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SHALE OIL BRIEFING NOTE

March 28th // 2021

US Oil: Return to Robust Shale Growth Expected in 2022

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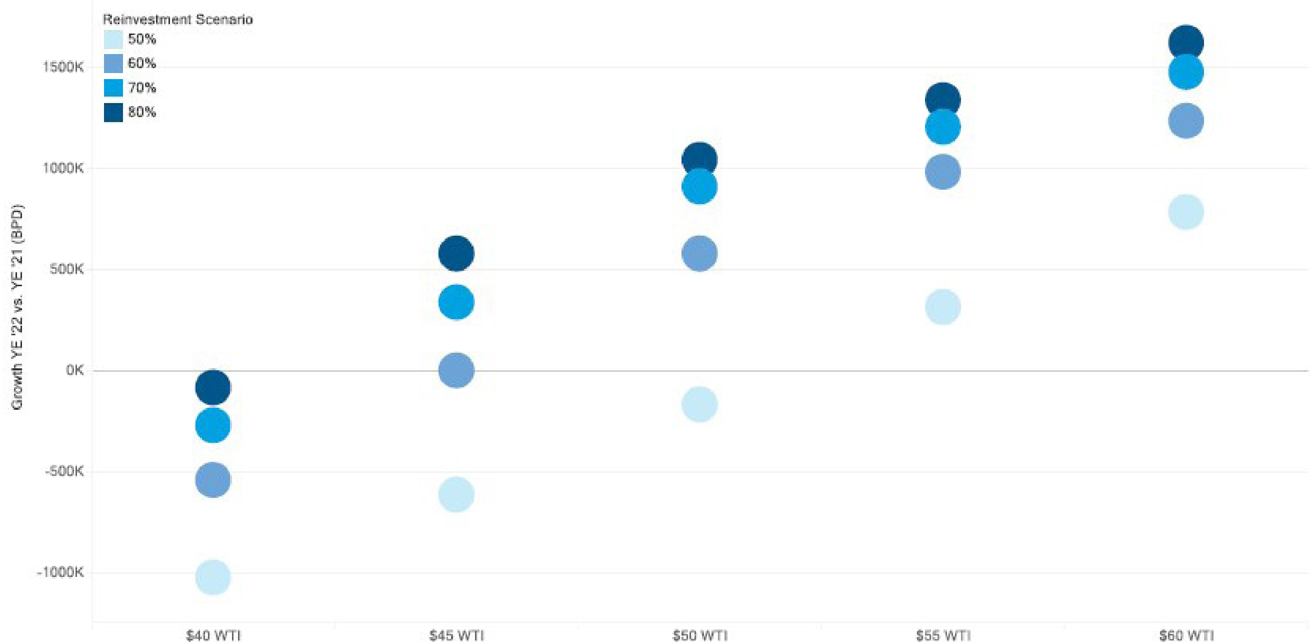
$50+ WTI expected to unlock '22 growth, even with increased focus on capital disciplineturn sentiment around.

We continue to anticipate a relatively muted growth profile for US tight oil in 2021 despite still-elevated WTI prices. We see the tempered shale response despite stronger oil prices as largely temporal, driven by: 1) a natural, behavioural response to realized volatility in 2020 and continued fundamental uncertainty in oil markets 2) a crescendo of investor demands for capital discipline from public producers and early re-orientation of '21 plans to maintenance spending 3) hedging for a significant proportion of '21 volumes at levels below prevailing prices. As the calendar shifts to 2H '21/22 we anticipate a diminishing impact from each of these factors and re-assertion of US growth potential.

In light of the significant deflation in well costs and emergent productivity gains we have observed, we believe meaningful tight oil growth can resume in a $50+ WTI environment, even with a continuation of conservative reinvestment rates. We highlight our estimates of L-48 land production growth in a variety of crude price and cash reinvestment scenarios from YE '21 to YE '22 below. Given the wide range of re-investment rates and oil prices envisioned, as well as normal operational lags, in each of these scenarios we assume a gradual adjustment to changing price assumptions and reinvestment rates. While the US upstream remains a highly dynamic industry with diverse participants and incentives, and additional sources of CapEx (midstream and exploratory capital, for example) might represent a drag on growth in each of these scenarios, we nevertheless believe the below matrix illustrates the ongoing oil growth potential at prevailing WTI prices.

