The Mounting Pressure of Capital Discipline on US E&P

Prepared for: COQA San Antonio

March 5, 2020
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Who is BTU Analytics?

**BTU Analytics** is a data-driven energy market analytics firm focused on providing clear and timely information to industry decision makers

- Clientele is spread across private equity, producers, service companies, power providers, midstream, traders, and marketers

**Consulting** capabilities include:

- Natural gas, oil, and NGL market analysis
- Infrastructure development analysis
- Producer strategy advisory services

**Products:**

- [BTU View](#)
- [Oil Market Outlook Report](#)
- [Upstream Outlook Report](#)
- [E&P Positioning Report](#)
- [Natural Gas Basis Outlook Report](#)
- [Henry Hub Outlook Report](#)
Agenda

- Impact of novel coronavirus on global oil balances and pricing
- US shale breakevens and implications of capital discipline
- Domestic oil production outlook for Permian and other US Shale
- Permian crude production and oil gravity
Supply cuts and disruptions failing to offset hits to demand from virus impacts to China and global demand.

Source: BTU Analytics, Bloomberg, Updated 3/2/2020
While global crude demand growth was originally forecast to pick up modestly from 2019, the outbreak of coronavirus is expected to lower growth for the year and could even lead to flat to declining demand.

Change in Global Liquids Demand vs Global GDP

- Year-Over-Year Change (MMb/d)
- Global GDP (Trillions Current USD)

- Early 1990s recession in much of Western World
- 1992 Japanese Asset Bubble Collapse
- 1997 Asian Financial Crisis
- 1998 Russian Financial Crisis
- 1999-2000 US DotCom Bust
- 2001 Enron, 9/11 Terrorist Attacks
- 2008-2009 Global Recession
- Coronavirus expected to lower global demand by 500 Mb/d from previous estimates

Note: GDP in current prices. 2019 GDP estimated based on the IMF’s January 2020 World Economic Outlook
Source: BTU Analytics, IEA, World Bank, OECD, IMF Updated 2/11/2020
Falling commodity prices in Feb and March put even the best operators under pressure.

Prior to the oil crash in 2014, the vast majority of US independent E&Ps were outspending cash flow and funding growth with debt and equity issuances.

US Independent E&P Sources and Uses of Cash – Q1’14

*CFO is adjusted to back out settled hedges and interest impacts for greater transparency
Source: BTU Analytics’ Equities Weekly, Bloomberg. Sample includes 55 public E&P companies.
In 2019, 24% of cashflow was diverted to sources other than CapEx to meet shareholder demands.

24% of Cash is Diverted Away from Future CapEx with only 14% coming from voluntary sources.

Note: CFFO is adjusted to back out settled hedges and interest impacts for greater transparency. Excludes impacts from OXY-APC deal. Green denotes inflows of cash, red denotes outflows of cash.

Source: BTU Analytics’ Equities Weekly, Bloomberg. Sample includes 50 public E&P companies.
Corporate costs add approximately $4.00 - $8.00/boe to average oil-focused operator breakeven levels.

Regional Average Half-Cycle Breakevens and Corporate Costs

Note: Estimated half-cycle breakevens at wellhead for wells turned to sale between 3Q18 and 2Q19 use regional assumptions for operating costs and exclude transportation.
Source: BTU Analytics, Bloomberg
Slowing US drilling and completion activity has to overcome steep annual decline rates for shale development.

Source: BTU Analytics, Data as of January 2020
Lower activity leading to declining/flat production across most major onshore oil plays except Permian

Exit-to-Exit Production Changes by Quality

Historical

Note: Calculations are December vs December of the previous year. 2018-2019 would be December 2019 vs December 2018

Source: BTU Analytics’ Oil Market Outlook (February 2020)
Permian activity growth continues to be increasingly driven by majors, while small independents decreased 2019 drilling activity.
New completion designs, a better understanding of the geology, and improved technology drove significant well productivity gains despite headlines to the contrary.

Permian Oil Well Cumulative Oil Production per 1,000’ Lateral

<table>
<thead>
<tr>
<th>Year</th>
<th>Avg Lateral (ft.)</th>
</tr>
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<tbody>
<tr>
<td>2013</td>
<td>5,833</td>
</tr>
<tr>
<td>2014</td>
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<td>2015</td>
<td>6,573</td>
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<td>8,294</td>
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<tr>
<td>2019</td>
<td>8,941</td>
</tr>
</tbody>
</table>

Note: Data for 2019 is incomplete for 4Q 2019 and subject to revisions due to lags in state data.
Source: BTU Analytics [Upstream Outlook Report](#), Updated 2/18/2020
Permian average crude gravity is trending lighter, creating quality bottlenecks at points in time.

Note: Visualizes data as of 9/1/2018 using volume-weighted average oil quality in each 3x3 mile grid.
WTI Midland spread historically reflects overall Permian Basin infrastructure bottlenecks while WTS vs WTI Midland spreads indicate blending issues for pipelines and refineries.

Blowouts in WTI Midland relative to WTI Cushing indicate regional transportation constraints or local refinery outages.

WTS strength relative to WTI Midland indicates need for intermediate barrels for blending in pipelines or at refineries.

Note: Utilization >100% implies truck and/or rail needed to transport marginal barrel.

Source: BTU Analytics Oil Market Outlook (February 2020), Updated 3/4/2020
Delaware Basin driving production growth in crude with >45° API gravity crude and totaled over 1 MMb/d in YE2019

Permian Basin Oil Production by API Gravity

Source: BTU Analytics Upstream Outlook Report, Updated 3/4/2020
Newer Permian pipelines have higher max gravity than older pipelines to serve higher-gravity Delaware production.

Note: Light blue bars indicate Permian pipes with direct origins in the Delaware Basin.
Source: BTU Analytics *Oil Market Outlook* (February 2020)
Key Takeaways

- The outbreak of coronavirus is expected to lower global liquids demand growth for the year and pressure oil pricing especially in 1H 2020
- Falling commodity prices in February and March put even the best operators under pressure, especially when taking into account SG&A
- Slowing US drilling and completion activity has to overcome steep annual decline rates for shale development
- Libyan supply disruptions have sidelined 1 MMb/d of crude, but impact is overshadowed by global demand concerns
- Outside the Permian, US oil production exit-to-exit is expected to be flat to declining
- Oil gravity in the Permian becomes more important during times of pipeline constraints
BTU Analytics provides data-driven, market-risk assessments and due diligence analysis for acquisitions and divestitures of oil, NGL, and natural gas assets in North America. We utilize our in-depth understanding of North American energy data to help clients determine the future value of upstream, midstream, and downstream assets in the face of ever-evolving market conditions.