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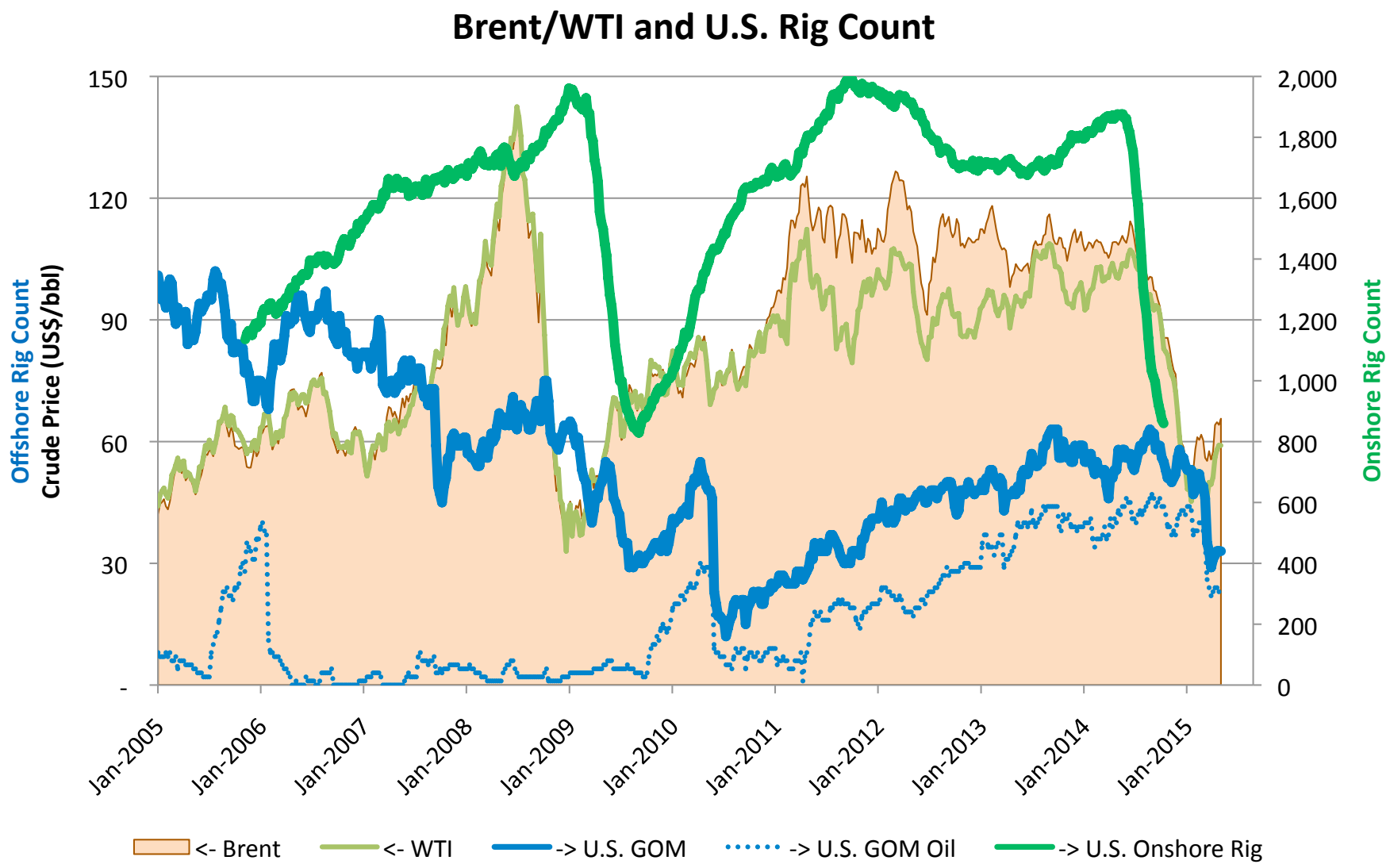
Conventional and Unconventional Hydrocarbon Resource Economics

