Hydrocarbon Research Group

Introductory Analysis Report

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Summary

This report provides a high-level overview of key topics within the oil and gas industry, serving as an <u>introductory analysis</u> of the sections covered. In future editions, each topic will be explored in greater depth through dedicated reports.

The oil and gas industry is primarily driven by two factors, geopolitics and price. This report touches on these areas, offering a brief glimpse into their impact. Another crucial factor is production. Texas's oil, gas, and natural gas liquids (NGL) production make up a substantial percentage of the global market and account for approximately 42% of the energy produced in the United States. Please note that <u>Most of the production data and statistics</u> in this analysis spans from January 2024 to April 2024 This is due to the lag in reported data in addition to upcoming reports that have yet to be released.

Investment insights for two of the top producers and one small cap producer in Texas. Diamondback Energy, Exxon Mobil, and Birch Resources—are also included. The goal is to highlight a major producer like Exxon, an up-and-coming producer like Diamondback Energy, and a small-cap producer like Birch Resources. Understanding how these companies hedge, invest, and produce is essential for gaining deeper insights into the market.

Cybersecurity is a critical focus for the industry, and this report highlights current trends, previous attacks, and preventative measures. As technology evolves, companies must adapt and navigate the associated risks to ensure continued security and operational integrity.

Lastly, the report discusses Geothermal energy. Geothermal holds promise as an emerging energy source that aligns well with clean energy goals. Its potential for easier integration, due to fewer major infrastructure obstacles, makes it an important aspect of future reports.

Geopolitical Overview



Conflict in the Middle East

The death of the Iranian president and foreign minister prompted OPEC+ to reschedule their ministerial-level meeting to June 2, shifting from an in-person gathering to a videoconference. This adjustment underscores the ongoing geopolitical tensions in the Middle East. Adding to the instability, Israel's bombing of a refugee camp in Rafah has sparked international condemnation and urgent calls for a cessation of military actions in the Gaza Strip. Attacks by Houthi rebels in the Red Sea have disrupted shipping routes, leading to a spike in freight costs and perceived oil supply disruptions.

The number of tankers transiting through the Red Sea has fallen by more than half since October 2023, as voyages have been rerouted around Africa to avoid conflict zones.

This has raised concerns about potential inflationary impacts on imported goods and oil prices, though the effects so far appear modest compared to COVID-era disruptions. [1] [30]

Russia's attacks on energy infrastructure

Russia's ongoing attacks on energy infrastructure in Ukraine, including storage facilities, persist, posing risks to natural gas supply security in Europe. Geopolitical tensions represent the greatest risk to the short-term outlook for natural gas markets, according to the IEA. This will continue to put pressure on logistical flows of oil and ngl going forward.

The halt in LNG trade across the Red Sea since the start of 2024 due to conflicts is a concern for energy security and supply flexibility. [2]

OPEC+ production decisions

OPEC+'s strategy of balancing market share with pricing goals is a key factor shaping global oil markets, as their production cuts or increases can significantly impact supply and prices. [3]

<u>Summary</u>

While the impacts have been relatively contained so far, any further escalation of conflicts in regions like the Middle East could lead to more severe oil supply disruptions and inflationary pressures on energy prices. The geopolitical flashpoints in the Middle East, Russia's attacks on energy assets, and OPEC+ production policies are the main areas of geopolitical risk impacting



Global Oil Forecast

Historical and forecasted global oil consumption

The forecast was created using an exponential smoothing model. A common type of time series forecasting.

Key Insights & Forecast (2023-2028)

Stable Growth- From 2003 to 2019, steady increase in global oil consumption, peaking around 2019. Pandemic Impact- A noticeable dip occurs around 2020, due to the COVID-19 pandemic's impact on global demand. Base Forecast - The orange line represents the base forecast, showing a gradual increase in oil consumption from approximately 50,000 units in 2022 to over 55,000 units by 2028.