Fig 1 2022 L-48 land production growth expectations across price and reinvestment regimes



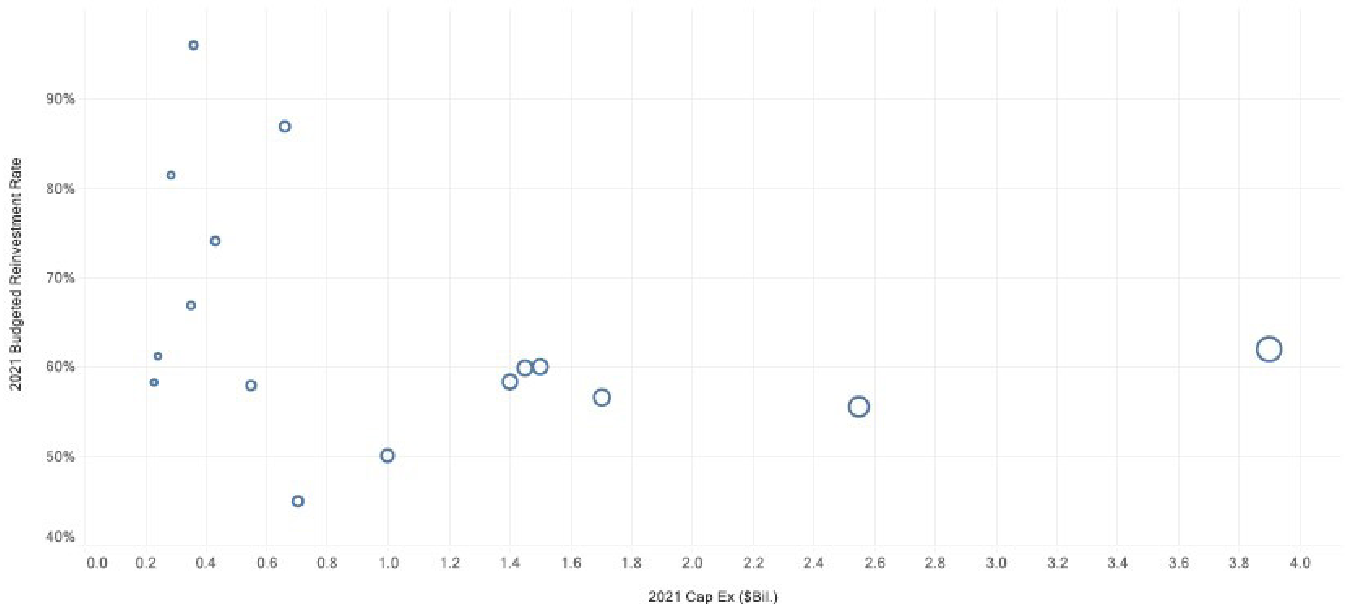
Source: EIA, IHS, Baker Hughes, Macquarie Macro Strategy, March 2021

‘21 reinvestment rates appear below long-term frameworks, supporting ‘22 growth potential

Broadly speaking, among large, prominent US producers, we see ’21 budgets implying reinvestment rates of ~60% in a ~$50 WTI price environment. In many cases, however, this budgeted re-investment rate falls below long-term frameworks that generally anticipate ~70%. Put alternatively, a return to growth (if at a more moderate pace) appears to be contemplated in the outlooks of producers leading the current charge for capital discipline. Complementing this potential ‘22 pivot are structural growth expectations from supermajors in the Permian and smaller US producers that already appear poised for growth in ’21. All told, we see cash flows and tight oil economics supporting a return to more robust growth in ’22, should crude prices remain above $50 WTI. As shown below, we highlight budgeted ‘21 re-investment rates for several US producers; assumed price levels across producers may vary somewhat, but generally we see these scenarios as clustered around ~$50 WTI.

