Oil Companies and Wall Street Gain Confidence

U.S. Oil & Gas Extraction Briefing - Fourth Quarter 2021

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The Payne Institute for Public Policy at the Colorado School of Mines produces a quarterly commentary series on the U.S. upstream oil and gas sector's financial health, activity levels, employment and outlook.

SUMMARY

Stronger oil and natural gas prices have infused oil companies and Wall Street with confidence about future prospects, although remaining in shareholders' good graces by not "over-spending" continues to dominate U.S. public oil and natural gas (O&G) industry mindset. Announced spending increases for oilfield activity suggest ~25% year-over-year growth in 2022, with much of that going to cover inflation and only modest (often <5%) forecast production growth.

In order to further demonstrate a commitment to spending discipline, the public oil and gas companies have also implemented formal policies to return a proportion (40-50% is common) of their "excess" cash to shareholders. The combination of rising conviction in strong oil and natural gas prices and this discipline commitment appears to have helped encourage investors to buy oil company stocks — share prices of the XOP, a U.S. oil company stock market index, rose 67% in 2021 vs. the S&P500 index up 27%.

However, if current strong commodity prices persist, they provide the basis for these companies to spend considerably more this year, and thus grow their production more than they have announced thus far. (The formulaic return of excess cash allows the companies to give some of that extra profit to shareholders and put the rest towards trying to grow production.)

With that said, it is also plausible that the industry's efforts to further increase their oilfield activity this year will be partially stymied by what can be described as supply chain challenges. In particular, hydraulic fracturing equipment, the availability of which has been reduced dramatically over the last two+ years, may be in short supply until new and refurbished equipment can be brought on line.

Looking over the medium term, the industry is beginning to expect multiple years of spending growth given the strength of demand, under-investment that is leading to production capacity shortfalls and now the ostracization, if not widespread sanctioning, of Russian oil and gas. To that last point, longer term demand growth can include providing the gas for LNG export to Europe. A 55% increase in U.S. LNG capacity, to 18 Billion Cubic Feet per Day is already either underway or being sought, but delivering that (or more) growth will take years given the requirements to plan, permit and build more takeaway capacity (pipelines) and liquefaction facilities. Commercial models for U.S. upstream natural gas producers are already shifting to include direct exposure to (higher) overseas LNG prices, however, making it more attractive for U.S. gas producers to pursue.

Please see page 4 for recent activity discussion, page 5 for 2022 discussion and pages 6-7 for an update on the impact of higher global natural gas prices and emerging models to "feed" LNG.

Reference Table – U.S. Oil & Gas and Activity Statistics

	1Q20	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	3/18/22
Oil Price (West Texas Intermediate, $/bbl)	$45.80	$29.14	$40.94	$42.72	$58.14	$66.16	$70.55	$76.97	$112.14
Nat Gas Price (Henry Hub, $/Mcf)	$1.90	$1.70	$2.00	$2.53	$2.77	$2.95	$4.37	$4.72	$4.77
Oil Production (Millions of Barrels per Day)	12.7	10.8	10.8	10.9	10.7	11.3	11.2	11.6	N/A
Nat. Gas Dry Production (Billions of Cubic ft per Day)	96.4	89.6	90.0	91.1	90.5	93.2	94.5	96.2	N/A
Drilled but Uncompleted Wells (DUCs)	8,513	8,826	8,770	8,046	7,269	6,416	5,629	4,657	N/A
Rig Count	763	378	240	293	374	436	484	544	649
Frac Spread Count	318	89	79	132	156	221	241	263	266
Oil $ Gas Co. Bankruptcies	5	18	17	6	8	4	3	5	N/A
Oilfield Services Bankruptcies	7	11	27	17	5	8	14	9	N/A
Direct Employment In O&G Extraction (Thousands)	442.0	376.0	383.2	369.5	387.5	404.9	421.3	364.9	N/A

Sources: *Macrotrends.net, Energy Information Administration, Baker Hughes, Primary Vision, Haynes and Boone LLP, Bureau of Labor Statistics*

