growth fundamentals.

### 75 A&D WATCH

Chesapeake Energy Corp. refocused its portfolio on shale gas on Jan. 25 with a flurry of A&D activity totaling over \$3 billion that included the previously rumored acquisition of Chief Oil & Gas and an exit from the Powder River Basin.

### 82 ACTIVITY HIGHLIGHTS

The U.S. oil and gas rig count, up 61% in mid-January over the same time in 2021, appeared to plateau later in the month in response to weakening oil prices in fourth-quarter 2021.

### 84 NEW FINANCINGS

### 86 COMPANIES IN THIS ISSUE

ABOUT THE COVER: The times have changed in A&D dealmaking. Illustration by Robert D. Avila.

Information contained herein is believed to be accurate; however, its accuracy is not guaranteed. Investment opinions presented are not to be construed as advice or endorsement by Oil and Gas Investor.

Oil and Gas Investor (ISSN 0744-5881, PM40036185) is published monthly by Hart Energy Publishing, LP, 1616 S. Voss Rd., Suite 1000, Houston, Texas 77057. Periodicals postage paid at Houston, TX. Ride-along enclosed. Advertising rates furnished upon request. **POSTMASTER: Send address changes to Oil and Gas Investor, PO Box 5020, Brentwood, TN 37024.** Address all correspondence to Oil and Gas Investor, 1616 S. Voss Rd., Suite 1000, Houston, Texas 77057. Telephone: +1.713.260.6400. Fax: +1.713.840.8585. oilandgasinvestor@hartenergy.com

Subscription rates: United States and Canada: 1 year (12 issues) US\$297; 2 years (24 issues) US\$478; all other countries: 1 year (12 issues) US\$387; 2 years (24 issues) US\$649. Single copies: US\$30 (prepayment required). Denver residents add 7.3%; suburbs, 3.8%; other Colorado, 3%.

Copyright ©Hart Energy Publishing, LP, 2022. Hart Energy Publishing, LP reserves all rights to editorial matter in this magazine. No article may be reproduced or transmitted in whole or in parts by any means without written permission of the publisher, excepting that permission to photocopy is granted to users registered with Copyright Clearance Center/ 013-522/96 \$3/\$2. Federal copyright law prohibits unauthorized reproduction by any means and imposes fines of up to \$25,000 for violations.

Innovation has a new name:

# Vortex Prime™

Changing the face of hydraulic fracturing



Learn More

**ESG Focused Direct-drive Turbine Technology**

Fuel Savings - Smaller Footprint - Faster Setup

**CATALYST**

[www.CatalystEnergyHart.com](http://www.CatalystEnergyHart.com) 432.315.3450



# THE IMPACT AND INFLUENCE OF LESLIE HAINES

It might not seem likely for someone from New Hampshire to become “queen of the oil patch” in the heart of the energy capital of the world, but Leslie Haines did just that. With stops in Williston, Midland, Denver and, ultimately, Houston, the longtime and iconic former editor-in-chief of Oil and Gas Investor spent the better part of four decades as one of the industry’s most notable people.

Sadly, Leslie passed away suddenly on Feb. 18, after becoming ill while undergoing treatment for cancer. Upon learning of her death, industry executives and former colleagues sent an outpouring of emotional tributes and remembrances to Hart Energy and flooded social media with stories of her unique influence on the oil and gas industry throughout her career.

To many of her colleagues, Leslie was defined by her compassion and curiosity. She truly loved Hart Energy and the oil and gas industry. She was always up for a conversation about nearly any part of it, whether it was price-earnings ratios, the deal market or the industry’s history, such as who drilled first in the Bakken or the growth of the Permian Basin.

Her oil and gas expertise was built over decades of interviews, plane rides, site visits and dinners with some of the most influential executives in the business. She knew every player in the industry from Harold Hamm to Scott Sheffield to Bill Armstrong, and they trusted her for good reason. She knew her stuff, and she grew up in this industry with them.

Those of us who have carried the Oil and Gas Investor brand can attest that nearly every time we have spoken with veteran leaders they invariably asked about Leslie. She was generous with her knowledge and connections as well. As colleagues quickly learned, one only needed to stand next to Leslie at events and the oil and gas world came to her.

Her work ranged from interviewing presidents and luminaries on stage at events to visiting the newly discovered Northeast Blanco Unit in the San Juan Basin with Larry Nichols and the late John Nichols as their company, which became Devon Energy Corp., was an eight-figure market cap. There are so many memorable articles and assignments on her résumé that it would take an entire issue of Oil and Gas Investor to list them all.

Leslie was also extremely generous with her time to help the industry as well as mentoring new employees at Hart Energy. She was a past president and board member of the Houston Producers’ Forum and a board member of the Houston Energy Finance Group.



As a journalist, Leslie was a stickler for details and solid reporting. As an editor, she had a particular disdain for mixed metaphors and improper use of commas but would often find something to keep the work light. She once quoted Woody Allen on writing: “Sentence structure is innate, but whining is acquired.”

Leslie started her energy journalism career in 1980 with the Williston Daily Herald in North Dakota and then later moved to Midland, Texas, as an energy and business reporter for the Midland Reporter-Telegram. She joined Hart Energy as a copy editor in 1983 in Denver. She then began writing for the former Western Oil Reporter magazine before joining the Oil and Gas Investor staff in 1985, where she was named managing editor two years later and then editor-in-chief in 1992.

Hart Energy moved its headquarters from Colorado to Houston in the 1990s, and Leslie moved with it. During that time, she was instrumental in the growth of Oil and Gas Investor

from a fledgling magazine to a must-read, industry-defining publication.

In the 2000s, she helped Hart Energy establish the DUG brand of industry events in response to the burgeoning shale revolution. She served as the host and content developer for many of those conferences. In addition, she was instrumental in exporting the DUG and Oil and Gas Investor brands outside of the U.S. to places such as Canada and Australia.

Leslie transitioned from the editor-in-chief role of Oil and Gas Investor to executive editor-at-large in 2016. She retired from full-time work in 2019, but she continued to contribute to Oil and Gas Investor through 2021, even after returning to her native New Hampshire. She could still be counted on to represent the magazine until her passing.

She will be greatly missed.



*Save  
the Date*

**May 10, 2022  
OMNI Houston  
Houston, Texas**

 **Energy  
TRANSITION Capital**  
**CONFERENCE**

## Monetizing the Energy Future

The energy future needs money and business leaders who understand how to monetize the energy value chain. It needs oil and gas people!

Hear about the money and get clear descriptions of the prize. Join us in Houston for the Energy Transition Capital Conference, May 10, 2022 at the OMNI Houston.

Also, stay tuned for our second Energy Transition Capital Conference to be held September 2022 in New York City.



## Featured Sponsors

**GOLD**

**BKD**  
CPAs & Advisors

**BRONZE**

**TGS** 

**CONTRIBUTING**

**PROJECT  
CANARY**

PRESENTED BY:

**HART ENERGY**

**Register today at  
EnergyTransitionConf.com**



# OIL AND GAS' INTERVIEW OF A LIFETIME



LEN VERMILLION,  
EDITORIAL DIRECTOR

A lot of people have tried to convince me that the “S” and “G” in ESG are somehow less important than the “E.” Oh, how I beg to differ.

Their thinking goes, whether in casual conversation, in a presentation or on that circus of intellectual fallacy, Twitter, that in the energy sector it’s all about decarbonization. All you need to do is figure out how to cut your carbon emissions, monitor your methane output, offset your carbon footprint, invest in carbon capture and so on.

ESG is a single entity. As an editor, I tend to look at the grammar. Prepositions are important. When we define ESG, it’s environmental, social *and* governance. Notice there is no “or.” If you’re trying to assign percentages and priorities to ESG, you’re really missing the point.

I’ll submit that ESG isn’t a “what have you done for me lately” kind of game. For investors, it’s really about what you are going to do for me in the future. Simply complying with current regulations and expectations doesn’t tell anyone what they really want to know—how are you changing your company’s management, strategy and investments to be able to withstand a future that is sure to include ever-changing expectations and requirements. Appeasement won’t be a success in this case.

I listened to Danny Brown, CEO of Oasis Petroleum, discuss this at a recent Houston Producers Forum luncheon. As he described the company’s “transformative year,” he touted the establishment of the company’s board-level ESG committee. What Oasis realizes is what everyone should: ESG needs to be taken seriously as an opportunity to secure your future, not as a burden that needs to be solved.

Want further evidence?

“There have been more than 2,000 independent studies on the impact of ESG on equity returns that find that companies that have strong ESG propositions actually correlate to higher returns,” said Angie Gildea, national sector leader of energy, natural resources and chemicals at KPMG, during a recent roundtable on HartEnergy.com.

So, it’s important enough to stop messing around and to put it at the top of your corporate governance. Only then will you show investors, regulators and the public that you’re serious about being part of an ESG-focused future.

Finally, let’s talk about the messaging, a vital part of the S. Although it’s fabulous that the oil and gas industry has finally started to stand up for itself, defiance isn’t the message anyone outside of the industry wants to hear, and they probably aren’t responding to it. As I said earlier, ESG is about the future, not the past or the present. While it’s vital that we remind the world of the role oil and gas has played in the development of modern civilization, that’s not the message that will win the day.

We established that investors want to know your plan for a cleaner future with less negative social impact. They need to know why the oil and gas industry will continue to be safe not only for the atmosphere but also for the daily lives of the public. How will you make them feel that way in the future?

As much as oil and gas executives might not like to admit it, they have the job interview of a lifetime. The world’s population is hiring for a future energy provider, and the job will be done by those who present the best all-around plan for the future.



Join me at [HartEnergy.com/Vermillion-march2022](https://HartEnergy.com/Vermillion-march2022).

I have much more to talk about, including a recent letter from U.S. senators to Energy Secretary Jennifer Granholm, prepping for DUG Permian + Eagle Ford and my random non-energy thought of them on the month.

# FLOGISTIX



## VAPOR RECOVERY

- Industry leader in vapor recovery with a 98% runtime guarantee
- Captures fugitive gas with minimal cost and no capital expenditure
- Creates a safer work environment and improves air quality



## LDAR SOLUTION

**Equipped with methane sniffers and laser detection systems, our aerial solution can scan for emissions and find leaks in hard-to-reach areas**

- Equipped with an Optical Gas Imaging Camera, Laser and Sniffer
- Leak Detection and Repair (LDAR)
- Produces 2D and 3D Concentration Maps
- Optimized Operations
- Serving All Domestic Locations
- Laser methane leakage detector
- OGI camera
- Ground control system
- Communication system
- Sniffer4D air pollutant mapping

PUT FLOGISTIX TO WORK FOR YOU

[www.flogistix.com](http://www.flogistix.com) | (405) 536-0000 | [info@flogistix.com](mailto:info@flogistix.com)

## GIDDY OR GIDDY UP?



DARREN BARBEE,  
SENIOR EDITOR

Chesapeake Energy Corp.'s recent vibe, to put a word to it, has been decidedly bubbly.

Perhaps it's the Jan. 25 announcement that the company would purchase Chief Oil & Gas while simultaneously offloading its Powder River Basin assets to Continental Resources Inc. With the stroke of a pen, or maybe it was a quill, the company ignited about \$3 billion in deals that briefly sent the company's stock 5% higher in trading.

Maybe it's the presence of Mike Wichterich, executive chairman, who held a tongue-in-cheek NAPE keynote under the pretext he was precluded from speaking about Chesapeake. Probably safest to keep Wichterich away from the PA system altogether.

Still, a sense of ebullience has crept back into Chesapeake after it quietly slipped out of bankruptcy last February.

Its November capture of Vine Energy Inc. in a \$2.2 billion zero-premium merger kept the company from adding debt, added production, 227,000 net acres in the Haynesville Shale and Mid-Bossier and, most importantly, cash flow. The company said that the deal increased Chesapeake's five-year free cash flow by \$1.5 billion, or about 68% of the transaction value.

Then the more recent deals only added to the M&A fun. And by fun, this is when the allegedly muzzled Wichterich could help himself.

"We can't talk about the \$5 billion in transactions this year? We can't talk about the billion-dollar buyback?" Wichterich asked playfully.

Yes, Chesapeake is back to swinging big deals for the first time since 2018, when the company rushed into the Eagle Ford Austin Chalk with a nearly \$4 billion deal that gave it, abruptly, oil production.

Its more recent deals, including the acquisition of Chief Oil & Gas, returned the company to its more familiar natural gas dealmaking.

At the NAPE event in Houston, Chesapeake president and CEO Nick Dell'Osso gave some additional insight into the Chief deal and the now roughly three-year-old merger with WildHorse Resource Development Corp.

"We believe very strongly in the ability to optimize capital across the portfolio when you have more than one place to put the money," Dell'Osso said.

"It's just like a portfolio of stocks; if you have more than one stock in your portfolio, you can optimize returns with some diversification," he said. "We think that's absolutely true for a portfolio of oil and gas assets."

Dell'Osso recently told the Financial Times that oil will remain important to Chesapeake, and its Texas position is not for sale.

"We are committed to the Eagle Ford," he said.

While analysts see the Chief deal as a return to gas, Dell'Osso "wouldn't necessarily describe it that way." Oil will still generate 25% of its cash flow after the deal, he told the Times.

Chesapeake's sale of its oily Powder River Basin position to Continental Resources was different, Dell'Osso said at NAPE. He said the position simply wouldn't be able to compete for capital in the Chesapeake portfolio, meaning it was always going to lose out to the company's Eagle Ford holdings. Continental purchased the asset for \$450 million, according to Fitch Ratings.

"The Powder wasn't very big," he explained. "It was going to be really expensive to get big."

"It was a tougher fit, and Continental is going to do well with it because they are going to be big in the basin. ... They're going to consolidate it in with the other stuff they're doing," he said.

Despite its recent moves, some analysts are slightly skeptical.

Wells Fargo analyst Nitin Kumar said in a Jan. 31 report that Chesapeake's post-bankruptcy finances and "friendlier midstream contracts bode well." Wells Fargo rated Chesapeake overweight with a price target of \$88, which would propel the company from its current value to a \$10 billion company.

But, "we think there is also a significant bridge to gap with the investment community following years of difficult decisions that led the company into Chapter 11 in 2020," Kumar said. "Overall, there is strong potential for sustained FCF [free cash flow] generation, given the new operating plan, which should be attractive to investors, especially given the current discounted valuation."

Even Fitch Ratings couldn't pour any cold water on the recent Chief Oil deal, saying the company's credit quality could improve as it retains a conservative financial approach.

# HART ENERGY

## CALL FOR ENTRIES

### 2022 Special Meritorious Awards for **ENGINEERING INNOVATION**

The **Special Meritorious Awards for Engineering Innovation (MEAs)** is the industry's most established and widely respected engineering awards program. Each year, the world's best new tools and techniques for finding, developing and producing hydrocarbons are recognized.

**MEA** entries are judged on their game-changing significance, both technically and economically. Judges include respected professionals with engineering and technical backgrounds who have extensive knowledge of the categories they are judging.

Entry is free, and awards will be presented in a Hart Energy publication in July 2022.

### Submit your Entry in 3 Easy Steps!

- 1** Gather the required documents to support your award submission. A complete list is available at **MEAentry.com**.
- 2** Go to **MEAentry.com** and create an online account.
- 3** Use your personal entry page to submit and edit your entry. **Enter at MEAentry.com**



## MEA AWARD CATEGORIES

- Artificial Lift
- Carbon Management
- Digital Oil Field
- Drill Bits
- Drilling Fluids/Stimulation
- Drilling Systems
- Exploration/Geoscience
- Floating Systems and Rigs
- Formation Evaluation
- HSE
- Hydraulic Fracturing/Pressure Pumping
- IOR/EOR/Remediation
- Machine Learning and AI
- Marine Construction & Decommissioning
- Nonfracturing Completions
- Onshore Rigs
- Subsea Systems
- Water Management



**Deadline for submissions is April 29, 2022.**

Contact **meainfo@hartenergy.com** with any questions.

# NATURAL GAS TO THE RESCUE?



JACK BELCHER,  
CORNERSTONE  
GOVERNMENT  
AFFAIRS

**N**atural gas has been in the news quite a bit, vaulting to the center of geopolitics.

First, the energy crisis in Europe has highlighted the need for alternative sources of natural gas, as supplies have slowed and there is very little in storage. As the solution, the press in Europe has heralded LNG imports from the U.S., Qatar and elsewhere. At the same time, German approval of the Nordstream Pipeline has become a bargaining chip in the Ukraine–Russia crisis.

The role that U.S. natural gas can play in assisting our allies in Europe and lessening the threat posed by Russia, while simultaneously benefiting the U.S. economically, was underscored at a recent U.S.–E.U. Energy Ministerial. With Secretary of State Antony Blinken and Secretary of Energy Jennifer Granholm in attendance, participants touted U.S. LNG exports to Europe and called for identifying “ways to sustain strong U.S. LNG exports to Europe.”

Meanwhile, in a nod to the importance of natural gas to Europe’s energy security amid the ongoing energy transition, the European Commission has published the final text of its “taxonomy for sustainable finance” that classifies nuclear and some natural gas as “green energy.”

With high gas prices and demand pressures in the U.S., the Biden administration is also feeling pressure to slow down exports to Europe and redirect those Btus domestically. For example, a group of 10 Democratic U.S. senators from the Northeast and upper Midwest recently wrote a letter to Secretary Granholm urging the Biden administration to take steps to limit LNG exports. They specifically asked the Department of Energy to conduct a review of LNG exports and their impact on domestic prices and the public interest, calling on Granholm to “consider halting permit approvals of LNG export facilities.” All the while, administration officials, including Deputy Energy Secretary David Turk, have stated that the U.S. is not considering banning LNG exports.

It is clear that the administration is facing considerable pressure when it comes to its policies toward natural gas. On one hand, it supports policies that make gas exploration, production, transportation and utilization more difficult, lumping natural gas with crude oil as commodities that should be phased out. On the other hand, it supports natural gas exports when doing so proves useful in geopolitics, such as greenhouse gases and the current

environment where the pressure is on for the U.S. to export more LNG.

However, increasing LNG exports requires increasing natural gas production, which necessarily involves more crude oil production given geological realities. As reflected by current public policies, boosting domestic production is something the administration has a hard time supporting. Yet, not surprisingly, high commodity prices and increasing demand are driving higher drilling and production activity in any way.

Over the long term, an approach that considers producing more LNG to export to Europe to be a good thing, but producing the gas necessary to be liquefied and exported to be a bad thing, it will support neither domestic production nor LNG exports to our allies.

Unfortunately, that is just the track down which we are currently headed. Federal policy continues to make it harder to produce oil and gas on federal lands and waters. In his first days in office, President Biden paused new oil and gas leasing under federal jurisdiction. While the moratorium was struck down by a federal court, another federal judge threw out a subsequent offshore lease sale. It is unclear what action the administration will take to defend the lease sale decision, but it isn’t likely to fight hard to defend that auction or hold new lease sales. The multiyear process to develop the five-year offshore oil and gas leasing plan hasn’t even started, and the current plan expires in June.

Combined with continued pressure on new pipeline development by Federal Energy Regulatory Commission, leasing and permitting slowdowns at the Bureau of Land Management and Bureau of Ocean Energy Management and the tightening of standards from Environmental Protection Agency, it is becoming significantly more difficult to produce and transport U.S. oil and natural gas at a time when our country and allies around the world need it the most.

The U.S. has an opportunity to show leadership in the face of threats abroad, including from Russia. U.S. natural gas is already considerably cleaner than gas produced in Russia, and bold efforts are underway to develop responsibly sourced gas in the U.S., reduce methane emissions and decarbonize across the natural gas value chain. For the sake of the environment, economy and national security, the administration should not only support our ability to export natural gas, it should also support all aspects of exploring, producing and transporting it in a truly sustainable manner.

# EVENTS CALENDAR

The following events present investment and networking opportunities for industry executives and financiers.

EVENT	DATE	CITY	VENUE	CONTACT
<b>2022</b>				
<b>DUG Midcontinent</b>	<b>March 1-3</b>	<b>Oklahoma City</b>	<b>Oklahoma City Conv. Ctr.</b>	<b>dugmidcontinent.com</b>
SPE-GCS A&D Symposium	March 2	Houston	Petroleum Club of Houston	spegcs.org
LOGA Annual Meeting	March 7-8	Lake Charles, LA	Golden Nugget Hotel & Casino	loga.la
CERAWeek by IHS Markit	March 7-11	Houston	Hilton Americas-Houston	ceraweek.com
West Texas Oil & Gas Convention	March 23-24	Midland, TX	Midland County Horseshoe Pavilion	roselandconsulting.com
TIPRO Annual Convention	March 28-29	Austin, TX	Otis Hotel	tipro.org
SPE-GCS Permian Basin Summit	March 31	Houston	Norris Center CityCentre	spegcs.org
EnerCom Dallas	April 6-7	Dallas	Dallas Petroleum Club	enercomdallas.com
Energy Workforce & Technology Council Annual Mtg.	April 6-8	Point Clear, AL	Marriott Grand Hotel	energyworkforce.org
Mineral & Royalty Conference	April 18-19	Houston	Post Oak Hotel	mineralconference.com
<b>Energy ESG Conference</b>	<b>April 26-27</b>	<b>Dallas</b>	<b>Omni Dallas</b>	<b>hartenergyconferences.com</b>
<b>Women In Energy</b>	<b>April 29</b>	<b>Houston</b>	<b>Marriott Marquis</b>	<b>hartenergyconferences.com</b>
Offshore Technology Conference	May 2-5	Houston	NRG Park	2022.otcnet.org
<b>Energy Transition Capital Conference</b>	<b>May 10</b>	<b>Houston</b>	<b>Omni Houston</b>	<b>hartenergyconferences.com</b>
<b>Carbon Management Conference</b>	<b>May 16</b>	<b>Fort Worth, TX</b>	<b>Fort Worth Convention Center</b>	<b>hartenergyconferences.com</b>
<b>DUG Permian/Eagle Ford</b>	<b>May 16-18</b>	<b>Fort Worth, TX</b>	<b>Fort Worth Convention Center</b>	<b>dugpermian.com</b>
Louisiana Energy Conference	May 24-27	New Orleans	The Ritz-Carlton, New Orleans	louisianaenergyconference.com
<b>DUG Haynesville</b>	<b>May 25-26</b>	<b>Shreveport, LA</b>	<b>Shreveport Convention Center</b>	<b>dughaynesville.com</b>
Mexico Gas Summit	June 1-2	San Antonio	St. Anthony Hotel	mexicogassummit.com
CIPA Annual Meeting	June 9	Carlsbad, CA	TBD	cipa.org
<b>DUG East</b>	<b>June 13-15</b>	<b>Pittsburgh</b>	<b>David L. Lawrence Conv. Ctr.</b>	<b>dugeast.com</b>
Unconventional Resources Technology Conference	June 20-22	Houston	George R. Brown Conv. Ctr.	urtec.org
<b>DUG Bakken and Rockies</b>	<b>June 28-29</b>	<b>Denver</b>	<b>Colorado Convention Center</b>	<b>hartenergyconferences.com</b>
IPAA Annual Meeting	July 20-22	Colorado Springs, CO	The Broadmoor	ipaa.org
EnerCom Denver	Aug. 8-11	Denver	The Westin Denver Downtown	enercomdenver.com
Western Energy Alliance Annual Meeting	Aug. 10-11	Beaver Creek, CO	Park Hyatt Beaver Creek	westernenergyalliance.org
KIOGA Annual Convention	Aug. 14-15	Wichita, KS	Hyatt Regency	kioga.org
<b>America's Natural Gas Conference</b>	<b>Sept. 7</b>	<b>Fort Worth, TX</b>	<b>Worthington Renaissance</b>	<b>hartenergyconferences.com</b>
<b>Energy ESG Conference</b>	<b>Oct. 11-12</b>	<b>Houston</b>	<b>TBD</b>	<b>hartenergyconferences.com</b>
<b>Energy Capital Conference</b>	<b>Oct. 25</b>	<b>Dallas</b>	<b>Fairmont Hotel</b>	<b>hartenergyconferences.com</b>
North American Gas Forum	Oct. 25-27	Washington, D.C.	Hilton Washington, D.C.	energy-dialogues.com/nagf/
<b>A&amp;D Strategies and Opportunities Conference</b>	<b>Oct. 26</b>	<b>Dallas</b>	<b>Fairmont Hotel</b>	<b>adstrategiesconference.com</b>
<b>Executive Oil Conference</b>	<b>Nov. 15-16</b>	<b>Midland, TX</b>	<b>Midland County Horseshoe Pavilion</b>	<b>executiveoilconference.com</b>
<b>Monthly</b>				
ADAM-Dallas	First Thursday	Dallas	Dallas Petroleum Club	adamenergyforum.org
ADAM-Fort Worth	Third Thursday, odd mos.	Fort Worth	Fort Worth Petroleum Club	adamenergyfortworth.org
ADAM-Greater East Texas	First Wed., even mos.	Tyler, Texas	Willow Brook Country Club	etxadam.org
ADAM-Houston	Third Friday	Houston	Brennan's	adamhouston.org
ADAM-OKC	Bi-monthly (Feb.-Oct.)	Oklahoma City	Park House	adamokc.com
ADAM-Permian	Bi-monthly	Midland, Texas	Midland Petroleum Club	adampemian.org
ADAM-Tulsa Energy Network	Bi-monthly	Tulsa, Okla.	The Tavern On Brady	adamtulsa.com
ADAM-Rockies	Second Thurs./Quarterly	Denver	University Club	adamrockies.org
Austin Oil & Gas Group	Varies	Austin	Headliners Club	coleson.bruce@shearman.com
Houston Association of Professional Landmen	Bi-monthly	Houston	Houston Petroleum Club	hapl.org
Houston Energy Finance Group	Third Wednesday	Houston	Houston Center Club	hefg.net
Houston Producers' Forum	Third Tuesday	Houston	Houston Petroleum Club	houstonproducersforum.org
IPAA-Tipro Speaker Series	Second Wednesday	Houston	Houston Petroleum Club	ipaa.org

Email details of your event to Brandy Fidler at [bfidler@hartenergy.com](mailto:bfidler@hartenergy.com).

For more, see the calendar of all industry financial, business-building and networking events at [HartEnergy.com/events](http://HartEnergy.com/events).



**\$1,150,000,000**

4.750% Senior Notes due 2032  
Joint Book-Running Manager

December 2021



**\$400,000,000**

3.250% Senior Notes due 2032  
Co-Manager

November 2021



**\$800,000,000**

4.500% Senior Notes due 2030  
Joint Book-Running Manager

October 2021



**\$700,000,000**

8.500% Senior Secured  
Second-Lien Notes due 2026  
Joint Book-Running Manager

October 2021

## Wall Street capabilities. Main Street sensibilities.

Support to navigate the ever-changing landscape of the energy and natural resources industry.

As you work to move your business toward an even stronger financial future, Regions Securities® is here to help you turn obstacles into opportunities. Our team of executive-level bankers and engineers has experience in the energy and natural resources industry and its subsectors. Our first priority is to get to know your business to help you reach your objectives in all economic cycles.

We use a relationship-oriented approach to offer capital-raising and advisory services as well as customized risk management tailored to meet your needs.

**Learn how our specialized energy and natural resources industry banking team can help keep your business moving forward at [regions.com/energy](https://regions.com/energy).**

**Brian Tate | Energy & Natural Resources Group Head**  
980.287.2811 | [brian.tate@regions.com](mailto:brian.tate@regions.com)



Industry Expertise | Corporate Banking | Capital Markets & Advisory Services | Comprehensive Financing Solutions

**Investment, Annuities and Insurance Products**

Are Not FDIC Insured | Are Not Bank Guaranteed | May Lose Value

Are Not Deposits | Are Not Insured by Any Federal Government Agency

Are Not a Condition of Any Banking Activity

Securities activities and Merger and Acquisition advisory services are provided by Regions Securities LLC, 1180 W. Peachtree St. NW, Suite 1400, Atlanta, GA 30309, 404-279-7400. Member FINRA and SIPC.

Banking products and services, including lending, financial risk management, and treasury and payment solutions, are offered by Regions Bank. Deposit products are offered by Regions Bank, Member FDIC.

© 2022 Regions Bank. All rights reserved. Regions Securities is a registered service mark of Regions Bank and is used under license for the corporate and investment banking services of subsidiaries of Regions Financial Corporation. Regions, the Regions logo and Regions Securities are registered trademarks of Regions Bank and are used by its affiliates under license. The LifeGreen color is a trademark of Regions Bank.

# TEXAS' SHALE PLAYS – *Setting the Momentum*

CONFERENCE & EXHIBITION

# DUG

PERMIAN  
+EAGLE FORD

Just as the Permian Basin's activity picks up, Hart Energy's *DUG Permian Basin and Eagle Ford Conference & Exhibition* returns May 16-18 at the Fort Worth Convention Center. Attendees will find this combined conference and exhibition provides a comprehensive view of the momentum building for Texas' crude oil and natural gas producers.

### Industry Leading Speakers Include:

- Steve Struna, President & CEO, *Bayswater Exploration & Production LLC*
- Mike Oestmann, President & CEO, *Tall City Exploration III LLC*
- Ryan Keys, President & Co-Founder, *Triple Crown Resources LLC*
- Tom Petrie, Chairman, *Petrie Partners*
- Tyler Harris, Chief Financial Officer, *Moriah Energy Investments*
- Michael Hart, Chief Financial Officer, *Rio Grande Exploration & Production*
- Josh Adler, Founder & CEO, *Sourcenergy*
- Bob Barba, Petroleum Engineer, *Integrated Energy Services*

### Attend the Carbon Management Conference

On May 16, prior to the main conference, Hart Energy will host a *Carbon Management Conference* with in-depth presentations about technologies and strategies making significant impacts. The focus is helping Permian and Eagle Ford producers continue to thrive with responsible, streamlined and profitable operations.

## Thanks to our 2022 Sponsors

### PLATINUM

**GR**Energy Services

### SILVER



**Intelligent**  
Wellhead Systems



PROJECT  
**CANARY**



### GOLD



**BAKER BOTTS**

### BRONZE



Continental

**ECOVAPOR**



**KIRKLAND & ELLIS**

HARTENERGY

For complete agenda with speakers and  
to register, visit [DUGPermianBasin.com](http://DUGPermianBasin.com)

# NewsWell



## Steady production growth from Marcellus, Utica shales, report says

With gas prices soaring to record highs coupled with additional pipeline capacity, the Marcellus and Utica shale plays are showing strong growth fundamentals.

Leading data and analytics company GlobalData recently forecast natural gas production from the Marcellus and Utica formations is expected to rise at a compound annual growth rate of 5.1% to reach a combined 38.3 Bcf/d by 2025.

In its latest report, GlobalData noted that the natural gas plays of the Appalachian Basin saw a minimal change in production and drilling activity during the economic downturn caused by COVID-19 in 2020. During fourth-quarter 2020 and into January 2021, the Marcellus and Utica shale plays saw an increase in production before leveling out during the first and second quarters of 2021.

“Not only did natural gas appraisal and development evade some of the more devastating

impacts COVID-19 had on other areas of the oil and gas industry, but natural gas production in these shales exceeded pre-pandemic levels in 2021, reaching 35 Bcf/d on an annual basis,” commented Svetlana Doh, oil and gas analyst at GlobalData. “In fact, Marcellus and Utica accounted for nearly one-third of the total natural gas production in the U.S.”

Reflecting similar sentiment, Rystad Energy analysts told attendees of Hart Energy’s 2021 DUG East/Marcellus-Utica Midstream Conference that Appalachia is producing record levels of natural gas and producers should be able to maintain or grow that output without the significant investment in wells required in past years.

By 2025, GlobalData forecasts the natural gas production in both the shale plays will exceed its pre-pandemic level, while crude oil production is forecasted to recover at a slower pace during the same period.

### Marcellus, Utica Shales Production Outlook (2021-2025)

	2019	2020	2021	2022	2023	2024	2025
<b>MMbbl/d</b> Marcellus (crude oil)	98	103	94	99	101	103	106
<b>MMbbl/d</b> Utica (crude oil)	59	45	46	46	46	46	46
<b>MMcfd</b> Marcellus (natural gas)	25,695	26,729	28,498	29,499	29,794	30,183	30,652
<b>MMcfd</b> Utica (natural gas)	6,405	6,232	6,532	6,981	7,287	7,472	7,608

Source: GlobalData

“In 2020, with the crash in oil prices, operators saw massive reductions in capital expenditures and headcounts,” Doh added. “The U.S. shale industry also witnessed record numbers of bankruptcies and debt restructurings. Operators continue to recover from this downturn. As a result, deal activity in the Marcellus and Utica shales is still below pre-pandemic levels.”

The biggest operators in the region such as Chesapeake Energy Corp., EQT Corp. and Southwestern Energy Co. all added scale within the past several years through M&A activity. The most recent example is Chesapeake’s planned purchase of Chief Oil & Gas, announced on Jan. 25.

Still, GlobalData said the total M&A deal value in these shale plays is up just 1% over 2020, and down approximately 5% from 2019 through three quarters.

“M&A activity in other crude oil plays in the U.S. was mainly related to the consolidation tactic of bigger oil and gas companies holding assets across multiple plays,” Doh said. “However, Appalachia is the biggest natural gas play in the U.S., and deals occur mainly for medium-to-small sized operators within a handful of gas plays in the country, resulting in a smaller total deal value.”

—Faiza Rizvi

### Outlook from NAPE: Oil prices will fly even higher

If you’re experiencing déjà vu over the current state of the energy industry, then you really need to pay closer attention. Never has an outlook been this good, bad and weird.

“It is different today. There are many things in our business that no one in this room has ever seen in their career,” Marshall Adkins, managing director and head of energy at Raymond James, said during the NAPE Business Conference.

**WTI Spot Price (Monthly since January 2017, \$/bbl)**



Source: U.S. Energy Information Administration, CME Group, Raymond James presentation

So, what does one do in an unprecedented business environment? Check the fundamentals. Then, check them again to understand why Adkins is so bullish.

“You need to know when to lean into the business activity or back away,” Adkins said. “I’m going to make the case that now is the time to lean in even though we’re at \$90 crude. The backdrop, the fundamentals, I think, are massively underappreciated by the market.”

Traders, for example, don’t think the price will hold. The futures strip has WTI fading to less than \$80/bbl over the next 12 months.

“I don’t know what’s going to happen next week or the week after next, but I’m pretty sure over the next couple of years, the price of oil is going to be meaningfully higher than what the futures strip is currently suggesting,” he said. “And meaningfully higher than what most of you guys are probably running in your deck for your acquisitions or projects that you’re looking at.”

Adkins pointed to these trouble areas.

“We’ve never seen the level of demonization of oil and really all hydrocarbons, which has led to massive capital starvation,” he said.

It goes well beyond lawsuits and regulatory limitations that slow development and construction, Adkins said. Pressure on oil companies, particularly majors

and in Europe, are denying the industry necessary capital to grow production and meet demand.

“The anti-hydrocarbon stuff in Europe has literally replaced Catholicism as their religion and I think that’s forced the slowing of the oil and gas of many of those majors,” he said. “And so, you’re stymying supply, pretty simple. We’ve never seen that in our careers. We haven’t seen these things come to bear.”

Supply is not responding to prices as it did in the past, he said.

“I don’t recall a period where we’ve been out of all of this stuff at the same time,” Adkins said. “Not enough coal in China, not enough coal in India, not enough natural gas in Europe and not enough oil. I mean, it’s the whole complex.”

Until this point in his career, E&Ps would spend about 125% of their cash flow, or 25% more money than they were bringing in. So, they would turn to the market, which was a terrific environment for investment bankers, who kept on raising money. Not so terrific from a return perspective, however.

“If you’re never generating enough cash to pay for that, that’s a horrible business,” he said. “That’s changed. Companies now are paying back that cash flow at today’s prices. The U.S. E&P business is generating massive amounts of cash, and companies are being responsible

with returns.”

Also, labor issues are starting to emerge, especially in the service sector. Adkins expects those problems to continue to worsen.

“Anyone remember the last time OPEC maxed out?” he asked the audience. No one responded because OPEC never has.

