PERMIAN BASIN

LATEST TRENDS AND PERSPECTIVES

Artem Abramov, VP Analysis
Rystad Energy

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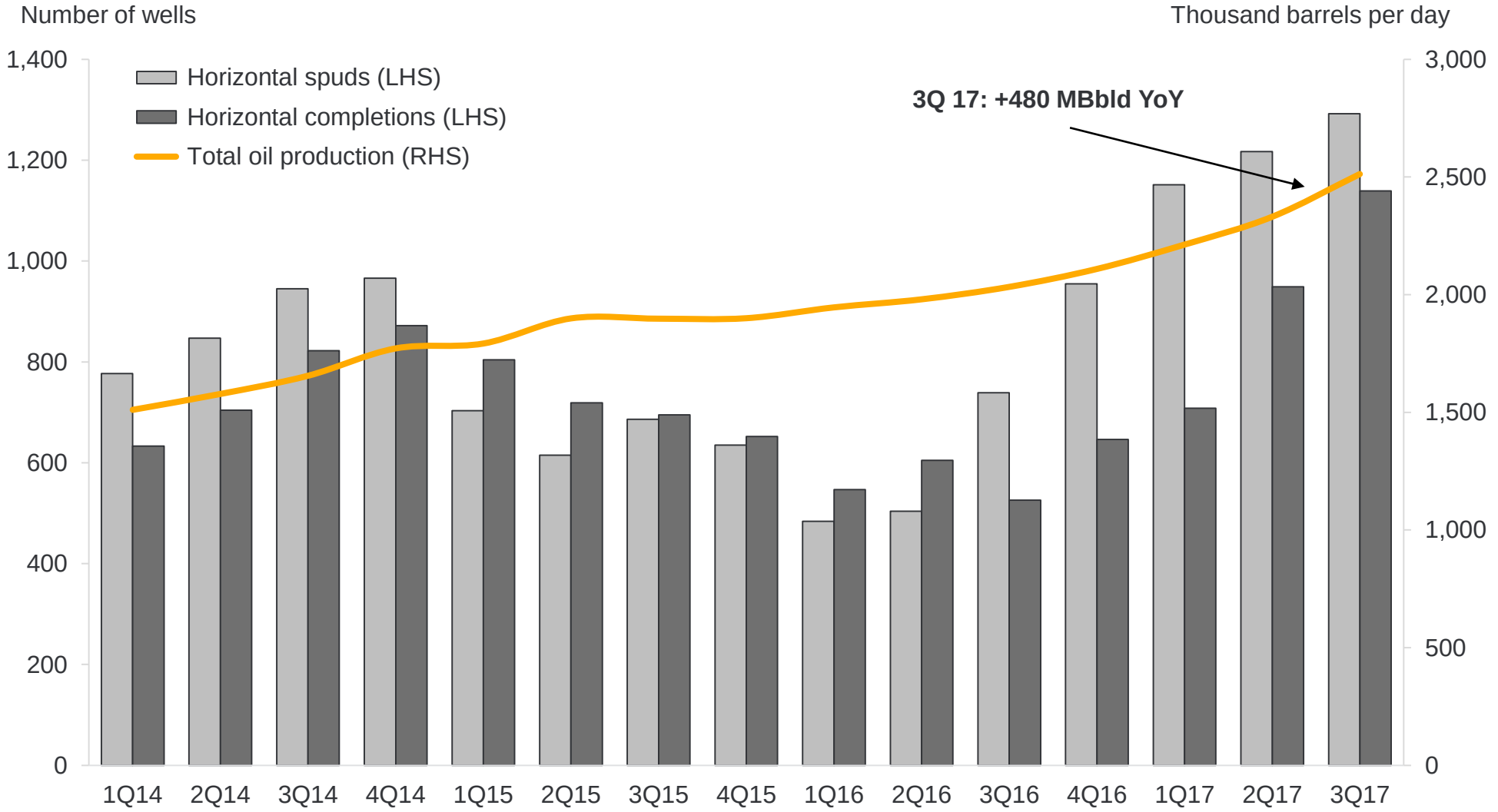
Permian Basin has been adding 40-90 MBbld of oil per month recently
Large upward shift from the average pace of additions from 2015-2016

