



INFLATING

U.S. Oil & Gas Extraction Briefing - First Quarter 2022

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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

The top priority for the U.S. public oil and gas (O&G) companies remains to deliver higher financial returns to shareholders. Public commentary as the companies reported their 1Q22 earnings included widespread commitments to pay higher dividends and to buy back shares of their own stock.

Yet, only a couple of months after laying out their spending expectations for 2022, the companies have also begun to raise their spending budgets for the year. These increases are largely in response to rising prices for goods and services, a function of supply constraints. Thus, although aggregations of budget revisions are still being processed, spending increases of 35% year-over-year in 2022 for the industry, 10 percentage points above their original budgets, now seem plausible. Yet because the spending increases are largely the result of inflation, they are not expected to result in much incremental production of oil and gas; the public O&G companies continue to target 3-5% production growth year-over-year in 2022.

The drilling rig count continues its climb, up another 14% sequentially in 1Q22 and to within 14% of pre-Covid activity levels by early May. However, activity has recovered to a point where constraints on goods and services will increasingly slow growth of some oilfield activity and hinder potential attempts to grow hydrocarbon production more quickly. Those constraints, particularly related to steel used in wellbore pipe (known as Oil Country Tubular Goods, or OCTG) and hydraulic fracturing equipment, are the result in part of capacity removal during the pandemic — and, for OCTG, constraints on imports, including from Russia and Ukraine — and may take over a year to comprehensively address.

In other words, even though industry confidence about duration of this upturn is running high and cash flows are

ample to support even more growth in spending than the latest announcements, it will take time to address some of the pinch points. Thus, these pinch points reinforce the idea that production growth likely remains modest, and that employment gains are moderate through 2022.

It is worth highlighting that there is no evidence to suggest that Federal policy is having a constraining impact on onshore industry activity. As has been addressed in previous quarterlies, the O&G industry has adequate access to Federal lands through existing leases and permits. Rather, the constraints are investor demands for spending discipline and, increasingly, availability of select services as noted above.

Please see pages 3-4 for recent activity discussion, page 5 for discussion of spending budget increases and page 6 for an update on the constraints to producing more oil and gas.



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

	2Q20	3Q20	4Q20	1Q21	2Q21	3Q21	4Q21	1Q22	5/6/22
Oil Price (West Texas Intermediate, \$/bbl)	\$29.14	\$40.94	\$42.72	\$58.14	\$66.16	\$70.55	\$76.97	\$94.86	\$109.77
Nat Gas Price (Henry Hub, \$/Mcf)	\$1.70	\$2.00	\$2.53	\$2.77	\$2.95	\$4.37	\$4.72	\$4.67	\$0.00
Oil Production (Millions of Barrels per Day)	10.8	10.8	10.9	10.7	11.3	11.2	11.6	11.3	N/A
Nat. Gas Dry Production (Billions of Cubic ft per Day)	89.6	90.0	91.1	90.4	93.2	93.9	96.5	94.4	N/A
LNG Exports (Billions of Cubic ft per Day)	5.5	3.9	8.8	9.2	9.8	9.6	10.3	11.5	N/A
Drilled but Uncompleted Wells (DUCs)	8,816	8,445	7,692	6,905	6,112	5,386	4,714	4,273	N/A
Rig Count	378	240	293	374	436	484	544	620	689
Frac Spread Count	89	79	132	156	221	241	263	266	278
Direct Employment In O&G Extraction (Thousands)	362.5	340.3	333.4	329.8	345.0	354.5	369.0	377.6	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
- N/A = Not Available

FIRST QUARTER 2022 UPDATE

U.S. oil industry's activity recovery continued in 1Q22, with the U.S. onshore drilling rig count averaging 620 in the quarter vs. 544 in 4Q21 (up 14%) and vs. its low of 230 set in August 2020. The U.S. onshore hydraulic fracturing (frac) spread count, in contrast, rose only 2% to average 268 in 1Q22 (see Reference Table and Exhibit 1). The rig and frac spread count averages in 1Q22 were both approximately 25% below late-2019 levels. For reference, as of May 6, 2022 the rig and frac crew counts were 689 and 278, respectively (Continued).