Confidence Bounds

Lower Confidence Bound (**Green Line**)- Suggests a more conservative estimate, potentially accounting for factors like accelerated adoption of renewable energy or stricter environmental regulations, projecting a slight decline or stable consumption.

Upper Confidence Bound (**Blue Line**) Indicates a more optimistic scenario where economic growth and industrial demand drive higher consumption, reaching up to 65,000 units by 2028.

Financial Analysis & Risks

Market Implications- The base forecast suggests a moderate increase in oil consumption, which aligns with expectations of post-pandemic economic recovery and continued industrialization in emerging markets. Environmental Policies - The lower confidence bound highlights the risk of stricter environmental policies and shifts towards renewable energy, potentially reducing oil demand. Economic uncertainty, The upper confidence bound underscores the potential for higher-than-expected economic growth, which could boost oil consumption.

Data source Data - U.S. Energy Information Administration (EIA)



Brent / WTI Prices March – April

Brent Crude Oil Performance with WTI overlay * Markers March-April *

Brent Crude oil exhibited notable gains from March through April. After hitting a low of approximately \$81.3 in March, prices surged to a high of around \$92.6 by the end of April. This upward momentum has been significant, marking a robust recovery in the market. <u>Current price points and conditions will be updated in the upcoming report.</u>

The Relative Strength Index (RSI) indicated that Brent Crude was approaching overbought (**noted in yellow**) territory during this period, signaling strong buying pressure. This metric, which measures the speed and change of price movements, suggests that the commodity may be due for consolidation or a correction if the buying trend continues at this pace.

Brent Crude has been trading within a long-range channel that extends back to June 2023. This channel has provided a framework for the commodity's price movements, with the recent gains positioning it towards the upper boundary of this range. The sustained activity within this

channel highlights the resilience of Brent Crude prices amidst varying market conditions over the past year. Keep an eye on future geopolitical impacts on market pricing.



Texas Production

Texas Yearly Production data from April 2023 to 2024

Several key takeaways emerge. District 8 stands out as a powerhouse, leading in both condensate and oil production, with condensate surpassing 2000M BBL and oil close to 1500M BBL. This district's significant output underscores its crucial role in Texas' oil industry. Similarly, District 6 shows substantial condensate production, second only to District 8, although its oil and GW gas outputs are minimal. This concentration of production in just a few districts highlights a notable disparity, with Districts 8 and 6 dominating while others like Districts 1 and 9, although also productive, contribute less significantly. This suggests that future resource allocation and investment should focus on these high-yield districts to maximize returns. Lastly, the emphasis on condensate production in these leading districts indicates its growing importance in the overall production landscape, pointing to a potential area for further strategic development. The total production for each category is as follows. Oil, 1,607,237,762 bbls. Gas, 7,242,781,081 and Condensate, 303,909,319 bbls.

- Pricing Oil at an average of 82.00 dollar per bbl = <u>131,793,496,484 dollars</u>.
- Pricing Nat Gas at 2.00 per MCF = <u>14,485,562,162</u>
- Pricing Condensate at 39.00 per bbls (converted MMbtu into bbls) = 11,852,463,441
- Total energy produced in dollars is approximately <u>158,131,522,087 billion mcf.</u>

Data sourced from the The Railroad Commission of Texas (state.tx.us)



Texas Top Producers in millions produced

Your top 20 producers from March through April can be seen above. Gas was converted to BOE equivalent, oil and condensate were also combined. This provided a total accumulative assessment of production for each company. Endeavor Energy led the way with a total accumulative of 7,428,228 BOE. Followed by EOG Resources with 5,803,594 BOE and XTO Energy with 3,908,601 BOE.