Gaffney, Cline & Associates

May. 18, 2015

N. American Shale: Passing the Tipping Point



Source: GCA U.S. Oil and Gas Monitor

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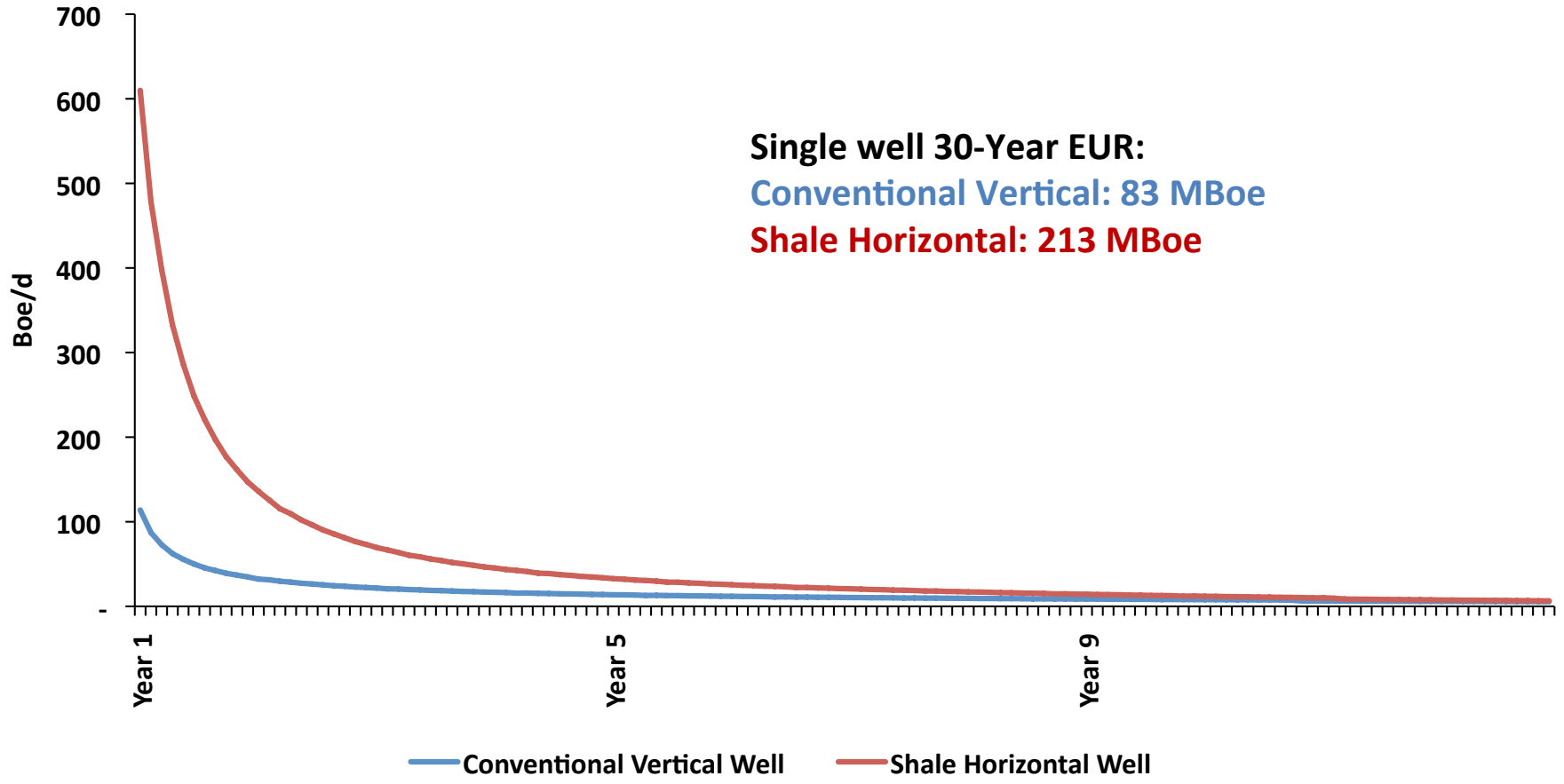
Agenda

- Presentation objective
  - Juxtapose shale resource economics with onshore conventional and deepwater resources
- Single-Well Economics
  - Comparison between a conventional vertical well and a shale horizontal well onshore
- Field Development Schedule and Cash Flow
  - Comparison between Deepwater and Shale developments
- Key Takeaways

Onshore Conventional vs. Unconventional
Type curves based on real production data in the Permian

A Typical Conventional Vertical Well
and A Typical Shale Horizontal Well in the Permian Basin



Single well 30-Year EUR:
Conventional Vertical: 83 MBoe
Shale Horizontal: 213 MBoe

High IP, Fast Decline & High EUR for Shale Horizontal Wells

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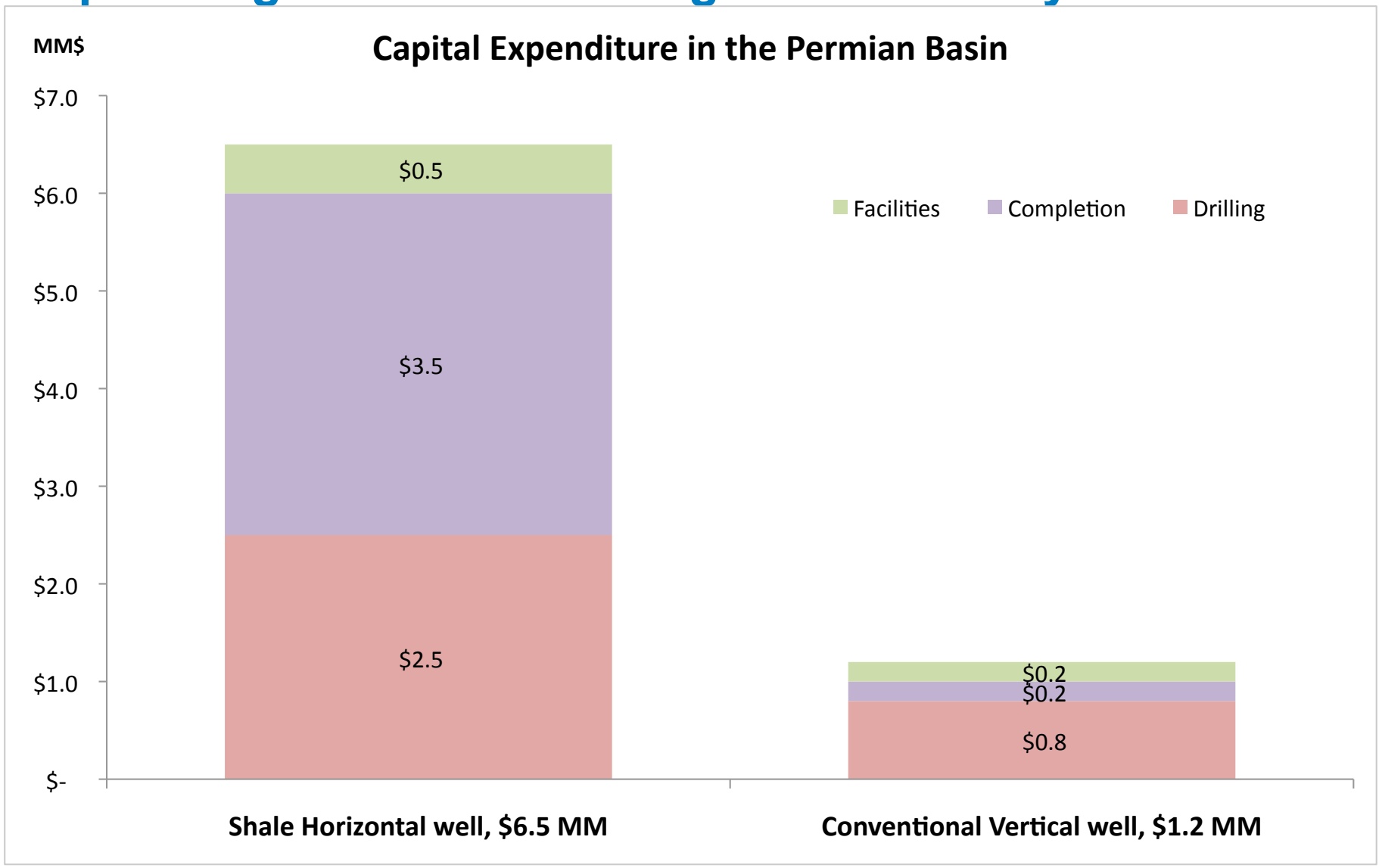
Sizable cost on drilling and fracturing for shale wells implies high risk in achieving commerciality