Fig 2 Budgeted 2021 reinvestment rates clustered around 60% for large shale producers in ~$50 WTI scenario

2021 Budgeted Reinvestment Rates For Public Producers



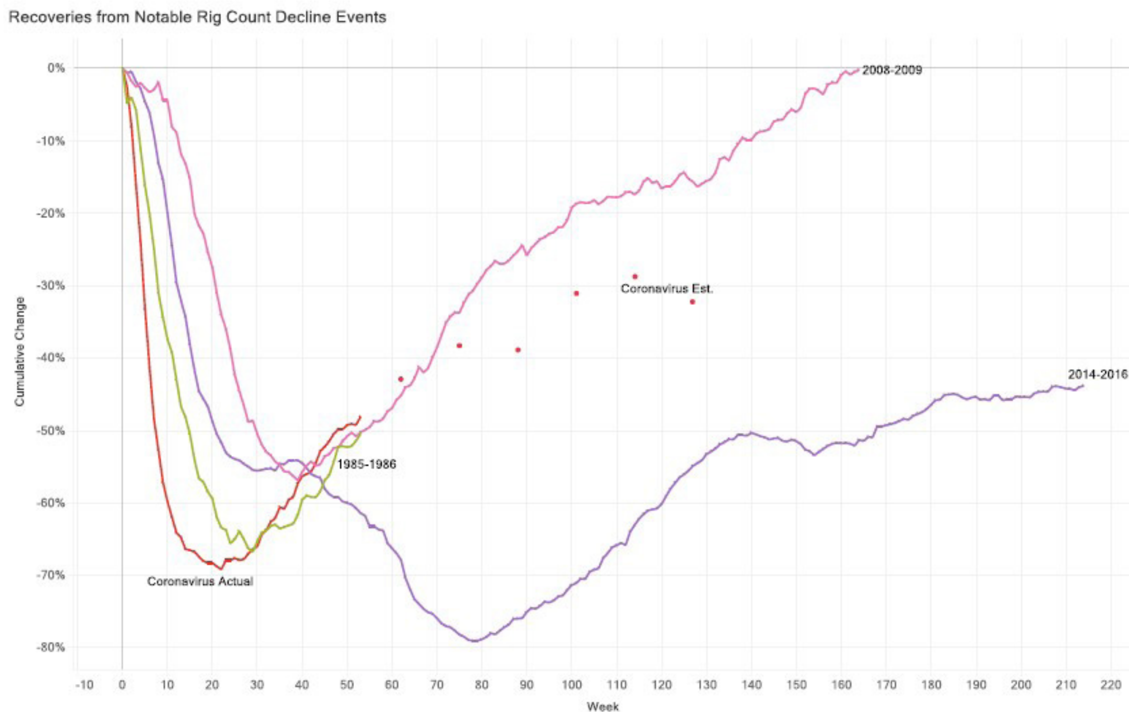
Source: Company data, Macquarie Macro Strategy, March 2021 Note: Adapted from company materials/commentary; not intended for comparable purposes as basis of calculation and price assumptions may vary by company; company specific figures intended for macro purposes only.

Cyclical perspective on rig count recovery

We highlight our base case rig count assumptions for the US below, pursuant to our higher, revised WTI price deck. These activity assumptions underpin our expectation for ~800 KBD of L-48 land exit/exit growth in ’22 and ~400 KBD in ’21 (loaded to 2H ’21). While every cycle offers different circumstances, industry characteristics, and price paths, we find it notable that after a steeper initial drop, the US rig count has plotted a recovery that closely tracks two similar severe cyclical downturns, the global financial crisis of 2008-2009 and the 1985-1986 downturn. On the back of a strong price environment through the balance of ‘21 and $50+ WTI in ‘22, we anticipate the US rig count ultimately returning to ~70% of pre-COVID levels.