<u>Endeavor Energy Resources</u> is focused on the Core 6 counties of the Midland Basin in West Texas - Midland, Martin, Howard, Glasscock, Upton, and Reagan counties. The company has over 344,000 net acres concentrated in these core Midland Basin counties and an active horizontal drilling program in the region. [4] [5]

<u>EOG Resources</u> has a significant presence in the Permian Basin of West Texas and Southeast New Mexico, with a focus on the Delaware Basin portion. Some of the key counties where EOG operates many leases and wells are Loving, Reeves, Ward, Culberson counties in West Texas and Lea and Eddy counties. [6] [7]

<u>XTO</u> is described as the most active operator in the Permian Basin, with plans to increase total daily production to 1 million oil-equivalent barrels by as early as 2024 from its Permian operations in Texas. XTO operates in 88 counties across Texas, with a concentrated presence in the Permian Basin region of West Texas. [8] [9]

Data sourced from The Railroad Commission of Texas (state.tx.us



Top Producing Counties in Texas

The graph illustrates the total oil and condensate production from the top producing counties in Texas from March through April. Martin County leads as the highest producer, nearing 20 million barrels, followed closely by Midland County with slightly less production. Reeves County ranks third, with production levels like Midland County. Loving and Upton Counties also contributed significantly, each producing around 10 million barrels. Other notable producers include Howard and Karnes Counties, both within the range of 5 to 10 million barrels.

• Martin County has shown a decrease in production over the past six months. Winter months and colder conditions in addition to other logistical and production issues could be the cause. This will be something to monitor in the months going Forward.

Data sourced from The Railroad Commission of Texas (state.tx.us



Martin County Oil production over five months.

November-December to March-April, showing a declining trend. In November-December, production was highest at 38,143,609 barrels. This declined to 36,282,572 barrels in December-January, a drop of approximately 1.86 million barrels. The downward trend continued in January-February, with production at 34,671,145 barrels, a reduction of about 1.61 million barrels. February-March saw a slight increase to 35,934,873 barrels, suggesting a short-term recovery. However, March-April experienced a significant drop to 18,746,973 barrels, with production nearly halving from the previous period. Overall, the trend is a clear decline in oil production, with the sharp drop from February-March to March-April raising concerns about potential operational, economic, or environmental issues.



Martin County Top Producers

Diamondback E&P LLC emerged as the leading producer, contributing a substantial 5 million barrels, which accounts for 32.95% of the total production. Following closely is Pioneer Natural Resources US, which produces 4 million barrels, representing 23.07% of the total. Endeavor Energy Resources holds a significant share as well, with 3 million barrels, making up 17.79% of the production.

Other notable contributors include COG Operating LLC and Occidental Permian Ltd., each producing 1 million barrels, contributing 5.73% and 5.47% respectively. XTO Energy Inc. adds another 1 million barrels to the total, accounting for 4.02%. Crown-Quest Operating, DE IV Operating, LLC, SM Energy Company, and Birch Operations, Inc. each contributed 1 million barrels, with shares ranging from 3.79% to 3.95%.

Financials



Company Overview

Diamondback Energy continues to emphasize operational efficiency and strategic growth. In Q1 2024, the company drilled 79 new horizontal wells and brought 101 wells into production, primarily in the Midland Basin. Their proactive capital management is evident through the sale of Viper's Class A Common Stock to fund the pending Endeavor Acquisition. Despite significant capital expenditures, the company's efficient cost structure and strong production rates indicate robust operational performance. Diamondback's focus on disciplined investment and production expansion underscores their optimistic outlook and commitment to sustainable growth.