The faster growth of the rig count vis-à-vis the frac spread counts confirms earlier suspicion that there is tightness in hydraulic fracturing equipment availability (and plausibly personnel and more modestly other constraints related to well completion, see thematic discussion) and that the Drilled but Uncompleted (DUC) well count is nearing — and may have found — bottom. The DUC count did continue to decline in 1Q22, albeit at a slower pace, falling by 441 wells to 4,273 at the end of March vs. an average decline of 730 wells over the prior three quarters (see reference table). **The tightness in the frac/completion market and the DUC count implies that it will be incrementally more expensive and will take more time to grow oil and natural gas production.**

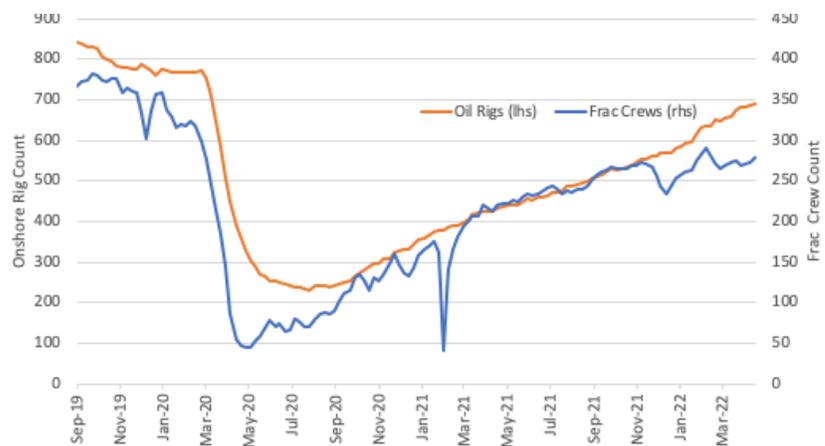
Production of oil and natural gas declined modestly in 1Q22, to 11.3 Million barrels per day (Mbd) and 94.4 Billion cubic feet per day (Bcfd), due to weather-related constraints (not uncommon in the winter). Such weather impacts look likely to modestly bleed into 2Q22 (for oil production) given heavy snowfall in the Williston basin (primarily in North Dakota). LNG exports grew to 11.5 Bcfd in 1Q22 from 10.3 Bcfd in 4Q21 as strong overseas pricing and efforts to curtail use of Russian natural gas provide

greater opportunity for export. Liquefaction facilities are now operating at or near peak capacity — including benefitting from debottlenecking efforts — and are seeking approvals for expansion (for more discussion on LNG capacity expansion plans, see our [March 2022](#) quarterly report).

Direct upstream industry sector employment rose by 8,600 in 1Q22 to 377,600 (recall that

revisions by the Bureau of Labor Statistics late in 2021 trimmed estimates of employment recovery in the upstream oil industry vs. its prior estimates). **These (re-) hires have exclusively been in the service sector; oil company employment has remained flat. Direct employment in the upstream remains approximately 25% below the recent peak set in 1Q19 and 40% below levels experienced in 2014 (see Reference Table).**

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



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

THEMES

THE IMPACT OF INFLATION

As expected, several of the public oil companies' public commentary as they reported their earnings for 1Q22 noted their expectation to raise capital expenditures in 2022. (Note: the vast majority of an oil company's spending goes towards development of new wells, known as capital expenditures or capex, while the balance goes towards maintenance of existing wells, which is a mix of operating expenditure, or opex, and capex.)

Initial capex budgets for 2022 pointed to an increase of ~25% over 2021 (roughly 20% for the public companies and closer to 25% for the industry when averaging-in expected increases from private oil companies). As a reminder, and 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 to answer investor demands to reverse a decade of delivering inferior financial returns.