Although the rig count trajectory is slightly ahead of the ‘08/09 precedent, our modelling anticipates a more modest recovery across the cycle. In contrast, we anticipate a more robust recovery than the ‘14-16 precedent that saw protracted price weakness and sharp efficiency/productivity gains across tight oil. Again, while a strong price recovery has spurred the current rebound in US activity, we nevertheless find the presence of a cyclically comparable response notable amidst pervasive narratives proclaiming that “this time is different”.

Fig 3 Eventual rig count recovery seen at ~70% of pre-COVID levels, lagging '08/09 rebound but exceeding '14/16 precedent

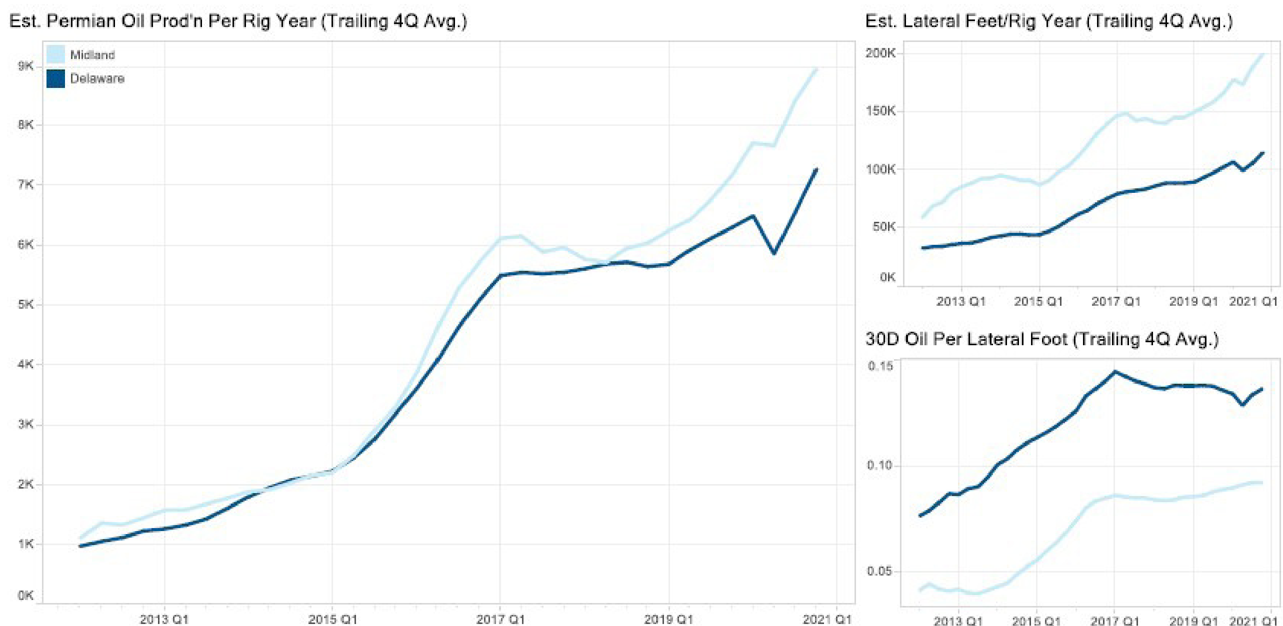


Source: Baker Hughes, Macquarie Macro Strategy, March 2021

Efficiency surge merits watching

As we have previously noted, in early 2H '20 drilling and production data we see signs of an emerging efficiency surge in the critical Permian basin. While we do not anticipate a repeat of the efficiency experience in the prior downturn, wherein annualized production per rig roughly doubled across tight oil, Permian gains have been impressive to date and merit watching moving forward. We see potential for continued gains in surface efficiency and well productivity to continue in '21 as activity remains well below pre-COVID levels and a highgraded well mix works through the supply chain. Continued efficiency gains of the magnitude seen in 2H '20 in the Permian could drive downside to our rig count estimates and upside to our production estimates.