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Permian conventional resources have better economics but much less resource potential

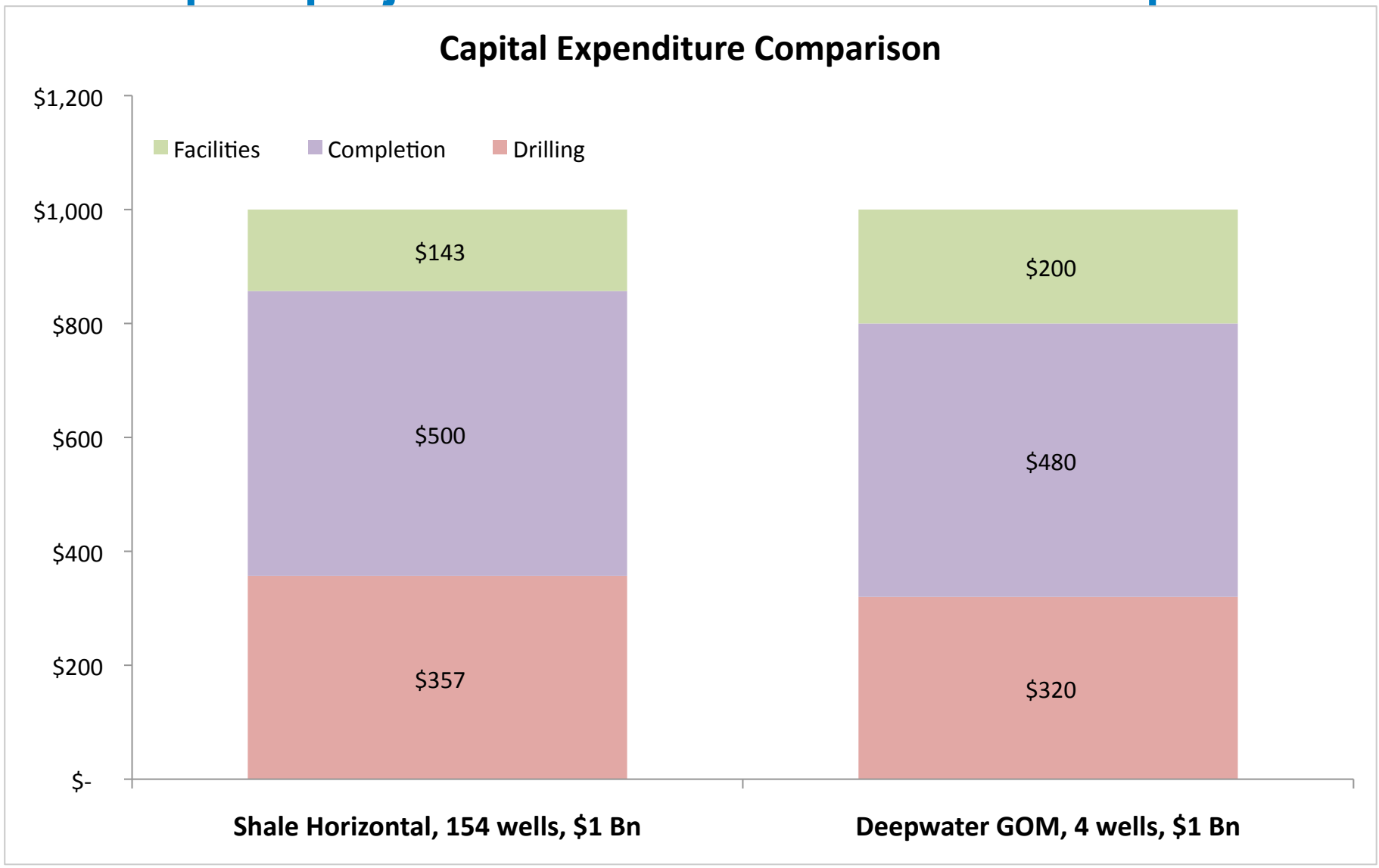
Economic Metrics	Unburdened		Burdened	
	Conv. V.	Shale H.	Conv. V.	Shale H.
Production (MMBoe)	0.08	0.21	0.08	0.21
Undisc. CF (US$MM)	3.7	7.3	1.8	2.3
NPV15	1.6	4.3	0.7	0.6
IRR	143%	121%	59%	25%
Payback (years)	0.9	0.9	1.5	2.3
Capex/Boe	14.5	30.5	14.5	30.5
Opex/Boe	6.0	6.0	6.0	6.0

Note:

- $80/Bbl flat oil price and $4/Mcf flat gas price used in the analysis
- For burdened economics: Typical US lease terms (Texas): Lessor royalty 25% for unconventional and 16.7% for conventional, Depreciation 10 years straight line, Income tax 35%

Single-Well economics does not truly reflect investment returns because operational delays, problematic wells and unexpected costs decrease field-level economics