“Even in the ’70s, OPEC had plenty of excess capacity,” Adkins said. “They just kept it off the market. My model is showing, sometime this year, we are likely out of all excess capacity within OPEC. We’ve never been in that situation.”

The Saudis insist their capacity is 12.5 MMbbl/d, but he just doesn’t see it: “They’ve never produced more than 10.8 [MMbbl/d] for two months in a row.”

Russia? Flatlining production. Iraq? Nobody knows. Iran is a wild card but, even if a nuclear deal was signed tomorrow, would likely max out by 2023 if not sooner, and may not even reach 3 MMbbl/d.

The discussion has shifted in the last 20 years from “peak supply” to “peak demand.”

“The market is pricing oil and gas as if we are out of business in five years,” he said. “Do a discounted cash flow analysis, and go to zero in year five. That’s why you trade in two, three, four times EBITDA, because you better get your money back from the next three years, or else.”

Even if an agreement gets Iran pumping crude again, online

excess capacity reaches zero sometime around midyear. In this scenario, Adkins envisions oil prices continuing to climb throughout 2022, assuming no meaningful interruption and inventories remaining weak, at least through the first half of the year.

“It’s a long-term price of \$85,” he said, “in which I think there’s enough cash flow generated by our industry to grow production, sufficient to fuel demand growth over the next decade.”

—Joseph Markman

## **‘ESG now impacts all access to capital,’ energy consultant says**

ESG has transcended being a checked box for oil and gas companies. Now investors are looking for improved disclosure of ESG-related issues supported by quantitative data to garner capital, according to Daniel Romito, director of ESG strategy and integration at Pickering Energy Partners.

“ESG now impacts all access to capital...your insurance, your banking and your equity, is all heavily influenced,” Romito said at the Independent Petroleum Association of America’s Private Capital Conference on Jan. 20. “Now, it’s not the end all be all, but it is heavily influenced by your ESG profile.”

Investors are not only basing their capital allocation decisions on how well executives implement ESG practices into their business, he told conference attendees. They are pushing for qualitative and quantitative ESG metrics to better examine which companies can compete within the transition.

“They want trending data,” he said. “As cynical as it sounds, most investors that were burned by prior experience with energy need a little bit more validation and a little bit more reasoning, and unfortunately, in most cases, ESG data seems to be the source that they’re turning to for that validation.”

The standard for issuing sustainability reports was set by the technology industry and the energy sector, Romito said, lacked the financial performance to compete, making it increasingly difficult to match the attractive returns. As a result, the

energy industry became an easy target, he added with the goalpost moving “what seems to be almost monthly, whether it’s a framework or a dataset.”

“The benchmark [for ESG related data] was set by technology, and they’ve had an incredible head start in getting this underway,” he said. “But keep in mind, you’re not competing just for energy. You’re competing against the other sectors that have established the narrative, the paradigm and established the expectations of disclosure, and they have done a really good job of establishing what a sustainability report looks like.”

Data providers, aggregators and raters of ESG data have arbitrarily decided that 50%—give or take—but nonetheless, a massive proportion of an energy company’s ESG profile should be dedicated to the E [environmental], Romito said.

“The practical approach centers on progress, showcasing that you are on a journey—and along that journey, you are progressing and improving,” he said. “So, a three-year rolling trend is a very material and incredibly powerful story to tell.”

Romito’s recommendation is for energy companies to be candid in these disclosures about where there is room for improvement because it is “far more important than arbitrarily saying ‘we’re going to be net zero on this date.’”

Adding to the complexity, Europe’s regulations are directly influencing how these profiles are structured in America. Specifically, Romito noted the EU Sustainable Finance Disclosure Regulation (SFDR), which is a set of rules that aim to make the sustainability profile of funds more comparable and better understood by end-investors.

These rules require firms to make strategic business and policy decisions regarding their approach to ESG, which must be disclosed on the firm’s website and in pre-contractual and periodic disclosures.

In October 2021, the U.S. Department of Treasury’s Financial Stability Oversight Council (FSOC) published a report identifying climate change as an emerging and increasing threat to financial stability, forging the road to sustainability disclosure

rules and obligations.

“European regulation has mandated the tracking and monitoring of climate-related, human capital management-related, and governance-related data,” he said. “They want it implemented into debt underwriting.”

In the report, FSOC’s recommendations for member agencies included access to climate-related financial risks to financial stability. Examples consist of thorough scenario analysis and enhanced climate-related disclosures to give investors and market participants the information they need to make informed decisions.

Most notably, the committee made a recommendation for “enhanced actionable climate-related data to allow better risk measurement by regulators and in the private sector.”

“Climate change is an emerging and increasing threat to America’s financial system that requires action,” Secretary of the Treasury Janet L. Yellen said in the report. “FSOC’s report and recommendations represent an important first step towards making our financial system more resilient to the threat of climate change. These measures will support the Administration’s urgent, whole-of-government effort on climate change and help the financial system support an orderly, economy-wide transition toward the goal of net-zero emissions.”

On the private side, Romito said various limited partners (LP) have been under incredible external pressure to get rid of fossil fuels and therefore aren’t proceeding with raising capital without seeing environmental-related or, at the minimum, trending data from their partners.

“Now, getting rid of fossil fuels is a foolish notion,” he said. “But there is a very influential contingent that has been very successful in making that case. So those who want to get back into energy have to showcase a material set of data that the external audience wants in order to make the move back into whatever energy investment they want.”

Outside of emissions, the areas investors are examining include a company’s biodiversity strategy, health and safety goals, ESG-based compensation for executives and, most importantly, water stewardship.

“Water stewardship is actually

shooting up the list of priorities ... it's going to be the next GHG," he said. "It is a real business concern considering what's going on in California and Colorado."

The remedy to attract capital and operate this ESG landscape? Companies should rely on quantifiable data points being sure to eliminate all "fluff."

"Those superlatives and antipodes don't necessarily weigh as much as the quantitative data points that the valuers want to see in the first place," Romito said. "Anecdotal claims should be matched with quantitative data to mitigate even the slightest appearance of greenwashing and progression is more important than targets."

"Because it's an unstandardized world," he continued, "there is almost like a six-month rotation, and some joker in your class will up the game in disclosure. Then, what ends up happening is 'company XYZ started reporting on this, why don't you report on that?' The strategy is to be proactive and to try to stay ahead of the competitive curve so that you're not perceived to be the laggard in the group."

—Mary Holcomb

## **How the oil and gas industry can survive the energy transition**

Back in the day, geopolitics-induced commodity volatility would send oil prices skyrocketing, infusing fresh capital into the oil business.

Models focused on year-on-year production growth dominated.

The banks were welcoming.

Competition for capital was amongst peers.

Unchecked, many oil companies overspent and underdelivered—again and again and again. Investors, of all kinds, forgave.

Welp, times are changing.

"We're no longer an allocation today. We stunk it up. We had a big, huge red problem. We lost a lot of money. We've got the green problem ... that we're going to have to deal with," said Chuck Yates, podcast host and panelist at the International Petroleum Association of America's recent Private Capital Conference. "If you're sitting there with an oil and gas company and you want capital, do not sit there and go, well,

'I've got PDP and PV-10' ... All those old rules are out the door. You have to walk in to an investor and show how you uniquely can make money."

The competition, he added, includes Apple, Google and other technology stocks.

Today, an oil company's ability to attract capital—as consumers push toward a lower-carbon world—is not just about generating returns, growing cash flow and staying disciplined financially. It also hinges on ESG, longer-term goals, reclaiming the narrative and uniquely creating value, according to experts who shared perspectives on transitions of the past and present during the conference on Jan. 20.

"And we need to get back to understanding our assets and clarifying that we're drilling the right assets for the right reasons," said Samantha Holroyd, owner of Golden Advisory Services.

Part of the return on capital will be integrating the ESG component, Holroyd added, which also makes companies attractive to potential partners and buyers. "The key here is remembering where you are in the ladder of capital flow. What are your targets? What are your objectives?"

Be it a 10-year vision or a three-year exit, strategies are needed to ensure all boxes are checked concerning not only return of capital but also integrating it all into operations and analysis, she said.

The allocation of capital on both the public and private exchanges has dropped to the low-single digits, from the 10% to 15% range, she said, adding focus must be on return on capital.

Panelists seemed to agree that oil will still be needed despite the growing push for an energy transition.

"You've got to use your capital to generate revenue, and you do that by drilling development wells, exploitation wells," said Jim Trimble, owner of Tanda Resources LLC.

As oil exploration continues to fall—leaving voids in the areas of large seismic shoots, acreage plays and discoveries—he sees oil prices rising as supplies get tighter.

"Exploration is something that has just gone away," Trimble added. "Until we can figure out how to have that as part of our portfolio, production in the U.S. will start declining."

There is plenty of room for responsible growth companies that are generating free cash flow, keeping debts low and are socially responsible, according to Frank Lodzinski, executive chairman of Earthstone Energy Inc.

"To attract the capital, I think we're going to have to show folks that we are financially disciplined—that there is growth there, but it's responsible growth in terms of what we do," he said.

"ESG is one of the new playing cards in the capital game, and you will need to find your hold cards," Holroyd said. "You'll need to find a way to make ESG relevant in your business. I think in our particular business, we need to start with the two easy ones: carbon management and social, or our impact to our communities, to our people and the communities in which we work in. Governance should be easy and governance will help you get to those solutions."

Speaking on the environmental aspect of ESG, Lodzinski said carbon management can also make companies attractive to potential buyers.

"In the event you're going to build something and sell it off to a bigger company, they're not going to want to go backwards on their ESG criteria," he said. "So, the add is not only production [and] good cash flow from operations ... but field-level ES&G and carbon emissions."

While ESG issues involving the industry have driven a lot of banks—mainly in Europe, Canada and the U.S.—out of the market due to mandates by their boards not to invest, not all banks are exiting.

"The Asian banks are all hungry to get into this market," Trimble said.

Those in the business may feel caught up in a whirlwind of change. But some things like regulatory changes, evolving tax policies and inflation aren't new.

"That was there in the '70s," Lodzinski said of inflation. "The key is how do you survive over time to operate profitably or at least in a manner where you can sustain your operation and your debt service and some level of capital."

Panelists agree that it's about responsible investing and responsible management.

And perhaps it's better to plan pessimistically, instead of optimistically, "and enjoy the benefits if things turn around faster," acknowledge what you don't know; attract and retain young talent; reclaim the narrative; and find "green angles" to oil and gas opportunities, panelists said.

"Just show everybody that you can generate free cash flow and be environmentally conscious at the same time," said Lodzinski. "Nothing has really changed, except over the years there's a much greater national and investor focus on the whole ES&G thing."

Yates also pointed out that young people believe it is important to work for companies that look like America. "I hate to call our industry out, but we don't look like America," he said. "We need to give that a lot of thought."

The industry needs to step up and say it knows what is needed to evolve the energy business, Holroyd added.

"The key to the future for our business is youth, and I really hope that we find ways to make them curious about us, have them bring their thoughts and their ambitions and their behaviors and their learnings, and teach us how to be better oil and gas people," she said. "I believe the future is oil and gas transitioning to a broader power industry or energy industry, which includes

alternatives. But we are going to have to be a constructive commercial solution, and the people sitting in this room have to be leaders in that transition."

—Velda Addison

## Seneca Resources shares results of frac fleet study with NexTier

The benefits of natural gas-powered electric fracturing has been the subject of much discussion in the shale industry as a growing number of producers seek ways to lower their emissions.

"The debate between electric and dual fuel has really exploded over the past year," Tom Cannon, drilling and completions manager for Seneca Resources, told attendees at Hart Energy's DUG East Conference.

One of the few to share their decision-making analysis on electric frac, or e-frac, fleet adoption, the Pennsylvania producer presented its findings alongside partner NexTier Oilfield Services at DUG East in December.

Seneca Resources, the E&P segment of diversified energy company National Fuel Gas Co., operates roughly 1.2 million net acres producing over 1 Bcf/d of natural gas in the Marcellus and Utica shale plays. The company

recently achieved certification of 100% of its Appalachian natural gas production under Equitable Origin's EO100 standard for responsible energy development, a series of rigorous ESG performance targets.

According to Seneca Resources, natural gas-capable and 100% electric fleets made up about one-third of all U.S. land fleets in 2021. But they expect that by the end of the year, those will account for more than half of all fleets in the U.S.

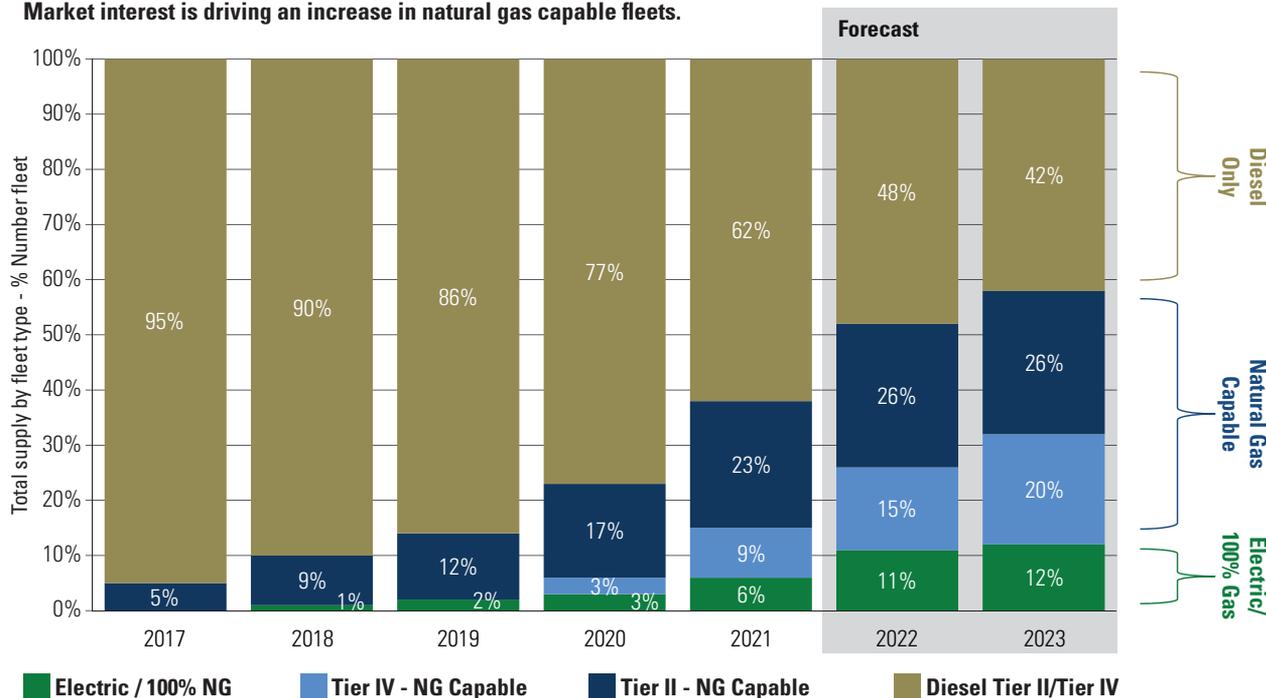
Cannon explained that Seneca has employed several drilling and completions emission reduction initiatives, including using dual fuel rigs and fracs, natural gas water transfer pumps, and natural gas-run water wells and natural gas generators that power outside lighting offices and camps.

Seneca was also considering adopting e-frac into their operations but first wanted to understand what the best fit was for the company, which led it to pioneer a study with NexTier Oilfield Solutions.

Launched in July 2021, the study by Seneca and NexTier aimed to provide the shale industry with a comparative insight on the emissions profile of hydraulic fracturing technologies utilizing Tier 2 diesel and dynamic gas blending (DGB) engines, Tier 4 diesel and DGB engines, natural

## Forecast For Gas-Fueled Fleets

Market interest is driving an increase in natural gas capable fleets.



Source: Rystad Energy, Frac Services Report, September 2021

gas-powered turbine engines and e-frac equipment powered by natural gas-fueled reciprocating engines.

“We really tried to get a study that was as unbiased as possible,” Cannon said. “We didn’t have any bias toward any one of these technologies. We really wanted to understand what truly is the best with emissions and use that emissions data to make our best decisions as Seneca.”

Cannon explained that compared to diesel fuel on a per gallon basis, natural gas costs 33 cents per gallon, where diesel delivered to location costs \$3. But Seneca evaluated different frac fleet options on availability, horsepower requirements, flexibility and reliability as well.

“Does the fuel savings offset the market premium of natural gas-capable fleets, mainly because you’re not only looking at the fuel savings, but you’re also looking at the market increase price at what these new generation equipment is coming out,” he said. “Limited supply of these fleets causes the cost of this equipment to be a lot higher.”

The study ultimately focused on three different types of frac equipment—Tier 2 and Tier 4 dual fuel equipment and next-generation natural gas-powered equipment.

“The study was comprehensive in that it included both air quality pollutants and greenhouse-gas emissions,” Allen Crum, vice president of business development for NexTier, told DUG East Conference attendees.

Crum explained that cost savings for dual fuel power generation can save up to \$8 million annually with a 70% natural gas replacement, while a 100% gas-powered fleet can save upwards of \$10 million annually.

“Of course, not every location will have access to lean, dry field gas,” he said. “But even on CNG, the cost savings still favor natural gas-capable fleets.”

Ultimately, Cannon said, Seneca opted to deploy the Tier 4 dual fuel fleets offered by NexTier.

“Ongoing technology improvements provide room for emissions reductions and increased gas substitution,” he said. “And as an industry we continue to evolve, and technology continues to evolve. And today’s answer for

us may be Tier 4, but tomorrow could very well be something else with changing operational plans.”

—Brian Walzel

## **Is Europe’s energy crisis headed to America?**

The world is on the brink of an energy crisis, which isn’t a shortage or a supply chain issue but an international relations problem, similar to the 1970’s Arab oil embargo, according to a new report by energy advocacy organization Power the Future.

The energy crisis, the report noted, is the direct result of “deliberate and myopic energy policies” made by political leaders.

In Europe, countries are facing skyrocketing energy bills and an increasing dependence on Russia for energy. Additionally, European citizens are facing unaffordable food prices and are confronting record high heating and utility bills.

Americans are feeling the pinch too. Gas prices are surging, recently hitting a seven-year high, with oil prices reaching \$80 per barrel for the first time since 2014, the report noted.

“Although the [energy crisis] is more acutely felt in Europe, unless the Biden administration takes action, it is headed to America soon,” warned Daniel Turner, founder and executive director of Power the Future.

“As the energy crisis is a supply-side one, America needs to protect and encourage increased supply, which means increased production,” Turner told Hart Energy. “Yet the steps taken by the Biden administration, from fracking bans, land use bans, denying permitting, including the recent decision to reverse access to Alaska’s petroleum reserve, are inhibiting production and causing a dwindling of supply.”

“Oil and gas does not come online easily,” he continued. “It is a labor and capital-intensive enterprise, and the deliberate disruptions to our domestic supply will have lasting repercussions.”

Turner noted that the EU is experiencing “massive energy disruptions of its own creation.”

The EU’s climate policy initiative—European version of the Green New Deal—is an effort to

cut greenhouse-gas emissions by 55% by the end of the decade. But natural gas prices in Europe have jumped nearly 600% this year on concerns that there simply won’t be enough of it to handle the expected winter surge in demand. Additionally, soaring natural gas prices compelled the U.K. to restart an old coal plant to help it meet its energy needs, Turner said.

Although COVID-19 has played a significant role in amplifying the ‘man-made’ energy crisis, the report noted that in reality, this crisis has been years in the making. The energy shortages and dramatically rising prices are the product of a decades-long effort by environmentalists to completely eliminate fossil fuels at any cost.

More recently, the focus on ESG and sustainability has demonized fossil fuels to the extent that several institutional investors and governments have eliminated oil and gas from their portfolios and have begun flowing capital to more socially acceptable low-carbon alternatives.

For instance, BlackRock announced last year it would no longer finance fossil fuel development while Wall Street gurus like Jim Cramer have called the oil industry “uninvestable.”

The report points to the Green New Deal and its adherents as a key driver of the grim outlook for the fossil fuel market.

“Just some of the specifics include ending fossil fuels entirely in around ten years, abandoning the Keystone XL pipeline and imposing a moratorium on issuing new oil and gas leases on federal lands. There are other—just as ludicrous—proposals floating around in reconciliation, such as the Clean Electricity Performance Program, which would raise electricity costs by penalizing natural gas and requiring more intermittent, expensive renewables,” according to the in-depth report.

What now?

While most will agree with the notion that affordable, reliable and abundant renewable energy is the need of the hour, the challenge, however, is that other than being (theoretically) abundant, renewable energy is neither reliable nor inexpensive, the report noted. And forcing consumers to rely on it—especially in the

# 2022 UPCOMING EVENTS

Insightful Discussions  
with Exceptional Networking

SHALE

CONFERENCE & EXHIBITION

**DUG**  
MIDCONTINENT

**March 1-3, 2022**  
Oklahoma City, OK  
Oklahoma City  
Convention Center

SHALE

CONFERENCE & EXHIBITION

**DUG**  
PERMIAN  
+EAGLE FORD

**May 16-18, 2022**  
Forth Worth, TX  
Fort Worth  
Convention Center

SHALE

CONFERENCE & EXHIBITION

**DUG**  
HAYNESVILLE

**May 25-26, 2022**  
Shreveport, LA  
Shreveport  
Convention Center

SHALE

CONFERENCE & EXHIBITION

**DUG**  
EAST

**June 13-15, 2022**  
Pittsburgh, PA  
David L. Lawrence  
Convention Center

SHALE

CONFERENCE & EXHIBITION

**DUG**  
BAKKEN AND ROCKIES

**June 28-29, 2022**  
Denver, CO  
Colorado  
Convention Center

SHALE

**AMERICA'S  
NATURAL GAS**  
Conference

**Sept. 7, 2022**  
Ft Worth, TX  
Worthington  
Renaissance

SHALE

**EXECUTIVE OIL**  
CONFERENCE & EXHIBITION

**Nov. 15-16, 2022**  
Midland, TX  
Midland County  
Horseshoe Arena

CAPITAL

**Energy  
TRANSITION  
Capital**  
CONFERENCE

**May 10, 2022**  
Houston, TX  
Omni Houston

CAPITAL

**Energy  
TRANSITION  
Capital**  
CONFERENCE

**Fall 2022**  
New York, NY

CAPITAL

**energy  
capital**  
CONFERENCE

**Oct. 25, 2022**  
Dallas, TX  
Fairmont Hotel

Join us for a compelling roster of 2022 Hart Energy events. Access unrivaled content and networking opportunities across the upstream oil and gas sector. Engage with industry leaders, policymakers, and experts, and participate in industry-leading dialogue as an event attendee, exhibitor, or sponsor.

TRANSACTION

**A&D**  
STRATEGIES AND  
OPPORTUNITIES  
CONFERENCE

**Oct. 26, 2022**  
Dallas, TX  
Fairmont Hotel

ESG

**Energy  
ESG**  
CONFERENCE

**April 26-27, 2022**  
Dallas, TX  
Omni Dallas

ESG

**25  
INFLUENTIAL  
Women  
IN ENERGY**

**April 29, 2022**  
Houston, TX  
Marriott Marquis

ESG

**CARBON  
MANAGEMENT**  
CONFERENCE

**May 16, 2022**  
Fort Worth, TX  
Fort Worth  
Convention Center

ESG

**Energy  
ESG**  
CONFERENCE

**October 2022**  
Houston, TX

REV: 02/22/22

# HART ENERGY Conferences

VIEW EVENTS



For more information, visit [HartEnergyConferences.com](https://www.HartEnergyConferences.com)

middle of a global pandemic and massive supply chain disruptions—is already leading to catastrophe.

So, how can the energy crisis be avoided?

While renewable energy advocates claim the current issues are the result of a global failure to more fully embrace renewable energy sources, the report finds that the answer isn't all that complicated.

The world will continue to see demand for oil and gas, with fossil fuels being the foundation of the gigantic energy complex. The U.S. Department of Energy forecasts global energy demand to rise another 47% over the next 30 years, with oil remaining the most crucial fuel.

While renewable energy sources should be a component of the global energy framework, the report pointed out that working to eliminate the energy sources like oil and natural gas that have transformed the global economy and raised billions out of poverty is “exceptionally shortsighted.”

Instead, world economies must continue to rely on oil and natural

gas while incorporating renewable energy sources as appropriate, the report said.

—Faiza Rizvi

## **Energy experts discuss the keys to hydrogen's success**

Just about all of the ingredients are there to transform potential into reality for a robust hydrogen market: abundant resources, underground storage, infrastructure, a market on which to build and technological expertise.

However, taking hydrogen—whether it's green, blue or another color—to the next level will require addressing some critical needs, including driving down costs, experts said during a recent hydrogen-focused virtual event.

“One of the ways we're going to get the cost down is the economies of scale, but economies of scale don't work when it's too expensive to start with,” said Bob Hebner, director of the University of Texas at Austin's Center for Electromechanics.

R&D must go hand in hand with economies of scale, he added.

“To do that, we need better materials; we're going to [need] better controls. We're going to need to really take advantage of the promise that hydrogen storage has,” Hebner said, noting large underground storage caverns and the ability to store energy for longer can be a game-changer for the grid. “Suddenly, you can start storing energy for half a year. Or you can store hydrogen at one point in one location and transport it to another location and generate electricity there.”

The insight was shared amid ambitions by many across the globe to transition to cleaner forms of energy. Mostly used today for refining oil, producing fertilizer and treating metals, experts believe hydrogen's ability to generate electricity and fuel vehicles via hydrogen fuel cells could boost the transition to a low-carbon energy system.

Hydrogen, the most plentiful and lightest element on earth, is seen as a cleaner alternative to fossil fuel-based



## Stepping up to the challenge.

As the economy recovers from the pandemic, BKD continues to stand firm in our commitment to helping you mitigate the financial effects. Our trusted advisors are ready to help you navigate the current environment and meet your business needs with protection measures and cost recovery strategies.

Everyone needs a trusted advisor.  
Who's yours?

**BKD**  
CPAs & Advisors

[bkd.com/energy](http://bkd.com/energy) • @BKDEnergy

sources—specifically natural gas, which is used to produce gray (most common today) and blue hydrogen (which incorporates carbon capture and storage)—used to generate electricity. Green hydrogen relies on renewable sources such as wind and solar power to generate electricity. The electricity is used to split water into separate hydrogen and oxygen molecules by way of a process called electrolysis, using an electrolyzer.

While green hydrogen is the most sustainable of the hydrogens, it remains the most expensive to produce. However, falling renewable power costs is helping to improve economics. As noted in a 2019 International Renewable Energy Agency (IRENA) report, costs for electrolyzers are falling as the technology scales and evolves.

“Electrolyser costs are projected to halve by 2040 to 2050, from US\$840 per kilowatt (kW) today, while renewable electricity costs will continue to fall as well,” the report stated. “Renewable hydrogen will soon become the cheapest clean hydrogen

supply option for many greenfield applications.”

To be competitive, green hydrogen must be generally produced at less than US\$2.50/kg, depending on the market and other factors, according to IRENA.

Researchers continue to advance technology, finding ways to use different materials to get hydrogen from water more economically. Researchers at the University of Central Florida have created a nanomaterial to successfully get hydrogen from seawater.

The key is understanding nature well.

In simple terms, purified seawater plus solar light equals hydrogen with nanoelectrolysis.

“If we can directly harvest the solar energy and combine with the blue ocean, that will always generate the green hydrogen for us to use for free,” said Dr. Yang Yang, an associate professor at the university’s Nanoscience Technology Center.

Electrolyzers are sensitive to the purity of water, Yang added, noting heavy metals or other

organic things found in water can damage the electrolyzer.

However, the nanomaterial created—made of nickel selenide with added iron and phosphor—enhances the efficiency and stability required for industrial-scale electrolysis, while cost-effectively balancing competing reactions of elements typically found in seawater, he explained.

“We are trying to use solar panels to generate electricity combined with the electrolyzer to directly harvest hydrogen from the ocean,” Yang said.

The technology is one of many steps backers of hydrogen development are working to push at the Bowman Centre for Sustainable Energy in Ontario.

“One of the problems we have is at a commercial scale, the kind of scale that we produce gasoline, we really don’t have a green hydrogen supply,” said Ed Brost, an associate at the center. “In addition, we don’t have a market for green hydrogen, partly because it’s so expensive. In a sense, we have the classic chicken and egg story here.”

—Velda Addison



**TENEX**

*Pioneering Materials-Based Chemical Technologies for Oil & Gas*

TenEx offer’s a suite of exceptional and proprietary technologies to revolutionize the oil & gas industry by focusing on generating the lowest cost per barrel using innovative and cost-effective products that can be tailored to every reservoir.

[www.PumpMoreOil.com](http://www.PumpMoreOil.com)

# HOW DEALS WORK NOW

Just as the E&P sector changed its focus from growth and even sprawling net acreage to capital discipline, dealmaking in 2021 and beyond has been altered into a single question: Does it make money?

ARTICLE BY  
DARREN BARBEE

The notion that capital discipline extends only to the drill bit was firmly vanquished in 2021 as the deal activity that dominated in the public arena followed a rudimentary formula: cash flow good, growth bad.

The key theme for deals in 2021, and which extends through the first month of 2022, was that free cash flow was not a mere part of the equation but the entire algorithm.

As Mike Kelly, chief strategy officer for Northern Oil and Gas Inc., recently said at an Independent Petroleum Association of America (IPAA) event, public companies are more or less pinned to cash flow.

“Investors have spoken; they want dividends, they want share buybacks. They want production that’s flat,” he said.

Caveat emptor suddenly returned to the buyer mindset. The rules of upstream dealmaking were amended, recodified and significantly altered to comport with the industry-wide mantra to seek out free cash flow and boldly forgo (at least for now) unbridled, unchecked growth.

For some buyers, value models now segregate PDP wells into those with established declines. Wells are also analyzed on the basis of potential positive or negative decline revisions. New wells with less production are treated differently. The bid-ask spread narrows or widens accordingly.

Net asset value assumptions were packed up, and what was unboxed was a new model that evaluates transactions based on returns-based finances with an almost paranoid skew toward the downside.

Deals shifted to a clinical, returns-based approach that generally places asset worth at a lower but more predictable baseline, according to Joseph Small, head of U.S. oil and gas activity at CIBC.

Buyers now tend to test and retest downside risks, evaluating assets at \$40/bbl WTI and \$2/Mcf natural gas prices, before they’re willing to pull the trigger on deals. In some cases, the risk buyers are willing to take has narrowed to a subtle allowance for reduced LOE, a contrast to the days when buyers envisioned \$100 WTI and a quick exit within a few years, Small said speaking on a panel at the IPAA’s Private Capital Conference on Jan. 20.

“At the end of the day, those cash flow comps, they don’t lie. That’s the real deal,” he said. “That’s the money speaking. That’s what they’re paying.

CIBC looked at 30 transaction comps from 2021 and found the average deal, based on cash flows, returned 3.4x, and in the Permian Basin, 3.2x.

“If you’re coming up with something that says there’s going to get 6.0x cash flows, and there’s been 30 deals that are between 3.0x and 3.5x, there better be a damn good reason for that.”

The old premise of burning through some inventory and exiting in three to five years also went by the wayside. Deals were all structured, Small said, with an exit horizon of six to eight years with the built-in assumption of little growth. Instead, successful transactions worked at prices that made economic sense within cash flow without adding rigs from day one.

“So, it ends up with a flat production profile, a flat cash flow profile,” he said. “Then you’re keeping it for eight years. You’re not making some crazy exit assumptions” based on selling the asset at a premium.

Buyers were also keener to factor in actual risk as real rather than a far-off notion someone else would have to juggle.

In a pronounced shift toward responsibility, plugging and abandonment (P&A) obligations, for instance, were thrown into the mix.

“P&A is part of the model of any sophisticated counterparty to a transaction we’ve focused our attention on,” said Rusty Shepherd, managing director at RBC Richardson Barr. “We’ve developed a realistic view of that. You can’t just defer at all to the end of life anymore. It has to be something that’s well thought out and documented as far as when those expenditures ... in the life of any model. And if you’re not including that, then you’re doing your client a bit of a disservice.”

## Trick tapes

Downside commodity price risks also supplanted the sunny upside optimism that ruled prior to the downturn.

“No one’s running [projections] at what it’s like at \$100 oil,” Small said.



**Rusty Shepherd,** managing director at RBC Richardson Barr, said that stable commodity prices promote a healthy A&D market.

Kelly was also struck by the turnabout in how deals were valued. Acreage was no longer the beginning and end of working out what something was worth.

"I couldn't believe it. The value that we used to place on acreage prior to 2018 ... 80% [of the value] was the acreage value. And it's just not the case anymore," he said. "It just feels good to be able to buy something kind of close to PDP value."

That doesn't necessarily make for happy dealmakers.

Rising commodity prices and associated grousing by dealmakers is not a new phenomenon.

The gripe is that variable prices can widen the bid-ask, causing buyers and sellers to hold off on deals until they feel more confident in the price of the asset.

Through the first 35 days of 2022, prices have been a series of starter gun shots, jolting the marking. Even factors that might have helped steady oil and gas prices haven't stopped runaway prices. OPEC production remains less robust than expected, the intensity of Omicron hasn't spurred new lockdowns and even geopolitical uncertainties (between, say, the U.S. and Russia) remain wait-and-see events.

Shepherd said that stable commodity prices promote a healthy A&D market. While a run up in prices is always appreciated by the industry, "it's also much more difficult to get buyers and sellers to sit down at the table and have an intellectually honest conversation," he said. The disconnect comes within timeframes. Sellers' eyes are on current strip prices while buyers have to live with the results of the deal three to five years out.

The market tends to see the value of oil and gas well locations more conservative and undeveloped resources at a more conservative commodity price.

Higher prices are good, but they're "not helping the story in terms of getting deals done," Shepherd said.

On the opposite end, hedges have caused companies that were protecting against even further downside risk to now forgo huge amounts of revenue. The Permian's Pioneer Natural Resources Co., for instance, lost more than a half billion dollars in third-quarter 2021.

CIBC's Small said those hedges also serve as speed bumps to getting deals done.

"We had a couple of gas deals where people hedge for the next three years at \$2.50 (per Mcf)," he said.

So an asset with a value of \$400 million may also have a \$100 million unwind it has to go through because a company hedged its production.

Most deals, Small said, are now more like checking math equations than spinning once fanciful growth stories. As Small heard one analyst explain, whether a company produces oil, gas or toilet paper, what's important is how well the company's finances will hold up over time.

The idea that a buyer "can't really count on some massive exit to cover everything" invested in the business.

"There are fewer large operators, meaning it's really important to think about the long-term relations with them and collaborating."

—Christi Clancy,  
Shell

### Glory of the Delaware

Few basins garnered more attention than the Delaware, which last year attracted the top seven deals and accounted for 35%—\$22 billion—of 2021 deal values, said Christi Clancy, commercial general manager for U.S. shales at Shell, who also participated on the IPAA conference panel.

The Delaware Basin is now highly constricted, which has led to an increased focus on cashless land swaps that don't change an E&P's portfolio but high-grade positions. Overall, Clancy said there were 17 Delaware Basin transactions with an average value of \$1.4 billion.

"I think acquiring a new material position in the basin has gotten quite challenging," she said. "There are limited remaining large investments available. The recent consolidation and field development has basically driven up new entry prices."

The degree of consolidation has put the largest 15 operators in the Delaware Basin in control of about 80% of the basin's undeveloped resources, with the top five operators controlling about 50% of its resources.

Little released, attractive acreage remains in the core of the play, she said. That's resulting in companies engaging in acreage swaps, which require limited upfront investment plus a great deal of cooperation among leaseholders.

"A lot of the western and southern parts of the Delaware Basin is checkerboarded," she said.

Primary goals for companies are to secure long laterals, reduce breakeven prices and high-grade asset portfolios back into the core where possible and "optimize use of mid-stream infrastructure," she said.

While the exact number of swaps done is unknown since they're unreported, it remains a special challenge for companies as they try to align their valuations with those of four or five operators in a section, as well as differing royalty interests across verticals and horizontals.