Notes:
– All reflect averages for the period except employment and DUCs, which are end of period
– Direct Employment is from the BLS' Current Employment Statistics; reflects Oil & Gas (NAICS code 211) and Support for Mining (213) segments
NAICS code 213 includes ~5,000-10,000 employees in the coal and non-energy sectors
– Winter storm Uri weighed on 1Q21 averages. Oil production, for example, was 11.1 million b/d in January and 9.9 million b/d in February
–N/A = Not Available

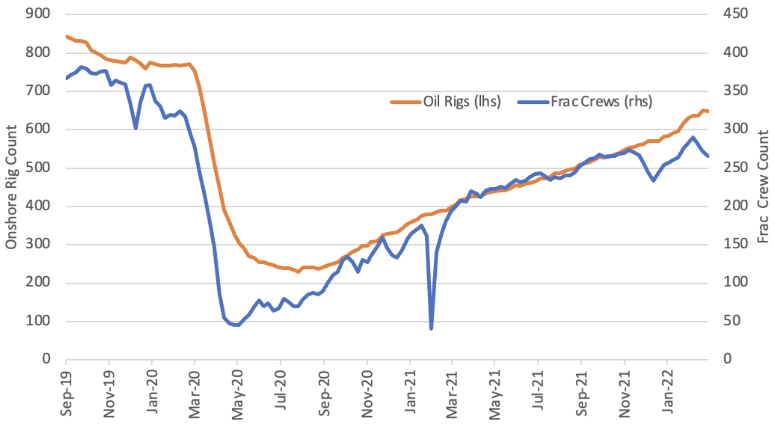
FOURTH QUARTER 2021 UPDATE

On the strength in oil and natural gas prices, but with constraints put in place by public producers' commitments to capital spending discipline, the U.S. oil industry's activity recovery continued in 4Q21. The U.S. onshore drilling rig count averaged 544 in the quarter, vs. 484 in 3Q21 and its low of 230 set in August 2020. The U.S. onshore hydraulic fracturing (frac) spread count averaged 263 in 4Q21 (vs. its May 2020 trough of 45) (see Reference Table and Exhibit 1). The rig and frac spread count averages in 4Q21 were 32% and 28%, respectively, below late-2019 levels. For reference, as of March 18, 2022 the rig and frac crew counts were 649 and 266, respectively.

In the quarter, what had been lockstep growth of the rig and frac spread counts gave way to faster rig count growth (see Exhibit 1). This appears to be an indication of (1) confidence in oil company drilling plans and (2) some plausible tightness in hydraulic fracturing equipment availability. It also may signal that the Drilled but Uncompleted (DUC) well count may be nearing bottom, although the DUC count did continue to decline at a roughly comparable pace to recent quarters, falling to 4,657 by the end of 4Q21 from 5,334 at 3Q21-end and from a high of over 8,800 in 2020 (see Reference Table). Assuming all of the above, additional production recovery is likely becoming more contingent on drilling more new wells and thus higher rig counts.

“Additional production recovery is likely becoming more contingent on drilling more new wells.”

Exhibit 1:
Rig and Frac Crew Counts
September 2019 – March 2022



Note: *February 2021 crew count impaired by ice storms*
Source: *Baker Hughes, Primary Vision*

Revisions by the Bureau of Labor Statistics have trimmed estimates of employment recovery in the upstream oil industry, to now 35,000 (to 365,000) by year-end 2021 vs. 52,000 previously. These (re-) hires have exclusively been in the service sector; oil company employment has remained flat. Direct employment in the upstream remains 25% below the recent peak set in 1Q19 and nearly 45% below levels experienced in 2014 (see Reference Table). Finally, bankruptcies continued through year end and tallied roughly ½ the level from 2020, at 20 for oil companies and 36 for oilfield service companies in 2021 (see Reference Table).

THEMES

SPENDING OUTLOOK FOR 2022

U.S. public oil companies have thus far generally pointed to 20% spending growth in 2022 vs. 2021, which accommodates expected inflation and the modest production growth. Although it is much harder to estimate private oil company spending, one can expect more spending growth from this group, raising the U.S. industry total to perhaps ~25%. (As discussed in earlier quarterlies, the activity recovery has been led largely by private companies as public O&G companies are restraining their capital spending.)