Scenarios of a US$1 Bn investment are modeled to compare project economics of Shale vs. Deepwater



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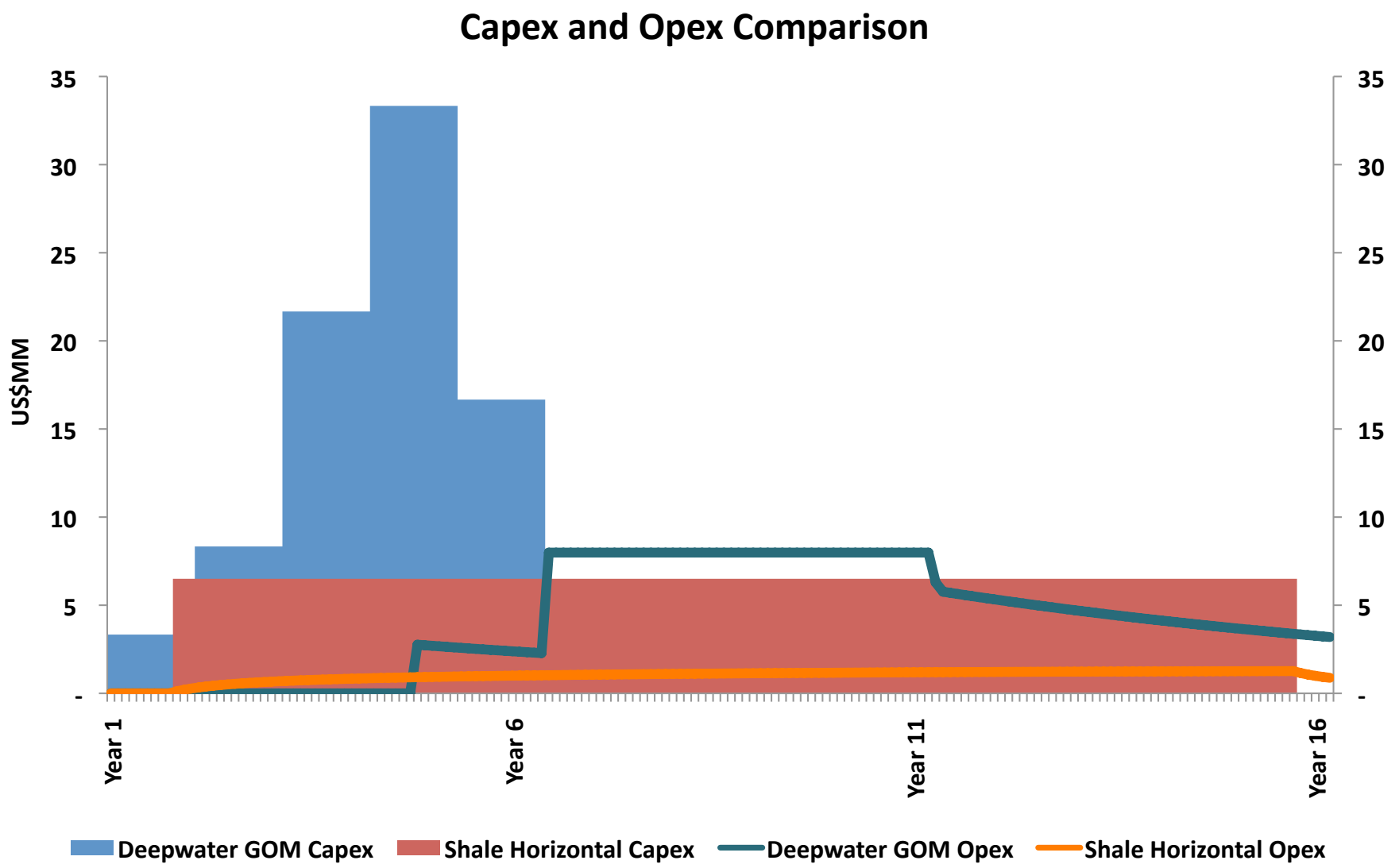
Capex spending and production are concurrent in Shale horizontal development, unlike in Deepwater