"Landing these deals has become very time-consuming," Clancy said. "We had a three-section swap probably go on for two years. And it was brutal."

Shell was able to do about 15 such transactions in 2021, ranging in size from 60 net mineral acres to 5,000 acres, she said.

Clancy said relationships continue to play a big part in how transactions are conducted.

"There are fewer large operators, meaning it's really important to think about the long-term relations with them and collaborating," she said. "Because people remember." □



**"No one's running [projections] at what it's like at \$100 oil," said Joseph Small, head of U.S. oil and gas activity, CIBC.**



**"I think acquiring a new material position in the [Delaware] basin has gotten quite challenging," said Christi Clancy, commercial general manager for U.S. shales at Shell.**



# MOST INTRIGUING DEALS OF 2021

These deals were giant, unexpected or perhaps just haven't received the attention to deserve. Here are five of the more intriguing deals of 2021 and what they could mean (or not) for 2022.

## One Permian to rule them all

Pioneer Natural Resources Co. CEO Scott Sheffield has been forging the One Ring for some time, first with his acquisition of Parsley Energy in 2021, then the acquisition of DoublePoint Energy, which created further synergies.

1

**What's to like:** The Permian powerhouse added muscle to its muscle in the Midland Basin and generated \$1.1 billion in free cash flow in third-quarter 2021. The company has also liquidated its remaining hedges.

**But?** What to do with all that Delaware Basin acreage? It found a willing buyer and closed the transaction in December for \$3.25 billion. (See below).

**Potential payoff:** Subtracting the Delaware assets made Pioneer the largest pure-play Midland Basin operator. In the past three months, the company has increased its market capitalization by 20% to roughly \$56 billion.

**Key metrics:** It's the Permian. Also, Pioneer projected \$175 million in annual cost savings, representing a net present value of \$1 billion in cost savings over a decade.

**Moves the needle?** Pioneer planned to deliver \$525 million in synergies by year-end, Cowen analyst David Deckelbaum said in August. G&A and interest savings of at least \$115 million are already realized. And like any good consolidator, Pioneer idled two of DoublePoint's seven rigs after the deal was closed.

## Mother of pearl

Colgate Energy Partners III LLC made a trio of purchases in 2021 in the Permian Basin, two with seller Occidental Petroleum Corp., totaling at least \$700 million.

Colgate executed what Christi Clancy, commercial general manager for U.S. shales at Shell, called a "string of pearls" strategy, forming an IPO-ready portfolio with assets in Reeves and Ward counties, Texas, and Eddy and Lea counties, N.M. Incidentally, the company is backed by Pearl Energy Investments and NGP.

2

**What's to like:** A tale of patient capital. Colgate, founded in 2015, made its first \$280 million acquisition in 2018 in Ward and Reeves counties, Texas, then went into (apparent) deep hibernation until last year.

**But?** The company's IPO trial balloon stirred great curiosity concerning the prospects of an oil and gas IPO. However, the company is just as likely to sell if the right offer comes along or just go on printing cash while private. Only time will tell.

**Potential payoff:** A source familiar with Colgate's thinking told *Oil and Gas Investor* the company values its assets at \$5 billion. Others say \$4 billion. Both are big numbers.

**Key metrics:** The company holds 108,000 net acres in New Mexico and Texas with estimated average daily production of 62,000 boe/d. A third deal early last year added the bankrupt but attractive assets held by Luxe Energy.

**Moves the needle?** A successful IPO would signal that investors are convinced E&Ps have atoned for their profligate spending, but E&P cash cows may be too late to prevail against the unrelenting winds of ESG change.

## 'Basin dominance'

Chesapeake Energy Corp.'s pain in the pandemic downturn brought it to bankruptcy after emergence from bankruptcy in February 2021 led it to renewal as one of the largest underdogs in U.S. shale.

With its eyes set on adding cash flow, in November it found its target in the Haynesville Shale with a \$2.2 billion merger with newly public Vine Energy.

 **What's to like:** Chesapeake's first acquisition since the 2018 merger with Eagle Ford oil-producer WildHorse Resource Development Corp. for nearly \$4 billion returned it to its gas roots in the Haynesville. The deal increased Chesapeake's Haynesville and LNG export exposure to 348,000 net acres with, Goldman Sachs noted, the transaction free cash flow accretive this year.

 **But?** Hedge losses for fourth-quarter 2021, including a \$538 million hit from gas hedges, will temporarily dampen the party. Wells Fargo senior analyst Nitin Kumar noted in January that strip prices have also come down sharply since October, which could put some pressure on Chesapeake's free cash flow estimates.

 **Potential payoff:** In rough numbers, Fitch Ratings estimated Chesapeake's positive free cash flow would rise

to \$600 million between 2022 and 2024 before dividends. The post-bankruptcy advantage of almost no debt—less than 1x—held fast for Chesapeake.

 **Key metrics:** CIBC calculated the deal would generate 4x cash flow returns during the next 12 months. Chesapeake added 123,000 net acres, nearly all in the dry-gas Haynesville in Louisiana and added Vine's 1 billion cubic feet per day of gas production.

 **Moves the needle?** As Wood Mackenzie noted, Chesapeake's deal added it to the list of companies taking a "basin dominance" growth strategy that could potentially force competitors to take on larger consolidation roles.

3

## The 'Dude' of deals

If there was one giant Big Lebowski deal—a mix of je ne sais quoi and the unexpected pleasure of bowling—to come out 2021, it was Continental Resources Inc.'s step into the Delaware Basin via an acquisition from Pioneer Natural Resources. Repeated examination of the transaction will likely transform the market's initial befuddlement into a potential classic.

 **What's to like:** Continental's \$3.25 billion all-cash deal announced on Nov. 3 sets it up as an instant player in the Delaware with 92,000 net acres and average daily production of 52,000 boe/d of production. The deal added 650 gross locations in the Third Bone Spring/Wolfcamp A and B.

 **But?** The immediate question on investors' minds was what this might mean for Continental's Bakken inventory. CEO William Berry told *Oil and Gas Investor* in February there are no issues with the company inventory either in the Bakken Shale, where Continental has nine rigs running—3x more than its nearest competitor. "There's still a lot of good inventory in the Bakken," Berry said.

 **Potential payoff:** Continental had previously considered a deal roughly 20 years ago in the Delaware, but, well, its replete Bakken inventory was working just fine for them. They know the rock. The company now felt the time

was right to execute based on a willing seller in Pioneer, headed by Scott Sheffield, who has a known bias for Midland over Delaware acreage.

 **Key metrics:** Continental, with additional acquisitions in the Powder River Basin, maintains 1.0x net debt to EBITDAX by year-end 2022 at \$60 WTI, which is conservative based on February strip prices. The company also said about 75% of its purchase prices was for PDP, meaning any upside was purchased at a healthy discount.

 **Moves the needle?** Though more deals have recently been made by Continental in the Powder River Basin, Harold Hamm and company are not the types to guess on asset quality. They're rock specialists. Looks like the band is getting back together.

4

## Co-basin parenting

Through most of 2021, Coterra Energy Inc. was not a household name for investors, largely because it didn't exist. Formed by the merger of Cabot Oil & Gas Corp. and Cimarex Energy Inc., the so-called merger of equals, Cimarex and Cabot's \$9.25 billion merger is an analyst darling even though it remains undervalued in the market.

 **What's to like:** Cabot's 173,000 Marcellus Shale acres and Cimarex's 560,000 net Permian and Anadarko Basin acres give returns to the E&P pure-play alternative: optionality amid two different commodity commodities. As natural gas and oil prices have risen, the company can throw off cash flow even if either commodity tanks and even, to some extent, if both do, according to analysts.

 **But?** Some analysts have fretted that Coterra's Marcellus Shale Tier 1 inventory is limited.

 **Potential payoff:** The company boasts a diversified commodity mix to oil/NGL while maintaining upside exposure from higher gas prices this winter depending on weather demand, Goldman Sachs said. In January, Wells

Fargo noted that Coterra's shares had massively underperformed in 2021, with the company up 17% compared to the XOP Index's 64% increase.

 **Key metrics:** CIBC sees the company with the ability to generate greater than 6.0x cash flow. Goldman Sachs said in November it estimated a 12% dividend yield assuming 65% FCF in 2022.

 **Moves the needle?** Did we mention cash flow generation? Goldman Sachs, Wells Fargo and Tudor, Pickering, Holt & Co. have all recommended buying the stock within the past three months, with Wells Fargo making Coterra one of its "Signature Picks."

5

# US E&P ACQUISITIONS & DIVESTITURES

Deals closed from July 1-Dec. 31, 2021. All deals, updated in real time, are now available at [HartEnergy.com/ad-transactions](https://HartEnergy.com/ad-transactions).

Deal No.	Estimated Value (\$MM)	Buyer/Surviving Entity	Seller/Acquired or Merged Entity	Month Deal Closed	Comments
1	9,500	ConocoPhillips Co.	Royal Dutch Shell Plc	12	Acquired Shell's Permian business comprising approximately 225,000 net acres within the Delaware Basin located entirely in West Texas with current production of around 175,000 boe/d.
2	9,250	Coterra Energy Inc.; Cabot Oil & Gas Corp.	Cimarex Energy Co.	10	Acquired Denver-based Cimarex in an all-stock combination to add approximately 560,000 net acres in the Permian and Anadarko basins to Cabot's approximately 173,000 net acres in the Marcellus Shale.
3	3,250	Continental Resources Inc.	Pioneer Natural Resources Co.	12	Acquired Pioneer's Delaware Basin position in the Permian covering approximately 92,000 net acres in Pecos, Reeves, Ward and Winkler counties in W TX with net production of approximately 50,000 boe/d and over 650 gross operated locations in Third Bone Spring/Wolfcamp A and B.
4	2,925	EQT Corp.	Alta Resources Development LLC	7	Acquired all of the membership interests in Alta's upstream and midstream subsidiaries in the core of the NE Marcellus Shale of the Appalachian Basin; includes 300,000 net acres (98% HBP) in PA and net production of 1 Bcfe/d (100% dry gas).
5	2,700	Southwestern Energy Co.	Indigo Natural Resources LLC	9	Acquired privately held Indigo Natural Resources, adding a 149,000 net-acre position in the Haynesville Shale in LA, with 1.1 Bcf/d of net production and proved reserves as of year-end 2020 of 3.1 Tcf.
6	2,200	Chesapeake Energy Corp.	Vine Energy Inc.; Blackstone Energy Partners LP	11	Acquired Vine, an energy company focused on the development of natural gas properties in the overpressured stacked Haynesville and Mid-Bossier shale plays in NW LA.
7	1,850	Southwestern Energy Co.	GEP Haynesville LLC; Geo-Southern Energy Corp.; GSO Capital Partners LP	12	Acquired GEP Haynesville, the third largest private Haynesville operator, in a cash-and-stock transaction; includes 226,000 net effective acres with estimated net resource potential of 6 Tcfe, approximately 700 MMcf/d of production and 700 locations.
8	1,400	Civitas Resources Inc.; Bonanza Creek Energy Inc.	Extraction Oil & Gas Inc.	11	Acquired through an all-stock merger, forming Civitas Resources, with approximately 425,000 net acres in CO's D-J Basin, a production base of 117,000 boe/d and aggregate enterprise value of \$2.6B.
9	1,310	Civitas Resources Inc.	Crestone Peak Resources LLC; Canada Pension Plan Investment Board	11	Acquired privately held Crestone Peak in an all-stock transaction; pro forma company will operate across more than half a million net acres in the D-J Basin with estimated production base of approximately 160,000 boe/d and year-end 2020 proved reserves of more than 530 MMboe.
10	788	Callon Petroleum Co.	Primexx Energy Partners Ltd.	10	Acquired the private Permian operator in a cash-and-stock transaction; includes contiguous footprint of 35,000 net acres in Reeves County, TX, within the Delaware Basin and net production of about 18,000 boe/d (61% oil).
11	745	Oasis Petroleum Inc.	Diamondback Energy Inc.	10	Acquired Diamondback's Williston Basin asset in the Bakken Shale comprising approximately 95,000 net acres with estimated net production of 25,000 boe/d for full-year 2021.
12	715	Laredo Petroleum Inc.	Sabalo Energy LLC; EnCap Investments LP; Undisclosed	7	Purchased the assets of Sabalo Energy and a nonoperating partner including roughly 21,000 contiguous net acres directly offsetting Laredo's existing Howard County, TX, leasehold in the Midland Basin of the Permian; current production is about 14,500 boe/d (83% oil, three stream) and PDP reserves are approximately 30 million boe (73% oil, three stream).
13	508	Lime Rock Resources LP	Rosehill Resources Inc.	10	Bought oil and gas properties in the Delaware Basin located primarily in Loving County, TX, producing 15,163 boe/d as of the April 1 transaction effective date.
14	508	Colgate Operating LLC	Occidental Petroleum Corp.	7	Acquired roughly 25,000 net acres in the Permian in Reeves and Ward counties, TX, within the southern Delaware Basin with current production of approximately 10,000 boe/d from about 360 active wells.

Deal No.	Estimated Value (\$MM)	Buyer/Surviving Entity	Seller/Acquired or Merged Entity	Month Deal Closed	Comments
15	498	Viper Energy Partners LP; Diamondback Energy Inc.	Swallowtail Royalties LLC; Blackstone Energy Partners LP	10	Purchased certain mineral and royalty interests including 2,302 net royalty acres primarily in the Northern Midland Basin, roughly 65% of which is operated by Diamondback Energy; transaction value is comprised of 15.25 million units of Viper common stock and \$225MM of cash.
16	481	Percussion Petroleum LLC; Undisclosed	Oasis Petroleum Inc.	7	Bought, in three separate transactions, Oasis' Permian position consists of approximately 24,000 net acres in the core of the Delaware Basin in W TX producing about 7,200 boe/d; Percussion Petroleum was buyer of primary transaction valued at \$375MM that includes contingent payments tied to future oil prices.
17	480	Paloma Partners VI Holdings LLC; EnCap Investments LP	Goodrich Petroleum Corp.	12	Acquired Houston-based Goodrich, which has acreage positions in the Haynesville Shale in N LA and E TX, the Tuscaloosa Marine Shale in LA and MS and the Eagle Ford Shale trend in S TX.
18	450	Warwick Investment Group	Rosewood Resources Inc.	9	Acquired Rosewood Resources operated oil and gas assets in the TX Eagle Ford Shale; combined purchase price and anticipated development capital represents an incremental commitment of roughly \$450MM to the Eagle Ford for Warwick.
19	419	Diversified Energy Co. Plc; Oaktree Capital Management LP	Tapstone Energy LLC	12	Bought upstream assets, field infrastructure, equipment and facilities in the Midcontinent region of OK; includes about 660 net operated wells producing roughly 12,000 boe/d (over 80% natural gas and NGL).
20	405	Undisclosed; Sixth Street Partners LLC	Laredo Petroleum Inc.	7	Bought operated PDP reserves in gas-weighted legacy assets in Reagan and Glasscock counties, TX, in the Permian Basin; comprises 37.5% of Laredo's WI in the assets, wellbore WI only, and does not include undeveloped locations.
21	370	Ranger Oil Corp.; Penn Virginia Corp.	Lonestar Resources US Inc.	10	Acquired Fort Worth, TX-based Eagle Ford Shale producer Lonestar Resources in an all-stock transaction including the assumption of \$236MM of net debt.
22	271	Whiting Petroleum Corp.	Undisclosed	9	Acquired 8,752 net acres in Mountrail County, ND, adjacent to existing operations in the Sanish Field within the Williston Basin, with net daily production of approximately 4,200 boe/d (80% oil).
23	230	Laredo Petroleum Inc.	Pioneer Natural Resources Co.	10	Acquired for cash and stock approximately 20,000 net acres directly offsetting its existing Midland Basin leasehold in western Glasscock County, TX; includes 4,400 boe/d (59% oil, 82% liquids) of current production and 135 gross operated oil-weighted locations.
24	187	Fundare Resources Co. LLC	Whiting Petroleum Corp.	9	Bought Whiting's entire D-J Basin position, including mid-stream assets, located in Weld County, CO; includes 67,278 net acres with daily production of approximately 7,100 boe/d (51% oil).
25	180	Freehold Royalties Ltd.	Undisclosed	9	Bought a concentrated royalty land position in the core of the Eagle Ford oil basin across approximately 92,000 gross drilling unit acres in Karnes, Atascosa and Live Oak counties, TX, with an average royalty rate of approximately 1.8%.
26	180	Diversified Energy Co. Plc	Blackbeard Operating LLC	7	Purchased 123,000 net acres, 16,000 boe/d and 840 net wells in the Barnett Shale.
27	172	Ridgewood Energy Corp.	Riverstone Energy Ltd.; ILX Holdings LLC	7	Purchased Riverstone's one-third ownership interest in ILX Holdings III, a Houston-based JV focused on acquiring nonoperated working interests in oil-focused exploration projects in the GoM.
28	154	Diversified Energy Co. Plc	Tanos Energy Holdings III LLC	8	Acquired certain Cotton Valley and Haynesville assets in LA and TX that currently generate 14,000 boe/d with 40 MMboe of PDP reserves.
29	154	Northern Oil and Gas Inc.	Comstock Resources Inc.	11	Purchased nonoperated interests across over 400 producing wellbores in the Bakken Shale of the Williston Basin located primarily in Williams, McKenzie, Mountrail and Dunn counties, ND; include 65.9 net producing wells and 4,500 boe/d (2-stream, ~65% oil) of production.
30	153	Citizen Energy LLC; Warburg Pincus LLC	Undisclosed	12	To acquire 28,000 net acres (94% HBP) located primarily in Blaine, Canadian and Kingfisher Cos., OK, largely within Citizen's existing Anadarko Basin footprint; includes net production of 8,000 boe/d (58% gas, 25% NGL) from 97 operated wells and 400 nonoperated wells.

Deal No.	Estimated Value (\$MM)	Buyer/Surviving Entity	Seller/Acquired or Merged Entity	Month Deal Closed	Comments
31	150	Andros Capital Partners LLC	Midland-Petro D.C. Partners LLC	8	Formed JV to fund a development drilling program targeting the Spraberry and Wolfcamp formations on MPDC's position in the core of the Midland Basin in the Permian in Midland County, TX.
32	140	Chambers Investments LLC; Kimmeridge Energy Management Co. LLC	Callon Petroleum Co.	11	Purchased 22,000 net acres in northern La Salle and Frio counties, TX, of Eagle Ford Shale acreage noncore to Callon averaging 1,900 boe/d (66% oil) of net production during 3Q 2021.
33	127	Earthstone Energy Inc.	Tracker Resource Development LLC; Sequel Energy Group LLC; EnCap Investments LP	7	Acquired privately held operated assets located in the Midland Basin comprising about 20,300 net acres (100% HBP, 100% operated) in Irion County, TX, 7,800 boe/d (21% oil / 59% liquids) current net production from 71 wells (30 horizontal / 41 vertical), an inventory of 49 Earthstone-identified horizontal Wolfcamp locations and a \$153MM PDP PV-10 with reserves of approximately 19.8 MMboe.
34	120	Eagle Mountain Energy Partners LLC	Enerplus Corp.	11	Purchased interests in MT's Sleeping Giant Field and ND's Russian Creek area in the Williston Basin; transaction includes up to \$5MM in contingent payments tied to future oil prices.
35	102.2	Northern Oil and Gas Inc.	CM Resources LLC	8	Bought nonoperated interests across approximately 2,900 net acres located in the core of the Delaware Basin in Reeves County, TX, and Lea and Eddy counties, NM.
36	102	Undisclosed	California Resources Corp.	11	Purchase operations in the Ventura Basin producing 3,600 boe/d (about 65% oil) during 1Q 2021; agreements include additional earn-out consideration linked to future commodity prices.
37	101	Henry Resources LLC; Pickering Energy Partners LP	Centennial Resource Development Inc.	12	Purchased approximately 6,200 net leasehold acres and related assets located in Reeves County, TX, within the Delaware sub-basin of the Permian; 3Q 2021 estimated average net production associated with the acreage was approximately 1,600 boe/d (64% oil).
38	96	Brigham Minerals Inc.	Principle Energy LLC; Regal Petroleum LLC	12	Acquired 8,400 net royalty acres in the D-J Basin primarily in Weld County, CO, including 10.37 net producing wells, 1.6 net PUDs and 1.5 net drilling permits.
39	75	SilverBow Resources Inc.	Teal Natural Resources LLC; Castlerock Production LLC	11	Acquired from two sellers 17,000 total net acres in the oil window of the Eagle Ford shale play in La Salle, McMullen, DeWitt and Lavaca cos., TX, with approximately 2,500 boe/d (71% liquids / 46% oil) of net production in May from 111 PDP wells; includes over 100 net drilling locations.
40	73	Earthstone Energy Inc.	Undisclosed	11	Acquired privately held operated assets located in the Midland Basin with average daily production of 4,400 boe/d (26% oil, 52% liquids) for September and associated reserves of approximately 13.3 MMboe (11% oil, 31% NGL, 58% natural gas) plus 10,000 net acres (100% operated; 67% HBP) in Irion County, TX.
41	73	Undisclosed	Diversified Energy Co. Plc; Oaktree Capital Management LP	12	Purchased 22,729 net acres of predominantly undeveloped Haynesville Shale leasehold in Harrison, Leon, Panola, Robertson and Rusk counties, TX, and 38 gross wells producing approximately 1,700 net Mcf/d as of November, net to Diversified.
42	67	Contango Oil & Gas Co.	ConocoPhillips Co.	8	Acquired Wind River Basin assets covering approximately 44,000 net acres in Fremont and Natrona counties, WY, and a net production run rate of approximately 78 MMcfe/d (roughly 100% gas).
43	57	Kimbell Royalty Partners LP	Undisclosed	12	Purchased a multibasin mineral and royalty portfolio including over 26,000 gross producing wells concentrated in the Permian Basin (39%), Midcontinent (31%) and Haynesville Shale (14%).
44	53	California Resources Corp.	Macquarie Infrastructure and Real Assets Inc.	8	Bought the 90% working interest MIRA held in JV wells located in the company's core areas of the San Joaquin Basin in CA.
45	50	U.S. Energy Development Corp.	Undisclosed	9	Purchased a Permian project located in Loving County, TX, in the core of the Delaware Basin that includes wells targeting the Third Bone Spring, Wolfcamp A and Wolfcamp XY.
46	33	SilverBow Resources Inc.	Undisclosed	10	Acquired oil and gas assets in the Eagle Ford from an undisclosed seller in an all-stock transaction; includes 45,000 total net acres across Atascosa, Fayette, Lavaca, Live Oak and McMullen counties, TX and 1,580 boe/d (39% liquids) of net production.

Deal No.	Estimated Value (\$MM)	Buyer/Surviving Entity	Seller/Acquired or Merged Entity	Month Deal Closed	Comments
47	29	Dorchester Minerals LP	Undisclosed	12	Bought mineral and royalty interests representing approximately 4,600 net royalty acres located in 27 counties across NM, OK, TX & WY.
48	22	U.S. Energy Development Corp.	Atlantic Energy Partners LLC	8	Formed JV to to develop and operate three horizontal wells within the Permian Basin in Ward County, TX.
49		BCE-Mach III LLC; Mach Resources LLC; Bayou City Energy Management LLC	Undisclosed	9	Purchased approximately 18,200 net acres (98% HBP) of producing Anadarko Basin properties primarily across Blaine, Custer and Dewey counties, OK; includes 4,400 net royalty acres and 17 MMcfe/d of production.
50		Bowline Energy LLC	Nine Point Energy LLC	8	Purchased Nine Point Energy's Williston Basin assets through a Chapter 11 Section 363 sales process.
51		Crescent Pass Energy LLC	Armor Energy LLC; Undisclosed	9	Purchased producing assets in the northern area of the Eagle Ford play from Armor Energy plus three bolt-on acquisitions in the Cotton Valley trend in E TX.
52		Crescent Energy Co.; KKR & Co. Inc.	Contango Oil & Gas Co.; Independence Energy LLC	12	Acquire Fort Worth, TX-based Contango in an all-stock combination creating Crescent Energy, a platform targeting acquisitions of low-decline, producing upstream oil and natural gas assets with an enterprise value of about \$5.7 billion.
53		Crescent Pass Energy LLC	Undisclosed	11	Bought operated and nonoperated assets in E TX including approximately 60,000 net acres flowing roughly 12.5 MMcfe/d of natural gas weighted production across a region with multiple producing horizons.
54		Crowheart Energy LLC	The Williams Cos. Inc.	7	Formed upstream JV consolidates three legacy upstream assets into one contiguous footprint in the Wamsutter Field of the Greater Green River Basin covering over 1.2 million net acres in WY.
55		Elk Range Royalties LP; NGP Royalty Partners LP	Undisclosed	10	Purchased roughly 2,600 core net royalty acres evenly split between the Delaware and Midland basins of NM and W TX in the core of the Permian with last 12-month cash flow of \$10.8MM.
56		Ensign Natural Resources LLC	Reliance Eagleford Upstream Holding LP; Reliance Industries Ltd.	11	Bought Reliance's Eagle Ford Shale position covering approximately 62,000 net acres in Bee, DeWitt, Karnes and Live Oak counties in S TX and current net production of roughly 18,000 boe/d.
57		FireBird Energy LLC	Chevron Corp.	12	Acquired 21,000 net acres (99% operated) in the western Midland Basin of the Permian across Ector, Midland, Crane, and Upton counties, TX.
58		WildFire Energy LLC; Kayne Anderson	Hawkwood Energy LLC	9	To acquire Denver-based Hawkwood Energy, an Eagle Ford Shale operator with over 160,000 net acres in E TX primarily in Brazos and Burleson counties and over 375 operated wells producing more than 19,000 net boe/d (85% oil).
59		HEQ Deepwater; Houston Energy LP; Quantum Energy Partners	Beacon Offshore Energy LLC	8	Purchased a 20% WI in the Shenandoah deepwater development in the U.S. GoM.
60		Mesa Royalties II LLC	Undisclosed	7	Purchased a mineral and royalty portfolio in the Haynesville Shale in N LA consisting of about 15,000 net royalty acres with 472 existing PDP wells and projected NTM asset cash flow of about \$30 million.
61		Zephyr Energy Plc	Utah School and Institutional Trust Lands Administration	7	Purchased 12,260 leased acres in the Paradox Basin located on Utah School and Institutional Trust Lands Administration lands.

Deals shown are those closed during second-half 2021, involving U.S.-based assets or companies only, and having values of approx. \$20MM or more. Deals are ranked in descending estimated dollar value, when available, and then alphabetically when no value was made public or when the deal was significant but valued at less than \$20MM. Deals shown as pending may have since closed. The next E&P A&D list, covering Jan. 1-June 30, 2022, will appear in the September 2022 issue. Details on all dealmaking, updated in real time, are available at [HartEnergy.com/ad-transactions](http://HartEnergy.com/ad-transactions).

#### PENDING DEALS (AS OF JAN. 1, 2022)

62	604	Earthstone Energy Inc.	Chisholm Energy Holdings LLC; Warburg Pincus LLC		To acquire privately held Permian Basin operator with approximately 36,100 net acres and a drilling inventory of 414 gross (237 net) operated identified locations in the northern Delaware Basin in Eddy and Lea Cos., NM; current net production is about 13,500 boe/d (61% oil, 79% liquids).
63	538	Northern Oil and Gas Inc.	Veritas Energy LLC		To acquire Veritas Energy's nonop position covering 6,000 net acres in the Permian Basin (about 70% Delaware) with current production of about 9,100 boe/d (2-stream basis, 60% oil) and an estimated proved developed PV-10 of roughly \$429 million. <i>This deal closed in January.</i>

Deal No.	Estimated Value (\$MM)	Buyer/Surviving Entity	Seller/Acquired or Merged Entity	Month Deal Closed	Comments
64	222	Repsol SA	Rockdale Energy LLC		To acquire 79,000 boe/d production in the Marcellus Shale in Tioga, Lycoming and Bradford counties, PA, as the high bidder in a December bankruptcy sale. <i>This deal closed in January.</i>
65	190	Colgate Energy Partners III LLC	Undisclosed		To purchase approximately 22,000 net acres directly offset Colgate's existing position in the northern Delaware Basin of the Permian in Eddy and Lea counties, NM; includes 750 boe/d of estimated average net production and over 200 "high-quality locations."
66	67	BCE-Mach LLC; Mach Resources LLC; Bayou City Energy Management LLC	Undisclosed		To acquire, in separate transactions, additional working interest across 61 wells it operates in Kingfisher County, OK, in the STACK play and 66,000 net acres in the Mississippi Lime play with 193 operated wells primarily located in Barber County, KS, plus 16 disposal wells and corresponding gathering system.

## INDEX: U.S. E&P ACQUISITIONS & DIVESTITURES

Company	Deal	Company	Deal	Company	Deal
Alta Resources Development LLC.....	4	Eagle Mountain Energy Partners LLC.....	34	Penn Virginia Corp.....	21
Andros Capital Partners LLC.....	31	Earthstone Energy Inc. ....	33, 40, 62	Percussion Petroleum LLC.....	16
Armor Energy LLC.....	51	Elk Range Royalties LP.....	55	Pickering Energy Partners LP.....	37
Atlantic Energy Partners LLC.....	48	EnCap Investments LP.....	12, 17, 33	Pioneer Natural Resources Co. ....	3, 23
Bayou City Energy Management LLC.....	49, 66	Enerplus Corp. ....	34	Primexx Energy Partners Ltd. ....	10
BCE-Mach III LLC.....	49, 66	Ensign Natural Resources LLC.....	56	Principle Energy LLC.....	38
Beacon Offshore Energy LLC.....	59	EQT Corp.....	4	Quantum Energy Partners.....	59
Blackbeard Operating LLC.....	26	Extraction Oil & Gas Inc. ....	8	Ranger Oil Corp.....	21
Blackstone Energy Partners LP.....	6, 15	FireBird Energy LLC.....	57	Regal Petroleum LLC.....	38
Bonanza Creek Energy Inc.....	8	Freehold Royalties Ltd.....	25	Reliance Eagleford Upstream Holding LP.....	56
Bowline Energy LLC.....	50	Fundare Resources Co. LLC.....	24	Reliance Industries Ltd.....	56
Brigham Minerals Inc.....	38	GeoSouthern Energy Corp.....	7	Repsol SA.....	64
Cabot Oil & Gas Corp.....	2	GEP Haynesville LLC.....	7	Ridgewood Energy Corp.....	27
California Resources Corp.....	36, 44	Goodrich Petroleum Corp. ....	17	Riverstone Energy Ltd. ....	27
Callon Petroleum Co.....	10, 32	GSO Capital Partners LP.....	7	Rockdale Energy LLC.....	64
Canada Pension Plan Investment Board.....	9	Hawkwood Energy LLC.....	58	Rosehill Resources Inc. ....	13
Castlerock Production LLC.....	39	Henry Resources LLC.....	37	Rosewood Resources Inc. ....	18
Centennial Resource Development Inc.....	37	HEQ Deepwater.....	59	Sabalo Energy LLC.....	12
Chambers Investments LLC.....	32	Houston Energy LP.....	59	Sequel Energy Group LLC.....	33
Chesapeake Energy Corp. ....	6	ILX Holdings LLC.....	27	Shell Plc.....	1
Chevron Corp.....	57	Independence Energy LLC.....	52	SilverBow Resources Inc.....	39, 46
Chisholm Energy Holdings LLC.....	62	Indigo Natural Resources LLC.....	5	Sixth Street Partners LLC.....	20
Cimarex Energy Co. ....	2	Kayne Anderson.....	58	Southwestern Energy Co.....	5, 7
Citizen Energy LLC.....	30	Kimbell Royalty Partners LP.....	43	Swallowtail Royalties LLC.....	15
Civitas Resources Inc.....	8, 9	Kimmeridge Energy Management Co. LLC.....	32	Tanos Energy Holdings III LLC.....	28
CM Resources LLC.....	35	KKR & Co. Inc.....	52	Tapstone Energy LLC.....	19
Colgate Energy Partners III LLC.....	65	Laredo Petroleum Inc. ....	12, 20, 23	Teal Natural Resources LLC.....	39
Colgate Operating LLC.....	14	Lime Rock Resources LP.....	13	The Williams Cos. Inc. ....	54
Comstock Resources Inc. ....	29	Lonestar Resources US Inc. ....	21	Tracker Resources Development LLC.....	33
ConocoPhillips Co.....	1, 42	Mach Resources LLC.....	49, 66	U.S. Energy Development Corp.....	45, 48
Contango Oil & Gas Co. ....	42, 52	Macquarie Infrastructure and Real Assets Inc.....	44	Utah School and Institutional Trust Lands Administration.....	61
Continental Resources Inc. ....	3	Mesa Royalties II LLC.....	60	Veritas Energy LLC.....	63
Coterra Energy Inc.....	2	Midland-Petro D.C. Partners LLC.....	31	Vine Energy Inc.....	6
Crescent Energy Co. ....	52	NGP Royalty Partners LP.....	55	Viper Energy Partners LP.....	15
Crescent Pass Energy LLC.....	51, 53	Nine Point Energy LLC.....	50	Warburg Pincus LLC.....	30, 62
Crestone Peak Resources LLC.....	9	Northern Oil and Gas Inc.....	29, 35, 63	Warwick Investment Group.....	18
Crowheart Energy LLC.....	54	Oaktree Capital Management LP.....	19, 41	Whiting Petroleum Corp.....	22, 24
Diamondback Energy Inc.....	11, 15	Oasis Petroleum Inc.....	11, 16	WildFire Energy LLC.....	58
Diversified Energy Co. Plc.....	19, 26, 28, 41	Occidental Petroleum Corp. ....	14	Zephyr Energy Plc.....	61
Dorchester Minerals LP.....	47	Paloma Partners VI Holdings LLC.....	17		



# Energy ESG

## AWARDS

POWERED BY  CLEAR RATING

# Submit Your Nomination

## Energy ESG Awards Program

Hart Energy is recognizing innovations in reducing environmental impact, social efforts and community contributions, as well as leadership practices/directives and company cultures within a corporate structure.



Nominations are open to producers, operators, services companies and midstream companies in the oil and gas industry. Winners are chosen based on achievements, not only on goals. This includes completeness of company disclosures, internal measurement metrics and methodology, benchmarked against UN and Value Reporting Foundation standards, ESG performance against industry metrics, and proprietary Clear Rating formula and metrics.

Awards will be presented during Hart Energy's upcoming Energy ESG conference, October 2022, in Houston. These ESG champions also will be highlighted with in-depth profiles inside a special section of the November issue of *Oil and Gas Investor*, *HartEnergy.com* and on social media platforms.

**Nominations must be submitted by Aug. 31, 2022.**

**HART**ENERGY

[hartenergy.com/energy-esg-awards](https://hartenergy.com/energy-esg-awards)

# THE NEW ROUTE TO OIL AND GAS OWNERSHIP



EnergyFunders CEO Laura Pommer spoke with Hart Energy about a new private equity model for oil and gas that also offers access to Bitcoin mining.

INTERVIEW BY  
MARY HOLCOMB

**A**s the energy transition shifts the industry to a low-carbon future, the private investment structure is being upended by a crowdfunding startup, according to Laura Pommer, who is leveraging her expertise as a geologist to build up the online investing platform, EnergyFunders, where she serves as CEO.

Founded in 2013, Houston-based EnergyFunders connects accredited investors with investment opportunities in oil and gas assets. The firm provides a new model to eliminate the

---

“EnergyFunders is a new concept, and our ultimate goal is to disrupt the energy funding industry.”

expenses standing between investors and well-head economics, delivering direct cash flow returns from both development wells (PUDs)

and already-producing wells (PDPs), Pommer said.

Additionally, the firm has partnered with cryptomining experts to create mobile bitcoin mining units. These mobile units convert well-head natural gas into Bitcoins at the well site, for efficient and cost-advantaged mining.

Pommer joined EnergyFunders to lead the organization after previously serving as CEO and lead geologist of Century Natural Resources, an E&P company in Wyoming's Powder River Basin she helped launch in 2018 with a \$75 million private equity sponsorship. Before joining EnergyFunders, she also provided prospect consulting as the owner of Bolder Exploration.