The net effect of companies raising their spending expectations is still being determined, but another 10 percentage points (i.e. such that capex rises 35% over 2021) is plausible. Some companies explicitly raised their capex budget through the 1Q22 earnings reporting season, including:

- Hess: +7% to \$2.8 Billion, including adding a fourth drilling rig in the Bakken and the balance to cover inflation
- Continental Resources: +15% to \$2.65 Billion, of which ~1/3 reflects spending on newly acquired Permian basin acreage, ~1/3 on non-operating costs and ~1/3 to cover inflation
- Ovintiv +17% to \$1.75 Billion to cover inflation and
- Marathon: +8% to \$1.3 Billion to cover inflation

Others, including Pioneer Natural Resources and Devon Energy, suggested they are more likely to spend at the high end of a guided range (and the high end of a capex range is often 10-20% above the bottom end).

Because the majority of the additional capex is going towards greater-than-expected inflation, the additional spending will not spur much higher production; public O&G companies continue to target ~3-5% growth in 2022. The additional spending is therefore also not expected to be tied with significant incremental staffing, either by the O&G companies or the service industry.

As for the most important sources of inflationary pressure, O&G companies continue to cite steel (most directly relevant for pipe used in wellbores), sand (used in hydraulic fracturing), cement (used to prevent hydrocarbons leaking to the surface around the pipe), diesel (for both trucking and to power wellsite equipment) and labor. Oilfield services pricing (i.e. for services charged to oil companies) are also rising as shortages in equipment and crews — most precipitously in frac as noted above, but also in higher end/more capable drilling rigs — give service providers more pricing power.

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We note that O&G companies continue to cite some partial offset of inflationary pressure from various efficiencies, including drilling longer (lateral sections of) wells, the simultaneous fracking of two wells ("simulfrac"), and water reuse.

EXPECT A GRADUAL LOOSENING OF CONSTRAINTS

We expect a gradual loosening of constraints on oilfield development activity through the course of 2022 and into 2023. First, psychologically, as very strong commodity prices persist and conviction builds that the industry can realize several years of higher prices, O&G companies, reassured by investors, will get more comfortable spending more aggressively. The public U.S.-based O&G companies have already set the framework for how they can spend more while satisfying investors' demand for capital discipline. They have 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, to investors (again [see earlier quarterlies](#) for more on this).

O&G company cash flow is indeed rising with the higher oil and natural gas prices: a summary of the ten largest U.S.-based upstream companies (known as independents and led in size by EOG Resources, Pioneer Natural Resources and Devon Energy) are forecast to have Operating Cash Flow of approximately \$65 Billion, up 70%.

Second, there is already visibility on pricing increases that should spur more availability of necessary oilfield equipment. For example in frac services, it is generally thought that margins must increase ~50% in order to justify building new or significantly refurbishing older equipment. Yet industry analysts are starting to model such levels by year-end 2022 based on oilfield services company commentary as well as stronger-than-expected 1Q22 results.

In frac sand, it is acknowledged that the U.S. has adequate supply; deliverability of so-called "in basin" sand (which is within trucking distance of well sites), however, had been compromised by facility closures during the pandemic. Increased sand demand is in part being met by product being railed from outside of the basins (this was standard practice before in-basin deposits achieved widespread acceptance in 2018-2019) but the "imported" sand should be gradually pushed back out by restarting in-basin operations over the next few quarters.