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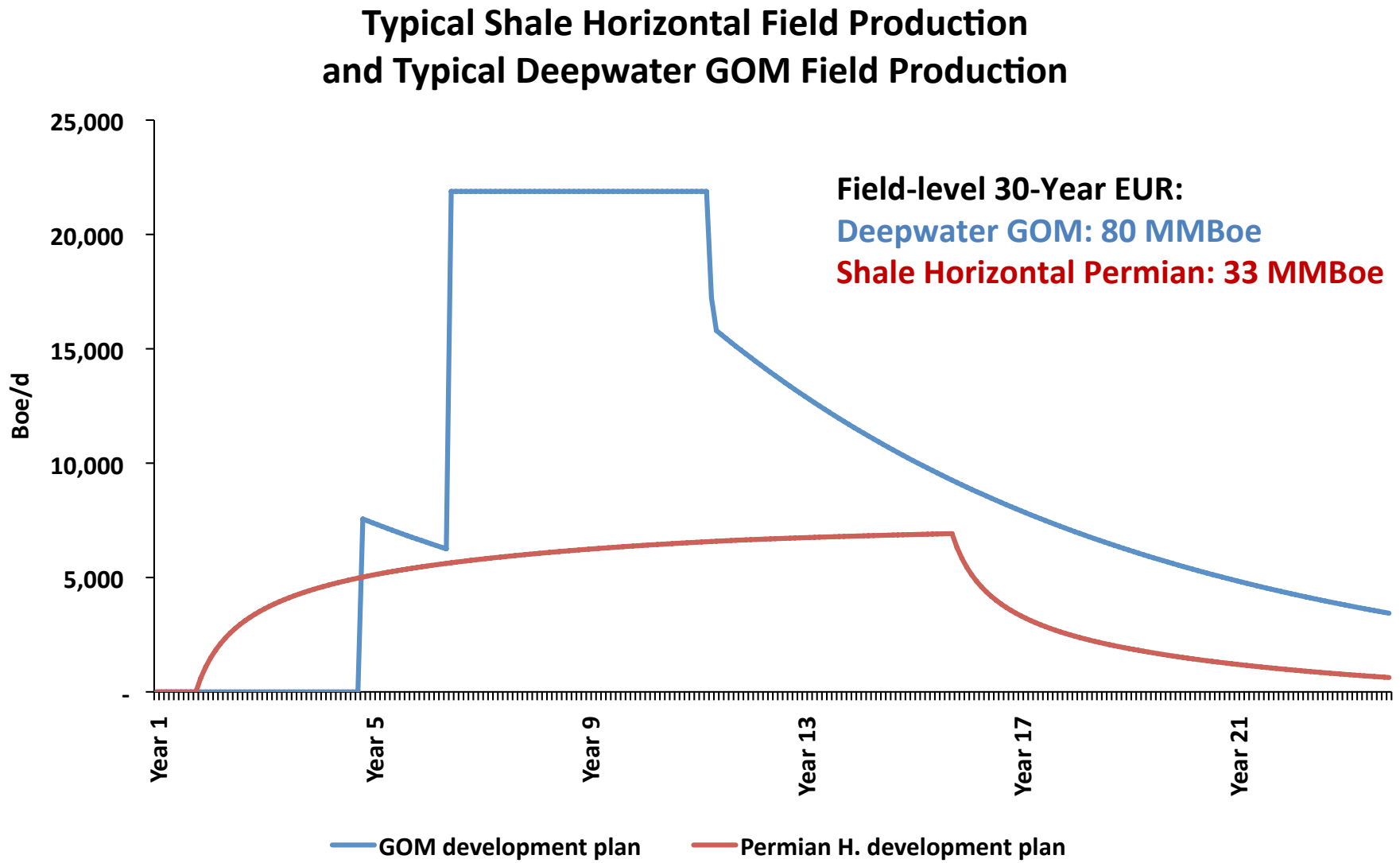
Shale horizontal development generates less than half of total production, compared to Deepwater GOM



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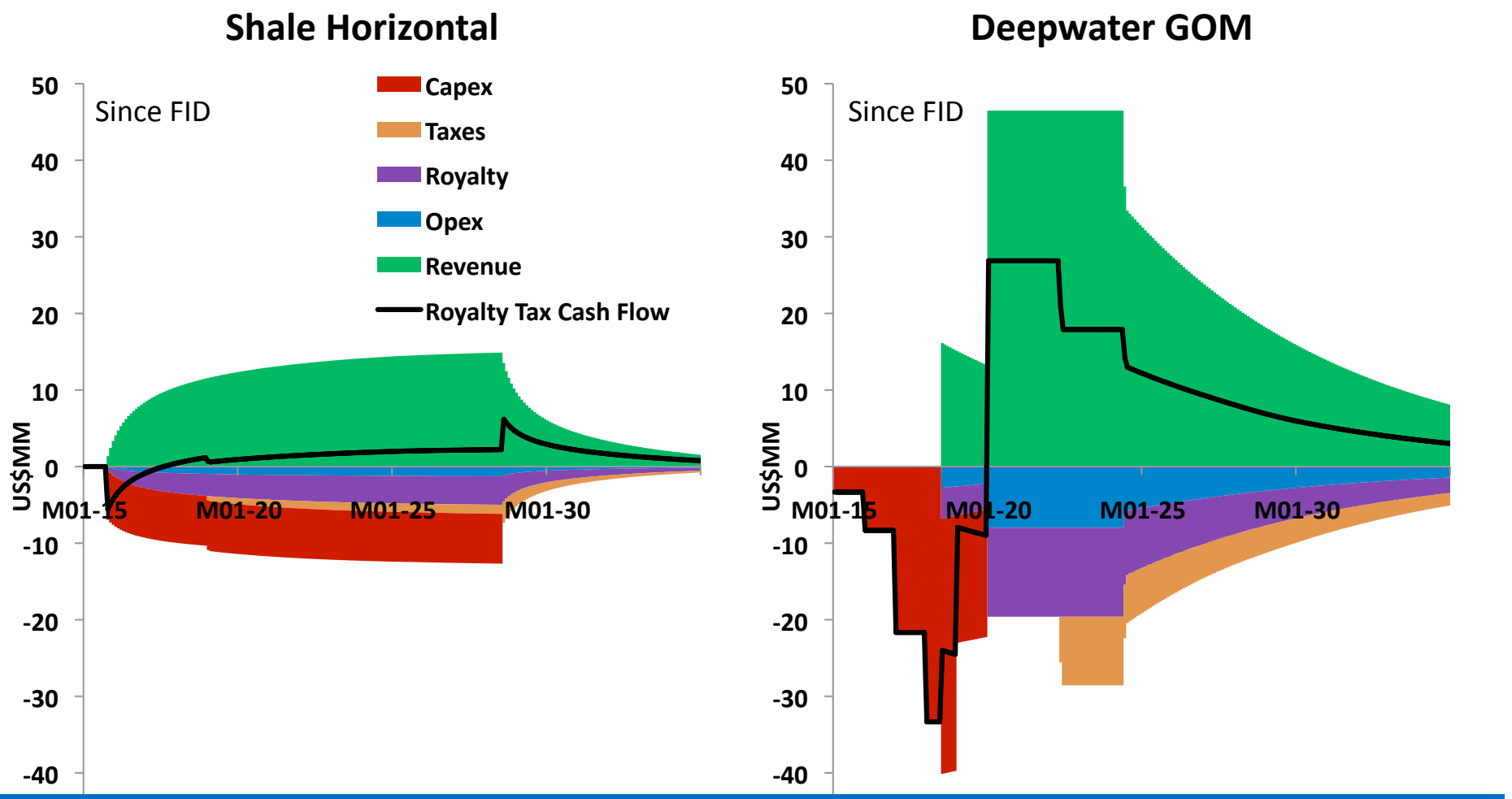
Shale development cash flow is smooth over longer time horizons and the "maximum cash out" is lower



