Impact of Technology and Innovation on Global Oil & Gas Markets

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Global Oil Production – Resilient and Economical

Global Breakeven Costs Improving
(Data shown for year 2025)

Future Supply Needed from All Regions
and Types of Resources
(MMBD)

- Russia
- United States
- Other Non-OPEC Onshore
- Other Non-OPEC Offshore
- OPEC NGLs
- OPEC Crude

Source: COP, Rystad Energy

Source: COP (Q3 2017)
Technology + Innovation Improve Costs & Support U.S. Tight Oil Output

**Eagle Ford**

Month 1 Production in 2017: **18%**

**Permian**

Month 1 Production in 2017: **21%**

*Source: DrillingInfo*

**U.S. Tight Oil Production Sensitivity Cases to WTI Price**

(MMBD)

*Source: COP estimates (Q3 2017). WTI prices are expressed in real 2017 $.*

Growth rates driven by:
- Reinvestment Rates
- Productivity Improvement
- Cost Escalation
Gas Plays Still Benefit from Technology + Innovation

Gas Production from Top U.S. Unconventional Plays (Bcfd)

Marcellus Gas Type Curves Still Improving Today

Production Growth by Play, 2016-2025 (Bcfd)

Source: U.S. Energy Information Administration

Source: Types Curves from Drilling Info; Production Outlook from COP
A higher percentage of people today believe cost reductions are more structural than cyclical.
Summary

Oil Market
• Above-trend demand growth is helping to balance market
• Lower cost structure and ongoing productivity improvements enable a larger global resource base to be economic at lower prices than seen prior to 2014

Natural Gas Market
• Low cost resource base and infrastructure enable North America shale gas output to grow and satisfy export demand
• Global LNG market will see significant growth in volumes next decade along with evolving trade terms as the market matures

Market Microstructure
• Investors’ risk appetite shifting as global economy heats up and QE shift to QT
• Capital discipline and healthy balance sheets likely to be rewarded