Pommer gave an exclusive interview with Hart Energy to discuss her efforts to disrupt the traditional energy funding model.

**MARY HOLCOMB:** You're introducing a new way to do energy funding. How do you pitch this to interested investors considering this can be perceived as a high-risk endeavor?

**LAURA POMMER:** One of the great things about the EnergyFunders platform is we provide investors with multiple different fund options with different styles of investment suited for different risk profiles.

This includes a Yield Fund, focused on lower-risk proven reserves, as well as a Wildcat Fund for investors looking to take more risk in pursuit of higher returns. These are traditionally unapproachable assets for your everyday investor, and we're excited to offer people the opportunity to perform their due diligence and find a fund style that works for them.

Plus, we now offer funds that provide fractional interests in Bitcoin mines, which means that you get the benefit of mining, and you get to be a part owner in a mine. Instead of buying a Bitcoin on Coinbase, or something like that, you can invest with us and we actually mine the Bitcoin, which is cheaper than buying Bitcoin. There's literally no other company who's doing anything like this. So it's super novel, and the fact that we're using energy that would otherwise be wasted, I think, is really important.

While Bitcoin mining can also be a risky endeavor given the volatility of bitcoin prices, we believe our mining approach can give investors a cost advantage, by getting exposure to a mining process that can produce Bitcoins at a cost basis below the market price.

My whole goal is to democratize mine ownership because I think the point of Bitcoin is to be democratic—it's supposed to be owned by everyone. But the problem is that he who owns the energy is the one who ultimately will own the Bitcoin, and very many people in the world don't own energy or land or water or anything that can create electricity, so you have to pay to do those things.

**MH:** How would you explain what Bitcoin mining is, and what makes it a good fit for oil and gas?

**LP:** Bitcoin mining is simply using a computer to solve algorithms that are specifically built

for running the Bitcoin network. When the computer solves the Bitcoin algorithm, you get rewarded with a bitcoin.

Ultimately, it's a really good fit for oil and gas because oil and gas is all built on energy. We're extracting energy from the earth, so one of the ways that you can get electricity is from converting natural gas into electricity through a generator. So when we're mining Bitcoin on the well site, we attach these generators to our natural gas wells, and then we put little mobile units on the well site that have a bunch of computers in them that are all mining Bitcoin. All you really need is electricity, and once you have electricity, you can pretty much go and start your mine.

**MH:** Describe the process of scoping out acreage for deals. As a trained geologist, has that made the exploring process easier considering you already know what makes "good rock"?

**LP:** I've worked at public companies, a large public company and then several smaller private companies—one of which I founded—so my whole career has been about reviewing deals and trying to determine if they're going to be good or bad. It's been my job for about 15 years, and I've gotten pretty good at it.

Of course, with any sort of oil and gas project, there's always the risk of something not panning out. But we're doing our best to mitigate that risk at EnergyFunders by not putting all of our investor's capital into one project. We put them into multiple wells, around 10 wells at this point. This could change in the next fund that we raise, but we're putting our capital into multiple wells and because of that, you decrease your concentration risk—the risk of one of your wells hitting a dry hole or having problems. So your likelihood of a successful outcome overall becomes higher by doing that.

**MH:** What assets would you say are not the most valuable and profitable that you offer to your clients?

**LP:** Wildcat wells can be very, very, very profitable if you have a good geologist, a good engineer who has taken a look at the projects and really made sure that they are low risk. Wildcat wells can offer returns of 10 times or more if you're lucky, but the chances of a wildcat well paying off are relatively low. In general, there's about a 30% chance that a wildcat well will produce oil or gas.

Bitcoin mining can be very profitable as well. Based on the modeling we've done, we believe there's opportunity to generate 100% or greater IRRs. Of course, the biggest underlying assumption here is what the bitcoin price does, right? Frankly, Bitcoin mining from an operational perspective and an execution perspective is relatively low risk. The only risk that you're really incurring in Bitcoin mining is commodity price—whether it's going to be high or low.

“The team has been working really well together, and our long-term goal is to be the new private equity model, focused on generating higher returns and taking less money from our investors’ returns.”

**MH:** Who can become an investor?

**LP:** Right now we only accept accredited investors, which the SEC [Securities and Exchange Commission] defines as people who make \$200,000 a year or more, or couples who make \$300,000 or more a year, or you have a million-dollar net worth.

For now, this does maybe prevent us from fully democratizing the energy space, but our goal eventually is to offer a Series A, or a regulatory A fund, which means anybody can invest. But right now, we’re limited to people who are considered accredited by the SEC. So our target audience are accredited investors who are interested in alternative investments and people who are interested in crypto.

**MH:** What is the biggest challenge that energy investors are facing right now, and how is EnergyFunders positioning itself as a new solution for them?

**LP:** EnergyFunders is a new concept, and our ultimate goal is to disrupt the energy funding industry. Traditional funding for oil and gas is very expensive. You can invest in public energy companies but then you’re paying the indirect costs of corporate overhead, potentially bloated budgets and things like high executive compensation rates. You also have zero impact on what’s happening with your money.

Alternatively, you can go the private equity route if you’re wealthy enough to invest in private equity, but they charge fees based on the Two and Twenty model, which means that they’re charging you an upfront fee. And then they’re charging you another 20% at the end of the investment, so it’s very expensive to do.

The other big risk facing investors right now is inflation, which is approaching 7%—the highest rates of the last 40 years. EnergyFunders provides exposure to the two asset classes that we believe offer great inflation protection—energy and Bitcoin. Energy has traditionally been one of the best inflation hedges.

And then more recently investors are increasingly considering bitcoin as a way to protect themselves from inflation. Most of our investors are alternative investors who are looking for hedges against inflation so that they can put their money somewhere where it can still continue to grow and avoid losing purchasing power.

**MH:** Is EnergyFunders the new way to do private equity?

**LP:** Yes, I would say we are trying to replace private equity. EnergyFunders offers a new private equity model by offering retail investors access to opportunities for great returns and also really good tax benefits available to people who directly invest in oil and gas.

We also approach running the business in a different way from the traditional oil and gas investment model. Right after I joined, we did a total brand overhaul. We brought new employees in house, including mostly women, and who all have oil and gas or technology experience. The team has been working really well together, and our long-term goal is to be the new private equity model, focused on generating higher returns and taking less money from our investors’ returns.

**MH:** So you foresee EnergyFunders threatening today’s private equity structure down the road?

**LP:** Oh, yeah. Not right now, but the idea is there for sure. I think we’re still pretty small. Ultimately, I’d love to have a couple hundred million dollars in assets under management. Frankly, I don’t think it’ll be very long before we get there. A lot of those bigger private equity shops have millions and billions of dollars under management. I think we’ll get there. It’s just a matter of scaling up as quickly as possible. We are still a startup now, and my main goal is to make us a viable business model that can displace private equity. I’d like to eventually just kind of run oil and gas investing.

**MH:** Looking ahead, what is next for EnergyFunders, and what does the successful integration of Bitcoin mining and energy finance look like to you?

**LP:** We are opening two new funds in January; we’re opening a Bitcoin mining only fund and a Wildcat fund. The Wildcat fund is higher risk and potentially higher reward, and we’re excited to offer it because we know that a lot of our investors are really into that more aggressive style of investing.

With the Bitcoin mining fund, we’ve had so much good feedback about our approach of offering fractionalized Bitcoin mine ownership. People also love the off-grid angle, powered by natural gas that might otherwise be wasted. We’ve seen a lot of interest, so I think that fund is going to fill very quickly.

We also have plans for green energy and other alternative funds. Hopefully within the next year or two we’ve got \$200 [million] to \$500 million under management. We’re cruising, and we’re making amazing offerings to our investors; we’re saving them money, we’re putting money back into their pockets and we’re protecting them from inflation.

Even though oil and gas has a pretty bad reputation from an ESG perspective, there are ways to do it correctly. And, I think that the way that EnergyFunders is doing it is correct. We partner with only the best, and that’s how I want it to be. With our five year plan, I see us being the Robinhood of oil and gas and Bitcoin mining. □

# 25 **INFLUENTIAL** Women IN ENERGY

## NOW ACCEPTING NOMINATIONS FOR 2023

*Oil and Gas Investor* invites you to nominate an exceptional industry executive for its 6th Annual **25 Influential Women in Energy** program. Help us celebrate women who have risen to the top of their professions and achieved outstanding success in the oil and gas industry.

Past honorees have included professional women from entrepreneurs to producers, midstream operators, service companies and the financial community. They've represented varied disciplines including engineering, finance, operations, banking, engineering, law, accounting, corporate development, human resources, trade association management and more across the upstream and midstream sectors. All nominees will be profiled in a special report that will mail to *Oil and Gas Investor* subscribers in April 2023.

The  
deadline for  
nominations is  
December 16,  
2022

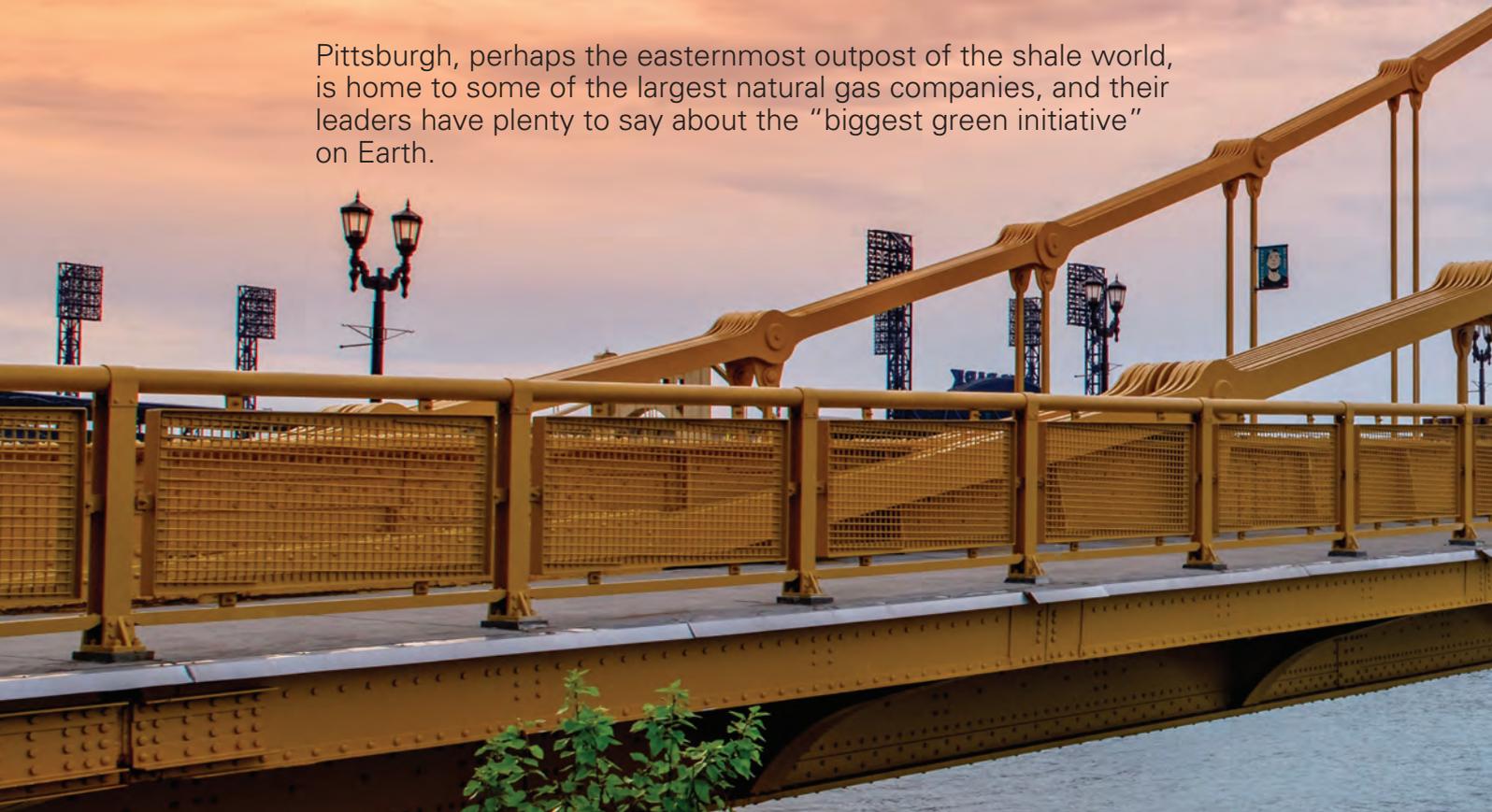
HARTENERGY

[InfluentialWomenInEnergy.com](https://www.InfluentialWomenInEnergy.com)

Oil and Gas  
Investor

# THE ALLEGHENY'S ANTIHEROES

Pittsburgh, perhaps the easternmost outpost of the shale world, is home to some of the largest natural gas companies, and their leaders have plenty to say about the “biggest green initiative” on Earth.



ARTICLE BY  
DARREN BARBEE

The city of Pittsburgh, especially in the winter, seems perpetually locked in a slate hue, either of color or mood, brought into clear distinction by the yellow bridges, one named for Andy Warhol, that span the murky Allegheny River.

Though not a clear division, the river serves to bifurcate part of downtown’s business sector from shopping, museums and PNC Park, the ballpark guarded by the statues of Roberto Clemente, Bill Mazeroski and other Pittsburgh Pirates legends.

Downtown, the buildings are a mix of health-care, banks, hotels and, in more recent years, the natural gas companies that have taken over vertical slots in the skyline. EQT Corp.’s building is seemingly most prominent among them, perhaps because it has lately become one of the leading E&P kingdoms here.

It has not always been so. Pittsburgh has had a rocky and explosive history with methane. Before that, it was known as the Smoky City, choked and darkened by massive coal-burning to power homes and industry.

Natural gas was fleetingly the city’s savior but sputtered by the early 20th century. Only in

the past couple of decades has natural gas been restored to its former glory and, beyond that, made the city burn brighter than ever.

Pittsburgh is perhaps the easternmost outpost of the shale universe, and the leaders of some of its largest natural gas companies have plenty to say about what they offer not just the nation but the world.

Increasingly, CEOs of Pittsburgh companies have felt spurned, not merely by liberal politicians but by their northeastern neighbors in Massachusetts (who instead accept Russian LNG shipments at Boston Harbor from time to time) and gas-dependent but ideologically averse New York.

Naturally, this rubs Toby Rice, CEO of EQT, the wrong way.

“I’m from Boston. My mom still burns oil in her basement to heat her home like it’s the 1800s,” Rice said during Hart Energy’s DUG East Conference and in a subsequent interview. “To use oil is about six times more expensive than using clean burning natural gas.”

Calling it a step above burning “whale oil” for home heating, Rice said it’s one of his life goals to get his mother’s home powered by natural gas.



### **An ESG mindset**

The most relentless obstacle is a group of environmental activists who don't see natural gas, as Rice does, as a way in which to cut emissions but a false choice between all hydrocarbons and renewable sources. However, even Europe is pro-renewable.

Activists have made it difficult to construct pipelines that would allow it.

"They've basically put a wall up, cutting Appalachia and the Marcellus Shale off from serving more gas to New England," he said. "That's been about 6 Bcf/d of pipeline projects that have been canceled or delayed."

Pittsburgh has previously been at the forefront of pro-environmental leanings in the past, based on the use of natural gas. An ESG mindset, both for the general health and for more economical reasons, has long been on the brains of city's natural gas producers.

As a 1927 natural gas handbook noted, "gas leaking into the atmosphere means a continual loss in money," according to "Boom and Bust in Pittsburgh Natural Gas History: Development, Policy, and Environmental Effects, 1878–1920" by historians Joel A. Tarr and Karen Clay.

Rice sees U.S. LNG powered by the Marcellus as the biggest green initiative on the planet.

"We shouldn't be thinking about cutting down LNG exports; we should be thinking about doing more," he said.

To that end, EQT said in May it would be expanding its operating position in Pennsylvania through the acquisition of Alta Resources LLC in a \$2.9 billion deal.

EQT acquired Alta's upstream and mid-stream subsidiaries in the core of the northeast Marcellus Shale to add to its footprint in southwest Marcellus in Ohio, Pennsylvania and West Virginia. Alta's acreage position added roughly 300,000 acres in the northeastern part of the play.

But Rice remains convinced that the environmental movement represents a "very vocal minority."

"I think most Americans would agree we care about cheap, reliable, clean [energy]."

But opponents of natural gas, however, have lured politicians into more dangerous territory in which clean energy, not just reliable or affordable, is the priority, CEOs say.



***"I think most Americans would agree we care about cheap, reliable, clean [energy]," said Toby Rice, CEO of EQT Corp.***



***“The current situation this region and industry finds itself in evolved under a campaign where the reality is shrouded purposely by those looking to replace it with a mirage,” said Nicholas J. Deluliis, CEO of CNX Resources Corp.***

### **The moderate firebrand**

Baltimore was the first American city to use natural gas as a lighting system, and Pittsburgh followed in 1837, according to Tarr and Clay.

But national publications such as Harper’s Weekly said the city’s natural gas had taken over coal in a peaceful revolution.

But supplies waned. In 1892, a speaker at the Engineer’s Society of Western Pennsylvania warned, “We are going back into the smoke. We had four or five years of wonderful cleanliness for Pittsburg, and we have all had a taste of knowing what it is to be clean.

“But we are back into the smoke. It is growing worse day by day.”

At DUG East in December, Nicholas J. Deluliis, CEO of CNX Resources Corp., spoke of a similar dread as he called for a halt of the encroachment of left-wing policies that could effectively plunge the city and the national back into darkness.

Deluliis, who hosts a podcast called “The Far Middle,” sees politics inextricably linked to the energy powering small, mid-sized and large businesses.

He sees the country’s middle class in particular being eroded by a “hard left environmental movement, by the administrative state and by elite academia, at times.”

“The current situation this region and industry finds itself in evolved under a campaign where the reality is shrouded purposely by those looking to replace it with a mirage.”

He sees strident attacks against natural gas, domestic oil pipelines, petrochemicals and home gas hookups as a justification to create new rules and regulations and mandate subsidies and tax credits to build “wind farms to nowhere.”

The cost isn’t just to C-suites in offices in Pittsburgh, Houston or New York, but to anyone who he says doesn’t subscribe to the “zero-carbon mythology” of renewables.

Deluliis wants a new social contract in which the industry gives more and gets more.

Impact and severance tax paid more than \$2 billion to the commonwealth of Pennsylvania cumulatively in summer 2021.

“Do you know of any other industry that’s paid more of a fair share than we have in the past 10 years? Because I don’t.”

Deluliis said the fee structure, now a decade old, should be updated so that the industry, region and state get more out of the fees.

He also wants environmental reporting to include more rigor into regulatory importing for environmental metrics.

He’s also proposed that employees and contract service providers are targeted exclusively through local and regional hiring.

“What if we also target without our local and regional spending individuals and companies from the socioeconomically underserved communities?” he said. “We talk a lot in this industry and across all of business, rightfully so, about diversity, but I’m being geographically non-diverse by hiring and spending exclusively in the regions that we operate within.”

Deluliis also wants the industry to proactively plug abandoned wells under his new social contract.

In exchange, Deluliis proposes a simple recognition that every economic endeavor in Pittsburgh, the region, the nation and the world has a carbon footprint, including wind and solar.

Deluliis also wants leaders to support pipeline construction, natural gas and combined-cycle power generation, which he argues are good for the climate and for jobs.

“They should be completely aligned with us on this,” he said.

And he also sees Pennsylvania being hurt by left-leaning ideology, including from President Joe Biden, state governors and local mayors.

Leaders need to “defend this region and industry’s interests when we’re threatened by nonsensical, ideological, regulatory or financial attack from others,” he said.

And Deluliis wants to eliminate protective markets and subsidies for “expensive, unreliable foreign wind and solar.”

“They make the budget gaps of municipalities and school districts and states and nations worse,” he said. “The middle class and working poor bear the brunt of those costs, both direct and indirect.”

Deluliis said the country is now headed toward outsourcing its energy independence to foreign rivals with the hope they “don’t use it against us time and time again.”

CNX’s approach to ESG has taken an empirical bent as it has worked to strengthen its environmental politics through what Deluliis called a “tangible, impactful, local” approach.

The company has chosen to look at reasonable actions in a reasonable period of time that “move the needle” on societal and quality of life fronts.

“There’s a good, a bad and an ugly with respect to ESG,” he said. “Obviously embracing and running toward the good is what we try to do.”

### **Community approach**

When CEO Tim Dugan first met the team of nearly 50 employees in 2020, he quickly realized why Olympus Energy LLC had been successful.

Like other E&Ps, the goal was to drill high-quality wells, generate significant revenue and provide healthy returns to owners and investors.

But the team also had invested every project with integrity, excellence and stewardship.

The company works in an area other E&Ps might be reluctant to work in because its operations are in close proximity to neighborhoods.

“But our mission is, and always has been, to develop our assets, not just responsibly, but in a way that truly makes a positive difference in the lives of our stakeholders, communities, employees and the entire region that we all call home,” Dugan said. “We don’t plan to be perfect, but we do promise that doing things the right way, and the way will always be a top priority.”

Most of the company's wells, he said, are in the top quartile of all Marcellus wells with several in the top 2% of all producing wells.

"But what we're most proud of is that the longer laterals from our Midas pad minimized the impact of the community and created additional values for our owners," he said. "Since we started drilling in 2017, we haven't scaled quickly. We've been focused on doing it properly because we understand what responsible development looks like in the communities in which we operate at Olympus."

The company also supports community initiatives that provide benefits for all, especially the most vulnerable. Dugan said that didn't just mean writing a check. "We also invest our time," he said, noting that in December "we had eight employees that spent their time packing boxes of food for low income families and individuals who face food insecurity and rely on the Westmoreland County Food Bank for help."

In 2021, every Olympus employee contributed time to volunteer activities.

Olympus works closer to more populated areas than most companies, including new subdivisions in suburban neighborhoods.

"We have to have a thoughtful approach to development that enables us to minimize our impact and maintain strong relationships with our neighbors."

Diversity remains a challenge. Dugan said that about 70% of the company's employees look like him: white males.

To branch out to a more diverse group of potential talent, the company has started to engage in conversations with students across the region and launched four scholarships that will provide up to \$10,000 per student.

"As an industry, we have always found ways to get better and overcome challenges," he said. "We've had a tremendous impact on improving air quality and reducing emissions, probably more so than any other industry in the world. We did it because we knew it was important, and we knew it needed to be addressed. We may not get credit for it, but we're doing it."

The industry needs to tackle diversity with the same focus, he said.

On ESG, Olympus has also leaped toward making water use and transports to its sites a priority as it seeks to reduce truck traffic and benefit residents.

"We've partnered with local municipal authorities and built infrastructure that will allow them to provide freshwater access to more residents in the community and also serve Olympus operational needs to date," Dugan said. "Even at the early stages of our development, we've invested over \$20 million in water infrastructure and just go one step further. Our goal is always to reuse 100% of our produced water."

Late last year, the company also announced it would be the first integrated E&P company to seek independent Project Canary certification of its upstream producing and midstream infrastructure assets,

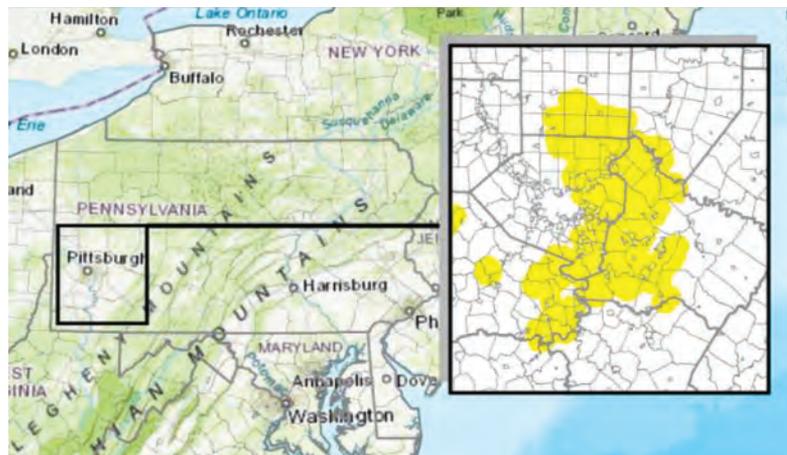
"We probably get more pushback on every permit we apply for than any other company," Dugan said.



**EQT Corp.'s  
Christen pad in  
production mode  
in Pennsylvania.**

STEVE TOON

### Olympus Energy Assets



Source: Olympus Energy LLC



obvious conclusion: shut off the largest source of emissions in the world, foreign coal.

Despite his disagreements with Warren and other activists, “that’s why I think we’ll be arm in arm, side by side on this initiative to unleash U.S. shale and promote U.S. LNG initiative as the biggest green initiative on the planet.”

Opposition to pipelines continues to hurt the Marcellus Shale’s ability to produce.

“The community where we operate at EQT, we are embraced. Because people love the fact that we’re coming out to operate in their backyards. Because they know that’s going to mean jobs, it’s going to mean meals at their local restaurants. It’s going to be people buying properties,” he said

But Rice has no illusions about the struggle to get cheap, reliable energy to Americans.

The stark reality is that environmentalism has become a far more sophisticated movement in which vocal minorities are giving the wrong signal to politicians.

The basin produces 35 Bcf/d of local demand takeaway that, when the Mountain Valley Pipeline comes online, will increase to 37 Bcf/d.

“The reality is the price signal is there,” Rice said. “The actual pipe signal is not. And unfortunately, that’s not something that we can control. Certainly, industry’s proposed billions of dollars of projects that have been canceled, for lack of better terms, environmental activists.”

Rice fears that could lead down a road Americans don’t want to go down.

With plenty of natural gas in the Marcellus, Rice wonders whether continual blocking of infrastructure will send the U.S. into energy poverty.

“Is that going to make natural gas prices spike to \$5 when it should be \$3? Because we have different concerns than people in ... a developing country [are] just trying to get energy any way they can,” he said.

And he points to Europe, which has seen a meteoric increase in natural gas prices.

“You can have developed nations that suddenly find themselves in energy poverty because of a lack of investment,” he said. “And that could easily come back over here.”

That doesn’t mean that EQT shies away from operating in strict regulatory environments. It already faces stringent rules in Pennsylvania, Ohio and West Virginia.

“Is it difficult to operate up here in Appalachia? Absolutely. But we deal with it. We just need more time for planning.”

Rice said as long as the rules of the game are clearly defined, EQT and the industry will do what it’s always done: “meet those demands.” □



**“As an industry, we have always found ways to get better and overcome challenges,” said Tim Dugan, CEO, Olympus Energy LLC.**

That’s why the company is pursuing Project Canary certification, using an electric fleet and why its approach to ESG has become “critical to our success.”

“We made the decision early on that we can’t fly under the radar and get a few wells under our belt. We need to do it right from the start.”

#### **Man on a mission**

Rice sits in a break room near the DUG East Conference stage where he’s just come off stage delivering a blistering critique of Massachusetts Sen. Elizabeth Warren’s charge that LNG was hurting American consumers.

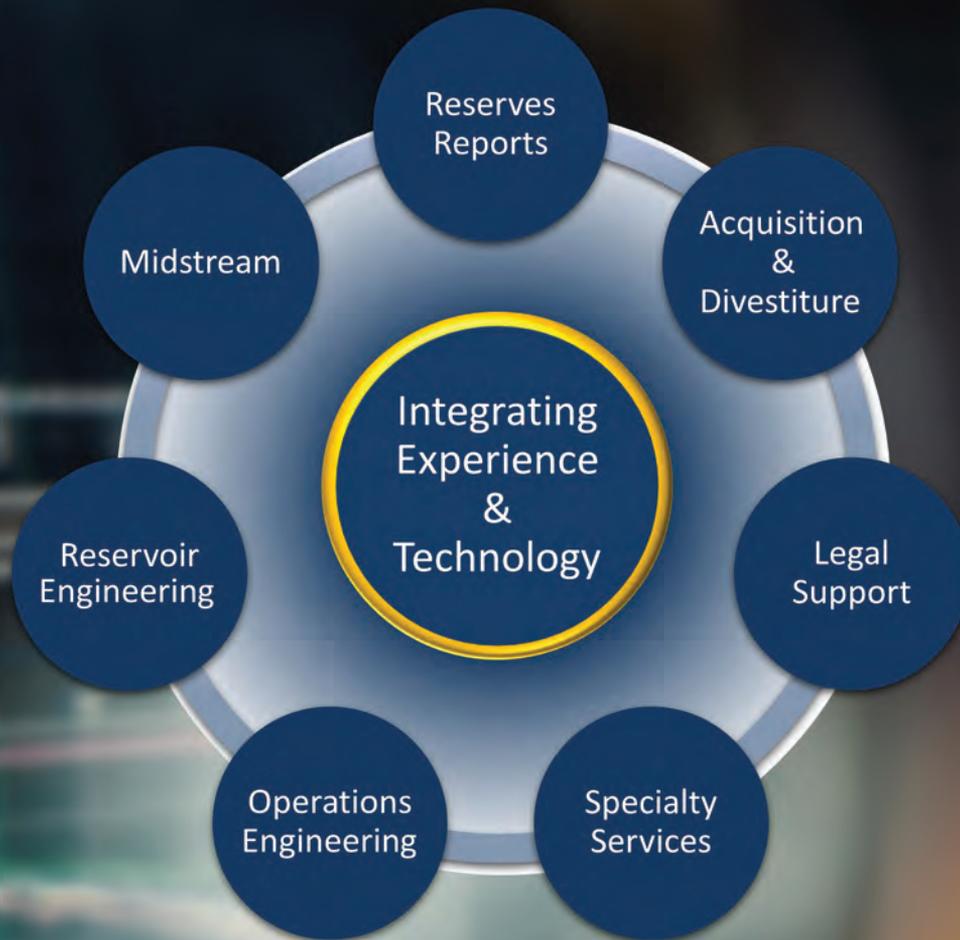
Part of his response is what he hopes will be a reframing of natural gas not as the enemy of combating climate change, but one of its best chances at beating it.

“I believe in climate change. I believe it’s caused by humans. But I do not believe it’s an apocalypse,” he said, “because I believe in human ingenuity.”

Rice’s bet is that innovation and the ability to adapt and solve problems will lead to an

# Wright & Company, Inc.

Petroleum Consultants



## Divisions of Wright

Wright Energy Advisors

Wright Analytics Group

**Serving the petroleum industry for more than**  
*33 Years*

Founded by D. Randall Wright, President – 1988

[www.wrightandcompany.com](http://www.wrightandcompany.com)

PROJECT  
**CANARY**

# Net-Zero. Now.

Welcome to the  
measurement  
economy.



# CURBING METHANE

Emission monitoring technologies have emerged, offering ground- and air-based leak detection to the oil and gas industry.

ARTICLE BY  
BRIAN WALZEL



***The value there being that if large emission sources can occur anytime, then having a sensor nearby that's capable of telling you when they start will allow you to stop them much faster than if you just go once or twice a year," said Erin Tullos, director of research and development, Scientific Aviation***

One of the fastest-growing segments in the carbon management space is emission detection technologies, with everything from field sensors to drones to airplanes to helicopters being deployed to detect greenhouse-gas (GHG) leaks and emissions.

ChampionX, formed in the June 2020 merger between Apergy and ChampionX Holding Co., made entry into the emission detection space through its acquisition of Scientific Aviation in July 2021. Scientific Aviation brings to market plane-, drone- and land-based measurement devices to detect atmospheric pollutants and GHG.

Erin Tullos, director of research and development at Scientific Aviation, said the company was established when CEO Steve Conley sought a method to conduct atmospheric science evaluations via airplane to better understand emission rates in a given region.

"Scientific Aviation had its ride to fame during the Aliso Canyon [gas leak] event where NASA and others were called out," Tullos said. "The state of California declared a state of emergency to try to understand where these emissions were coming from. They called Steve out, and he took his airplane out there and flew around. Before he even landed, the plane gave them a number that it took NASA one year to agree with."

Scientific Aviation's technology eventually caught the attention of the oil and gas industry, when in 2017 ConocoPhillips Co. approached Conley with a request for a drone surveillance technology to monitor its emissions. Tullos said that after a few years of deploying drones to detect its emissions, ConocoPhillips came back to Conley requesting a continuous monitoring application.

"That customer said, 'I want it to be cheap, and I want it to tell me when I have an emission and pin false alarms,'" she said.

At that, Tullos was then working for Exxon Mobil Corp. and also a Scientific Aviation customer.

"Steve called me and said, 'What does [this technology] need to cost, and what does it need to do? And how do you want an alert, and how would you like your information?'" she said. "So it was really [developed] from a user-centered design approach. And from there was born the SOOFIE."



***Seven operators entered into a joint venture with Scientific Aviation to study how the SOOFIE ground-based leak detection system could accurately detect fugitive methane emissions.***

Erin Tullos of Scientific Aviation cited research conducted by the Environmental Defense Fund that “super emitters” contribute an outsized impact on emissions, which include devices such as tank thief hatches, pressure relief devices, blow down valves on compressors and, of course, excessive flaring practices.

Scientific Aviation’s “Systematic Observations of Facility Intermittent Emissions,” or SOOFIE, is a land-based, solar-powered leak detection system that takes five measurements every second and employs machine learning to accurately identify anomalies 24 hours a day. SOOFIE also captures atmospheric conditions that are important to calculating actual emission rates, rather than measuring concentrations lev-

els, which the company says can be susceptible to producing many false alarms. The system can also measure gases such as H<sub>2</sub>S, NO and NO<sub>2</sub>.

“SOOFIEs are now deployed in thousands of units out into the oil field,” Tullos said. “The value there being that if large emission sources can occur anytime, then having a sensor nearby that’s capable of telling you when they start will allow you to stop them much faster than if you just go once or twice a year, manually inspecting those sources.”

As Tullos explained, most emissions result from leaks from valves and flanges or on equipment that is intended to emit such as an intermittent bleed pneumatic controller, which is engineered with an emissions source. And in terms of geographically guilty parties, the main culprit is far and wide the Permian Basin.

“If we’re talking sheer numbers and types of sources, the majority of the academic research has really focused on North American assets to date,” she said. “They say the majority of emis-

## US GAS FLARING HITS RECORD LOW

*Through a combination of improved takeaway capacities, investor expectations and COVID-related impacts, gas flaring hit a record low in the U.S. last fall, according to a report by Rystad Energy. The declines were led by improved flaring practices in the Permian Basin and Bakken Shale, resulting in the lowest levels of flaring in the U.S. since 2012, according to Rystad.*

*Hart Energy had an exclusive interview with the author of that report, Artem Abramov, head of shale research for Rystad Energy. The following is an excerpt of that interview. The full interview is available to view on [hartenergy.com](http://hartenergy.com).*

**Tell us a bit more about the recent report Rystad issued that looked at flaring in U.S. onshore development.**

**Artem Abramov:** Gas flaring in the U.S. oil basins, especially in the Permian and Bakken, has been a very major challenge, especially in 2018 and 2019. That was the time when activity level was really high, and we had quite a large number of infrastructure issues. That was when gas flaring increased quite substantially, even faster than oil production. At the peak, in the summer of 2019, the industry was actually flaring 1.5 billion cubic feet of gas daily in all major oil basins combined.

Since that time, we have seen fairly large numbers of structural improvements. The COVID-19 downturn in 2020 accelerated transformation of the industry to some extent. Essentially, it helped the industry to win some time and achieve the completion of several critical infrastructure projects while activity level and production were depressed.

[Flaring] actually started declining again to new multiyear records in the second half of last year. Flaring intensity—the percentage of gas which has been flared up to today—is lower than it was back in 2018, 2019. For example, in the Permian Basin, just around 1% compared to 5% during late 2018, early 2019.

But the significant part of the story came from the fact that



**Artem Abramov**

industry actually recognized and admitted the presence of the problem back in 2018, 2019. Essentially in the previous growth cycle, we saw so many cases when operators really didn’t employ integrated project planning approaches. There was a big miscommunication between upstream companies and midstream companies.