Spreading shale investments over a long development period provides more opportunities for improvements in decision-making and operations

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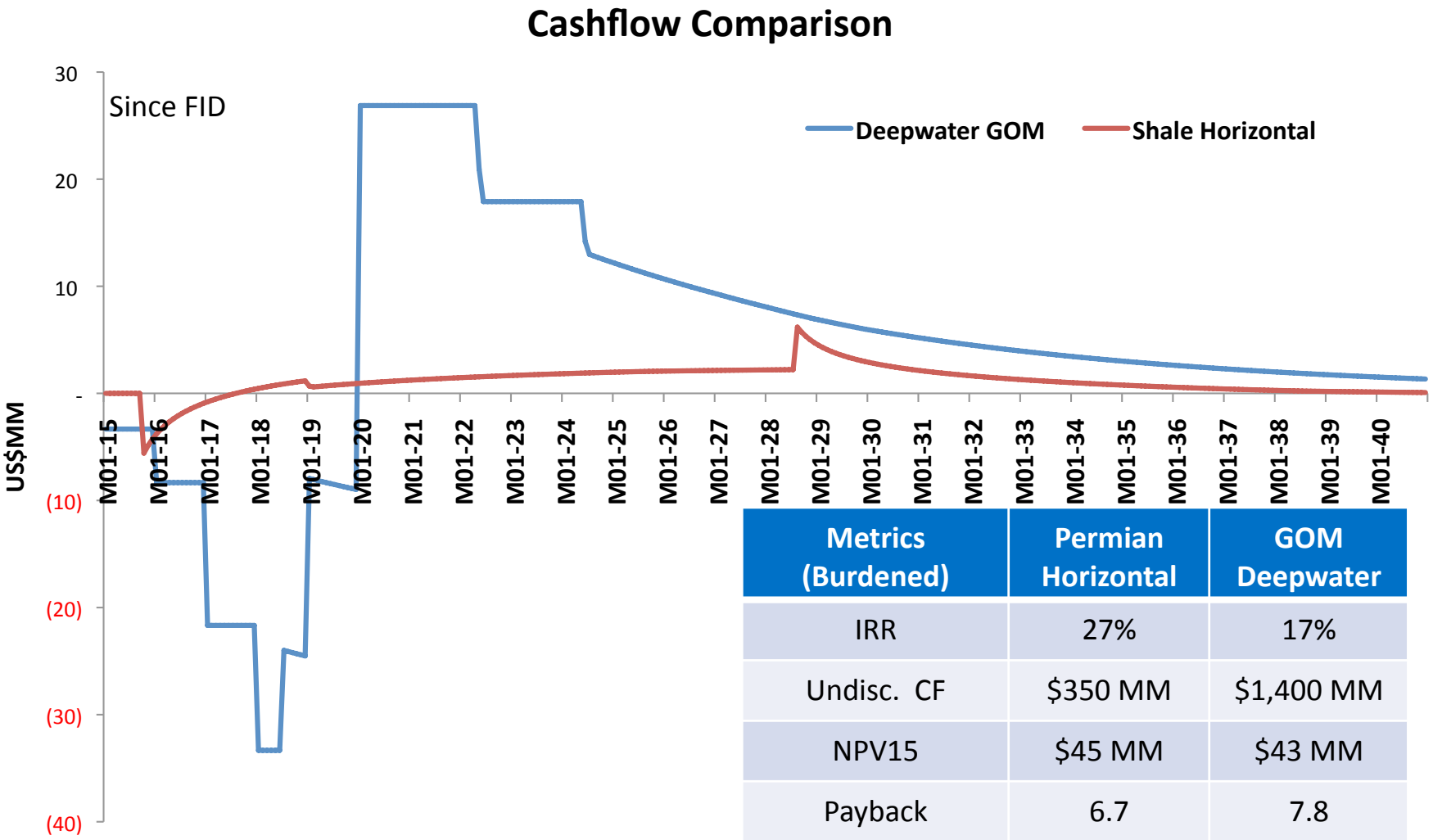
NPV15 are comparable, while IRR, Undis. Cash flow and unit production cost are not



Metrics (Burdened)	Permian Horizontal	GOM Deepwater
IRR	27%	17%
Undisc. CF	$350 MM	$1,400 MM
NPV15	$45 MM	$43 MM
Payback	6.7	7.8
Cost/Boe	36	24

