Climate Change and the Oil Sector

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Climate change concerns and the energy transition have reached a tipping point

- Climate change concerns are moving from an HSE / ESG issue to a CFO issue
  - Aspects of a generational shift like smoking
- Key technology cost trends support power sector decarbonization, electrified transport
  - Solar PV and batteries in particular
- Limited international coordination is partly offset by surging action at the city, state, and corporate levels.
Difficult truths about oil

- Transportation is the main use, but petroleum is in everything.
  - 20% of US oil is used to make things, imported plastics push to the total much higher
- Oil demand will persist even with net zero carbon
  - Size and shape of future demand is up for debate
- Oil wells naturally decline, so new development and investment is need to maintain supply.
  - Oil companies will still be needed
- Oil supply options cover a wide range of capital cost and development requirements.
  - Some will be challenged by growing uncertainty
Oil development takes time and money

Global liquid supply curve
Real Brent Break-even price, USD/bbl

- Weighted average breakeven
- Exploration and Evaluation (5-10 years)
- Development (1-5 years)
- Production (15-30 years)
- Decommissioning

Source: Rystad Energy UCube
Two extremes: comparing a shale oil well and a deepwater discovery

<table>
<thead>
<tr>
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<th>Shale well</th>
<th>Deepwater</th>
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<tr>
<td>Development</td>
<td>Fast</td>
<td>Slow</td>
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<tr>
<td>Depletion</td>
<td>Fast</td>
<td>Slow</td>
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<tr>
<td>Scale</td>
<td>Small</td>
<td>Very large</td>
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<tr>
<td>Capital</td>
<td>Low</td>
<td>High</td>
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<tr>
<td>Price sensitivity</td>
<td>High</td>
<td>Low</td>
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![Graph showing the comparison between shale well and deepwater discovery](image.png)

Global net zero for 1.5 degree C

ICE phase outs begin

Country net zero carbon targets
Implications for future oil development

- Oil markets are entering a new era of extreme uncertainty in demand, price, regulation, and consumer sentiment.
- Complex, long-term and high capital cost developments that start today will begin producing in the midst of this structural market shift.
- Investor pressure may already be shifting capital allocations and increasing internal carbon prices for final investment decisions.
- Countries like Brazil, Mexico, and Guyana with proven deepwater developments will see continued investment in known resources with access to infrastructure.
- Countries or regions with offshore potential but no infrastructure yet will have an increasingly difficult time attracting investment.
- Tight oil plays may see increasingly volatile capital flows as investors respond to price swings.
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