Fig 4 Strong productivity gains observed in '2H 20 Permian data

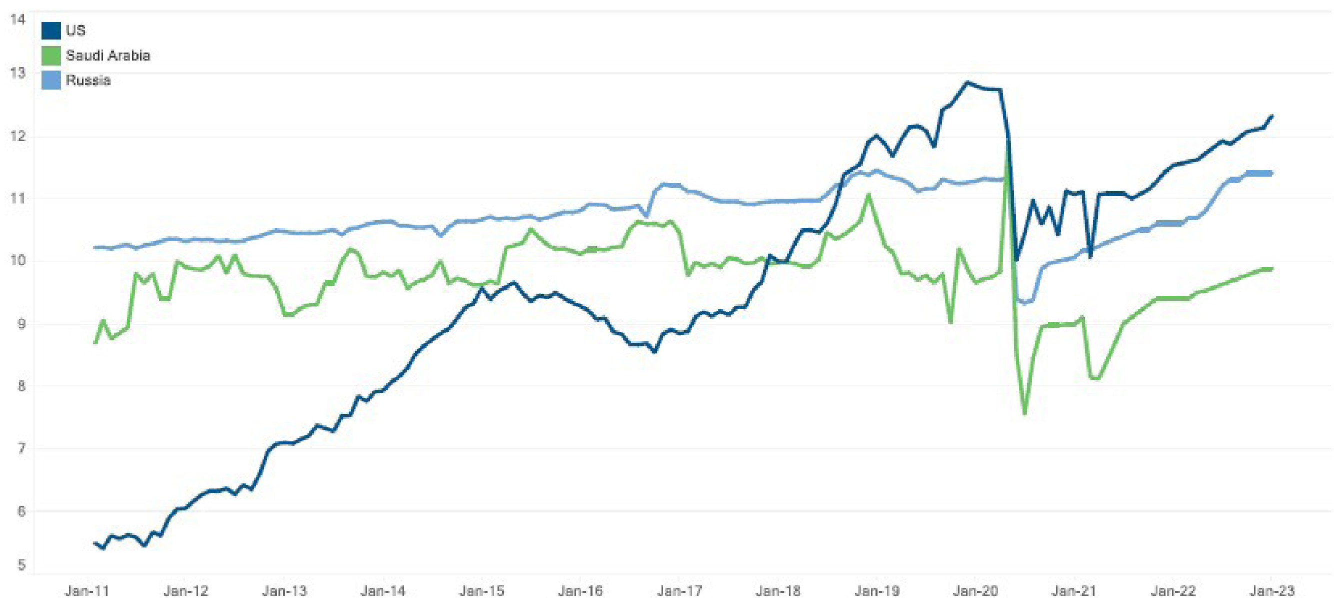


Source: Baker Hughes, IHS, Macquarie Macro Strategy, March 2021

OPEC reaction to shale growth a wildcard, but may not be deterministic

The prospect of renewed shale growth calls to mind OPEC+ supply rivalry, but we believe this may be an oversimplification of oil market dynamics, particularly from the perspective of Saudi Arabia. Prior to the January surprise cut announcement from KSA, we had seen the key players in OPEC+ (Russia, UAE, KSA) each arriving at a more market-share oriented view from its own unique calculus, with the net effect being some crowding out of shale growth longer-term. That proposition appears less certain, however, following the January and March OPEC+ meetings, wherein KSA re-introduced and then maintained unilateral cuts. With this move, and the inherent, structural disconnect between prices that invite large shale growth ($50+ WTI) and balance the Saudi budget (~$65-70 WTI) we see a wider-range of possible cyclical outcomes with respect to US supply, including a sustained period of shale growth akin to the '17-19 experience, if at a reduced scale. All told, we would not espouse a complacent view of Saudi/OPEC+ strategy, especially as risks such as Iran (and corresponding KSA responses) linger, and KSA exports themselves do not appear to reflect the full magnitude of advertised cuts. However, we would likewise hesitate to view shale growth as a deterministic driver of near/medium-term OPEC+ output policy.

Fig 5 Russia and KSA seen restoring pre-COVID production levels amidst resumption of stronger US growth in '22



Source: IEA, EIA, Macquarie Macro Strategy, March 2021

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