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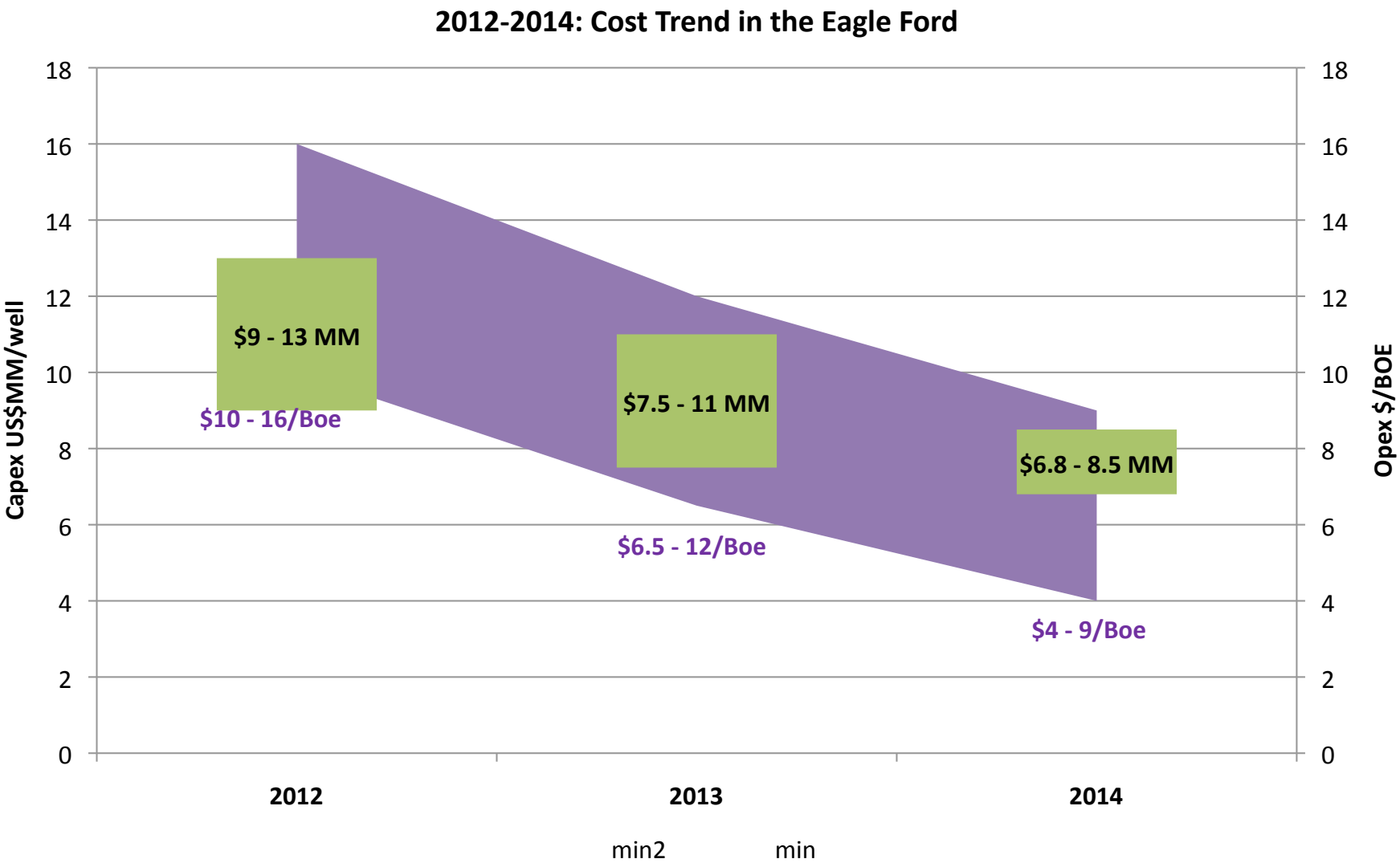
The current cost level observed in the U.S. key shale basins is achieved after a deep learning curve



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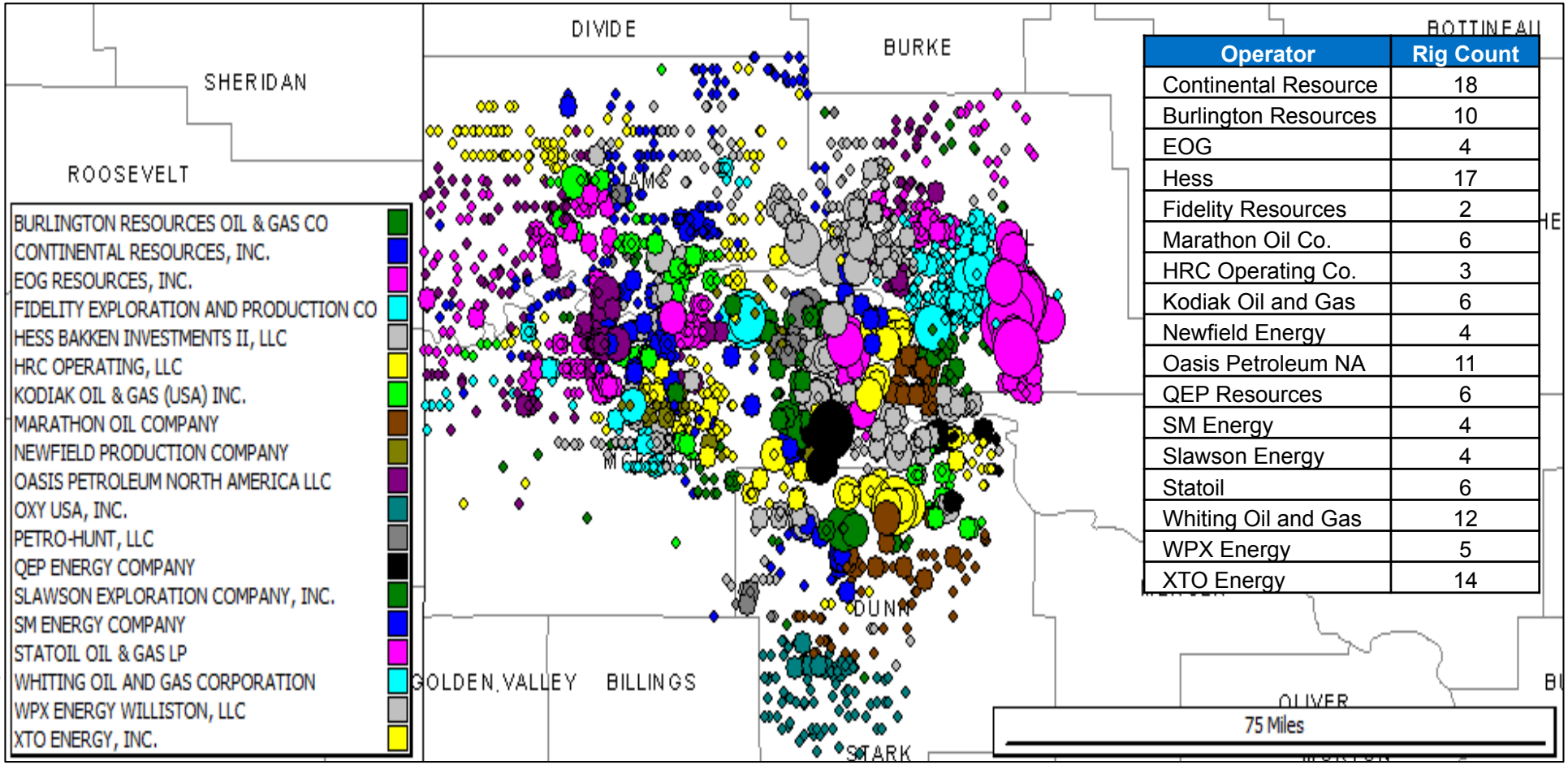
Multiple smaller players accelerate de-risking with landowner's short-term minimum work requirement