Much of this spending growth will go to covering higher input costs. Inflation, which we first addressed in the 3Q21 quarterly report, appears to be spreading to select services (vs. being concentrated in steel, fuel and labor in the third and early fourth quarters of 2021). Thus, between covering inflation and spending restraint, the outlook, at least for the public oil companies, remains one of modest production growth. Commentary from the public companies continues to point more to 2-5% production growth over late 2021 levels.

To highlight one important area of inflation, hydraulic fracturing (fracking) services, which can (including the input materials) run 40% or more of well costs, appear poised to become more expensive. The fracking segment has seen supply contraction in the order of 35-40% since 2019, leaving limited availability now that demand has risen. It is generally thought that prices for fracking service must increase ~50% in order to justify building new equipment. With that said, (1) the industry has a long history of refurbishment of existing equipment and (2) industry efficiency trends have tended to get more utilization from equipment; both phenomena point to fracking service providers seeking more modest price increases.

Also related to fracking, sand used in the fracking process has also experienced notable inflation (particularly in early 2022). Yet the availability of fracking-appropriate sand in West Texas and growing industry acceptance of the use of wet sand suggest pricing pressure in frac sand should be relatively short-lived.

As very strong commodity prices persist through 2022 and thus as higher profits are earned by the industry, one would expect spending growth to be higher, particularly as supply chains (i.e. the service sector) expand their capacity. The oil companies can do this while maintaining their commitments to investors because they have generally committed to return a proportion (generally 40-50%) of their “excess” cash flow, i.e., cash flow that is above levels needed to maintain their production and meet their financial obligations. In other words, many of the public oil companies have said that they earn additional profits from higher commodity prices, they would return roughly half to investors and use the rest to bolster their financial position and/or invest in production growth.

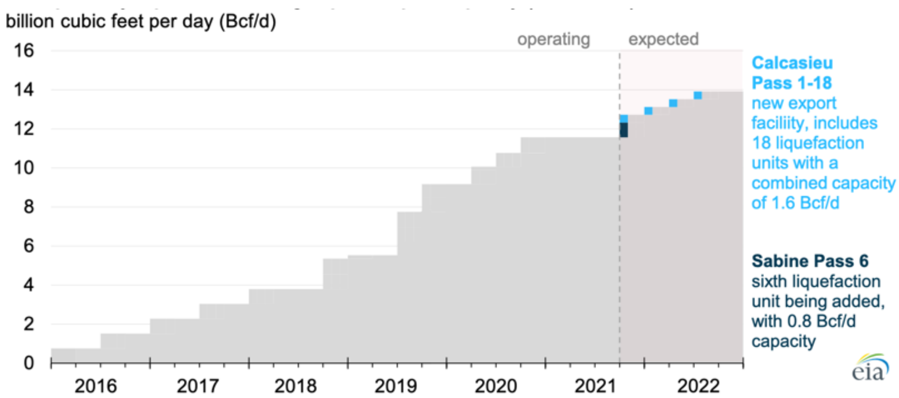
“*Between covering inflation and spending restraint, the outlook, at least for the public oil companies, remains one of modest production growth.*”

NATURAL GAS DEVELOPMENT FOR THE GLOBAL MARKET

The last quarterly provided background on the U.S. natural gas market, highlighting that it provides a multi-year platform of growth, largely to support export (and thus Liquefied Natural Gas [LNG]) growth.

Oil has received ~80% of the activity spend in the U.S. for over a decade and given the strength in oil prices and the export infrastructure requirements for gas, a significant upstream shift back towards natural gas is unlikely. Nevertheless, the increases in natural gas prices, both overseas and at home, is generating interest in more development. This is particularly true as there is some visibility on growing U.S. (peak) LNG export capacity to ~18 Billion Cubic Feet per Day (Bcfd) from ~11.5 currently, including to 14 Bcfd by the end of this year (see Exhibit 2).

