Impacts on oil and gas investments and long term supply potential

Per Magnus Nysveen
Senior Partner, Rystad Energy

This is a selection of slides presented. All slides available for users of our data.
Agenda

- **Climate: oil is still a must-have for decades, while coal is quickly replaced by cheaper gas**
  - Opec export capacity is tumbling, must deepen cuts next year
  - Non-Opec-exUS needs 300 BUSD yearly capex to stabilize its supply
  - US shale will grow profitably at 0.5 - 1 mmbbld per year to 2025, with WTI at 45-55
  - Conventional reserves replacement at dramatic lows, will become an issue as shale tapers off
Energy financing to change; Shale - a step on the road

The offshore megaproject era
1970 – 2015
Large projects, bespoke
USD 1 – 10 billion
80% - 85% equity
15% - 20% debt
Finance by oil companies
Subsurface risk, project risks, market risks, upside potential risks

The shale oil and gas era
2015 – 2035
Well by well, industrialized farming
USD 5 – 50 million
30% – 50% equity
50% - 70% debt
Finance by PE and funds + operational cash + asset sales
Less subsurface risks, project risks and market risks, production can be hedged

The renewables era
2035 – 2100
Plant by plant, manufacturing
USD 10 million – 10 billion
5% – 15% equity
85% - 95% debt
Finance by pension funds and banks primarily
Often governmentally guaranteed sales contracts and limited project risks

Typical share of debt for energy projects
Percent

- Offshore: 18%
- Shale: 60%
- Renewables: 90%
Multi-billion renewable projects will be prioritized

Equinor wins opportunity to develop the world’s largest offshore wind farm

Large offshore investments 2020-2026
USD Million

- Marjan, SA
- QatarGas (Offshore scope), QA
- Upper Zakum, AE
- Mero (Libra NW), BR
- Lula, BR
- Dogger Bank, UK
- Zuluf (expansion), SA
- Hall & Ghadha ultra-sour gas project, AE
- Ku-Maloob-Zaap Project, MX
- ACG (Azer-Chirag-Gunshli Deep Water), AZ

Source: Rystad Energy research and analysis, ServiceCube, September 2019
Long-term oil demand

Due to the massive underlying declines, there will be plenty of work also post-peak…

Global liquids production and future sources
Million bbl/d

→ Demand @ peaking trajectory

Global liquids supply historically keeping up with demand at ~ 1% growth rate annually

Source: Rystad Energy research and analysis
Climate: oil is still a must-have for decades, while coal is quickly replaced by cheaper gas

**Opec capacity is falling, must deepen cuts next year**

- Non-Opec-ex-US needs 500 BUSD yearly capex to stabilize its supply
  - US shale will grow profitably at 0.5 - 1 mmbbld per year to 2025, with WTI at 45-55
  - Conventional reserves replacement at dramatic lows, will become an issue as shale tapers off
Agenda

Climate: oil is still a must-have for decades, while coal is quickly replaced by cheaper gas

Opec capacity is falling, must deepen cuts next year

**Non-Opec-ex-US needs 300 BUSD yearly capex to stabilize its supply**

- US shale will grow profitably at 0.5 - 1 mmbbld per year to 2025, with WTI at 45-55

  Conventional reserves replacement at dramatic lows, will become an issue as shale tapers off
Free cash-flow in the public E&P industry

The E&P industry generated record high free cash-flows in 2018, the trend continues in 2019 (and 20?)

**Total FCF for all public E&P companies**

Billion USD

<table>
<thead>
<tr>
<th>Year</th>
<th>Free Cash Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>2010</td>
<td>136</td>
</tr>
<tr>
<td>2011</td>
<td>219</td>
</tr>
<tr>
<td>2012</td>
<td>157</td>
</tr>
<tr>
<td>2013</td>
<td>123</td>
</tr>
<tr>
<td>2014</td>
<td>111</td>
</tr>
<tr>
<td>2015</td>
<td>27</td>
</tr>
<tr>
<td>2016</td>
<td>65</td>
</tr>
<tr>
<td>2017</td>
<td>134</td>
</tr>
<tr>
<td>2018</td>
<td>263</td>
</tr>
<tr>
<td>2019</td>
<td>205</td>
</tr>
<tr>
<td>2020</td>
<td>241</td>
</tr>
</tbody>
</table>

Source: Rystad Energy research and analysis, UCube
Why are upstream free cash-flows record high?