Operator	Rig Count
Continental Resource	18
Burlington Resources	10
EOG	4
Hess	17
Fidelity Resources	2
Marathon Oil Co.	6
HRC Operating Co.	3
Kodiak Oil and Gas	6
Newfield Energy	4
Oasis Petroleum NA	11
QEP Resources	6
SM Energy	4
Slawson Energy	4
Statoil	6
Whiting Oil and Gas	12
WPX Energy	5
XTO Energy	14

Source: DrillingInfo, Bubbles represent 30 day peak liquids production

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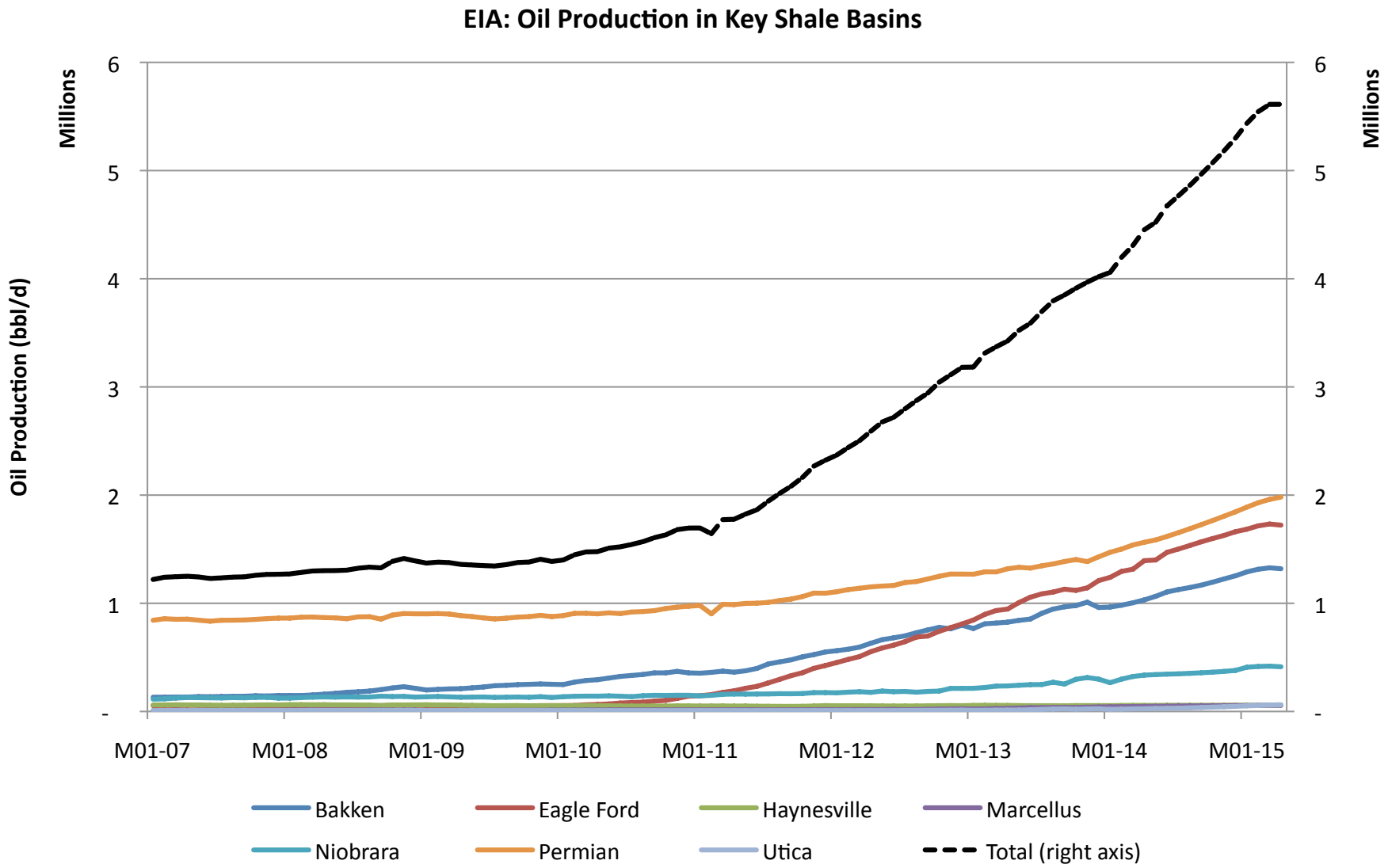
Key Takeaways

- The onshore conventional well modeled in this presentation is low-cost and highly profitable, but the resource potential is limited
- For the $1 Bn scenarios modeled in this presentation, shale development displays a lower capital exposure and a quicker positive net cash flow
- Deepwater and Unconventional resources suit different types of producers. In recent years, the U.S. shale success is largely driven by independent producers
- The de-risking process to unlock shale potential requires significant investment and intensive work programs

Liquids Production from U.S. Unconventionals tripled in the last four years



Source: EIA

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