Exhibit 2:
Peak LNG Export Capacity
2016-2022E



Source: U.S. Department of Energy, Energy Information Administration

To illustrate the degree of pricing increases, Dutch Title Transfer Facility, or TTF, gas hasn't been below €70 per Megawatt hour (MWh) since September 2021 and has touched €300/MWh vs. a max of €25/MWh in the prior five years (see Exhibit 3). In the U.S., Henry Hub index prices averaged $4.72 per Thousand Cubic Feet (Mcf) in 4Q21 after spending years below $3/Mcf (see Reference Table).

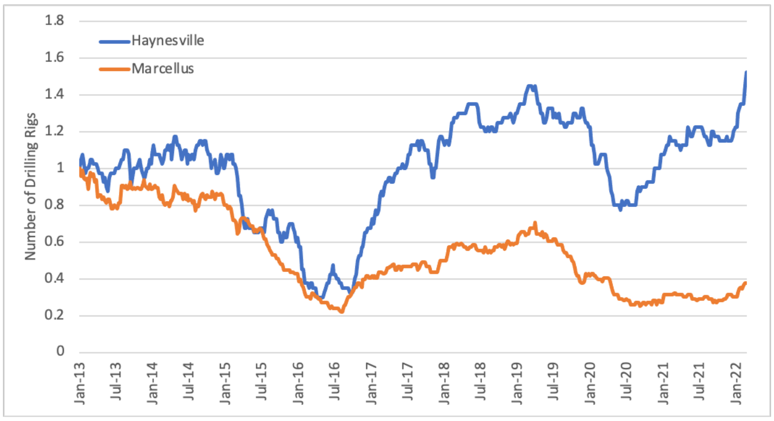
Exhibit 3:
Dutch TTF Pricing Trend
2014-Present

Source: Trading Economics

It is notable that one region that is seeing only modestly higher industry interest is the Marcellus basin, which is primarily in Pennsylvania. The Marcellus is very prolific and low cost, but successful resistance to new pipeline construction has constrained the industry's ability to take the product to market. This resistance has persuaded state-level courts that water quality and other environmental impacts had not been given adequate consideration in pipeline company construction plans. The rig count in the Marcellus is up only 33% from its pandemic low and remains well below prior cycle highs. In contrast, the Haynesville (primarily in East Texas and another natural gas basin) is up 90% and exceeding prior cycles' peaks (see Exhibit 4 and Appendix 1).