<u>Q1 – 2024 Highlights</u>

- Shareholder Equity (assets minus liabilities) is approximately 18 billion.
- Annual Dividends increased to 3.60\$ per share. Q1 Paid approximately 548 million.
- Oil, NG, (natural gas) and NGLs (natural gas liquids) sales 2.1 billion.
- Long term debt (consisting mostly of senior notes from 2026-2053) 6.6 billion.
- Brent Option Position (Settled Months April Jun) Puts 110,000bbls at 55.45\$
- Argus WTI Option Position (Settled Months April-Jun) Puts 32,000bbls at 55.63\$
- WTI Option Position (Settled Months April -Jun) Puts 39,000bbs at 59.23\$
- Average Production was 461.1 MBOE/d (millions bbl. oil equivalent)
- Sold 13.23 million shares of Vipers Class A Common Stock for approximately 451 million. These funds will be used to help fiancé Endeavor Acquisition.
- Operating Costs 11.52\$ per BOE

• LOE is approximately 6.08\$ per BOE. [10]

Merger and Growth Plans

In February 2024, Diamondback Energy announced a merger with Endeavor Energy Resources to create a premier Permian Basin operator. The combined company will have approximately 838,000 net acres and 816 MBOE/d of net production. It expects to realize \$550 million in annual synergies and substantial financial accretion from the merger.Diamondback's 2024 capital budget is focused on the Midland and Delaware Basins, with plans to drill 265-285 gross horizontal wells. [11]

ExonMobil

Company Overview

ExxonMobil's Q1 2024 report highlights strong financial performance with GAAP earnings of \$8.2 billion and \$14.7 billion in cash flow from operating activities. The company achieved record first-quarter refining throughput of 3.8 million barrels per day and substantial production growth in Guyana. ExxonMobil maintains a low net debt-to-capital ratio of 3%, the lowest in over a decade, showcasing financial stability. Strategic investments and operational efficiencies underscore the company's commitment to long-term growth and shareholder value.

Q1- 2024 Highlights

- Shareholder Equity (assets minus liabilities) is approximately 213 Billion.
- Cash Dividends paid out Q1 3.8 billion. The current price is 3.80 per share annually.
- Sales and Operating Rev (United States / Non-US) 80.4 billion (This includes, Oil, NGL's, NG and other products)
- Debt decreased by 1.2 billion in Q1 from 41.6b to 40.4b. The corporation debt to total capital ratio was 16.0% at the end of Q1 down from 16.4%.

• Derivative and option positions were not specifically detailed. However, Exxon maintains that they have the proper risk management and hedging instruments in place. See table below from Q1 10 Q filing.

The net notional long/(short) position of derivative instruments at March 31, 2024 and December 31, 2023, was as follows:

(millions)	March 31, 2024	December 31, 2023
Crude oil (barrels)	15	(7)
Petroleum products (barrels)	(39)	(43)
Natural gas (MMBTUs)	(577)	(560)

• Operating Expenses Totaled 16.5 billion with an adjusted total of 13.2 Billion after depreciation, impairments and depletions. [12]

Acquisitions and Growth

ExxonMobil has completed the acquisition of Pioneer Natural Resources, significantly transforming its upstream portfolio. This acquisition more than doubles ExxonMobil's footprint in the Permian Basin, adding over 1.4 million net acres in the Delaware and Midland basins and increasing the estimated resource to 16 billion barrels of oil equivalent. The merger is expected to enhance operational efficiency and generate double-digit returns by leveraging both companies' strengths in technology, financial resources, and project execution capabilities.

Additionally, the acquisition aims to advance environmental goals, transitioning Pioneer's 2050 net-zero emissions target to 2035 and committing to net-zero Scope 1 and Scope 2 greenhouse gas emissions from Permian operations by 2030. This merger positions ExxonMobil as a major player in the Permian Basin, expected to increase production to approximately 2 million barrels of oil equivalent per day by 2027. [13]



Small Cap Spotlight

Birch Resources and Birch Permian Holdings are privately held exploration and production (E&P) companies focused on assets in the prolific Permian Basin of West Texas. The company is headquartered in Houston, Texas at 909 Fannin Street. [14]

Birch Resources was founded in 2018 by a seasoned management team with extensive experience in the Permian Basin, aiming to capitalize on opportunities in this major shale play. A related entity, Birch Permian Holdings, raised \$780 million in equity capital in April 2018 to fund the company's entry into the Permian Basin. Later that year in October 2018, Birch Permian Holdings acquired assets in Howard County in the Midland Basin for \$775 million, marking Birch's emergence as a new player in the region. [15]