And at that time, in the Permian Basin, there was a lot of activity, a lot of new wells. And they were completed in new areas, which required new gathering pipelines to be built. And what we frequently saw was that wells were completed, but the gathering pipelines were not. The operators had to make a pretty difficult choice: either they wait for the pipelines and delay their cash flows—and remember at that time regional gas prices were very close to zero, sometimes even negative, so gas was really a

secondary product, insignificant for the total revenue stream—or you put your well on production and start flaring gas.

And given that you flare gas in the first four to six months of a well’s lifetime, when you flare gas on new wells, it immediately results in significant spikes in your total level of flaring.

The industry has really adopted a different policy. We know that there are many large independent producers, which now have very strict internal policies. They were, of course, pushed by the demand from the investor community. Essentially, they have a zero tolerance policy with respect to flaring.

**With production expected to continue to increase, do you expect flaring trends to continue to decline?**

**AA:** I have a high degree of confidence that gas flaring will continue to decline in the next two to three years. All large independent producers now have quite tangible targets. They plan to eliminate routine flaring completely at latest by 2025 and in exceptional cases by 2030.

—Brian Walzel

sions come from just a few things. There's a Stanford University paper that says in the Permian Basin, 50% of emissions came from 5% of the observed forces. So, if there were 100 sources, five of them gave 50% of the emissions."

Tullos also cited research conducted by the Environmental Defense Fund that "super emitters" contribute an outsized impact on emissions, which include devices such as tank thief hatches, pressure relief devices, blow down valves on compressors and, of course, excessive flaring practices.

"There are just a handful of sources that have been implicated quite a number of times as large sources," she said.

### **Project Falcon**

In what may be one of the most wide-ranging and ambitious methane detection projects to date, in March 2021 Scientific Aviation partnered with Chevron Corp., ConocoPhillips, Devon Energy Corp., Exxon Mobil, Pioneer Natural Resources Co., Royal Dutch Shell Plc and TRP Energy for what was deemed Project Falcon—a six-month joint industry partner study that aims to help determine the best way to deploy continuous methane monitoring technology that will allow energy companies to find, detect and repair methane leaks faster.

The project applied Scientific Aviation's SOOFIE system to measure methane emissions in Colorado, New Mexico and Texas.

"Project Falcon was seven operators who came together and said, 'Let's put an extensive number of instruments on a facility in each operator's site so we can get some variation,'" Tullos said. "And then we can study that data and see what would have been the optimal number of sensors to have placed to balance cost and the ability to detect emissions. And study what is the optimal way to set an alert that will send



SCIENTIFIC AVIATION

an operator out to the site to address an emission. What is the optimal height to set up your emissions monitor? What is the optimal configuration?"

Tullos said the results of the study are currently going through review for submission to a peer-reviewed journal.

In a press release announcing the study, Scientific Aviation explained that while Project Falcon specifically focuses on the use of the SOOFIE sensors, "the findings of the group will be useful regardless of which continuous monitoring system an operator may implement in the future. The goal of this project is to test and optimize implementation of real-time monitoring of methane emissions at the facility level."

The company added that the results of the project will complement other efforts investigating sensor networks for continuous monitoring of emissions at a regional level. □

**Scientific Aviation deploys drones over operator production sites to help detect methane leaks.**



SCIENTIFIC AVIATION

**Last year, several major operators entered into a partnership to help study methane detection capabilities by deploying the SOOFIE system.**



# EXECUTIVE ENERGY GRADUATE PROGRAMS





# ENERGY SCHOOLS ARE GETTING DOWN TO BUSINESS

Energy MBA programs are keeping up with the times by adapting their curriculum to suit the changing climate of the sector.

ARTICLE BY  
MADISON RATCLIFF

As the energy sector transitions, so does the educational pipeline between energy business schools and the oil and gas industry.

While operators and service providers work on implementing decarbonization and renewable strategies within their companies, business schools across the country are working to prepare future engineers and business leaders for the evolving landscape of the energy sector. For the time being, this primarily consists of ensuring that they have the flexibility to embrace traditional forms of energy as well as ESG-friendly practices.

“[Schools] need to convey to the students that solutions are going to be hybrid,” Stephen Arbogast, professor of the practice of finance and director of the Kenan-Flagler Energy Center at University of North Carolina (UNC) at Chapel Hill, told Hart Energy in an August 2021 interview.

According to Sarah Derdowski, executive director of global energy management at University of Colorado Denver (CU Denver), the schools that update their curriculum to reflect the evolving landscape of the energy industry are the ones that will attract more students.

“Initially, we had predominantly 75% oil and gas students who started in the program, and then that waned as the program matured and in general,” Derdowski said. “I think that speaks to people’s [changing mindsets]. We’ve seen an increase in renewables or larger-scale utility projects. Things like that come online, our student bases shifted and changed that way as well.”

## Providing the means

UNC’s Kenan-Flagler Energy Center, founded in 1919 and renamed in 1991, uniquely focuses on making money in commodity businesses such as the energy industry versus other MBA programs that have shifted their sights on the technical side.

“We teach the students, whether you are going to go into renewables, whether you are going to go into utilities, whether you’re going to go into oil and gas, you better be prepared to compete on the basis of cost leadership and unit cost leadership,” Arbogast said.

At CU Denver, the energy curriculum is reviewed annually to keep the information as up-to-date as possible. Additionally, alumni can come back for free to refresh their knowledge and learn about the newest advances in energy to remain competitive in the job market.

“We believe in lifelong learning,” Derdowski said. “Anyone who took any one of my graduate classes and graduated can come back and sit in on any class because energy is constantly changing. We want to make sure they get the value out of both their community and the curriculum that we offer.”

“Anyone who took a class in 2009 and they came back and take a class today, it’s not the same class,” she continued. “They get to sit in in that class for free because that’s how much we believe in what we offer in our degree. That’s a big piece of what we do to try to stay current and to talk to our alumni.”

In December, the Harold Hamm Foundation and Continental Resources Inc. announced the creation of the Hamm Institute for American Energy at Oklahoma State University, pledging a combined total of \$50 million. With the goal of educating a new wave of energy leaders, the institute will touch on each aspect of the energy industry, setting aside money for speakers to ensure the best education possible.

“What we’re after here today is creating the basis for reliable, affordable energy,” Harold Hamm, founder and chairman of Continental Resources, told *Oil and Gas Investor*. “This is nonpartisan. This is not about politics. This is about energy solutions and about what we can do in the future.”



**“[Schools] need to convey to the students that solutions are going to be hybrid.”**

— Stephen Arbogast,  
professor and director,  
University of North Carolina  
at Chapel Hill



### The right skills

Workforce candidates will need to be well-based in the “commercialization of new technology,” meaning how to make money using new technology.

“In the oil and gas industry, technology adoption has been very incremental, but now we’re talking about going outside our comfort zone and building new businesses in places where we haven’t operated,” Arbogast said. “How are you actually going to make a business that makes money out of carbon capture, for example?”

Since the energy transition has brought forth an onslaught of new technology, both in creating renewable energy and cleaning up existing pollutants in the atmosphere, this skill set is a vital one to have. And it doesn’t look like the technological advances will be slowing down anytime soon.

“Technology’s changed. Business models have changed. The way you get capital, all of that has changed,” Derdowski said. “Data analytics is going to just be your bread and butter for folks to be able to manage and handle, whether you’re talking about being able to manage AI [artificial intelligence] systems or what have you.”

However, if students aren’t open-minded and willing to embrace different forms of energy, they aren’t going to get far. According to Derdowski, students who see themselves as “energy professionals” as opposed to oil and gas people or renewables people will be able to build a bigger network and have an easier time finding work.

“Whether they’re fresh out of school or going to school, they expand their mind a little bit and not just take such very specific classes,” she added. “Whether they’re taking some economics and geopolitical classes, ensure they understand where their industry or the piece that they are fit, that’s really important. Especially if they want to move into management or upward leadership at some point.”

### Purposeful careers

Due to the negative press surrounding the oil and gas industry, Arbogast said that most MBA candidates going in have a renewables-first mindset, but the school helps them to see that compromises need to be made within the two industries.

“Although they come through the door deeply devoted to renewables, they’re educable,” he said. “We show them these other issues, and we show them the reasons why oil and gas has been so fundamental. And we talk to them about ways in which the oil and gas industry is going to be extremely important to solving the energy transition.”

Derdowski has also seen CU Denver’s classroom makeup change as well, shifting as the solid oil and gas-based student majority deteriorated over the years. However, as she believes that not just one industry can solve emissions problems, she encourages differing thoughts to all have a space in the energy transition conversation.

“Our dialogue around energy has changed,” she said. “We’ve always had great debates in class, which is what we want. We want diversity of thought. We want to make people feel comfortable to ask those questions within class with their classmates, to call them when they disagree.”

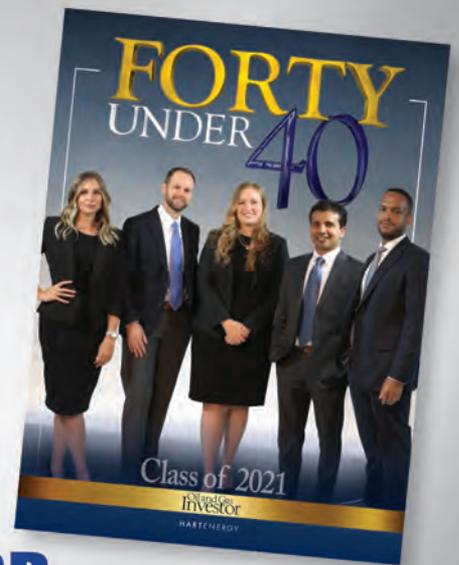
“I’ve seen it from our students, I know my faculty have as well, is that they want to have these purposeful careers,” Derdowski continued. “When they think of that, they want to work for an energy company that they feel like is making a positive impact. That doesn’t mean it’s not oil and gas. It just means they could be part of an oil and gas company that is more entrenched in the community.” □



**“We believe in lifelong learning.”**

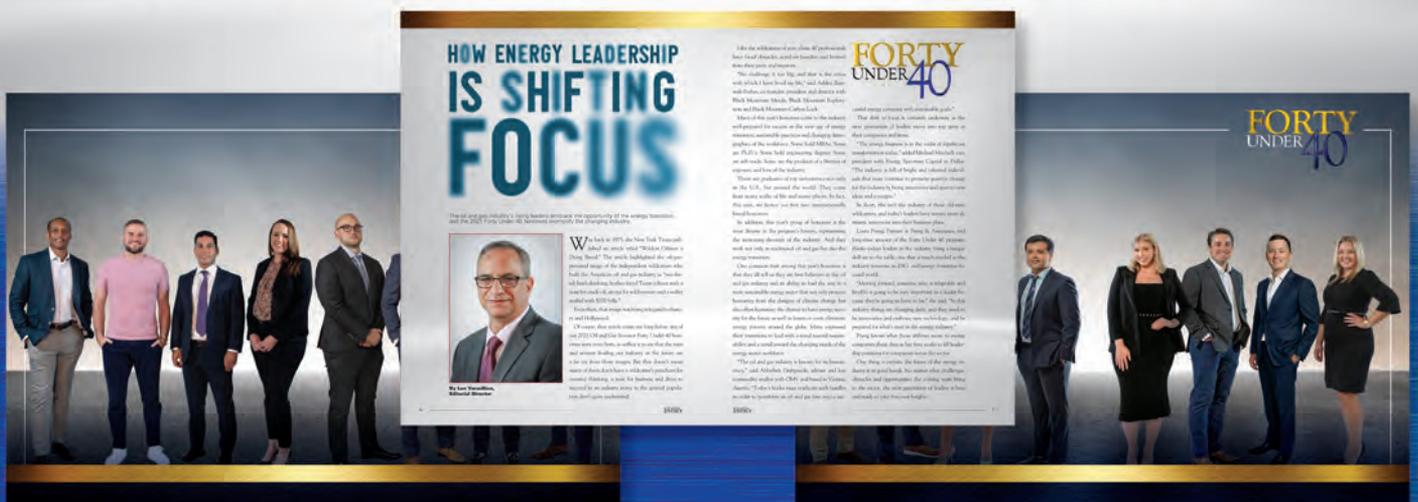
— Sarah Derdowski,  
executive director,  
University of Colorado Denver

# FORTY UNDER 40



## We invite you to **NOMINATE** those that are **MOVING INDUSTRY FORWARD**

*Oil and Gas Investor* is accepting nominations for the **2022 Forty Under 40 in Energy awards**. We encourage you to nominate yourself or a colleague who exhibits entrepreneurial spirit, creative energy and intellectual skills that set them apart. Nominees can be in E&P, finance, A&D, oilfield service, or midstream. Help us honor exceptional young professionals in oil and gas.



Honorees will be profiled in a special report that ships with the November issue of *Oil and Gas Investor* and on [HartEnergy.com](http://HartEnergy.com).

## Nominees should display:



**A desire to find new challenges**



**Community involvement**



**Leadership initiative**



**Creative problem solving**



**Professional excellence**



**Entrepreneurial spirit**



# GRADUATE ENERGY PROGRAMS REPORT

Graduate energy education takes multiple forms, and it could help industry professionals, including executives, address the sector's present and future challenges. These brief overviews of U.S.-based graduate business and technical programs are intended to help readers identify programs relevant to them.

Oklahoma State University  
 Texas Christian University  
 Tulane University  
 University of Colorado  
 Denver Business School  
 University of North Carolina — Chapel Hill  
 University of Oklahoma

## **OKLAHOMA STATE UNIVERSITY** **Undergraduate Minor, M.S. and Ph.D. in Petroleum Engineering**

- **Program Highlights:** Oklahoma State University's petroleum engineering programs are geographically well positioned in one of the most active E&P areas in the country.
- **Tuition:** Students pursuing their M.S. degree are funded between \$26,000 and \$27,000 per year, and students pursuing their Ph.D. degree are funded between \$27,000 and \$30,000 per year. Additionally, graduate students receive free health insurance.
- **Web address:** [ceat.okstate.edu/che/che-and-pete-programs.html](http://ceat.okstate.edu/che/che-and-pete-programs.html)

Housed in the School of Chemical Engineering, Oklahoma State University (OSU) offers M.S. and Ph.D. degrees in petroleum engineering. In general, all the admitted graduate students receive graduate research assistantships with an opportunity to work on one or more federal, state and/or industry-sponsored research projects. Research projects involve various fundamental and applied research topics in and beyond petroleum engineering and relevant to current and future energy needs as





well as economic and environmental sustainability. The graduate research laboratories are located in state-of-the-art facilities and are well-equipped with various high-end experimental and simulation technology. Current research topics include unconventional oil and gas, geothermal, carbon capture and sequestration (CCS) and water purification. The graduate programs offer different research tracks in the energy space of petroleum or renewables.

Undergraduate students majoring in engineering and engineering technology that wish to prepare for graduate degrees or positions in the petroleum industry can complete the minor in petroleum engineering. Undergraduate students have many opportunities to receive scholarships and undergraduate research assistantships.

OSU's College of Engineering, Architecture and Technology has first-class faculty with strong support from local and national oil and gas operators, service companies and close ties to the Hamm Institute for American Energy, giving their students the expertise they need to be successful in their careers. OSU's petroleum engineers will be hands-on with the understanding of formation rock, applied mechanics, materials, fluid behavior and application of their effects on reservoir, drilling and completion economics, and environmental sustainability. Students who graduate from OSU's programs will develop a team-oriented, problem-solving attitude that is required in the industry.

**TEXAS CHRISTIAN UNIVERSITY**  
**Energy MBA and Energy Certificate**

- **Program Highlight:** Texas Christian University offers multiple completion tracks (standard and accelerated) with evening-only format either on campus or via remote live learning.
- **Tuition:** For the 2022 to 2023 academic year, the estimated total tuition cost for the standard-length Energy MBA is \$85,458 and \$74,784 for the accelerated track. The energy certificate is \$17,110.
- **Web Address:** [neeley.tcu.edu/energymba](http://neeley.tcu.edu/energymba)

With a faculty ranked No. 1 in the world by The Economist, Texas Christian University's

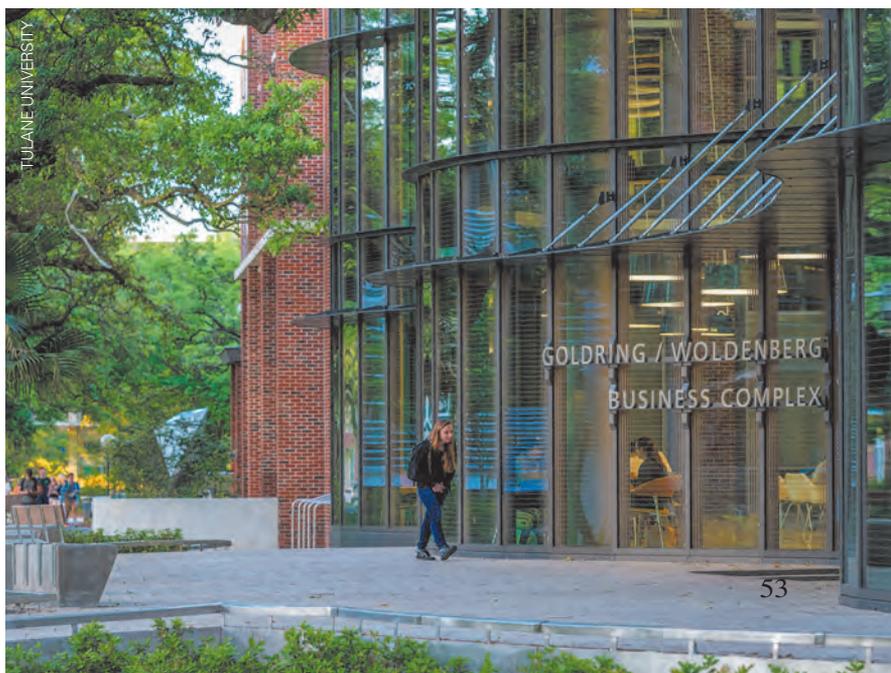
(TCU) Neeley School of Business provides globally recognized graduate business education, and its Energy MBA program draws from the core Neeley MBA curriculum while adding select courses and experiences exclusively focused on the energy industry.

The 42-hour Energy MBA program consists of 25.5 hours of core courses, 10.5 hours of energy-specific courses, which include an international trip, and six hours of business or energy electives. An accelerated completion track is available, which cuts the total semester hours from 42 to 36 by eliminating certain courses for students who meet specific requirements. The energy certificate consists of nine hours with focus on sustainable energy and ESG.

The Energy MBA program can be completed in person at TCU's Fort Worth campus or remotely. Courses are offered only in the evenings, which allows working professionals to continue their careers alongside their MBA studies.

**TULANE UNIVERSITY**  
**M.S. of Management in Energy**

- **Program Highlight:** Unique course offerings provide hands-on experience, and specializations allow students to customize their education to meet their career goals.





CU DENVER BUSINESS SCHOOL



CU DENVER BUSINESS SCHOOL

The STEM-designated MME program can be completed in 10 months, though it can be extended to 18 months to involve a summer internship. The program notes it has a consistent 100% graduation rate.

**UNIVERSITY OF COLORADO DENVER  
BUSINESS SCHOOL**  
**Global Energy Management Program**

- **Program Highlight:** Students and alumni have life-long access to an all-energy, global community and current curriculum.
- **Website:** [business.ucdenver.edu/industry/global-energy-management](http://business.ucdenver.edu/industry/global-energy-management)

People, purpose and energy are at the core of energy programming at CU Denver Business School. Anticipating a need for workforce mobility within global energy management (GEM) has delivered an all-energy business curriculum since 2009. Continued success has provided the program with the ability to expand and offer market-driven professional development opportunities across organizational levels and academic backgrounds. Graduate certificate pathways allow individuals to tailor professional development in the areas of financial management, energy transition, renewable energy and ESG. For more tactical skills, there are non-credit courses in data analytics, trading and hedging, energy and commodity analytics, all in accessible formats.

Deep ties with the energy industry ensure educational offerings are relevant and practical as well as keep pace with the industry's rapidly evolving needs. At the forefront of these efforts are the program's faculty, who are recruited for their extensive experience in energy. Additionally, GEM is the only program to offer a rotating Executive in Residence, providing students with direct access to multiple industry leaders. Furthermore, GEM's Industry Advisory Council offers continual guidance on changing industry needs and trends.

Lastly, learning and accessibility do not stop at graduation. Alumni are welcomed back to audit any graduate course at no charge and have access to all Executives in Residence. Over the past decade, the program has built a tight knit and global community ready to lead any company through the energy transition.

- **Tuition:** For the 2021 to 2022 academic year, the estimated total cost of the MME program, including tuition and university fees, is \$69,130.
- **Web Address:** [freeman.tulane.edu/graduate/master-management-energy](http://freeman.tulane.edu/graduate/master-management-energy)

The M.S. of management in energy (MME) program at Tulane University's A. B. Freeman School of Business has been designed with the input of energy leaders to provide students with knowledge and skills that are relevant and practical. Students are immersed in the business of energy with a particular focus on finance, preparing them to enter the energy professional services.

Experiential learning is a hallmark of the MME program. Among the unique course offerings available to MME students, courses taught in the Trading Center replicate real-world trading experience, with access to the software and research databases used in the industry. The Burkenroad Reports, the first university-sponsored securities analysis program, assigns students to cover a public, small-cap energy company. After conducting research and interviewing executives, students write a comprehensive analyst report.

**UNIVERSITY OF NORTH CAROLINA-  
CHAPEL HILL**  
**MBA in Energy**

- **Program Highlight:** Coverage of the entire energy value chain ensures that the UNC MBA in energy students have a full understanding of the industry.
- **Tuition:** Estimated total tuition costs vary depending on state residency. For North Carolina residents, total tuition and mandatory fees come out to \$51,152, and it costs \$66,840 for non-North Carolina residents.

- **Web Address:** [kenan-flagler.unc.edu/energy-center](http://kenan-flagler.unc.edu/energy-center)

Over the course of two years, students at the University of North Carolina-Chapel Hill (UNC) can earn an MBA in energy at the Kenan-Flagler Business School and receive a comprehensive education in the entire energy value chain. In courses based upon actual energy operations and deals, with faculty applying the skills they developed in their own industry careers, energy MBA students at UNC receive a specialized energy business education that is directly applicable to their careers.

As part of the program, students gain access to the Kenan-Flagler Energy Center, which enhances the student experience through career-focused events and conferences, research assistantships, curriculum development, internship assistance and access to faculty and industry professionals.

### **UNIVERSITY OF OKLAHOMA** **EMBA in Energy**

- **Program Highlight:** OU's EMBA in energy offers specializations in hydrocarbons or renewables to provide executives with the full tools to navigate the energy transition.
- **Tuition:** The total cost of the program, including tuition and fees, is \$85,500.
- **Web Address:** [ou.edu/price/mba/embainenergy](http://ou.edu/price/mba/embainenergy)

University of Oklahoma's (OU) nationally ranked EMBA in energy program offers students a 15-month curriculum that will prepare them to thrive during the industry's transition to renewable and alternative energies. Unlike most other EMBA programs in the U.S., the program's curriculum is entirely focused on the energy industry, with all components of the program having been designed with the real-world needs and challenges of energy professionals in mind.

Adapting to the increased sense of urgency around transition, the EMBA program has developed two specializations, hydrocarbons and renewables, to better prepare students to innovate and lead in the growing fields of renewable energy, alternative fuels and electrification.

An integral component of the EMBA program is its international residency module, which grants students the opportunity to take courses in Europe. In addition to the international residency, the EMBA program has two domestic residencies that take place on campus, one at the start of the program and another at its conclusion.

Due to the intensive nature of its curriculum, which will equip students with knowledge on topics such as decarbonization and energy economics, the university recommends that students set aside at least 25 hours per week to absorb new materials, complete assignments and work with their classmates on team exercises. □



UNIVERSITY OF OKLAHOMA



Neeley School  
of Business

# Energy MBA

## CONNECT FROM ANYWHERE

The TCU Energy MBA gives you the credibility you need to get into or move up in today's energy industry. Our evening-only format is ideal for working professionals, either on campus or via remote live learning. You'll learn solid business principles with special insight into the unique local and global challenges and opportunities of a career in energy.



- **TCU Energy MBA ranks #1 in Texas and #2 in the U.S.** – *Oil and Gas Magazine*
- **New 9-hour Energy Management Certificate in Sustainability and ESG**
- **Evening-only classes on campus or via remote live learning**
- **An AAPL accredited university**

[neeley.tcu.edu/energymba](http://neeley.tcu.edu/energymba)

**GROW YOUR WOR+H**

# GRADUATE STUDENTS FROM ACROSS THE COUNTRY TACKLE GLOBAL ENERGY POVERTY IN ENERGY CASE COMPETITION

“How can U.S. E&Ps leverage their energy transition strategy to reduce global energy poverty?”

The energy sector has always been in transition, but at no time as fast or fully as what we are currently witnessing. The pressures from regulators, banks, consumers, policy makers and investors are colliding with new capital allocation frameworks. There has never been a more critical crossroads within our industry to innovate for solutions in order to ensure smooth and economically viable transition. At TCU our mission is to prepare and develop tomorrow’s energy leaders for an economical, sustainable, and reliable energy future. Thus, it was only fitting to hold an academic case competition in conjunction with NAPE Summit, one of the most attended and successful energy conferences in the world. We wanted to ask the best and brightest to come to Houston and help solve some of the most important issues facing the energy sector.

This year, TCU hosted the 2nd annual Energy Innovation Case Competition, attracting top MBA students from all over the country. The prize money available for the competition this year was \$40,000, provided by AAPL and Total Energies. The top 4 winning universities also had the opportunity to present their case on the exhibit floor during the NAPE Summit in Houston, TX. Teams were asked to rank four business priorities in order of importance for US E&Ps, and to address what effects their choices will make regarding global energy poverty.

TCU was honored to recently partner with NAPE and the AAPL for the second annual Energy Innovation Case Competition in February 2022. The competition brought together MBAs from 12 top universities with 18 teams to compete in a virtual preliminary round. In the final round, the top 4 teams had five hours to work on the case before presenting their analyses to a panel of judges made up of leaders from industry and academia. “The competitors were well versed on the energy transition and the pressures it has put on capital markets. Their presentations clearly showed that our next generation of energy leaders are going to be innovative, thoughtful, and make an



impact in our industry,” said Ann Bluntzer, PhD, and Executive Director at TCU’s Ralph Lowe Energy Institute. The team from TCU won first place this year and \$20,000, followed by Rice University in second place with \$10,000, the University of North Carolina in third with \$6,000 and the University of Texas at Austin in fourth with \$4,000.

The TCU Neeley School of Business delivers a world-class, global curriculum with an emphasis on experiential learning. The coursework includes a study abroad trip to Europe to further analyze the role that geopolitics plays in the ability to produce clean, reliable and affordable energy. The curriculum also gives access to executives from global companies to prepare students to effectively lead on in the global energy industry. TCU Neeley offers the TCU Energy MBA and an Energy Certificate for working professionals, held evenings on the TCU campus and via virtual live learning accessible from anywhere. ■



Neeley School  
of Business

Ralph Lowe Energy Institute

[www.neeley.tcu.edu](http://www.neeley.tcu.edu)



## The Kenan-Flagler Energy MBA

*We promote sound public policy  
through balanced programming,  
research, and career placement across  
the entire energy value chain.*



**KENAN-FLAGLER  
BUSINESS SCHOOL**

**CONTACT US AT:**  
[energycenter@kenan-flagler.unc.edu](mailto:energycenter@kenan-flagler.unc.edu)

**INFORMATION:**  
<https://energyatkenanflagler.unc.edu>



# TEACHING THE BUSINESS OF ENERGY

With a full value chain curriculum of 13 courses all taught by industry practitioners, the Kenan-Flagler Business School's Full-time MBA with Energy Concentration prepares professionals with a comprehensive industry education.

The Kenan-Flagler Energy Concentration focuses on teaching “the business of energy.” Few business schools actually concentrate on teaching the keys to succeeding commercially in energy. We uniquely teach this business as “a strategic commodity business with a volatile price cycle.” Because it is a commodity business, there is little product differentiation and price discovery is facilitated by benchmark postings on exchanges. These and other factors produce a capital-intensive business with high fixed costs and a fragile price structure. Those who succeed in this business must relentlessly focus on unit cost efficiency and prudent capital allocation across the price cycle.

These and other key lessons are taught by a faculty consisting entirely of current and former industry executives. These include the current senior vice president, refining, at Marathon Petroleum, the current chief tax counsel at Kinder Morgan, the current senior vice president at Duke Energy's Piedmont Natural Gas affiliate, the former president of Duke Renewables, and the former treasurer of ExxonMobil Chemical.

Students have the opportunity for both full quarter and intensive weekend classes in topics ranging from the business of oil & gas exploration/production to strategy of project finance and project development and financing of renewables.

The Kenan-Flagler Energy Center sponsors invitation-only conferences on topics critical to understanding the energy transition. We focus these events on questions “which we cannot yet answer.” The events are conducted under Chatham House rules to assure the frankest possible dialogue. Recent events explored whether the U.S. hydraulic fracturing revolution would go global, the “all-in” costs of intermittent renewable power, whether new carbon capture technologies are ready for commercial deployment, and the prospects for long duration electricity storage. The Center gives select MBA students opportunities to undertake research related to these topics, which findings are presented at the events.

The program routinely places about 20 graduates in full-time energy related jobs and a similar number in summer internships with firms such as ExxonMobil,



Chevron, Kinder Morgan, Duke Energy, NextEra, National Grid, Scott Madden Consultancy, Morgan Stanley, Wells Fargo, Baker Hughes, Schlumberger and Tennessee Valley Authority ■



**KENAN-FLAGLER  
BUSINESS SCHOOL**

[www.kenan-flagler.unc.edu](http://www.kenan-flagler.unc.edu)  
[energycenter@kenan-flagler.unc.edu](mailto:energycenter@kenan-flagler.unc.edu)



## Tulane University Master of Management in Energy

Gain comprehensive knowledge of the energy value chain through hands-on, experiential learning – in less time than a traditional MBA.



Career Focused | Industry Driven

[energy.tulane.edu](http://energy.tulane.edu)



TULANE UNIVERSITY  
FREEMAN SCHOOL  
of BUSINESS



# EDUCATING ENERGY PROFESSIONALS FOR THE FUTURE

With a strategic focus on energy finance, Tulane's Master of Management in Energy program delivers the industry knowledge and technical skills that students need to take on a wide variety of leadership roles.

Combining a firm foundation across business disciplines with comprehensive knowledge of the energy value chain, the industry-endorsed curriculum in Tulane's Master of Management in Energy is designed for both recent college graduates seeking entry to the field as well as professionals wishing to expand their skill sets or pivot their careers.

Michael Belanger (MME '20), a mechanical engineer, sought to pivot from a background in mechanical engineering to a career in energy finance. "For my graduate degree, I wanted to pursue my interests in trading and analytics," says Belanger. "The Master of Management in Energy built on my existing skills and made them marketable."

For Belanger, the Freeman School's Trading Center offered all the tools and training needed to master the highly complex world of energy trading and analytics. A \$3 million classroom and simulated trading floor, the Trading Center gives students hands-on experience trading commodities, electric power and renewables as well as access to real-time data and industry leading software from Trading Technologies, Bloomberg, Palisade and other top vendors.

Experiential learning is a hallmark of the MME program. In addition to trading, courses like Energy Industry Projects put students to work on real-world scenarios using data provided by sponsoring companies. Company executives provide mentorship to students as they work through the problems, and the students also visit oil platforms, solar farms, power plants and other industry sites to better understand energy systems across the value chain.

In Renewable Energy Project Development and Finance, students gain the practical knowledge and skills needed to bring renewable energy projects from concept to completion.

"By the time students complete this course, they have a thorough understanding of energy project finance and an active financial model they can apply directly to renewable projects," says Pierre Moses, a veteran renewable energy developer and instructor in the course.

The MME curriculum emphasizes business skills including accounting, data analytics, risk management and statistical analysis. Students have the

*"We want to deliver employees with a 'net-zero' skill set who are ready for careers in energy from now to 2050. From meeting increased demand for buy-side traders to training executives to guide companies through the transition, our hands-on approach fosters leaders who are ready to manage the industry's transformation."*

—Pierre Conner, Director of the Master of Management in Energy Program

flexibility to specialize in one of six areas: analytics, banking and finance, electric power, energy trading and risk management, entrepreneurship, and, most recently, renewable and sustainable energy.

"Over the next several years, it's going to be increasingly important for energy professionals across all sectors to have a thorough understanding of renewable energy finance and development," says Pierre Conner, director of the MME program. "This is the future, and it's already happening here at Freeman."

Graduates of the program go on to jobs in all aspects of the business – upstream, midstream and downstream as well as trading, utilities, consulting, investment banking and support functions.

After his graduation from the program, Michael Belanger began his new career as a crude trading analyst at a major oil company.

"During the recruiting process, I could see that the knowledge I gained in the trading simulations was invaluable," he says. "The interviewers were very impressed that I had experience with the same research tools they use. It's what landed me the job." ■



Tulane University

FREEMAN SCHOOL OF BUSINESS

<https://freeman.tulane.edu/>



# ADVANCE YOUR ENERGY CAREER

---

*Earn your MBA in Energy online in as few as  
15 months!*

**SPECIALIZATIONS IN BOTH  
HYDROCARBONS AND RENEWABLES**



PRICE COLLEGE OF BUSINESS  
**EXECUTIVE MBA IN ENERGY**  
The UNIVERSITY of OKLAHOMA

<https://www.ou.edu/price/mba/embainenergy/>





# AN EDUCATION FOR LEADERS OF THE TRANSITION

OU's EMBA in Energy program remains committed to its all-energy curriculum, a third of which it has revamped to prepare leaders to understand and engage with the complexities of the energy transition.

**A**n Executive MBA in Energy from the University of Oklahoma prepares graduates to take the helm of organizations at the forefront of the ever-changing and constantly developing energy landscape. The need for elite professionals with EMBA's has never been greater in the energy field. Professionals who possess a specialized EMBA from OU can set themselves apart from the pack when seeking new leadership positions.

Provided by Price College of Business, the program offers a 15-month hybrid EMBA in Energy that allows working professionals to take the next step in their careers. Designed and led by experts in the energy field, the program is tailored to assist those seeking flexible instruction to complete their degree while working full time within the industry.

The EMBA in Energy provides comprehensive yet convenient learning opportunities. There are six online modules and three in-person residencies for students to complete. Two residencies will take place on the OU campus, while the third will take place in Europe. With decarbonization being a priority for multiple European nations, students will have the unique opportunity to learn about and evaluate government actions, policies, company responses, and more in real-time.

Since the program's inception in 2014, special attention has been placed upon addressing energy in transition. To that end, students take either a hydrocarbon or renewables specialization that will aid in preparing them for the clean energy transition targeting net-zero carbon emissions by midcentury. By leveraging instruction in either one of these two specializations, the EMBA in Energy prepares students to take advantage of the changing landscape and focus their experiences. Featuring a curriculum filled with courses like Carbon Management: Strategies and Steps, Energy and Environment, and Electric Power Systems, students will learn about energy transition and the change in the global energy mix from the perspectives of energy security, climate change, and rising energy prices.