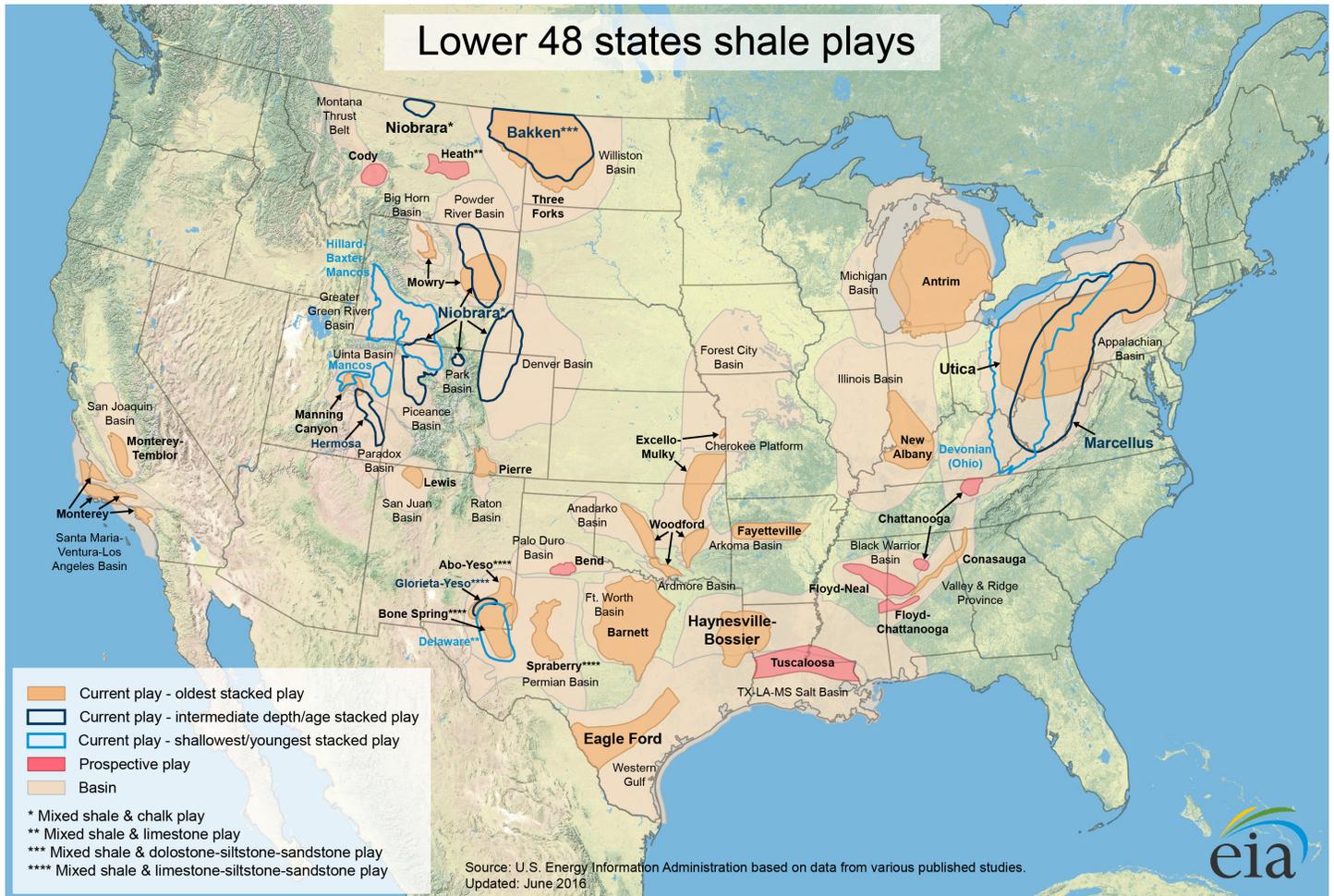
An exception to easing conditions, at least over the next few quarters, may be the OCTG market. OCTG is the pipe put down the wellbore through which oil and natural gas is produced, i.e. brought to the surface. Demand for OCTG is directly correlated to the upturn in drilling activity, and is thus poised for strong growth in the U.S. market in 2022. Supply, however, is constrained by plant closures in the U.S. — U.S. Steel, for example, idled nearly 1.2 Million tons per annum of capacity in 2020, or nearly 25% of U.S. "nameplate" capacity — and by expected effective cessation of imports from Russia and Ukraine, which [comprised 17% of imports](#) in late 2021. Further exacerbating price increases tied to tight supply/demand is looming anti-dumping tariffs levied by the U.S. Department of Commerce — preliminary duties were levied in early May on product imported from Argentina Mexico and Russia.

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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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