The operating subsidiary, Birch Operations Inc., manages the company's production activities across hundreds of leases and wells primarily in counties like Howard, Martin, Andrews, and Dawson in Texas. Birch Operations has been actively permitting, drilling, and completing new horizontal wells across both the Midland and Delaware Basins within the broader Permian Basin play. [16] [17]

As a privately held E&P firm, Birch Resources has rapidly grown its footprint in the Permian Basin since its formation in 2018 through strategic acquisitions, capital raises, and an aggressive drilling program targeting the region's prolific shale formations. [18] [19]

Production Highlights

- Birch Resources ranks 29 on the list of top producers in Texas.
- Total Oil Produced is approximately 88,310,168 bbls. of oil.
- Total Gas Production 229,369,969 MCF's
- Total BOE 126,538,425 bbls.
- Latest Production from March April was approximately 233,000 bbls of oil and 1,200,000 MCF.

Financial Highlights

- Birch Resources and Birch Permian Holdings (a part of the same structure) raised 780 million in equity in 2018.
- Birch Permian Holdings acquired assets in Howard County, Texas for \$775 million in October 2018, marking the company's entry into the Permian as an operator. These acquired assets were likely then operated by the Birch Resources LLC subsidiary. [15]

Cyber Security Spotlight



Cyber Industry Overview

According to a report by Offshore Technology, there's been an 87% rise in cybersecurity mentions in oil and gas company filings in Q1 2024 compared to the previous quarter, indicating increased concern over cyber threats, but does not give attack numbers. [29]

Ransomware Attacks

There were 21 global ransomware attacks on the industry in 2022 alone, making it the 5th most affected sector. [20]

Attacks on Operational Technology (OT) Systems

The industry's heavy reliance on operational technology like industrial control systems (ICS), distributed control systems (DCS), and supervisory control and data acquisition (SCADA) systems makes them vulnerable targets. These OT systems often lack robust security measures, have outdated infrastructure, and can potentially allow attackers to remotely control critical functions impacting safety. [21]

Advanced Persistent Threats (APTs)

The oil and gas industry faces sophisticated APT threats. APT attacks are highly targeted, often aimed at high-value organizations like governments, defense contractors, critical infrastructure, or large corporations. often from state-sponsored actors, seeking to gain unauthorized access to valuable data like intellectual property, exploration data, financial records, and strategic plans. [21] [22]

• <u>Attacks Targeting Safety Systems</u>

Some malicious actors aim to not just disrupt operations but cause physical damage and safety incidents. The search results mention a dangerous attack planned to trigger an industrial disaster that could threaten human lives. [23]

• Data Breaches and Theft of Sensitive Information

With vast amounts of sensitive data like intellectual property, customer information, and financial records, oil and gas companies are attractive targets for cyber criminals seeking to steal this valuable information through data breaches. [21] [22]

• Disruption of Critical Infrastructure

As critical national infrastructure, successful cyberattacks on oil and gas facilities like refineries, pipelines, and drilling rigs can lead to widespread disruptions in energy supply, production halts, and severe economic impacts. [23] [20]

Major Attacks in the past

• Cyberattack on European Oil Refining Ports and Storage (2022)

2022, a major cyberattack hit oil refining ports and storage facilities across Northwest Europe, including sites in the Netherlands, Belgium and Germany. The attack disrupted operations and highlighted vulnerabilities in critical energy infrastructure. [20]

• Colonial Pipeline Ransomware Attack (2021)

This forced Colonial to shut down its 5,500 miles of pipeline carrying gasoline, diesel and jet fuel, leading to fuel shortages and panic buying across several states. Colonial reportedly paid \$4.4 million in ransom to restore operations. [20] [21]