Students in the EMBA program have access to resources that were previously only available to senior-level executives at major corporations. This

*"The best thing about the actual EMBA program is that it's focused on the oil and gas sector, renewables. So, I've been able to apply that as well as the learnings through the courses ... to my day-to-day job. It's very relevant."*

—Michael C., EMBA '19



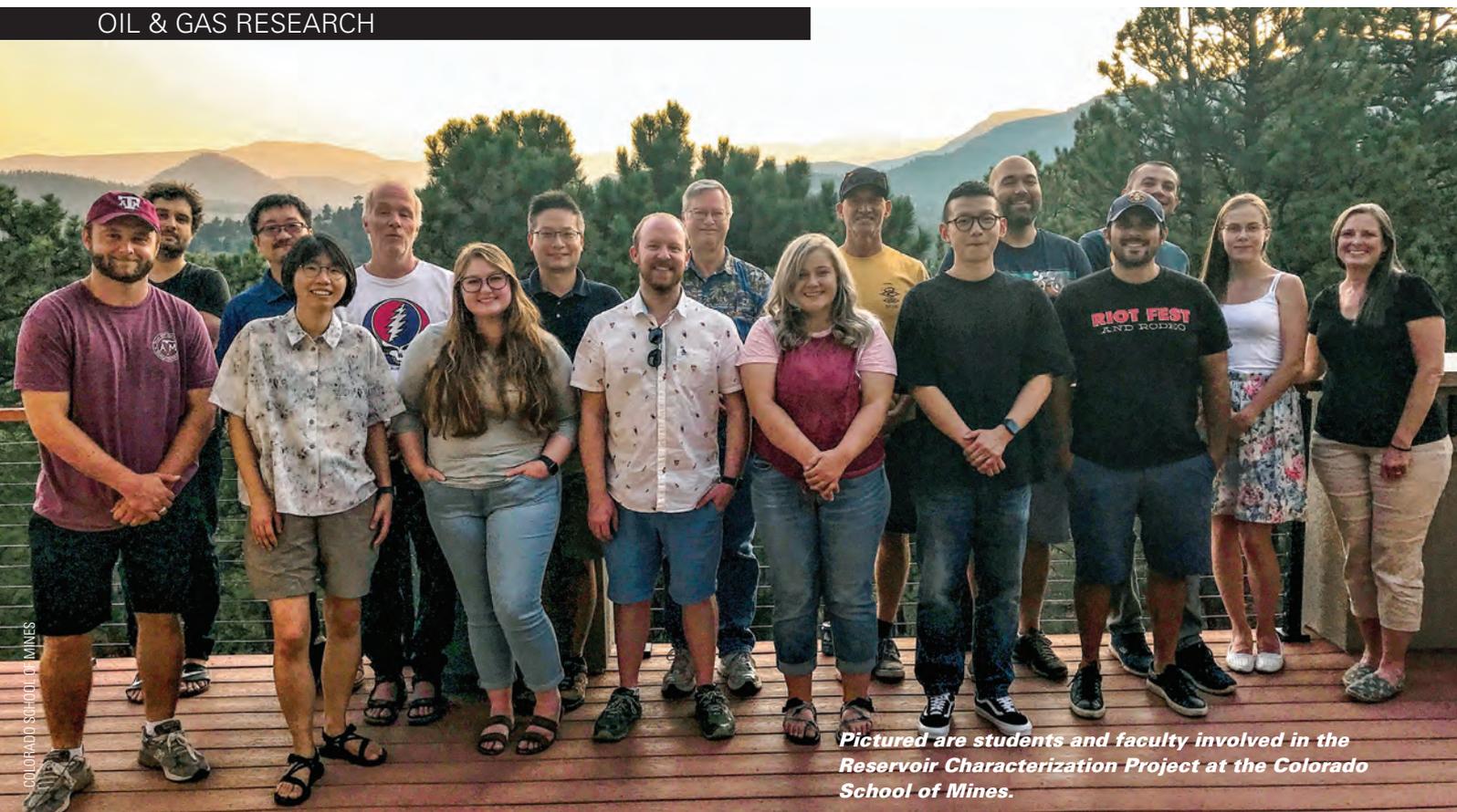
program provides students with critical advantages that will benefit themselves and their employers. Through a variety of group experiences, individual executive coaching, and numerous enriching workshops, students are provided with the tools necessary to guide them through the energy industry's most pressing issues.

Potential applicants for the EMBA in Energy program are required to have a minimum of eight years of progressive work experience, with at least two having been in the energy industry. Students can expect to engage with a cohort of about 20 other professionals with a vast array of experience and knowledge of the energy industry. With over 100 years of educating in the energy sector, OU EMBA students are surrounded by outstanding cohort peers and world-class program faculty to develop elite industry knowledge and a powerful network that provides immense benefits upon graduation. ■



PRICE COLLEGE OF BUSINESS  
**EXECUTIVE MBA IN ENERGY**  
The UNIVERSITY of OKLAHOMA

[www.ou.edu/price/mba/embainenergy](http://www.ou.edu/price/mba/embainenergy)



*Pictured are students and faculty involved in the Reservoir Characterization Project at the Colorado School of Mines.*

# EXPLORING RESERVOIR CHARACTERIZATION

Students at the Colorado School of Mines seek to improve unconventional and conventional reservoir characterization for onshore and offshore field production and development through integrated research.

ARTICLE BY  
LARRY PRADO

The Colorado School of Mines Reservoir Characterization Project (RCP) is an independently funded geophysical research consortium that is dedicated to the study of integrated reservoir characterization. The RCP group held its semiannual meeting in December 2021, where students presented their research findings. RCP is part of the Department of Geophysics at the Colorado School of Mines, a public research university dedicated to engineering and applied sciences in Golden, Colo.

The research is used to predict reservoir performance as well as to enhance field development strategies all over the world from the U.S. to Norway, deepwater Brazil and onshore Kuwait, with new offshore Gulf of Mexico projects being planned. The research spans geophysics,

geology, petrophysics and petroleum engineering with seismic methods as a foundation of the applied studies.

The program is completing Phase 18 and is currently working on Phase 19. Each project phase is about 2 1/2 years with a six-month overlap. The RCP program is comprised of seven field projects: DJ-Postle, Denver-Julesburg (D-J) Basin, Colo., with Great Western Resources Inc.; Chalk Bluff, D-J Basin, Colo., with HighPoint Resources Inc.; the Permian Basin in Texas with Apache Corp.; Raudhatain Field in Kuwait with the Kuwait Oil Co.; Norwegian North Sea, Edvard Grieg Field with Lundin Energy; offshore Brazil with Petrobras; and offshore Gulf of Mexico with TGS/WesternGeco.

The RCP R&D projects are fiber optics (dis-

tributed acoustic and temperature sensing), machine learning and data analytics, compressive sensing for seismic data acquisition and EOR for unconventional.

### **D-J Basin: Niobrara-Codell reservoirs**

The goal of this research is to maximize petroleum production and minimize lost energy left in the well. The RCP group has been conducting tests in the D-J Basin to characterize the Niobrara and Codell reservoirs in Hereford and Wattenberg fields using 4-D seismic to determine the best hydraulic fracturing and stimulation techniques and fault compartmentalization with geomechanical stress testing, pressure and production testing and distributed fiber-optic sensing for mapping fracture geometries.

The Postle pad, located in Colorado's Weld County and operated by Great Western Petroleum, will be used for Phase 19 testing of Niobrara (A, B, C) and the Codell Sandstone. Data from the Postle pad project is intended to be a comprehensive dataset to quantify uniformity with previous phase test results and basin characterization. Phase 19 testing will include more seismic analysis, distributed fiber-optic sensing analysis, completion efficiency evaluation and production analysis. RCP students working on the project are James Carmichael, Rosie Zhu, Joe Mjehovich, Peiyao Li, Eric Hillman and Daisy Ning, Ph.D.

### **Chalk Bluff Field**

Master's student Rosie Zhu presented her Phase 19 findings: "Interpretation of cross-well strain data in Chalk Bluff Field in the D-J Basin for hydraulic fracture propagation." The work is being conducted in Chalk Bluff Field in northern Colorado, and data for the program is provided by HighPoint Resources.

The program seeks to understand drivers and processes of vertical and horizontal connectivity, legacy development effects, and mitigation, stage and clusters pacing. The current objective is to identify regional geologic controls on the petroleum system heterogeneity and reservoir deliverability.

Zhu studied the low-frequency digital acoustic sensing (DAS) data and examined how intersecting fractures located along a monitor well can be used to estimate the fracture azimuth length and vertical growth of the fractures in the treatment well.

The project is studying the effects on low-frequency (below 5 Hz) DAS signals and fracture propagation differences encountered on the Niobrara and Codell. She found that zipper fracturing operations affect the fracture propagations in the Niobrara, and fracturing half-length within Codell is longer compared to the Niobrara. Zhu said it is likely due to lower fracture density and higher stress anisotropy than Niobrara. She also found that strong cross-formation interference between the Niobrara and Codell and that fracturing propagates faster toward the top of the well than the bottom of the well.

Ning, a second-year post-doc, also presented findings for the Chalk Bluff study area. The study is seeking to understand production in-

terference between the Niobrara and Codell wells, which included 23 horizontal wells drilled in 2019 in a 4-sq-mile area. Her study showed a strong connection between Niobrara and Codell production.

### **Raudhatain Field, Kuwait**

Liwei Cheng, doctoral candidate, discussed how to improve current seismic imaging from the Marrat Formation found in Raudhatain Jurassic gas field in northern Kuwait. Data from the field, provided by Kuwait Oil Co., covers about 130 sq km. The targeted Marrat formation has a thickness of up to 2,000 ft, and the most productive member is the Middle Marrat that consists of limestone and some anhydrite and dolomite.

According to Cheng, the seismic data have a noisy target zone (Middle Marrat) due to interbed multiples that prevent quantitative reservoir characterization. Cheng's proposed solution includes the effects of an irregular acquisition surface and complex, overburdened geological structures (e.g., strong lateral heterogeneities or layers with low or very high velocity). Seismic interferometry is the methodology by which new seismic responses are created by cross-correlating seismic observations at different receiver locations.

Cheng said that there are limitations to interferometric imaging. "Artifacts caused by high-order multiples still exist in the image. The redatuming from cross-correlation transform is formulated in 2-D and for 3-D application, and you should sort the traces into constant azimuth gathers." He also noted that this method does not account for attenuation effects.

For vertical seismic profile (VSP) applications, Cheng concluded that interferometric imaging does provide additional illumination of the subsurface away from the well. Pre-conditioning common receiver-gathers, especially removing S-waves, is key to a good interferometric

## **THE RESERVOIR CHARACTERIZATION PROJECT**

### **Field Projects**

- DJ-Postle, D-J-Basin, CO—Great Western Resources
- Chalk Bluff, D-J Basin, CO—HighPoint Resources
- Permian Basin, TX—Apache Corp.
- Raudhatain Field, Kuwait—Kuwait Oil Co.
- North Sea, Edvard Grieg—Lundin
- Offshore Brazil—Petrobras
- Offshore Gulf of Mexico

### **R&D Projects**

- Fiber optics—distributed acoustic and temperature sensing
- Machine learning and data analytics
- Compressive sensing for seismic data acquisition
- EOR for unconventional

Source: Colorado School of Mines

“The research spans geophysics, geology, petrophysics and petroleum engineering with seismic methods as a foundation of the applied studies.”

imaging. Interferometric imaging can be complementary to standard primary imaging methods to maximize the information from the VSP data.

### **Norwegian North Sea**

Second year master’s student Mari Held is working on a 4-D joint PP-PS (polypropylene-polystyrene) inversion of Edvard Grieg Field in the Norwegian North Sea. Using time-lapse PS component data with PP data, the program looks to understand time-lapse changes of the overburden and reservoir.

“The research spans geophysics, geology, petrophysics and petroleum engineering with seismic methods as a foundation of the applied studies.”

According to Held, the program “will improve imaging quality of reservoir changes with PP-PS joint inversion to understand waterfront movement and pressure compartments. This will also help us determine if joint inversion is needed over conventional PP inversion to further quantify pressure and saturation changes.”

The field began production in 2015, and water injection began in 2016. Production is primarily from the east part of the field, and water injectors are mostly in the western part of the field.

“There were 2020 plans to drill four new wells and put fiber optic cables in each of them. The fiber optics time-lapse VSPs could help see changes in the reservoir in regions where it would be difficult to acquire surface seismic data due to obstructions on the field,” Held said.

“We received all of the applicable data, including the 2016, 2018 and 2020, 4-D seismic surveys, a post-stack and pre-stack PP and PS data as well as a suite of well logs from 10 exploration wells and velocity models that were delivered in 2018.”

Held currently has completed all the base work, including well log analysis and correction from the vertical exploration wells. She also picked all of the main horizons from the overburden to the dipping beds beneath the reservoir.

“Going forward, we need to do the 4-D processing on the pre-stack data and then collect the

angle gathers. Then, I will be able to move onto the inversions on baseline monitor data (2016), monitor 1 data (2018) and monitor 2 data (2020). I will also look into the overburden application for well stability using an accurate 4-D shear impedance and look for changes in the overburden that may show any geomechanical changes or to see if there are any occurrences of well buckling.”

### **Gulf of Mexico**

Samara Omar, a doctorate student, discussed a proposed offshore Gulf of Mexico study from a survey shot in 2019. The survey, “Amendment,” was shot by TGS/WesternGeco across 1,062 sq miles in Mississippi Canyon/Atwater Valley blocks, and it used ocean bottom nodes to attempt to optimize acquisition of long-offset multicomponent data.

“The Amendment survey’s objective was to improve the imaging in complex salt settings by developing a velocity model and full-wave inversion,” Omar said. “It was a simultaneous acquisition of four-component data with pressure, z-component, x-component and y-component readings.”

According to Omar, RCP does not yet have the survey data in-house but expects that they will receive a 120-km long line (2-D) with all four data components. According to the TGS pre- and post-acquisition publications, there is full azimuth coverage out to ultra-long offsets out to 40 km and signal out to 15 km at frequencies as low as 1.6 Hz.

The “big picture” impact of this study, according to Omar, is that drilling has remained active in the Gulf with plenty of activity in the Mississippi Canyon. She noted that large amounts of money are being invested through recent auctions.

“The deepwater complexity of the Gulf is exaggerated by the main protagonist, salt, and salt is an almost necessary element for these deepwater Gulf reservoirs. Using structural mapping, amplitude analysis and integrating it with other datasets will improve drilling and production.

“Accurate salt interpretation is critical to successful Gulf of Mexico operations and is part of the petroleum system—salt and traps in the Gulf are incredibly complicated. Most of the reservoirs in this area are traps and combinations traps up against the salt,” Omar continued.

“New generation technology from the Amendment survey seeks to improve the complications of salt imaging and at-depth.”

Omar noted a TGS/WesternGeco study that showed that most of the enhancements using full-wave inversion velocity models and advances have come in node illumination. “But I suspect that there is much more to uncover using the ultrawide offset data from the ocean bottom nodes.”

Omar said, “Exploring the horizontal component may show P-wave signatures on the far offsets that may potentially improve P-wave imaging. Looking at the converted wave data on the horizontal components would be of interest using the node data. If we do well at separating these components, we could actually implement an elastic full-wave inversion that uses 3-C data.” □

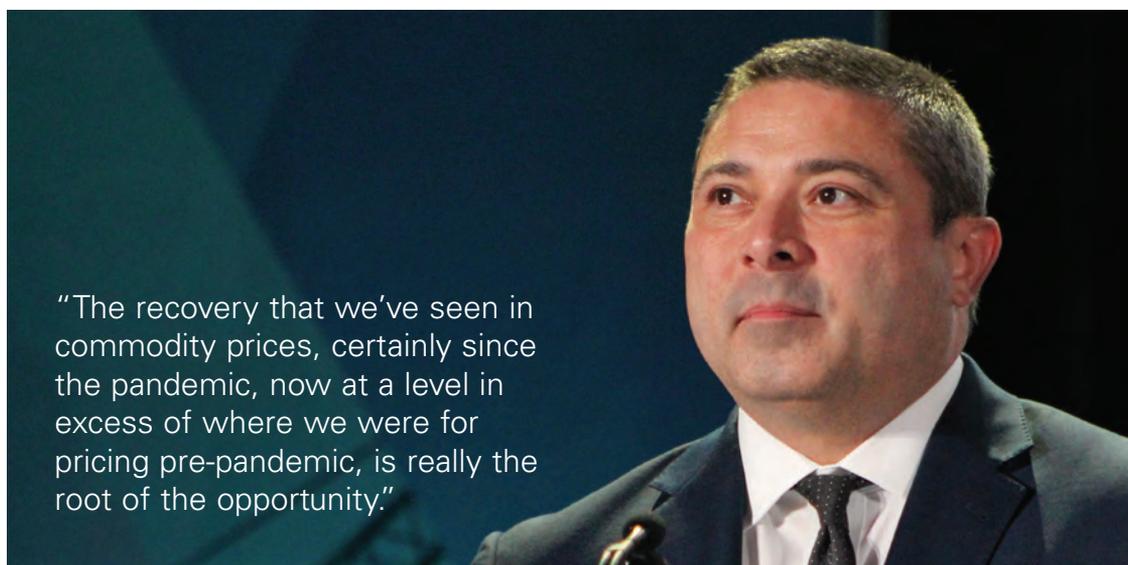
### **TOP HONORS**

The Colorado School of Mines Reservoir Characterization Project announced that three of its papers were awarded “Top 25 Papers” by the SEG during the IMAGE 2021, the International Meeting for Applied Geoscience & Energy. The three papers were selected among a field of 709 presentations during the conference:

- Ali Tura, Ph.D.—“Impact of joint PP/PS inversion on shear-impedance estimation for exploration and production”;
- Frantisek Stanek, Ph.D.—“Reservoir characterization using DAS microseismic events”;
- Bin Luo, Ph.D.—“Near-field strain of microseismic events in downhole DAS data.”

# WHY OIL AND GAS REMAINS A GOOD INVESTMENT

Jason Reibold, managing director of energy investment banking at BOK Financial, gives his take on the state of energy finance and dealmaking.



“The recovery that we’ve seen in commodity prices, certainly since the pandemic, now at a level in excess of where we were for pricing pre-pandemic, is really the root of the opportunity.”

INTERVIEW BY  
LEN VERMILLION

*Despite entering another pandemic year, the state of energy finance is definitely brighter than it has been—even pre-COVID, according to Jason Reibold, managing director of energy investment banking at BOK Financial.*

*The root of the opportunity? Higher commodity prices. In fact, Reibold told Len Vermillion, Hart Energy editorial director, during their recent conversation on energy banking trends that higher oil and especially higher gas prices are opening up opportunities for operators to develop assets that had previously been considered uneconomic.*

*While higher commodity prices have certainly been a bright spot coming out of the pandemic, Reibold noted an area where a price surge could have a negative effect: A&D activity.*

*Reibold, who is speaking at Hart Energy’s DUG Midcontinent Conference in Oklahoma City, said the Midcon is where nearly half of the energy investment bank’s divestment engagements were transacted.*

**Len Vermillion:** Let’s start by getting right to what everyone wants to know. Is energy still a good investment for lenders and also capital providers, especially given the volatility we’ve seen over the past two years? Why or why not?

**Jason Reibold:** In fact, the volatility is really what speaks to the opportunity. The recovery that we’ve seen in commodity prices, certainly since the pandemic, now at a level in excess of where we were for pricing pre-pandemic, is really the root of the opportunity. When we look at operators now pursuing the development of assets in a more economic environment, in addition to more supportive borrowing bases, as

a result of that improved pricing, we’re finding lending opportunities as well.

**LM:** In the case of oil and gas, what are investors really looking at as far as their financial decision factors, their final decisions?

**JR:** It’s somewhat tied to commodity prices and supportive pricing. We’ve seen, especially for natural gas, a level that we haven’t seen for many years. What were otherwise uneconomic wells to drill are now starting to carry themselves over into economic categories, and we’re starting to see some of that ongoing development. That’s very encouraging, especially given the continued demand we have for this

energy, which now provides an opportunity to open up a segment within our sector, if you will, that otherwise was untapped at the lower price environment.

**LM:** We hear about a lot of various trends in the energy space right now, such as ESG. We hear people declaring net-zero emissions, most notably. Can you talk about the trends that you see that are really of particular substance? And then maybe some of those that really don't have a lot of staying power. There's just a lot of trends out there right now and buzzwords.

**JR:** I'm hearing all the same talk that you are and others in the industry. I think, candidly, it's difficult to say which methods are going to have the most impact on our industry. We're continuing to explore different methods.

I think we could safely say that some of those are going to be different from asset to asset, company to company, region to region.

I have not seen from my own chair a direct impact yet whether on financing opportunities or in the investment bank transacting on an investment, but it is something we are hearing more about. We'll continue to explore and work through this time of this transition with the rest of the industry. But otherwise, we've not seen specifically any methods that we think are going to have the staying power that you spoke to. However, I think we can safely consider that we'll be looking for methods that are economic and obviously supportive to meet the ongoing demand for this energy.

**LM:** What are the trends out there that you're hearing? Are there any besides the two we already mentioned?

**JR:** I think the first that were really heard the most about so far would be sequestration of carbon and trying to achieve this net-zero status, if you will. I saw headlines from Exxon Mobil [Corp.]. But their method certainly seemed to be geared around making facilities more effective, more efficient. I think that is a reasonable first step toward this transition time.

**LM:** Let's talk about the other thing that's really big right now, the supply crunch. We keep hearing all about this. So, we have Europe needing natural gas, tankers changing course. There's equipment supply issues for operations. So, what's the impact both for operations and on the demand side?

**JR:** They continue to be just disruptions, and disruptions within our industry, disruptions I think fair to say, in many industries right now, and certainly at the consumer level. I think all of us have experienced that personally. We continue to work through those. We've not seen directly, I think, its impact because it's unknown how long these disruptions will continue and to what extent. However, we've always been a very resourceful, pragmatic industry and have been able to work through problems, and I expect us to work through these problems just as we have others in the past.

**LM:** Natural gas prices have surged. We're seeing oil in the \$90s. Some expect it at the hundreds by the end of the year. Nobody knows if that's good or bad. How are these price surges affecting the market, in particular, from your point, from the capital markets?

**JR:** The higher commodity price has certainly been supportive for growing borrowing bases, for providing opportunities for investors to make new investments, for operators to make new investments, to acquire properties and grow portfolios. That's really what we spend a lot of our time working on since actually 2020.

While the price surge has been supportive in those ways, where we have seen some adverse impact is when we see a market change in commodity prices up or down that sometimes can impede dealmaking. And so, we continue to work through those, but it does seem that the volatility is less for now than what it was in the earlier part of last year.

**LM:** Now of course, BOK has \$99 billion in assets under management and administration. So why is energy still a key priority for BOK?

**JR:** Our lineage really began with the oil and gas sector. The bank was founded in 1910 by oil industry professionals, and we've never moved away from that sector. In a way, you may say that energy, specifically oil and gas, is in our DNA, and we remain committed to this sector.

But I will say that that commitment is not arbitrary or merely the result of our lineage or being based in Oklahoma. We have got one of the largest petroleum engineering staffs of any bank that lends to this space. And when you look at our energy lending business in conjunction with our hedging services and our energy investment bank, we're providing services on par with the largest money center banks in the sector.

There truly is a commitment to the sector and a high level of expertise, which allows for a high level of comfort with the asset class, which is why we're able to continue doing business with our partners in the industry during these volatile times.

**LM:** Are you exploring other sectors at all in terms of ... Obviously, when we talk about not necessarily anything specific, whether it's renewables or biofuels or whatever, just wondering if you're getting into any other sectors besides?

**JR:** We've continued to look for opportunities to participate with the industry when it comes to renewables over the years. This has not been something new for us since the pandemic. However, we have not found really in a sizable way, the opportunity for us to do so. We continue to look at that. But for us, we want to be sure that No. 1, we can provide value and add value to our clients' efforts, and we just haven't found the right opportunity for that yet, but it is something that we continue to discuss internally and with our partners in the space.

**LM:** It sounds like the capital story for oil and gas still has a long way to go. We're not anywhere close to being finished yet.

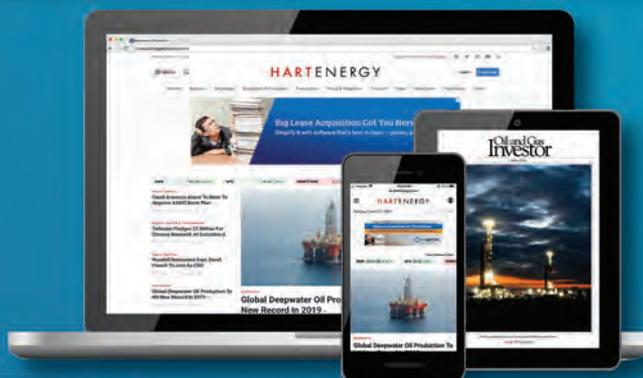
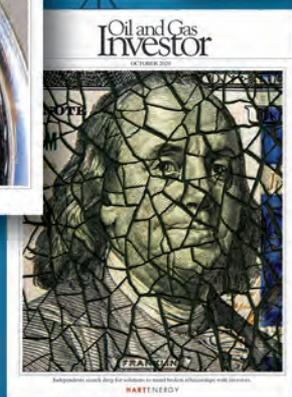
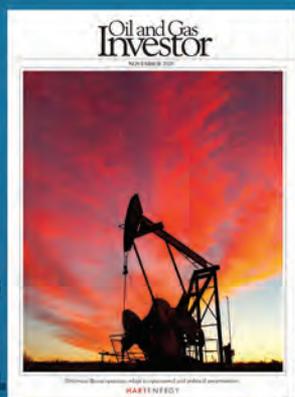
**JR:** I think not. □

MONTHLY  
SUBSCRIPTIONS  
AVAILABLE

# Oil and Gas Investor

WHEN OPPORTUNITY COMES,  
IT'S TOO LATE TO PREPARE.

Ensure your team is ready to seize  
every opportunity with access to  
*Oil and Gas Investor*



*Group and  
company-wide  
access available.*

For fastest service visit [HartEnergy.com/ogi](http://HartEnergy.com/ogi)

To learn more about corporate license please contact:  
**Chris Rasch** at 713-260-4669 or email [crasch@hartenergy.com](mailto:crasch@hartenergy.com)

# CARBON CAPTURE'S PIVOTAL ROLE

Carbon capture and storage is showing a promising future in curbing greenhouse-gas emissions, but there are costs and risks involved.

ARTICLE BY  
JEFF LEE

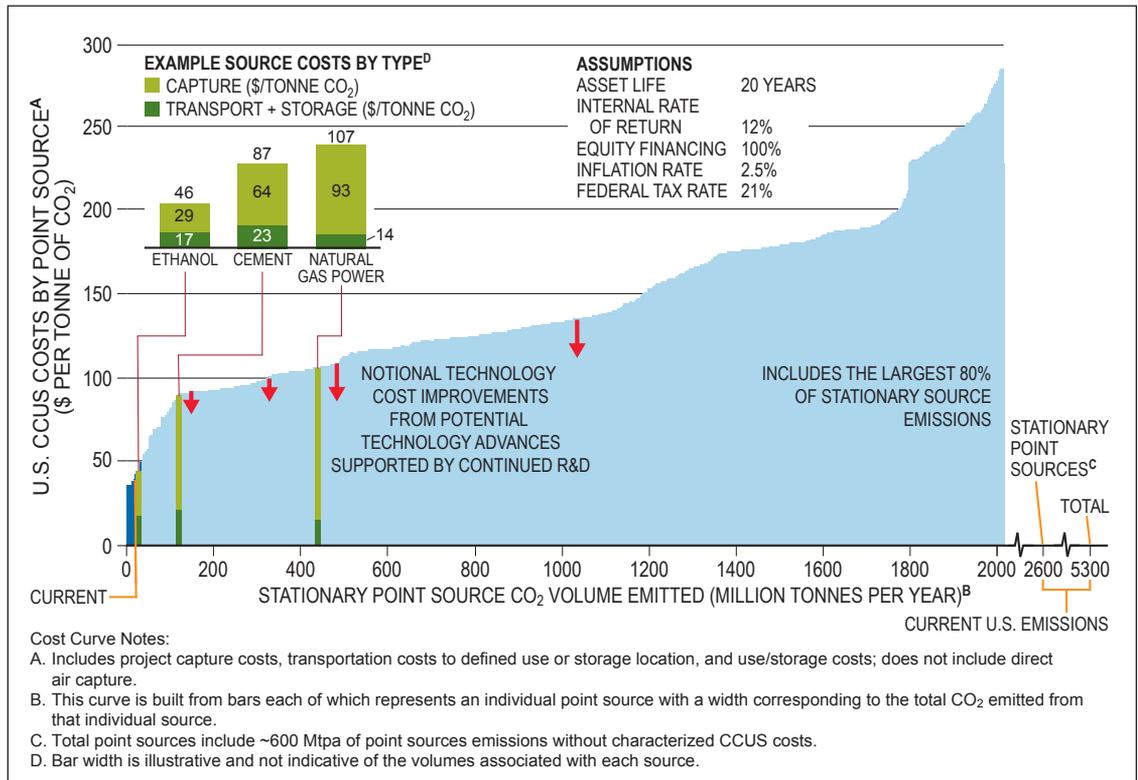
Carbon capture and storage (CCS or CCUS, with utilization) is a critical part of a worldwide effort to control greenhouse gases (GHG) emitted into the atmosphere. Without putting away massive amounts of CO<sub>2</sub> while awaiting renewable energy to mature commercially, there is no hope in stopping global temperature from rising beyond 1.5 C by the end of the century.

Despite the U.S.' federal 45Q tax credit near-record carbon price above \$80 euro/tonne in Europe, and a new emissions trading scheme in China, CCS in general still lacks a sound business model in the west and political will in the east. In the U.S.,

the Build Back Better Act would have increased the incentives beyond the current \$50/tonne and \$35/tonne for geologic storage and utilization, respectively.

The value proposition of a CCS project is twofold: environmental and commercial. In a sense, it is a waste disposal/recycling business. For the private sector to construct a business model, value has to be derived from the improved production of goods or sales revenue from utilizing the captured CO<sub>2</sub>. Due to the lack of "green" premium in products and immature carbon markets, governments worldwide have had to step in to provide support in the form of penalties (e.g.

**Figure 1: U.S. CCUS Cost Curve**



Source: National Petroleum Council

**This shows the U.S. CCUS cost curve using currently available and deployed technologies.**

carbon tax, emissions permit) or incentives (e.g. tax credit, direct grant) to kick start CCS/CCUS programs.

In the U.S., large quantities of CO<sub>2</sub> have traditionally been utilized for EOR, though this CO<sub>2</sub> almost entirely comes from naturally occurring underground reservoirs.

CCS/CCUS comprises three components:

- Capture of CO<sub>2</sub> from anthropogenic or natural sources such as an industrial facility or the atmosphere;
- Transport of CO<sub>2</sub> from sources to sinks where it can be stored or utilized; and
- Secure and permanent storage, monitoring and verification of CO<sub>2</sub> underground in saline aquifers, oil and gas reservoirs, mineralized rocks or in products such as cement.

### Cost comparison across sectors

The biggest cost in a typical project is the capture component. Given that most point sources are small, emission volumes need to be aggregated so that transportation and storage costs can be spread across a network, resulting in lower unit costs. Emission sources ranging from coal/gas power plants, chemicals and refineries to steel mills, cement plants and fertilizer plants have wildly different capture costs due to many factors. Other than a few project-specific studies for the likes of Boundary Dam and Petra Nova power plants, industry and government researchers have published many studies on the macro-level economics.

Figures 1 and 2 by the National Petroleum Council in 2019 and Great Plains Institute in 2020 outline the range of levelized costs of a reference plant across and within sectors with current technologies. These benchmarks are suitable for policy discussion and high-level project screening purposes, especially when compared to a carbon price or a government incentive such as the 45Q tax credit. However, they are difficult to apply to specific projects due to myriad factors such as capture scale, technology selection, project life, cost of capital, recency of study, etc. Project developers or financiers will need to conduct their own due diligence.

Carbon capture technologies are generally mature with recent improvements promising to bring costs down significantly. Capture methods depend on plant processes but are generally divided into chemical/physical solvent (e.g. amine, selexol), solid adsorbent, membrane and other up-and-comers such as direct air capture.

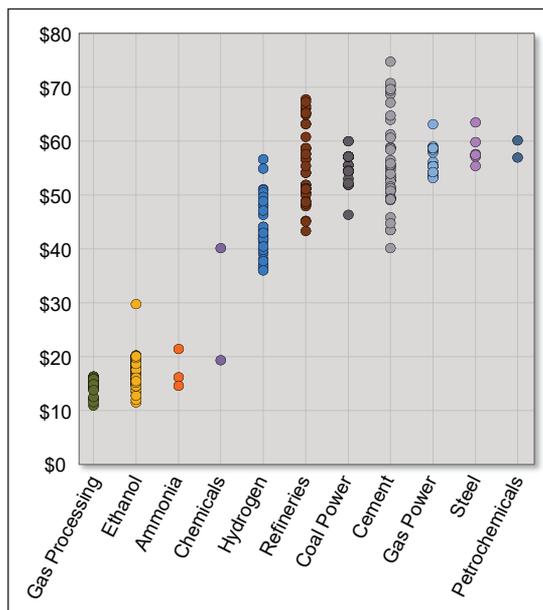
In a 2021 study, the Global CCS Institute rated these according to technology readiness and their applicability to different industries. Methods based on chemical processes require large heat input and result in higher costs but can separate low-concentration CO<sub>2</sub> in the flue gas. Physical processes are cheaper but require much higher CO<sub>2</sub> concentration and pressure.

The most important capture cost drivers are the properties of the source gas. As a general rule, lower partial pressure or concentration, smaller scale (<1 Mtpa) and

“Carbon capture technologies are generally mature with recent improvements promising to bring costs down significantly.”

more contaminants in the source gas result in higher costs. As in most industrial applications, economy of scale matters, and contaminants require more complicated gas treating. Lower CO<sub>2</sub> concentration requires more source gas to be processed and a higher solvent/sorbent utilization rate, resulting in larger equipment and higher energy penalty. It also limits the technology selection to higher-cost chemical solutions.

**Figure 2: Estimated Capture Cost Per Industry For Near-Term Facilities**



Source: Great Plains Institute

Ethanol and natural gas processing plants are the lowest-hanging fruits in the world of carbon capture due to their high-concentration CO<sub>2</sub> process gas of > 90%. Recently announced projects from Summit Carbon Solutions and Navigator Energy Services both aim to serve ethanol plants. Due to the typically small emission volumes (0.2 Mtpa to 0.3 Mtpa), both projects need to aggregate a large number of facilities to achieve commercial viability.

The next tranche of facilities likely to be retrofitted are chemicals, hydrogen and refineries with modest CO<sub>2</sub> volumes and concentration (15% to 40%) but conveniently packed in the Gulf Coast region with a large CO<sub>2</sub> trunk line owned by Denbury Inc. and a lot of geologic storage that enables low transportation and sequestration costs.

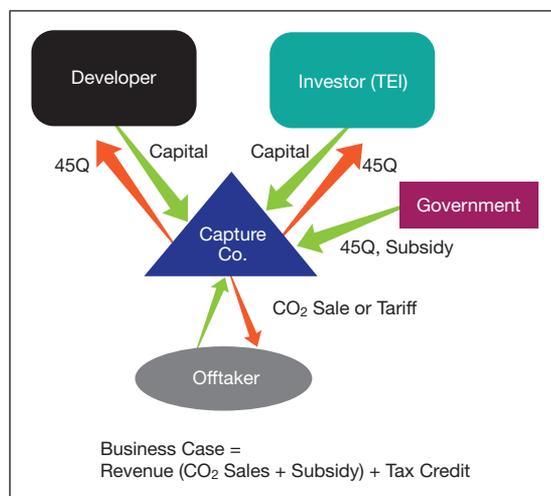
“The short 12-year asset useful life and limited pool of large investors with sufficient tax liability are additional hurdles to CCS projects.”

Coal-fired power plants, more so than natural gas-fired ones, are a major current focus of Department of Energy studies despite their low CO<sub>2</sub> concentration (3% to 15%) because of their large emissions (1 to 3 Mtpa). Steel and cement plants tend to have low-to-moderate CO<sub>2</sub> concentrations and large volumes but are hampered by technological challenges.

### Business model and structure

There are a few CCS/CCUS business models employed around the world with varying degrees of success. A vertical integration model is common in the U.S. for CO<sub>2</sub>-EOR operators that produce/capture, transport and inject CO<sub>2</sub> for oil production. The aforementioned Navigator and Summit are pursuing a CCS operator model whereby a business provides the capture and maybe transport and storage services for a fee. There are also existing joint ventures and CO<sub>2</sub> transporter models.