Exhibit 4:
Indexed Rig Counts, Marcellus and Haynesville Basins 2013-Present

Source: Baker Hughes



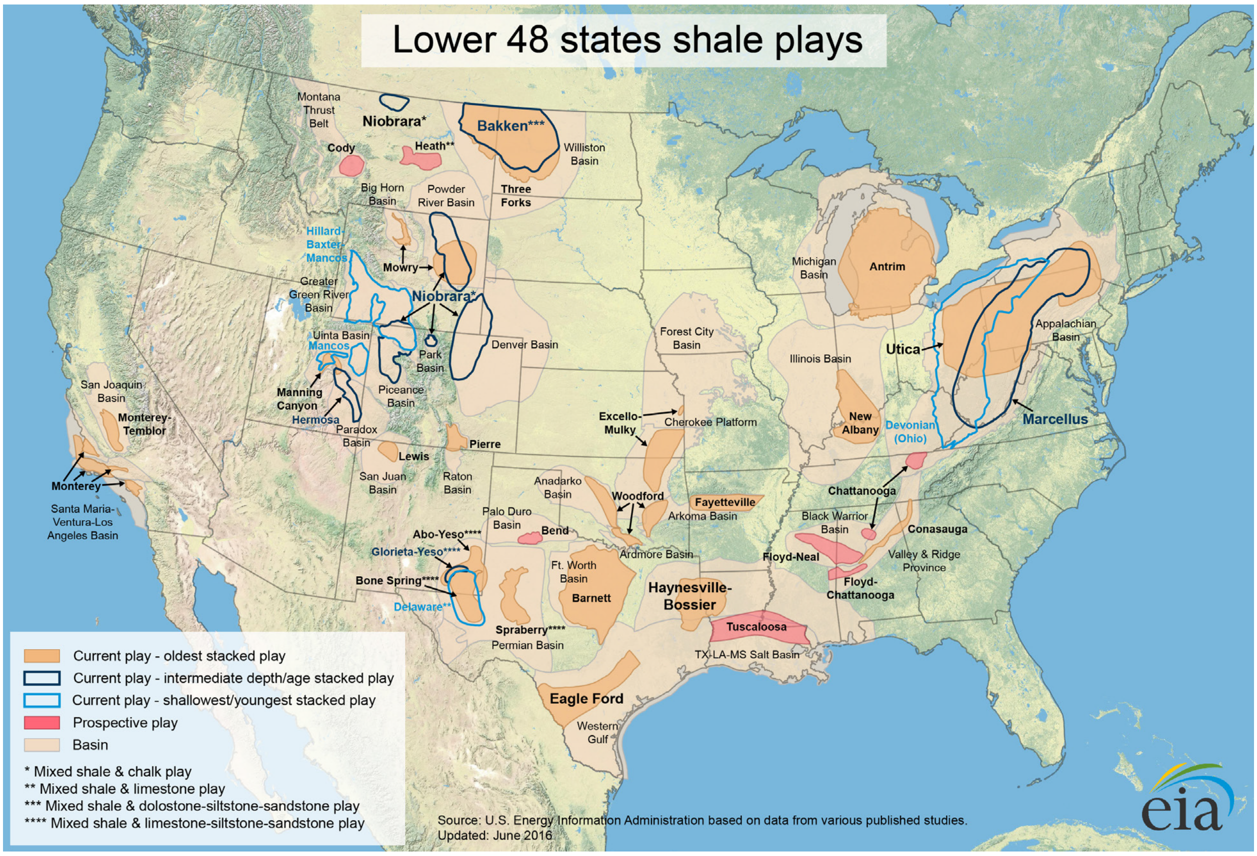
The focus on natural gas growth for export, particularly to Europe, has implications for the industry with respect to both climate stewardship and company finances. As European LNG buyers focus on methane intensity and other emissions, U.S. producers have begun pursuing "responsible" gas certification or similar data-driven monitoring of operations. In part, this certification is spawning new commercial models, in which the producers commit to long term supply agreements and share in the financial returns associated with selling to these foreign markets. (This compares to oil sales, which are transacted on a spot basis.)

Cheniere Energy, the U.S.'s largest LNG exporter, offers examples both of the certification process and new commercial models. In conjunction with its gas suppliers and academic (including the Payne Institute) and monitoring-technology partners, Cheniere is implementing a carbon emission tagging system for its LNG shipments. This tagging is a condition for long term supply agreements from suppliers; for example Cheniere recently expanded its Integrated Production Marketing agreement with EOG Resources, extending the term to 15 years and tripling the volume of gas it is to take from EOG. Pricing for the incremental gas from EOG is based on Platt's JKM™, an Asian LNG benchmark price.

International sales also create the incentive for more conservative financial management on the part of the oil industry. As described by EQT Resources, the country's largest producer of natural gas (with operations in the Northeast U.S.), obtaining an Investment Grade rating on its debt, achieved by strengthening its balance sheet and demonstrating strong cost management, will open up opportunities for the company to contract to provide natural gas for LNG at the aforementioned foreign benchmark pricing.

> *"The focus on natural gas growth for export, particularly to Europe, has implications for the industry with respect to both climate stewardship and company finances."*

Appendix 1: Map of U.S. Unconventional Hydrocarbon Plays



Source: *U.S. Energy Information Administration*

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Brad Handler is a researcher and heads the Payne Institute's Sustainable Finance Lab. He is also the Principal and Founder of Energy Transition Research LLC. He has recently had articles published in the Financial Times, Washington Post, Nasdaq.com, Petroleum Economist, Transition Economist, WorldOil, POWER Magazine, The Conversation and The Hill. Brad is a former Wall Street Equity Research Analyst with 20 years' experience covering the Oilfield Services & Drilling (OFS) sector at firms including Jefferies and Credit Suisse. He has an M.B.A from the Kellogg School of Management at Northwestern University and a B.A. in Economics from Johns Hopkins University.

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