• Ryuk Ransomware Attack on PEMEX 2019

Mexico's state oil company Pemex was hit by a major ransomware attack called Ryuk in 2019, disrupting administrative operations and prompting a cybersecurity alert across the industry. [21]

• Triton Malware Attack on Saudi Aramco (2017)

Designed to target industrial safety systems, it was deployed against Saudi Aramco in 2017. The malware aimed to manipulate emergency shutdown capabilities and could have triggered an industrial disaster. It was one of the first publicly known examples of malware targeting industrial control systems with potential for causing physical damage. [21] [23]

Preventative Measures

Oil and gas companies are implementing robust, multi-layered "defense-in-depth" cybersecurity strategies with overlapping controls like access restrictions, network segmentation, encryption, and intrusion detection systems. Companies are aligning their IT and industrial control systems cybersecurity programs to leading frameworks such as NIST and ISA/IEC 62443 standards, while also developing tailored guidance through the industry's API Standard 1164. Vulnerability management through regular risk assessments, scanning, and prompt patching of flaws in IT and OT systems is critical to reduce attack surfaces. Building a strong security culture is a focus, with increased personnel training on policies, best practices, and incident response procedures. Public-private collaboration through bodies like the ONG-ISAC enables threat intelligence sharing between firms and government agencies. Major companies are investing in advanced security technologies like managed detection and response services, zero-trust architectures, robust access controls, and continuous monitoring. They have also established dedicated cybersecurity teams, implemented security-by-design processes, and are undergoing digital transformation initiatives to enhance overall cyber resilience and program maturity. [20] [21] [23] [24]



Energy Shift - Geothermal

Geothermal Overview

The current administration announced \$60 million in funding for three projects to scale up enhanced geothermal systems (EGS), which have the potential to provide renewable geothermal energy to power the equivalent of 65 million U.S. homes.

The U.S. The Department of Energy (DOE) announced \$31 million in funding opportunities for projects supporting EGS wellbore tools and using low-temperature geothermal heat for industrial processes. A new lithium production facility is being developed near California's Salton Sea to harvest lithium from geothermal brines, highlighting geothermal potential for critical mineral production. Several states like New Mexico, New York, Maryland, Virginia, and Washington have passed or are considering legislation to increase funding, incentives, and regulations for geothermal energy development in 2024. [25][26]

Current Major Projects

- The Geysers Geothermal Complex in California remains the world's largest single geothermal field, with a capacity of 1,520 MW from 22 power plants.
- The Larderello Geothermal Complex in Italy is one of the oldest and largest, with 34 plants and a 770 MW total capacity.
- Other major geothermal power plants are in Mexico (Cerro Prieto, 570 MW), Indonesia (Salak, 377 MW), and the Philippines (Tiwi, 289 MW). [27]

<u>Texas Geothermal</u>

Sage Geosystems Project in Starr County

In 2021, Houston-based startup Sage Geosystems leased a site in Starr County where Shell had previously drilled and abandoned a dry gas well. Sage installed equipment and used fracking-like techniques to create cracks in the rock 2 miles deep to allow water circulation and heat extraction. In March 2023, they successfully generated electricity by pumping 20,000 barrels of water into the well, which returned as hot water spinning turbines. This was an experimental enhanced geothermal system (EGS) project demonstrating Sage's technology. [28]

Geothermal Outlook

The DOE's GeoVision analysis outlines strategic goals for geothermal, including 60 GW of EGS and hydrothermal deployment for electricity by 2050, and 17,500 district heating installations using geothermal by 2050. Geothermal is viewed as a critical, firm, flexible source of clean energy that can contribute to decarbonizing the power grid and building heating/cooling while providing grid stability and reliability. With continued R&D, technology improvements, and supportive policies, the geothermal sector is expected to experience significant growth in the coming decades as part of the clean energy transition. [25] [26] [27]

Disclaimer

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