**Figure 3: Prototypical Capture-Only CCS/CCUS Operator Business Model**



Source: Author's analysis

Since CO<sub>2</sub> disposal has no intrinsic market value, most business models rely heavily on government incentives. The current 45Q CCUS and CCS program can generate about \$400 million to \$600 million of tax credit for a 1 Mtpa during a 12-year period. Since a typical project will not generate sufficient income to utilize the entire credit, a developer is likely to partner with a tax equity investor with a large appetite for tax credit. A simplified business model is presented in Figure 3. Revenues for this structure come from the sale of the

captured CO<sub>2</sub> and possibly fees for transport and storage. They are offset by fixed and variable plant operating costs, electricity, fuel, taxes, financing cost and overhead.

Capex for carbon capture facilities can run into hundreds of millions of dollars. The short 12-year asset useful life and limited pool of large investors with sufficient tax liability are additional hurdles to CCS projects. Economics is challenging in this environment. Therefore, Congress, with bipartisan support, is considering a variety of revisions to this scheme, including direct-pay (refundable tax) and expanding storage credit from the current \$50/tonne to \$85 to \$175/tonne, and utilization credit from the current \$35/tonne to \$60 to \$150/tonne.

“Issues related to risk allocation and mitigation have added headwinds to attracting capital to CCS/CCUS worldwide.”

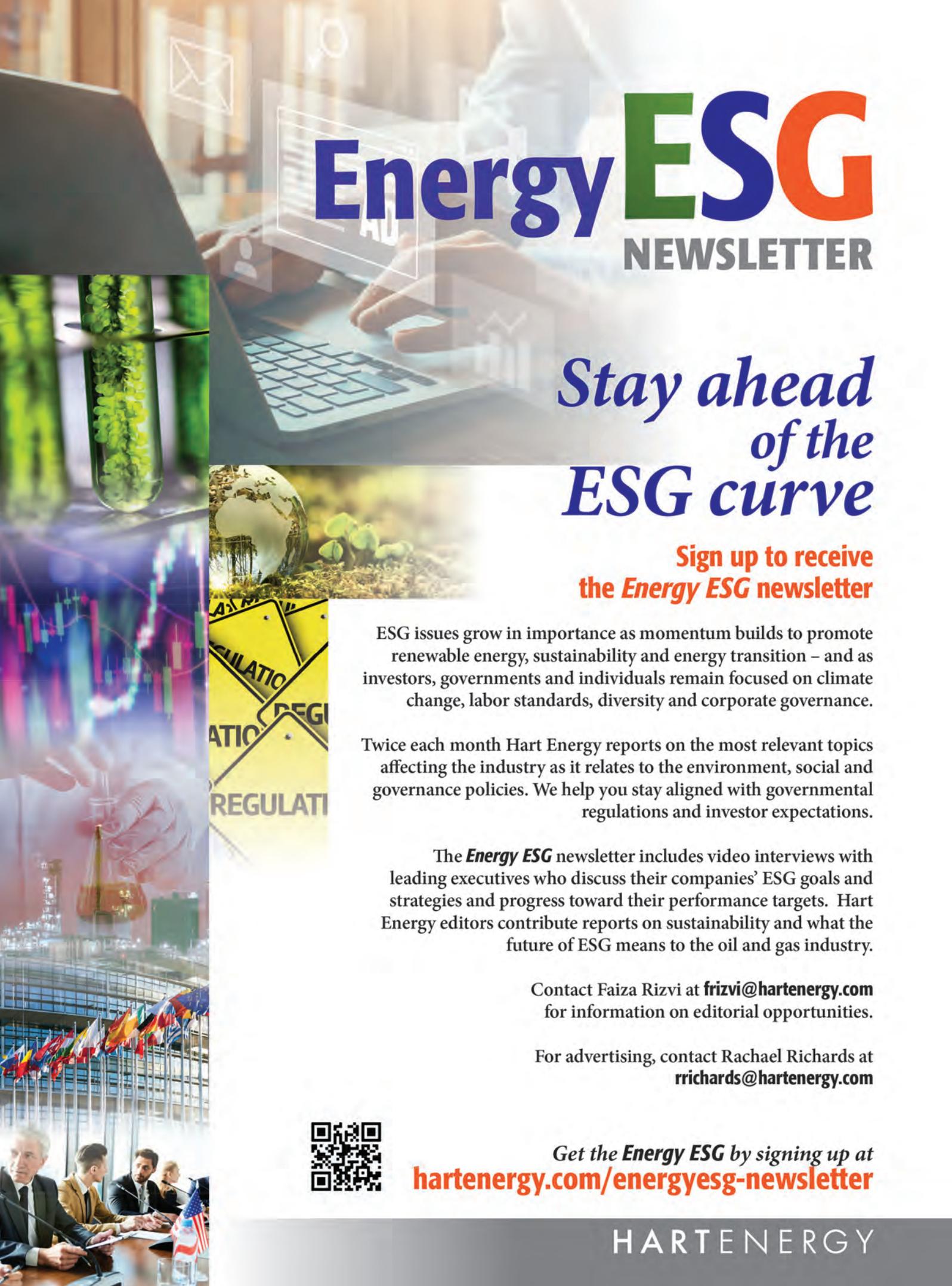
### Risk and allocation

In addition to policy risk and the traditional financing risk for capital-intensive industrial projects, there are specific risks related to CCS/CCUS projects. The above mentioned short useful life creates an aggressive schedule for return on investment and heightened stranded asset risk. Long-term CO<sub>2</sub> leakage risk is not easily mitigated by insurance. Pore space ownership issue can potentially be a litigation risk. The complex components create cross-chain risk in that one party's failure to perform can ripple through the entire value chain. If the captured CO<sub>2</sub> is used for EOR, commodity price exposure can also be problematic. The Petra Nova CCUS project cited weak oil prices as the reason for its suspension of operations.

Issues related to risk allocation and mitigation have added headwinds to attracting capital to CCS/CCUS worldwide. Similar to the solar and wind industries, although acute in the initial stages of development, risks are slowly being addressed by government support, technology improvement and evolving business models.

CCS/CCUS is an exciting multidecade trend, and the oil and gas industry is well-placed to ride the wave. We are experienced and well-positioned to help investors and developers navigate the economic, technical and policy landscape in this area. □

*Jeff Lee is the principal consultant for Kronos Management, a boutique consulting firm that caters to the oil and gas midstream sector. Seasoned engineers and commercial specialists work with oil and gas operators, banks, private equity companies and law firms to deliver transaction advisory, expert witness and capital project development/management services. Lee can be contacted at LeeJeff@engineer.com.*



# Energy **ESG**

## NEWSLETTER

*Stay ahead  
of the  
ESG curve*

**Sign up to receive  
the *Energy ESG* newsletter**

ESG issues grow in importance as momentum builds to promote renewable energy, sustainability and energy transition – and as investors, governments and individuals remain focused on climate change, labor standards, diversity and corporate governance.

Twice each month Hart Energy reports on the most relevant topics affecting the industry as it relates to the environment, social and governance policies. We help you stay aligned with governmental regulations and investor expectations.

The *Energy ESG* newsletter includes video interviews with leading executives who discuss their companies' ESG goals and strategies and progress toward their performance targets. Hart Energy editors contribute reports on sustainability and what the future of ESG means to the oil and gas industry.

Contact Faiza Rizvi at [frizvi@hartenergy.com](mailto:frizvi@hartenergy.com) for information on editorial opportunities.

For advertising, contact Rachael Richards at [rrichards@hartenergy.com](mailto:rrichards@hartenergy.com)

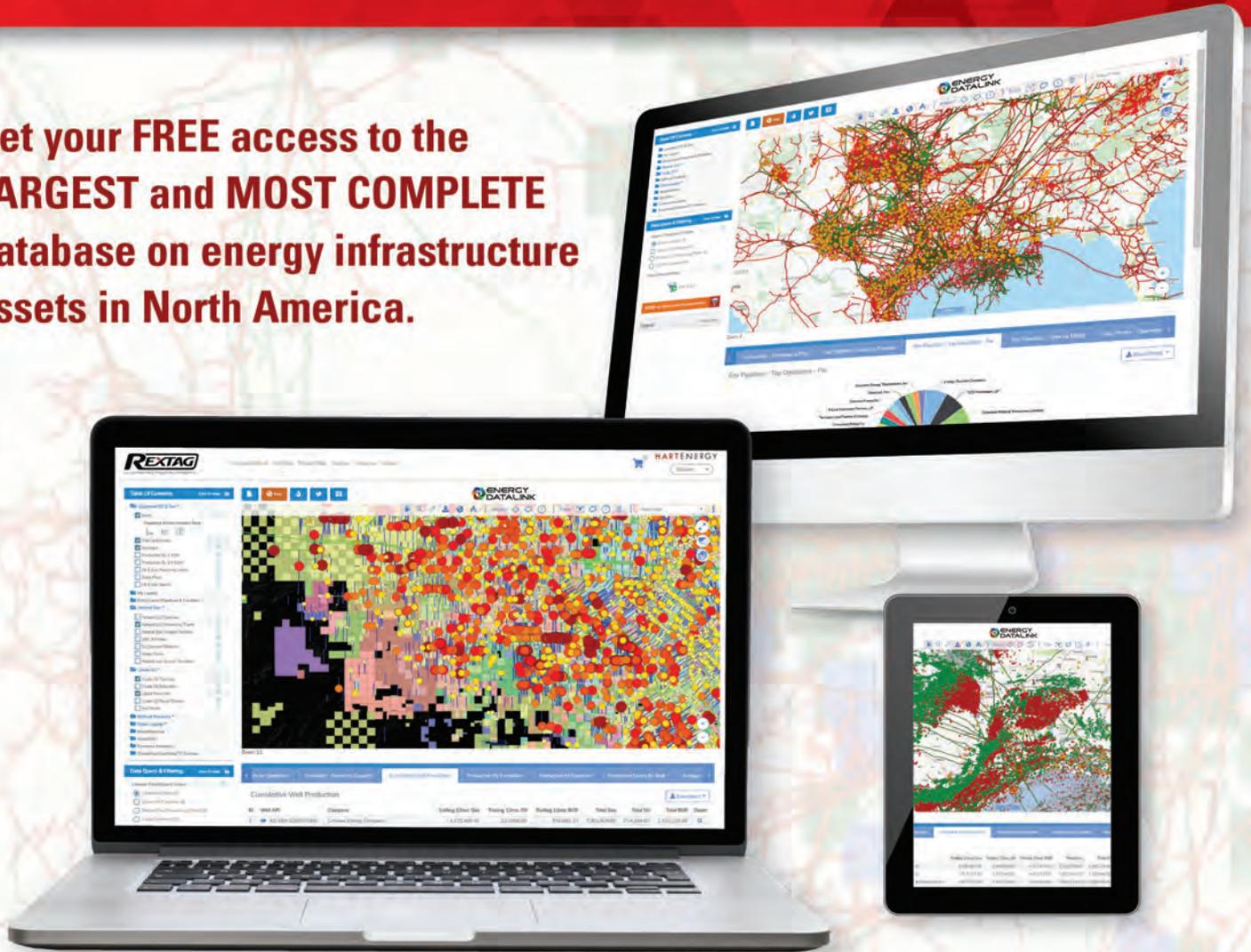


Get the *Energy ESG* by signing up at  
[hartenergy.com/energyesg-newsletter](https://hartenergy.com/energyesg-newsletter)

HARTENERGY

# HERE'S YOUR **SECRET** WEAPON

Get your **FREE** access to the **LARGEST** and **MOST COMPLETE** database on energy infrastructure assets in North America.



*Energy DataLink is the industry standard for accurate, up-to-date energy information and GIS data on energy infrastructure.*

## **INCLUDES:**

- Well Production & Completion Data
- Midstream and Downstream Data
- Visual Mapping
- and more!

**HART**ENERGY

Sign Up for  
**FREE** Access Today:  
[HartEnergy.com/datalink](http://HartEnergy.com/datalink)

## Chesapeake Energy Refocuses On Shale Gas With Chief, Tug Hill Acquisition

**CHESAPEAKE ENERGY CORP.** refocused its portfolio on shale gas on Jan. 25 with a flurry of A&D activity totaling over \$3 billion that included the previously rumored acquisition of **Chief Oil & Gas** and an exit from the Powder River Basin.

“In less than a year, we have achieved our goal of refocusing and high-grading our portfolio around our core assets, positioning us to generate meaningful returns for shareholders today while embracing lower carbon energy production for tomorrow,” president and CEO Nick Dell’Osso said in a news release.

According to the release, Chesapeake signed definitive agreements

to acquire privately held **Chief E&D Holdings LP** and associated nonoperated interests held by affiliates of **Tug Hill Inc.** for \$2 billion in cash and approximately 9.44 million common shares. **Tudor, Pickering, Holt & Co. (TPH)** estimate the cash-and-stock deal structure implies a roughly \$2.6 billion total price tag for the Marcellus Shale assets.

“We’ll still need to go through our own modeling of the transaction,” the TPH analyst wrote in a research note, “but per Chesapeake management, [the] deal is expected to increase cumulative free cash flow over the next five years to

\$9 billion from previous guidance of \$6 billion (offered during third-quarter 2021 earnings) with synergies of \$50 million to \$70 million annually.”

Additionally, Chesapeake also announced an agreement to sell its Powder River Basin assets in Wyoming to **Continental Resources Inc.** for \$450 million in cash. The transaction marks Continental’s latest significant acquisition in the Powder River Basin, where Continental CEO William Berry unveiled in an exclusive interview with *Oil and Investor* the company had completed a “follow up” deal that

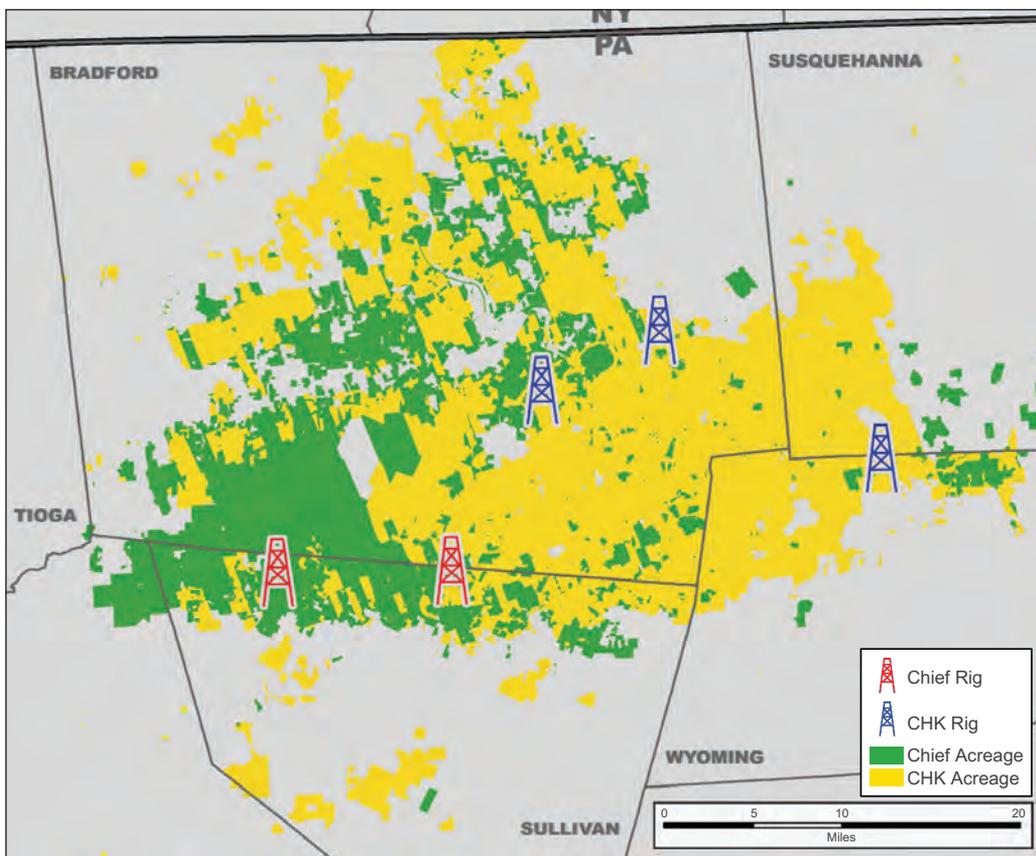
closed in November for about 85,000 net acres in the Powder River Basin.

Chesapeake’s Powder River Basin position includes approximately 172,000 net acres and 350 operated wells in southeastern Wyoming averaging about 19,000 boe/d of production in the fourth quarter. Production is approximately 58% crude oil and NGL.

Proceeds from the Powder River Basin sale will go toward the purchase price of the Chief acquisition, the company release said. Both transactions are expected to close by the end of first-quarter 2022. Upon closing, Chesapeake’s newly simplified portfolio will include refocused positions in the Marcellus, Haynesville and Eagle Ford shale plays.

“Having centered Chesapeake around our highest

### Chesapeake’s Chief Oil & Gas Acquisition



Source: Chesapeake Energy Corp.

performing assets, our team can now integrate these assets into our portfolio, achieve the valuable synergies available to us and enhance cash flows through executing our business,” Dell’Osso said.

The Chief and Tug Hill assets, which Dell’Osso said “fit like a glove” with Chesapeake’s existing position in the northeast Marcellus Shale, include 113,000 net acres producing 835 MMcf/d and extend Chesapeake’s drilling inventory to more than 15 years at current activity levels.

“The acquisition checks all the boxes,” Dell’Osso said. “It lengthens our premium inventory, further focuses our capital allocation, provides operational efficiencies, is accretive to free cash flow per share, allows us to grow our base dividend, preserves our balance sheet strength and improves our GHG [greenhouse-gas] emissions metrics.”

Upon closing of the transactions, Chesapeake plans to operate two rigs on the acquired Marcellus properties during 2022, resulting in a total of nine to 11 gas-focused rigs and two to three oil-focused rigs.

Chesapeake said it will maintain a disciplined capital reinvestment strategy, anticipating a 2022 reinvestment rate of approximately 47%. At current commodity strip prices, this preliminary capital program is anticipated to generate between \$3.4 billion and \$3.6 billion in total adjusted EBITDAX.

Alongside the deal news, Chesapeake also announced plans to increase its annual base dividend by approximately 14% from \$1.75 to \$2 per share beginning in second-quarter 2022, reflecting the cash flow accretion of the Chief acquisition, according to its release. The company also expects to maintain the \$1 billion common stock and warrant repurchase program, which is expected to be executed by the end of 2023.

For the Chief acquisitions, **RBC Capital Markets** is financial adviser to Chesapeake. **Shearman & Sterling LLP** is serving as its legal adviser, and **DrivePath Advisors** is its communications adviser.

**J.P. Morgan Securities LLC** is financial adviser, and **Gibson, Dunn & Crutcher LLP** is legal adviser to Chief and Tug Hill. **Akin Gump Strauss Hauer & Feld LLP** is also serving as legal adviser to Tug Hill and its affiliates.

—Emily Patsy

## Maverick To Buy Conocophillips Permian Basin Assets For \$440 Million

**MAVERICK NATURAL Resources** has entered into a definitive agreement to acquire certain producing properties in the Permian Basin from **ConocoPhillips Co.** for \$440 million, the company announced on Jan. 28.

ConocoPhillips’ assets averaged more than 11,000 boe/d (50% oil) from the Central Basin Platform and Northwest Shelf of the Permian Basin during September 2021. The position spans about 144,500 net acres across Andrews and Ector counties, Texas, and New Mexico’s Eddy and Lea counties. The acreage is largely operated and HBP.

The purchase price is subject to customary adjustments and will have an effective date of Sept. 1, according to Houston-based Maverick.

Chris Heinson, Maverick’s CEO, told Hart Energy that the company is a best-in-class operator that, with the deal, will “apply our operational strengths at scale in the Permian Basin by aggressively controlling costs and by exploiting opportunities to generate additional production.

“These producing assets are supplemented by high-quality drilling inventory, which together are a winning model for generating meaningful investor returns,” he said.

The company relies on intense cost-savings periods, which it calls “sprints,” to rapidly wring costs out of its bottom line. During the 2020 pandemic downturn, the company used such sprints to slash more than \$50 million in savings over a five-day period.

Maverick’s Permian acquisition expands the scale of Maverick’s operations and provides high-quality, oil-weighted drilling inventory, the company said in a news release.

“The transaction highlights our portfolio focus in Texas and Oklahoma, which follows our recent divestitures of assets in California and Michigan,” Heinson said. “Pro forma for the acquisition, Maverick’s production exceeded 78,000 boe/d in September 2021.”

The company is conservatively financed with pro forma leverage of just 0.5x at closing and expected pro forma 2022 EBITDA of approximately \$450 million, Heinson said.

“We expect to utilize our enhanced scale, operational track



**Chris Heinson**

record and conservative balance sheet to access capital markets for funding future acquisitions,” he said.

The acquisition was approved by Maverick’s board of directors and majority equity owner, **EIG**, and will be funded by a fully committed \$500 million reserve-based loan provided by **JPMorgan Chase Bank NA, Royal Bank of Canada, Citizens Bank NA, KeyBank National Association** and **KeyBanc Capital Markets Inc.** Subject to the satisfaction of customary closing conditions and funding, the parties expect the transaction to close in second-quarter 2022.

Maverick was formed from the ashes of **Breitbart Energy Partners LP**, a former MLP that shed most of its \$3 billion in debt after an exit from bankruptcy in 2018. Maverick specializes in the management of mature upstream assets through the application of automation and data science technology.

Maverick’s last announced acquisition, in December 2020, was the all-equity purchase of **FourPoint Energy LLC**, the largest producer in the western Anadarko Basin. The company was renamed **Unbridled Resources LLC** and included **MidPoint Midstream LLC** and **Wheeler Midstream LLC**, which provides midstream services in the western Anadarko Basin.

—Darren Barbee

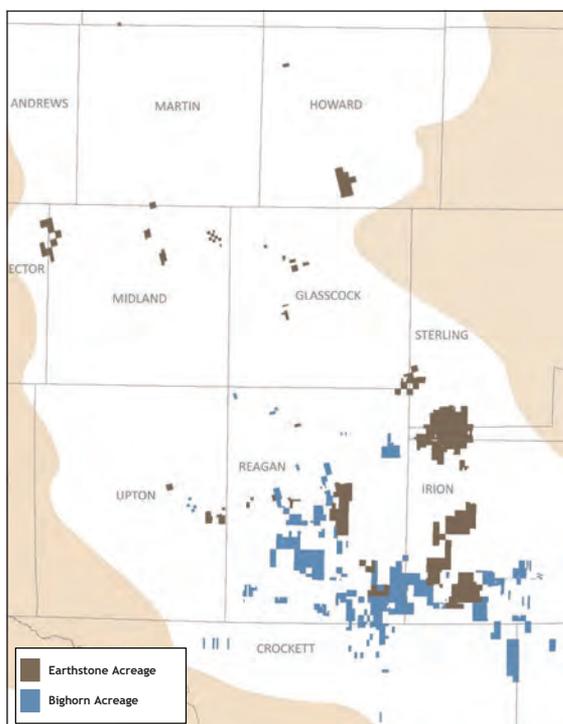
## Earthstone Energy Continues Transformation With Bighorn Acquisition

**EARTHSTONE ENERGY INC.** continued its role as a consolidator in the Permian Basin with the agreement on Jan. 31 to acquire **Bighorn Permian Resources LLC** for roughly \$860 million in cash and stock.

Bighorn is a privately held E&P company with approximately 110,600 net acres (98% operated, 93% working interest, 99% HBP) in the Midland Basin, primarily in Reagan and Irion counties, Texas. The acquisition of Bighorn, which averages daily production of roughly 42,400 boe/d (25% oil, 57% liquids), is expected to increase Earthstone's free cash flow in 2022 by roughly 194%, according to a company release.

"The addition of the high cash flow producing assets from Bighorn to the strong drilling inventory of Earthstone, including the Chisholm acquisition, furthers Earthstone's transformation into a larger-scaled, low-cost producer with lower reinvestment in order to maintain combined production levels," Robert J. Anderson, president and CEO of Earthstone, commented in the company release.

### Bighorn's Midland Basin Asset Overview



Source: Bighorn Permian Resources LLC

Within the past year, Earthstone has significantly transformed itself by utilizing M&A of small operators, including **Independence Resource Management LLC** and **Tracker Resource Development III LLC**, both of which closed in 2021 and added to Earthstone's Midland Basin position. The company in 2021 also closed an acquisition in the Eagle Ford Shale and a bolt-on deal in the Midland Basin before announcing its expansion into the Delaware sub-basin late last year through the pending acquisition of **Chisholm Energy Holdings LLC**.

"Combining the Bighorn acquisition with the four acquisitions completed in 2021 and the pending Chisholm acquisition," Anderson added, "we will have more than quadrupled our daily production rate, greatly expanded our Permian Basin acreage footprint and increased our free cash flow generating capacity by many multiples since year-end 2020."

The consideration for the Bighorn acquisition consists of approximately \$770 million in cash and 6.8 million shares of Earthstone's Class A common stock to be issued to Bighorn, subject to customary closing adjustments.

Bighorn, previously known as **Sable Permian Resources**, emerged from bankruptcy in February 2021. The company was reported by Reuters in October to be exploring a sale of its assets, which, according to the report, had been estimated to be worth around \$1.3 billion at current commodity prices.

Earthstone intends to fund the cash portion of the consideration and fees and expenses with cash on hand, new borrowings under its credit facility and from proceeds of a concurrent private placement of Earthstone equity (PIPE) with **EnCap Investments LP**, a current beneficial owner of approximately 47%

of Earthstone's total Class A and Class B common stock, and **Post Oak Energy Capital LP**, an unaffiliated party.

Existing lenders under Earthstone's credit facility have also agreed to an incremental \$500 million increase to the borrowing base and available commitments from the total \$825 million borrowing base and elected commitments under the credit facility in conjunction with the pending closing of the Chisholm acquisition, bringing the total borrowing base and available commitments to \$1.325 billion.

The effective date of the Bighorn acquisition is Jan. 1, with closing anticipated early in the second quarter. The previously announced Chisholm acquisition is expected to close in mid-February.

Earthstone anticipates holding production flat to moderate growth on a go-forward annual basis based on continuously running the total of four rigs currently being operated by Earthstone and Chisholm in the Midland Basin and the Delaware Basin, respectively.

The proximity of the Bighorn assets to existing Earthstone operations, Anderson said in the release, positions the company to create further value by applying Earthstone's proven operating approach to these assets, primarily in the form of reducing operating costs.

"Consistent with our track record, we are adding substantial size and scale while preserving our balance sheet strength," he said. "The mix of debt and equity utilized for the Bighorn acquisition was designed to be leverage neutral and maintain our targeted 1.0x debt to EBITDAX or better."

As a result of these transactions, Post Oak will have the right to appoint one individual to the Earthstone board of directors.

**Johnson Rice & Co. LLC** served as financial adviser to the audit committee of Earthstone with respect to the PIPE. **RBC Capital Markets** was exclusive financial adviser to Bighorn. Legal advisers included **Haynes and Boone LLP** and **Jones & Keller P.C.** for Earthstone, and **Simpson Thacher & Bartlett LLP** for Bighorn.

—Emily Patsy

## Targa to Sell Gulf Coast Express Pipeline Stake For \$857 Million



**TARGA RESOURCES CORP.** disclosed the sale of its 25% equity interest in the Gulf Coast Express Pipeline to an undisclosed company on Feb. 3 for \$857 million.

The divestiture was viewed as an increasing likelihood by the market, according to analysts with **Tudor, Pickering, Holt & Co.** (TPH), given completion of Targa's "DevCo" buy-in last month and management commentary highlighting the asset as a potential sale candidate. Still, TPH said the price tag for the 2 Bcf/d natural gas pipeline exceeded expectations and should accelerate the simplification of Targa's capital structure.

"The transaction price comes in well ahead of the previously rumored about \$750 million and reduces the net DevCo outlay to just \$68 million (TPH <1.0x EBITDA multiple) for the remaining Grand Prix and Frac 6 interests," TPH analysts wrote in a Feb. 4 research note.

The Gulf Coast Express Pipeline, which began operating in September

2019, transports natural gas from the Permian Basin to outside Corpus Christi on the Texas Gulf Coast.

Targa's stake in Gulf Coast Express, alongside a 20% interest in the Grand Prix NGL Pipeline and 100% interest in the Train 6 fractionator in Mont Belvieu, Texas, was previously part of a development company joint venture (DevCo JV) formed in 2018. On Jan. 10, Targa repurchased its interests in the DevCO JV from investment firm **Stonepeak Partners LP** for about \$925 million.

The DevCo buy-in materially reduced Targa's annual cash outflows, according to TPH, while further simplifying the capital stack, with a credit upgrade to its investment-grade likely as the year progresses.

"Though TRGP remains a consensus long among dedicated energy funds, an investment-grade upgrade may pave the way for potential S&P 500 inclusion as TRGP has recently met the market

cap requirement, which would likely expand the pool of potential investors," the TPH analysts wrote.

Targa expects to receive the full proceeds from the sale of its Gulf Coast Express stake in the second quarter following a customary call right period in favor of the other members of the pipeline. Other owners of the Gulf Coast Express include **Kinder Morgan Inc.**, **Altus Midstream** and **DCP Midstream**.

TPH analysts estimate Targa's pro forma excess free cash flow is likely to exceed \$900 million as proceeds from the sale combine with the accelerated retirement of the company's Series A Preferred to offset lost Gulf Coast Express cash flow, according to the firm's research note.

**J.P. Morgan** is serving as Targa's financial adviser, and **Vinson & Elkins LLP** is Targa's legal counsel on the Gulf Coast Express transaction.

—Emily Patsy

## Civitas CEO Eric Greager Steps Down Concurrent With \$346 Million Deal

**FRESH OFF A TRANSFORMATIVE** year, **Civitas Resources Inc.** said president and CEO Eric Greager has stepped down concurrent with a \$346 million acquisition of a privately held Denver-Julesburg (D-J) Basin operator.

"It has been an honor and privilege serving as CEO of Civitas," Greager said in a statement on Feb. 1. "I want to thank the Civitas board and our entire team for their exceptional efforts in successfully shaping the company's founding principles and positioning the platform for long-term success."

Formerly known as **Bonanza Creek Energy**, the company rebranded as Civitas Resources last November following a slew of acquisitions, which Greager helped oversee.

Greager has served as CEO of Civitas and its predecessor Bonanza Creek since 2018. During his tenure as CEO, Civitas acquired **High-Point Resources Inc.**, **Extraction Oil & Gas Inc.** and **Crestone Peak Resources LLC**. On Feb. 1, the company added to the list with the acquisition of **Bison Oil & Gas II LLC**, marking its fourth takeover within the past year.

The steady string of M&A activity helped to establish Civitas as the largest pure play E&P in the D-J Basin, according to the company. Based in Denver, Civitas also claims to be Colorado's first carbon neutral oil and gas producer.

"On behalf of the board and the entire Civitas organization, we thank Eric for all of his efforts in helping to establish Civitas as the largest pure play E&P in the D-J Basin," Civitas chairman Ben Dell commented in the release. "Eric realized much success in his time as CEO, and we wish him all the best with his future endeavors."

Effective Jan. 31, Dell assumed the role as interim CEO. Civitas formed a search committee comprised of members of its board of directors to identify a new CEO. Greager also agreed to serve as a technical consultant to Civitas for the next 12 months "in order to help ensure its continued success," a company release said.

Concurrent with the CEO transition, Civitas announced it had signed definitive agreements to acquire Bison Oil & Gas II LLC. Consideration consists of 2.3 million of Civitas Resources shares and \$45 million

in cash, plus the assumption of approximately \$176 million in debt and other liabilities.

Bison II was founded in December 2016 with capital commitments from **Carnelian Energy Capital** and management. The company holds leases covering roughly 40,000 net acres and to-date has drilled 30 horizontal wells across its core D-J position, according to the Bison website.

Civitas said the acquisition of Bison II margins with a 2022 estimate pro forma production increase of approximately 9,000 boe/d, composed of 75% oil and 90% liquids, without incremental G&A expense.

The Bison transaction will also add 102 gross "high-quality" locations, of which 38 are fully permitted, and be accretive to free cash flow beginning in 2023 with pro forma net leverage of 0.2x, the company release added.

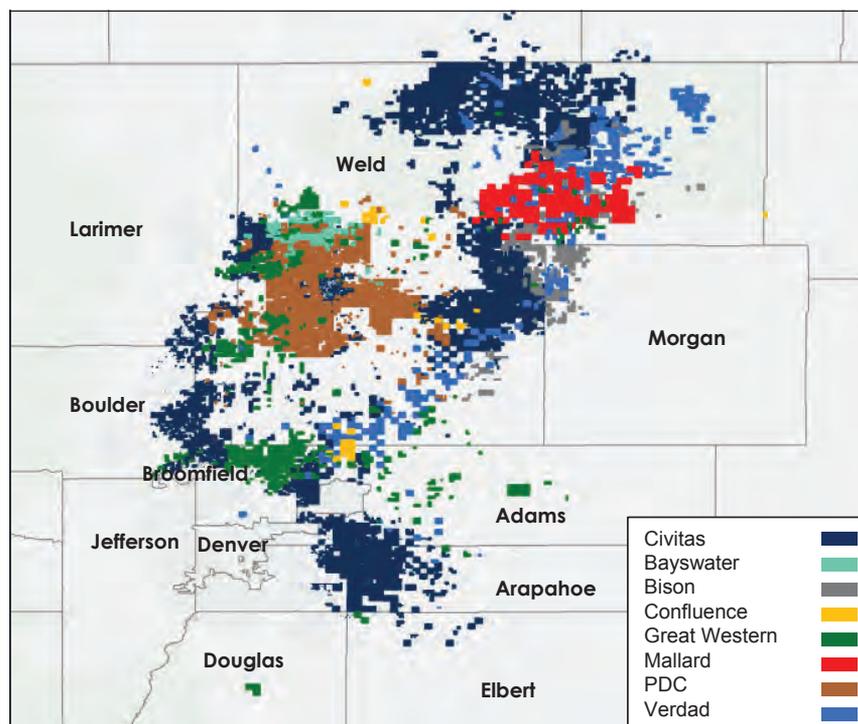
**Kimmeridge Energy**, Civitas' second largest shareholder, commented in the release: "In just a short period of time, Civitas has established itself as a leading platform in the D-J Basin, with scale, resources and a demonstrated commitment to delivering unprecedented value to all of its stakeholders. We are very pleased with the integration progress of Civitas' legacy companies and firmly believe that the Company is well positioned to continue successfully executing its business plan, with a clear objective of identifying value-accretive opportunities."

Civitas operates wells across its roughly 525,000 net-acre position in the D-J Basin producing about 160,000 bbl/d, according to its website. The company exited 2021 with a cash balance of approximately \$250 million and an undrawn revolving credit facility, yielding over \$1 billion in liquidity, not pro forma for the Bison transaction. Civitas is expected to release its fourth-quarter results after market close on Feb. 28.

The Bison transaction is expected to close in first-quarter 2022. **RBC Capital Markets LLC** and **Petrie Partners LLC** are serving as financial advisers, and **Kirkland & Ellis LLP** as legal adviser to Civitas. **CIBC Capital Markets** is financial adviser, and **Bracewell LLP** is legal adviser to Bison.

—Emily Patsy

### Civitas Resources Inc. D-J Basin Acquisition



Source: Civitas Resources Inc.

## Whiting Expands Position In Williston Basin's Sanish Field For \$237 Million



**WHITING PETROLEUM CORP.** is expanding its position in the Williston Basin's Sanish Field through a pair of acquisitions totaling \$237 million.

"We know and understand the Sanish Field extremely well and are very comfortable with the rate of return we are achieving," Lynn A. Peterson, president and CEO of Whiting, commented in a company release on Feb. 8.

In the release, Whiting said it had entered into separate definitive agreements with two private companies to acquire nonoperated oil and gas assets in the Williston Basin, where Whiting's operations are solely focused following its exit last year from the Denver-Julesburg Basin.

The pair of transactions announced on Feb. 8, which increase Whiting's average operated working interest to 74% from 61% throughout Sanish Field in Mountrail County, N.D., continue a strategy the company put forth beginning in late 2020, according to Peterson.