2. Breakeven prices for new projects are down by 40%

Rystad Energy has tracked the development of the estimated breakeven price for key oil projects expected to be sanctioned in the period 2016-2020. By tracking the changes in our estimated breakeven price at the start of each year, we can observe how the BE has come down for the different segments. For shale, the estimates are done well-by-well.

Source: Rystad Energy research and analysis, UCube
Shale’s competitive supply will shorten cycles going forward

Global liquids supply curve
Real Brent breakeven price, USD per barrel (bbl)

width indicates total remaining resources for each supply group as of 2019

Weighted average breakeven

Source: Rystad Energy research and analysis, UCube, September 2019
Agenda

Climate: oil is still a must-have for decades, while coal is quickly replaced by cheaper gas

Opec capacity is falling, must deepen cuts next year

Non-Opec-ex-US needs 300 BUSD yearly capex to stabilize its supply

**US shale will grow profitably at 0.5 - 1 mmbbl/d per year to 2025, with WTI at 45-55**

- Conventional reserves replacement at dramatic lows, will become an issue as shale tapers off
Active oil rigs have been declining steadily since early 2019, back to the activity level seen in mid-2017.

*Major liquid basins are Midland, Delaware, Bakken, Eagle Ford, DJ and SCOOP & STACK

Source: Baker Hughes, Rystad Energy research and analysis, October 2019
All major liquid basins (ex. Permian) saw downward adjustments in rig programs in 2019. Oklahoma accounts for 50% of total horizontal oil rig count decline.

**US onshore liquid basins, ex. Permian: horizontal oil rig count by basin and week**

Number of rigs

Source: Baker Hughes, Rystad Energy research and analysis, October 2019
In Permian, only New Mexico part of Delaware exhibits robust rig activity and new all-time high level of oil rig count.

Source: Baker Hughes, Rystad Energy research and analysis, October 2019
Despite the decline in rigs, well counts were exceptionally robust in 1H 2019.

*Major liquid basins are Permian, Bakken, Eagle Ford, Niobrara and Anadarko

Source: Rystad Energy ShaleWellCube, October 2019
Yet preliminary estimates for August 2019 indicate record-high addition since hurricane Ike in 2008.

Oil production additions by month and region

*August 2019 are based on preliminary production estimates

Source: Rystad Energy ShaleWellCube, Rystad Energy research and analysis, October 2019

(Forecasted 10/30/2019)
Among supermajors, ExxonMobil and Chevron have been exclusive contributors to the recent growth in US: gross operated LTO production by quarter for supermajors.*

*Horizontal wells only

Source: Rystad Energy ShaleWellCube, October 2019
America’s incredible path towards oil dominance (IV)

*Other liquids includes ethanol, biodiesel and processing gains.

Source: Rystad Energy UCube, Rystad Energy research and analysis

United States liquids production and demand
Million barrels per day

- Aug 2005: US oil products demand peaks beyond 21 million bpd
- Sep 2008: US crude oil production dips briefly below 4 million bpd
- Mar 2014: US total petroleum supply passes that of Saudi Arabia*
- Nov 2017: US crude oil production passes 10 million bpd
- Nov 30th 2018: US briefly becomes net exporter of crude oil and petroleum products
- Sep 2018: North America (US+CA) becomes self-sufficient in oil products
- Q4 2020: US becomes net exporter of oil and petroleum products in a sustainable manner
- Q1 2021: US+Canada becomes self-sufficient in crude oil
- Nov 30th 2018: US briefly becomes net exporter of crude oil and petroleum products
- Nov 30th 2018: US briefly becomes net exporter of crude oil and petroleum products
- 2025: US becomes net exporter of crude oil, while shale drillers return more than 50 BUSD to investors

*Other liquids includes ethanol, biodiesel and processing gains.

Source: Rystad Energy research and analysis, UCube
Climate: oil is still a must-have for decades, while coal is quickly replaced by cheaper gas

Opec capacity is falling, must deepen cuts next year

Non-Opec-ex-US needs 500 BUSD yearly capex to stabilize its supply

US shale will grow profitably at 0.5 - 1 mmbbld per year to 2025, with WTI at 45-55

**Conventional reserves replacement at dramatic lows, will become an issue as shale tapers off**
Rystad Energy: Independent energy consulting and business intelligence data firm established in 2004, headquartered in Oslo with offices across the globe.

Databases: Covering energy fundamentals, upstream, oilfield services and renewable energy industries.

Analytics: Extensive library of market reports, commentaries and fact sheets.

Consulting: Leading advisor on strategy, markets and business development within the energy space globally.

Contact: Rystad Energy, Houston
Jillian.Fuchs@rystadenergy.com