"By increasing our working interest," he said, "we are immediately recognizing substantial cash flow that is accretive for shareholders."

The transactions include 14,563 net acres, four gross (0.2 net) DUC well interests and 277 gross (32 net) undrilled locations. Whiting said it expects to develop the undeveloped locations near term.

The smaller transaction closed in fourth-quarter 2021, and the larger acquisition is scheduled to close this quarter. Whiting said the assets should contribute approximately 4,500 boe/d (67% oil) at closing.

The acquisition will impact many of the drilling units included in the company's current 2022 development program, according to the company release. The plan was designed, Whiting said, with higher working interests and slightly greater activity in Sanish Field where the company has shifted operations.

Whiting said it will operate two drilling rigs and one completion crew in the Williston Basin in Mountrail, McKenzie and Williams counties, N.D., for the majority of 2022. While the company noted its success with 3-mile laterals in its Sanish Field, Whiting plans to drill additional 3-mile laterals further west in McKenzie County during the year, which it expects

will help improve economics on additional inventory.

Peterson said Whiting also executed on its strategy last year of paying down its revolving credit facility, allowing for the company to initiate dividend payments of \$0.25 per share for the first quarter or \$1 per share annualized.

"With the expected sizable cash flow generation and the strength of the balance sheet, we believe this dividend payment is sustainable under significant commodity changes," he said. "Along with our acquisition of nonoperated interests, the initiation of the dividend is the latest commitment to realize value and shareholder return."

As a result of the updated guidance on Feb. 8 and an assumed WTI oil price of \$70/bbl, Whiting now expects to generate over \$900 million of EBITDA and over \$500 million of adjusted free cash flow in 2022.

Whiting's 2022 plan is to reinvest approximately 40% of the expected EBITDA for the period, which it said is consistent with the prior year. Low double-digit inflation has also been built into the projections, the company added.

—Emily Patsy

**CANADA**

■ **Exxon Mobil Corp.** on Jan. 12 offered for sale shale oil and gas properties in Western Canada, a decision that could make oil sands its largest Canadian onshore production business.

The top U.S. oil producer last year accelerated efforts to divest smaller oil and gas operations and use any proceeds to pay down debt acquired as the coronavirus pandemic triggered losses.

Exxon Mobil and affiliate **Imperial Oil Ltd.** each own 50% of **XTO Energy Canada**, operator of their Canadian shale business. XTO pumps about 9,000 bbl/d of liquids and 140 MMcf/d of natural gas in Canada.

**RBC Capital Markets** has been hired to advise Imperial on the sale, the company said. The properties could fetch between \$500 million and \$1 billion, people familiar with energy property sales said.

The shale assets were part of an impairment charge that Imperial and Exxon Mobil took in late 2020, an Imperial spokeswoman said. The companies also own petrochemical plants and Exxon Mobil operates offshore production in Eastern Canada.

**GOM**

■ **Red Willow Offshore LLC**, a closely-held U.S. oil and gas producer, is marketing its interest in six nonoperated U.S. Gulf of Mexico oil fields that it has valued at over \$130 million, two people familiar with the matter told Reuters on Jan. 28.

Energy dealmaking among smaller oil and gas producers has jumped as a strong rebound in oil and gas prices has encouraged companies to combine to gain economies of scale. The global crude oil benchmark on Jan. 28 traded at over \$91/bbl, up 62% from a year ago.

Red Willow Offshore, formed by the Southern Ute Indian Tribe of Colorado, has retained investment bank Evercore to advise it, the people said. Its six fields will produce about 3,500 bbl/d of oil and gas.

Red Willow Production and **Evercore** did not respond to requests for comment.

The company valued the properties at \$137 million based on current oil prices. Bids are anticipated in late March with any potential sale effective as of April 1, according to a

marketing document dated this month and seen by Reuters.

Red Willow's parent company Red Willow Production owns oil and gas producing assets in the San Juan Basin of Colorado and New Mexico, the Delaware Basin of West Texas and the Green River Basin of Wyoming, according to its website.

**MIDLAND BASIN**

■ Private U.S. oil and gas producer **Hannathon Petroleum LLC** has retained an investment bank to sell around 18,000 net acres in the northern Midland Basin of Texas, according to marketing documents seen by Reuters.

The assets could be valued at around \$500 million in a sale, a source familiar with the matter said. The source requested anonymity as the sale plan is confidential.

Shale operators have leaned heavily on dealmaking in recent months as a strong rebound in oil and gas prices has given companies a window to sell assets at attractive prices. The global crude oil benchmark on Jan. 31 traded at over \$91/bbl, up 62% from a year earlier.

Hannathon has retained investment bank **Jefferies** for the sale of its assets, which currently produce around 5,800 bbl/d of oil and gas, according to the documents.

The company is planning to open a "virtual data room" to interested parties next week and is expecting bids by March 23, the documents showed.

**ROYALTIES**

■ **Rising Phoenix Royalties** disclosed on Jan. 27 an acquisition of royalty acreage in the Woodford Basin in Oklahoma's Stephen County, marking the Dallas-based company's third deal this year.

"The Stephens County acquisition is a great example of our ability to assist sellers with smaller to medium size deals," Jace Graham, CEO and founder of Rising Phoenix Royalties, commented in a release from the company.

The Stephens County acquisition comprises roughly 5 net royalty acres (49% oil / 51% natural gas) from an undisclosed seller. The terms of the transaction were also not disclosed. **Ovintiv Inc.** is the wellsite operator, according to the release.

**MIDSTREAM**

■ **Clearfork Midstream LLC** agreed to acquire **Azure Midstream Energy LLC** following a \$400 million initial capital commitment from **EnCap Flatrock Midstream**, Clearfork said in a Jan. 18 company release.

Based in Fort Worth, Texas, Clearfork is a growth-oriented midstream company that was formed in 2020 to provide comprehensive midstream solutions for oil and gas producers in basins across North America.

"Over the past few years, we have developed strong relationships with key members of the EFM team," Clearfork CEO Kipper Overstreet commented in a company release.

Overstreet, who previously served in roles of increasing responsibility at Azure Midstream, leads the Clearfork team comprised of industry veterans including COO George Grau Jr., chief commercial officer Corey Lothamer and executive vice president Kevin Venturini.

"[EnCap Flatrock Midstream] aligned with us on the acquisition of Azure Midstream and Azure's growth potential," Overstreet added. "We are very pleased to be part of the EFM family of companies."

Azure Midstream's natural gas gathering and treating platform spans the core areas of the Haynesville Shale formation and includes more than 500 miles of pipeline and 1.2 Bcf/d of treating capacity across systems in North Louisiana and East Texas. Azure also has nine downstream interconnects offering access to major market hubs, including Henry Hub, Houston Ship Channel/Katy, Carthage, Columbia Gulf Mainline, Perryville and Agua Dulce (via TETCO and NGPL).

**Latham & Watkins LLP** was legal adviser to EnCap Flatrock Midstream on the equity commitment with partner James M. Garrett in the lead role. **Vinson & Elkins LLP** served as legal adviser to Clearfork on both the equity commitment and the acquisition of Azure Midstream. Partner Matthew Falcone led the firm's legal team.

**Donovan Ventures** served as financial adviser to Clearfork regarding the Azure acquisition. Jefferies was financial adviser, and **Porter Hedges LLP** was legal adviser to Azure.

# PERMITS

Not all oil and gas permits are issued in Texas, and not all Texas permits are issued by counties located in the Permian Basin. At the moment, though, most are.

From mid-December through mid-January, Texas accounted for about 70% of all permits, and eight of the 11 leading counties for issuing permits can be found in the Permian. Weld County, Colo.; Canadian County, Okla.; and Karnes County, Texas, in the Eagle Ford, made up the rest of the leaders.

In the Top 10 ranking of states and regions issuing permits—well, there wasn't a Top 10. Only eight states issued permits during that time frame. No-shows included the entire Marcellus-Utica region, the Gulf of Mexico, California, Utah, Alaska and New Mexico.

Pioneer Natural Resources Co. was issued the most permits during the period, many of them focused in Martin County, Texas, in the Midland Basin. Pioneer also collected permits for new drilling in Glasscock, Midland, Pecos, Reagan and Upton counties in Texas.

Operators active in permitting in Colorado included Great Western Operating Co. LLC, PDC Energy Inc. and Kerr McGhee Oil and Gas Onshore. In Oklahoma's Canadian County, the permitting leader was Citizen Energy III LLC. In North Dakota, Ovintiv Production Inc. was issued the most permits to drill in McKenzie County. Marathon Oil Corp. was issued drilling permits in Dunn County.



## Permits By Operator

Pioneer Natural Resources Co.	28
Great Western Operating Co. LLC	25
Endeavor Energy Resources LP	24
PDC Energy Inc.	22
EOG Resources Inc.	22
Blackbeard Operating LLC	22
CrownQuest Operating LLC	20
OXY	18
Exxon Mobil Corp.	17
All others	639

## Permits By State

Texas	622
Colorado	97
Oklahoma	91
Louisiana	38
North Dakota	38
Wyoming	13
All others	0

## Permits By County

Howard, Texas	54
Reeves, Texas	54
Martin, Texas	52
Midland, Texas	47
Weld, Colo.	27
Crane, Texas	26
Loving, Texas	24
Canadian, Okla.	24
Upton, Texas	20
Karnes, Texas	19
Reagan, Texas	19

# ACTIVITY HIGHLIGHTS

# RIG COUNT

The U.S. oil and gas rig count, up 61% in mid-January over the same time in 2021, appeared to plateau later in the month in response to weakening oil prices in fourth-quarter 2021.

WTI peaked at \$84.65/bbl on Oct. 25 before falling to less than \$66/bbl at the end of November. It typically takes a month or two for drillers to respond to significant oil price moves, which may account for a slip later in January. However, from the start of December to mid-January, WTI rose by 28%, an indication that, if the oil rig count continues to decline in February, it may well rise again soon.

The number of natural gas rigs continued to climb and was up 22% in mid-January compared to a year earlier, while the benchmark Henry Hub price of gas had increased 66% over the January 2021 level of \$2.546/MMBtu.

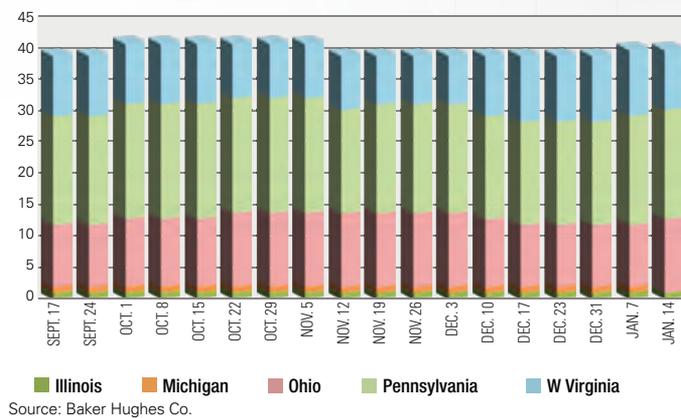
Texas accounted for almost half of the U.S. total, and its 281 rigs were almost three times as many as those operating in New Mexico, the next most active state. The Permian Basin's rig count rose 55% in the past 12 months to 293. The next largest basin, the Eagle Ford in South Texas, saw its count jump 79% in 12 months to 50 rigs.

If there is a tangible sign of the industry's recovery from the pandemic-induced crash, it is that the Permian Basin's rig count has returned to its level of mid-April 2020. It took 17 months to return to the April level, compared to four months from April to the count's nadir in August 2020.



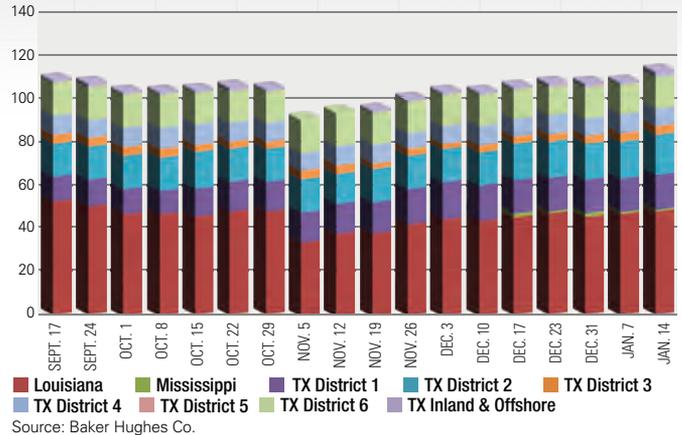
## Eastern U.S. Rig Count

Sept. 17, 2021-Jan. 14, 2022



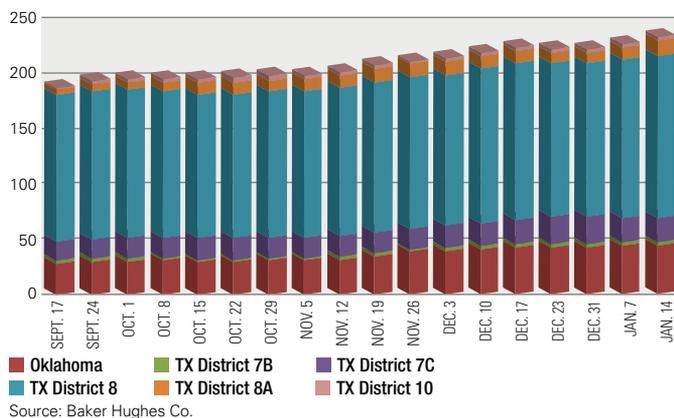
## Gulf Coast Rig Count

Sept. 17, 2021-Jan. 14, 2022



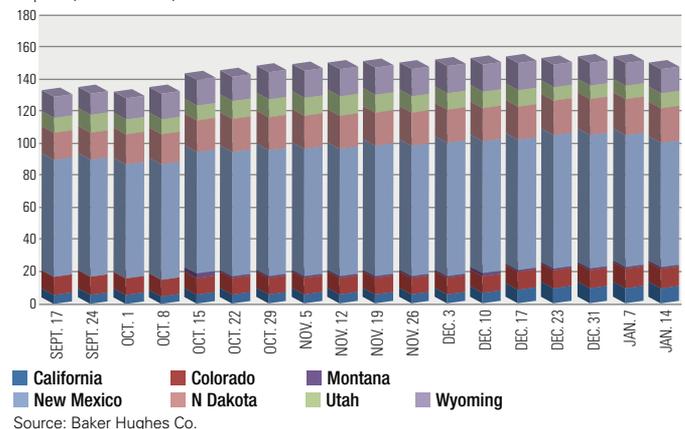
## Midcontinent & Permian Basin Rig Count

Sept. 17, 2021-Jan. 14, 2022



## Western U.S. Rig Count

Sept. 17, 2021-Jan. 14, 2022



## EQUITY

Company	Exchange/ Symbol	Headquarters	Amount (\$MM)	Comments
EIV Capital LLC	N/A	Houston	\$702	Announced final closing of its fourth flagship fund, <b>EIV Capital Fund IV LP</b> , along with its co-invest vehicle, <b>EIV Capital IV Top-up Fund LP</b> and affiliates, which surpassed its original \$625 million target. Fund IV, which completed fundraising activities in early December, has already partnered with three new portfolio companies to support their growth. Remaining proceeds will be used to pursue an investment strategy similar to prior funds by making growth equity investments primarily in energy infrastructure and niche renewable energy sectors and opportunistically in other parts of the energy value chain. <b>Latham &amp; Watkins LLP</b> served as legal counsel.
8minute Solar Energy	N/A	Los Angeles	\$400	Closed financing from <b>EIG</b> , which includes a portion of growth equity and a letter of credit. Proceeds will be used to help 8minute continue to operate and grow its attractive portfolio of clean energy assets, which includes more than 18 GW of solar capacity and 24 GWh of storage throughout California, Texas and the southwestern U.S., as well as to enable 8minute to focus on technology innovation and advanced solar plant design, and to begin building projects on its own balance sheet.
Earthstone Energy Inc.	NYSE: ESTE	The Woodland, Texas	\$280	Concurrent with the signing of the Bighorn acquisition agreement on Jan. 31, entered into an agreement to privately issue equity through a PIPE financing with two institutional investors, including affiliates of <b>EnCap Investments LP</b> , which is a current beneficial owner of approximately 47% of Earthstone's total Class A and Class B common stock. Funds managed by <b>Post Oak Energy Capital LP</b> , an unaffiliated party, is the other PIPE investor. Closing of the PIPE is conditioned upon and will occur concurrently with the closing of the Bighorn acquisition, expected in second-quarter 2022. Equity issued in the PIPE will initially be in the form of convertible equity that will automatically be converted into 25.2 million shares of Class A common stock, including 19.8 million shares to affiliates of EnCap. <b>Johnson Rice &amp; Co. LLC</b> served as financial adviser to the audit committee of Earthstone.
TreadStone Energy Partners III LLC	N/A	Houston	\$180	Formed with an equity commitment in excess of \$180 million from <b>Kayne Anderson Energy Fund VIII LP</b> and TreadStone III management. Represents the continuation of a successful partnership with Kayne Anderson Energy Funds dating back to the 2011 formation of <b>TreadStone Energy Partners LLC</b> . Proceeds will be used to pursue the acquisition of producing oil and natural gas properties with exploitation and development upside across the Lower 48, with an initial focus on Texas and New Mexico basins.
PetroShale Inc.	TSXV: PSH	Calgary, Alberta	CA\$54.5	Closed oversubscribed non-brokered and brokered private placements, which included the issuance of some 23.8 million units at a price of 40 cents each through a non-brokered private placement, plus a brokered private placement with a syndicate of agents led by <b>Peters &amp; Co. Ltd.</b> and including <b>Haywood Securities Inc.</b> , <b>National Bank Financial Inc.</b> , <b>RBC Dominion Securities Inc.</b> , <b>CIBC World Markets Inc.</b> , <b>BMO Nesbitt Burns Inc.</b> and <b>ATB Capital Markets Inc.</b> through which PetroShale issued 112.5 million common shares at a price of 40 cents each. Each unit issued in the non-brokered private placement consists of one common share and one warrant entitling the holder to purchase one common share at a price of \$0.475 per common share for a period of five years from the issuance date. Proceeds will be used to reduce debt and for general corporate purposes, positioning the company to execute on a disciplined corporate strategy.
Datagration Solutions Inc.	N/A	Houston	N/A	Closed an additional equity financing by all major existing investors, including <b>Quantum Energy Partners' Innovation Fund</b> , and several new investors, led by <b>EIV Capital LLC</b> . Proceeds will be used to support the growth of its business with funds slated to further advance the PetroVisor Platform, add to its implementations and customer success group and recruit additional global sales resources. Portions of new funding will also be used to grow its portfolio of platform-native apps and expand the use of its unified data model that can influence operational and process changes to improve asset productivity and profitability.
Ecotec International Holdings LLC	N/A	Colton, Calif.	N/A	Announced a strategic investment by funds managed by <b>Intrepid Investment Management LLC</b> , the investing arm of <b>Intrepid Financial Partners LLC</b> . Proceeds will be used to accelerate the production and roll out of its patented instrumentation and emissions data collection software to fulfill strong customer demand in the biogas and oil and gas industries.

Company	Exchange/Symbol	Headquarters	Amount (\$MM)	Comments
Magnolia Oil & Gas Corp.	NYSE: MGY	Houston	N/A	Announced that its board of directors raised the company's share repurchase authorization by an additional 10 million shares of Class A common stock, resulting in approximately 15.8 million shares available for repurchase under the authorization, which pertains only to open market purchases for shares of Class A common stock. Any purchases by Magnolia of Class B units from <b>EnerVest</b> are approved separately by Magnolia's board with these units canceled upon execution.

## DEBT

Pioneer Natural Resources Co.	NYSE: PXD	Irving, Texas	\$1,250	Announced that it has delivered notices of full redemption of all of its outstanding 0.75% senior notes due 2024 and 4.45% senior notes due 2026, having aggregate principal amounts of \$750 million and \$500 million, respectively. <b>Computershare Trust Co. NA</b> is serving as the paying agent.
Halliburton Co.	NYSE: HAL	Houston	\$600	Announced it has called for redemption of its 3.8% senior notes due 2025. The aggregate principal amount of the notes currently outstanding is approximately \$1 billion.
International Petroleum Corp.	TSX: IPCO	Toronto, Ontario	\$300	Completed a private placement of senior unsecured bonds with a tenor of five years, a fixed coupon rate of 7.25% per annum and interest payable in semiannual installments. Proceeds will be used to repay existing indebtedness under bank credit facilities and for general corporate purposes. <b>Arctic Securities</b> and <b>Pareto Securities</b> were joint lead managers. <b>SpareBank 1 Markets</b> was co-manager.
Diversified Energy Co. Plc	LSE: DEC	Birmingham, Ala.	\$365	Closed a sustainability-linked asset backed securitization (ABS) involving certain of its Appalachian assets previously pledged as collateral under the company's revolving credit facility led by <b>KeyBank NA</b> and substantially similar to assets securitized in the company's previous ABS transactions. Proceeds will be used to reduce its RBL borrowings and create additional liquidity.

# Hart Energy's New Financings Database

A searchable database of debt and equity offerings across the oil and gas industry



Updated regularly

Users can filter by company, start/end date or financing type

[hartenergy.com/new-financings](https://hartenergy.com/new-financings)

HARTENERGY

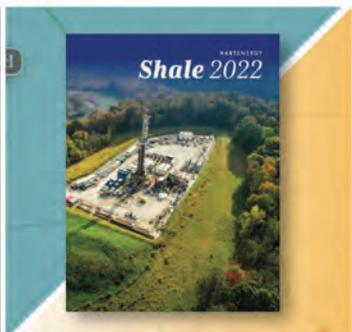
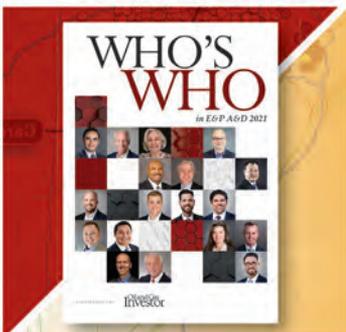
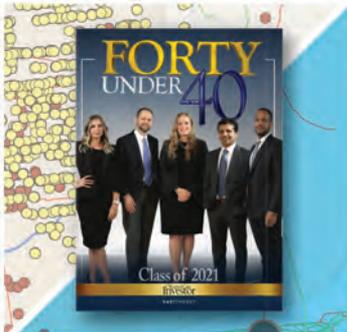
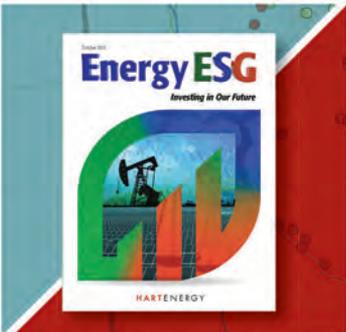
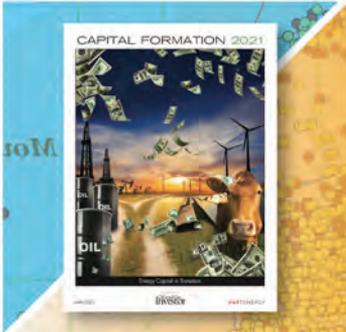
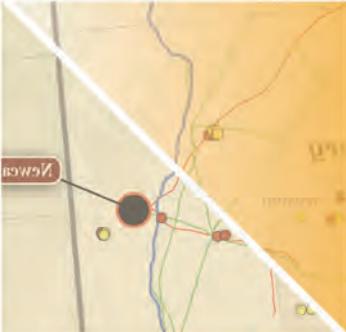
# COMPANIES IN THIS ISSUE

This index refers to the pages of the story or news item in which the company is first mentioned. Advertisers are in boldface.

<b>Company</b>	<b>Page</b>	<b>Company</b>	<b>Page</b>	<b>Company</b>	<b>Page</b>
Akin Gump Strauss Hauer & Feld LLP	76	<b>Forty Under 40</b>	<b>51</b>	Pioneer Natural Resources Co.	26, 47
Alta Resources LLC	39	FourPoint Energy LLC	76	Porter Hedges LLP	81
Altus Midstream	78	Gibson, Dunn & Crutcher LLP	76	Post Oak Energy Capital LP	77
Azure Midstream Energy LLC	81	GlobalData	15	Power the Future	20
Bison Oil & Gas II LLC	79	Golden Advisory Services	18	<b>Price College Of Business  </b>	
<b>BKD Energy Ltd.</b>	<b>22</b>	Goldman Sachs	27	<b>The University Of Oklahoma</b>	<b>62-63</b>
BlackRock	20	Great Western Operating Co. LLC	82	<b>Project Canary</b>	<b>44</b>
BOK Financial	67	Great Western Petroleum	65	Raymond James	15
Bracewell LLP	79	Hannathon Petroleum LLC	81	RBC Capital Markets	76
Breitburn Energy Partners LP	76	<b>Hart Energy Conferences</b>	<b>21</b>	RBC Richardson Barr	24
Cabot Oil & Gas Corp.	27	<b>Hart Energy's New Financings Database</b>	<b>85</b>	Red Willow Offshore LLC	81
Carnelian Energy Capital	79	<b>HartEnergyStore.com</b>	<b>87</b>	<b>Regions Securities</b>	<b>13</b>
<b>Catalyst Energy</b>	<b>4</b>	Haynes and Boone LLP	77	<b>Rextag</b>	<b>74</b>
ChampionX	45	Imperial Oil Ltd.	81	Royal Bank of Canada	76
Chesapeake Energy Corp.	9, 15, 27, 75	Independence Resource Management LLC	77	Royal Dutch Shell Plc	47
Chevron Corp.	47	<b>IPAA</b>	<b>IBC</b>	Rystad Energy	15
Chief Oil & Gas	9, 75	J.P. Morgan Securities LLC	76	Sable Permian Resources	77
Chisholm Energy Holdings LLC	77	Jefferies	81	Scientific Aviation	45
CIBC	24	Johnson Rice & Co. LLC	77	Seneca Resources	19
CIBC Capital Markets	79	Jones & Keller P.C.	77	Shearman & Sterling LLP	76
Cimarex Energy Inc.	27	JPMorgan Chase Bank NA	76	Shell	24
Citizen Energy III LLC	82	Kerr McGhee Oil and Gas Onshore	82	Simpson Thacher & Bartlett LLP	77
Citizens Bank NA	76	KeyBanc Capital Markets Inc.	76	Southwestern Energy Co.	15
Civitas Resources Inc.	79	KeyBank National Association	76	<b>Stephens Investment Banking</b>	<b>IFC</b>
Clearfork Midstream LLC	81	Kimmeridge Energy	79	Stonepeak Partners LP	78
CNX Resources Corp.	40	Kinder Morgan Inc.	78	Tanda Resources LLC	18
Colgate Energy Partners III LLC	26	Kirkland & Ellis LLP	79	Targa Resources Corp.	78
Colorado School of Mines	64	KPMG	7	<b>TCU Neeley School of Business</b>	<b>56-57</b>
ConocoPhillips Co.	45, 76	Kuwait Oil Co.	65	<b>TenEx</b>	<b>23</b>
<b>Continental Resources Inc.</b>	<b>OBC</b>	Latham & Watkins LLP	81	Texas Christian University	52
Continental Resources Inc.	9, 49, 75	Luxe Energy	26	Tracker Resource Development III LLC	77
Cowen	26	Luxe Energy	26	TRP Energy	47
DCP Midstream	78	Marathon Oil Corp.	82	Tudor, Pickering, Holt & Co.	27, 75
Devon Energy Corp.	47	Maverick Natural Resources	76	Tug Hill Inc.	75
Donovan Ventures	81	<b>Meritorious Engineering Awards</b>	<b>10</b>	<b>Tulane University Freeman School</b>	<b>60-61</b>
DoublePoint Energy	26	MidPoint Midstream LLC	76	Tulane University	52
DrivePath Advisors	76	<b>Netherland, Sewell &amp; Associates Inc.</b>	<b>2</b>	Unbridled Resources LLC	76
<b>DUG Permian + Eagle Ford</b>		NexTier Oilfield Services	19	University of Colorado Denver	49
<b>Conference &amp; Exhibition</b>	<b>14</b>	NGP	26	<b>UNC   Kenan-Flagler Business School</b>	<b>58-59</b>
Earthstone Energy Inc.	18, 77	Northern Oil and Gas Inc.	24	University of North Carolina at Chapel Hill	49
EIG	76	Oasis Petroleum	7	University of Oklahoma	52
EnCap Flatrock Midstream	81	Occidental Petroleum Corp.	26	Vine Energy Inc.	9
EnCap Investments LP	77	<b>Oil and Gas Investor</b>	<b>69</b>	Vinson & Elkins LLP	78
<b>Energy ESG Awards Program</b>	<b>33</b>	Oklahoma State University	52	Wells Fargo	9, 27
<b>Energy Transition Capital Conference</b>	<b>6</b>	Olympus Energy LLC	40	Wheeler Midstream LLC	76
EnergyFunders	34	Ovintiv Inc.	81	Whiting Petroleum Corp.	80
EQT Corp.	15, 38	Ovintiv Production Inc.	82	WildHorse Resource Development Corp.	9, 27
<b>ESG Newsletter</b>	<b>73</b>	Parsley Energy	26	<b>Women In Energy</b>	<b>37</b>
Evercore	81	PDC Energy Inc.	82	Wood Mackenzie	27
Exxon Mobil Corp.	45, 68, 81	Pearl Energy Investments	26	<b>Wright &amp; Co. Inc.</b>	<b>43</b>
Fitch Ratings	9, 27	Petrie Partners LLC	79	XTO Energy Canada	81
<b>Flogistix</b>	<b>8</b>	Pickering Energy Partners	15		



# HART ENERGY STORE UNMATCHED OIL AND GAS RESOURCES



SHOP AT  
[HARTENERGYSTORE.COM](https://HARTENERGYSTORE.COM)

# THE NEW ENGLAND OILERS



NISSA DARBONNE,  
EDITOR-AT-LARGE

**F**ootball separation anxiety, anyone? Its onset is every February, commencing the six-month dry spell until The Replacements games—pardon, I mean the pre-season games—kick off a new season of disappointment for 97% of NFL fans.

Here's a post-season distraction someone could work on, though. Since "the Oilers" is no longer in use in the NFL—as the late Bud Adams moved the Houston Oilers to Tennessee in the 1990s, rebranding them the Titans—the New England Oilers would be an aptly penned franchise. (A bonus distraction: getting the NFL to un-retire the name.)

Adding a 33rd team to the schedule-palooza forces a new wildcard into sports books' lines. And the NFL's dissatisfaction guarantee? Not a problem. Alexa says that 32 teams' failure to win the big game is still 97% fan disappointment—because, rounding.

(With a "power of 10" exponent, if an NFL ref killed your team's Super Bowl bid with a no-call for pass interference. See Rams vs. Saints, Jan. 20, 2019. Yes, still bitter.)

Why the New England Oilers? The region burns oil to generate electricity when it doesn't have enough natural gas—and it doesn't have enough natural gas.

In six weeks through Feb. 7, the region's power grid produced "a massive blast of greenhouse gas," Reuters reported, with 1.7 MMbbl of fuel oil to supplement power supply 10%.

It made 3.5 billion pounds of CO<sub>2</sub> in the first four weeks of the year—4,800% more than a year earlier. "Fuel oil typically accounts for less than 1% of the region's power production," Reuters added.

Overall, "in January, fuel oil accounted for about 11% of the overall fuel mix for New England generators, peaking at 21% on Jan. 16."

According to the Energy Information Administration (EIA), fuel oil is the feedstock in less than 1% of annual powergen in all of the U.S., including Alaska and Hawaii.

Contributing to the switch to oil from natural gas, besides New England's constrained access to ready supply and storage, was the price this winter: \$13.97 an MMBtu on Jan. 31 at the NYC Gate-Tettco M3 and \$14.29 on Jan. 7.

The Algonquin Citygate price was more than \$20, according to the EIA. A megawatt hour of electricity on Jan. 31 was more than \$200.

While the Appalachian Basin produces more than 30 Bcf/d, pipe into New England remains short as greenfield newbuild has been rejected by states along prospective routes.

Otherwise, there's an LNG receiving terminal across the Mystic River from Boston. On Feb. 9, LNG tanker *Castillo De Villalba* arrived to drop off a cargo from Point Fortin, Trinidad, according to MarineTraffic.com. She was off the coast of Cape Cod on Feb. 11 en route to Corpus Christi, Texas, to reload.

The Everett, Mass., LNG terminal was competing with Europe in bids for cargos. The situation is what Lucy in "Being the Ricardos" might call a "compound fracture" in lieu of the non-PG "cluster [expletive]" term for a confluence of extraordinary undesirable events.

As for Europe's situation, tweeter Wampum Mining exclaimed from Oklahoma, "How has no one learned not to [expletive] with Russia in winter?"

As for New England's situation, Michael Shellenberger, author of "Apocalypse Never: Why Environmental Alarmism Hurts Us All," tweeted, "Sen. Bernie Sanders ... convinced New Englanders that they didn't need nuclear or natural gas, and so now the region is getting 25% of its electricity by burning oil and desperately importing [LNG] from the Caribbean by ship."

His was a response to Meredith Angwin, author of "Shorting the Grid: The Hidden Fragility of Our Electric Grid," who tweeted on Jan. 16: "An update this morning on the Northeastern grid. Wind has died down. Still cold here. Minus 7 where I live. Sunny. Lots of oil on the grid, 25%. But renewables down to 8%, mostly due to lack of wind."

A Permian oil and gas producer retweeted the conversation, adding, "I wonder if this will get 'investigated?' Or will policymakers turn a blind eye to their own incompetence and try to continue to blame oil and gas companies? My bet is on the latter."

It was the latter: Reuters reported that New England's response was to ask the Biden administration to "reevaluate exports of LNG."

But New England doesn't want the pipelines to receive the gas. Sigh.

If New England is disenchanted with "Oilers" as a franchise team, "the Woodchippers" isn't taken.

The mascot: Griddy.

# 27<sup>TH</sup> ANNUAL TEXAS WILDCATTERS' OPEN

**MARCH 24<sup>TH</sup>  
BLACKHORSE  
GOLF CLUB**

12205 FRY ROAD  
CYPRESS, TEXAS



Enjoy on-course food from sponsoring companies, a plethora of prizes, and an awards ceremony with drinks and hors d' oeuvres all while supporting the industry.

Bring your favorite colleagues and/or clients, your business cards and

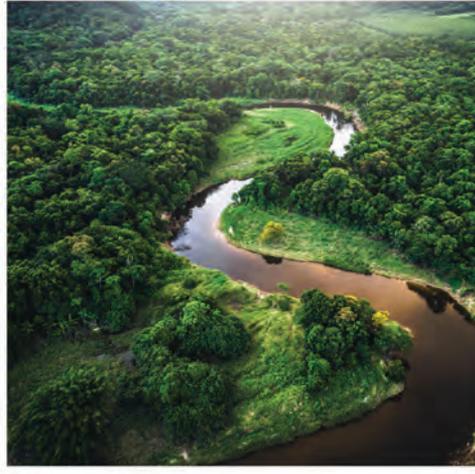
**JOIN US!**

**SHOTGUN START  
12:00 P.M.**

**AWARDS RECEPTION  
5:00 – 6:00 P.M.**

Sponsor to Play! View our **SPONSORSHIP OPPORTUNITIES** at [www.ipaa.org/events/texas-wildcatters-open-2022](http://www.ipaa.org/events/texas-wildcatters-open-2022) and contact Brittany Green at [bgreen@ipaa.org](mailto:bgreen@ipaa.org) to register.

**ONE CLICK  
AWAY TO  
SPONSORING  
TODAY!**



# We produce the energy needed to make our world work.

And not just now, but will for generations to come. It is not an understatement to say that without the miraculous properties of our domestically produced hydrocarbons, modern American life couldn't exist. The oil and natural gas we find and produce transports us, feeds us, illuminates us, comforts us, and even cures us. Petroleum and its byproducts are everywhere and in everything, we are essential and irreplaceable. In short, we produce the energy needed to make our world work. And we do it responsibly, affordably, abundantly, and innovatively. To learn more, visit **CLR.com**



CLR.com | NYSE: CLR