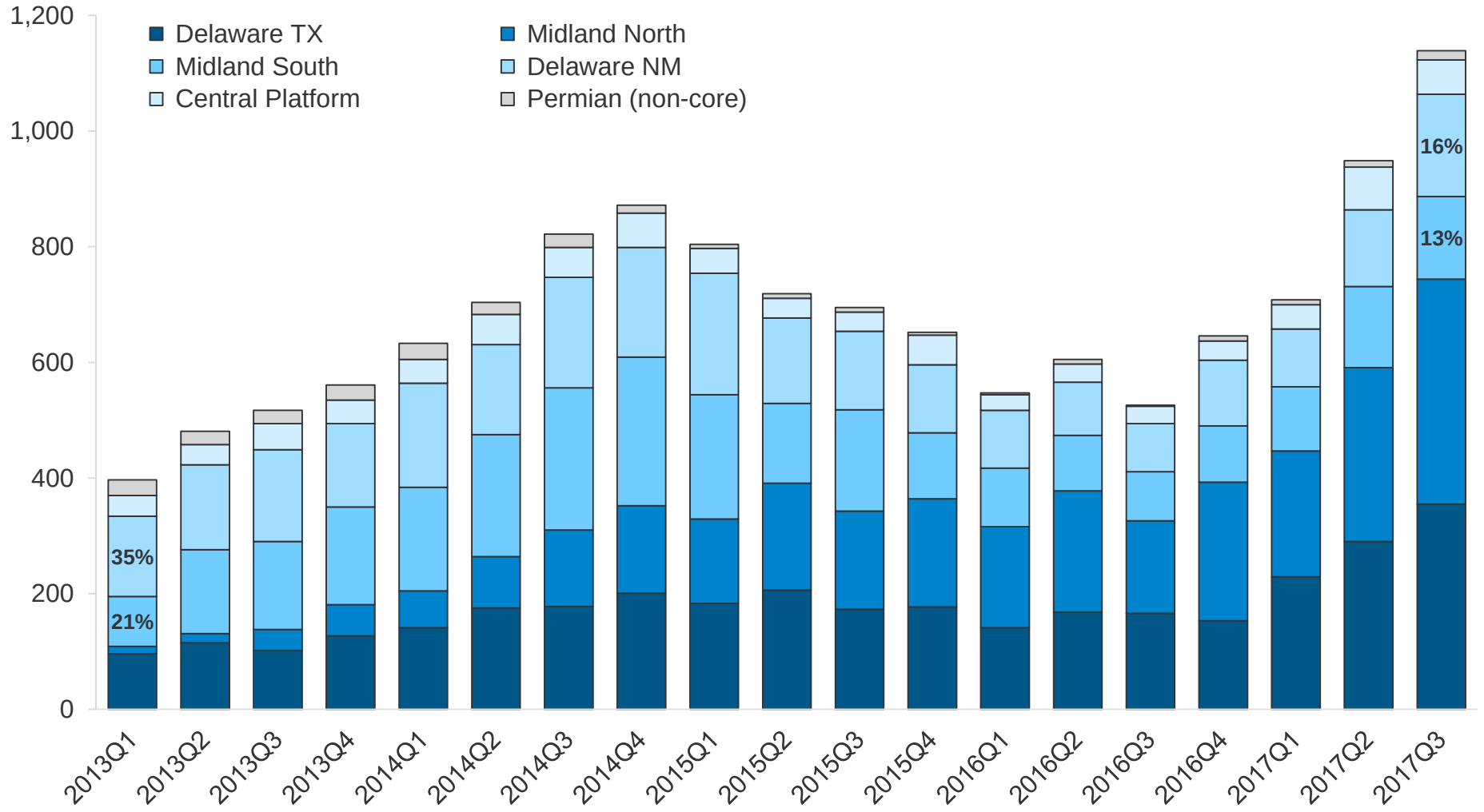
Permian Basin: quarterly horizontal activity and oil production evolution



Source: Rystad Energy NASWellCube

Horizontal activity in the Permian has shifted towards Northern Midland and Delaware, TX...

Permian Basin: horizontal completions by sub-basin
Number of wells



Source: Rystad Energy NASWellCube

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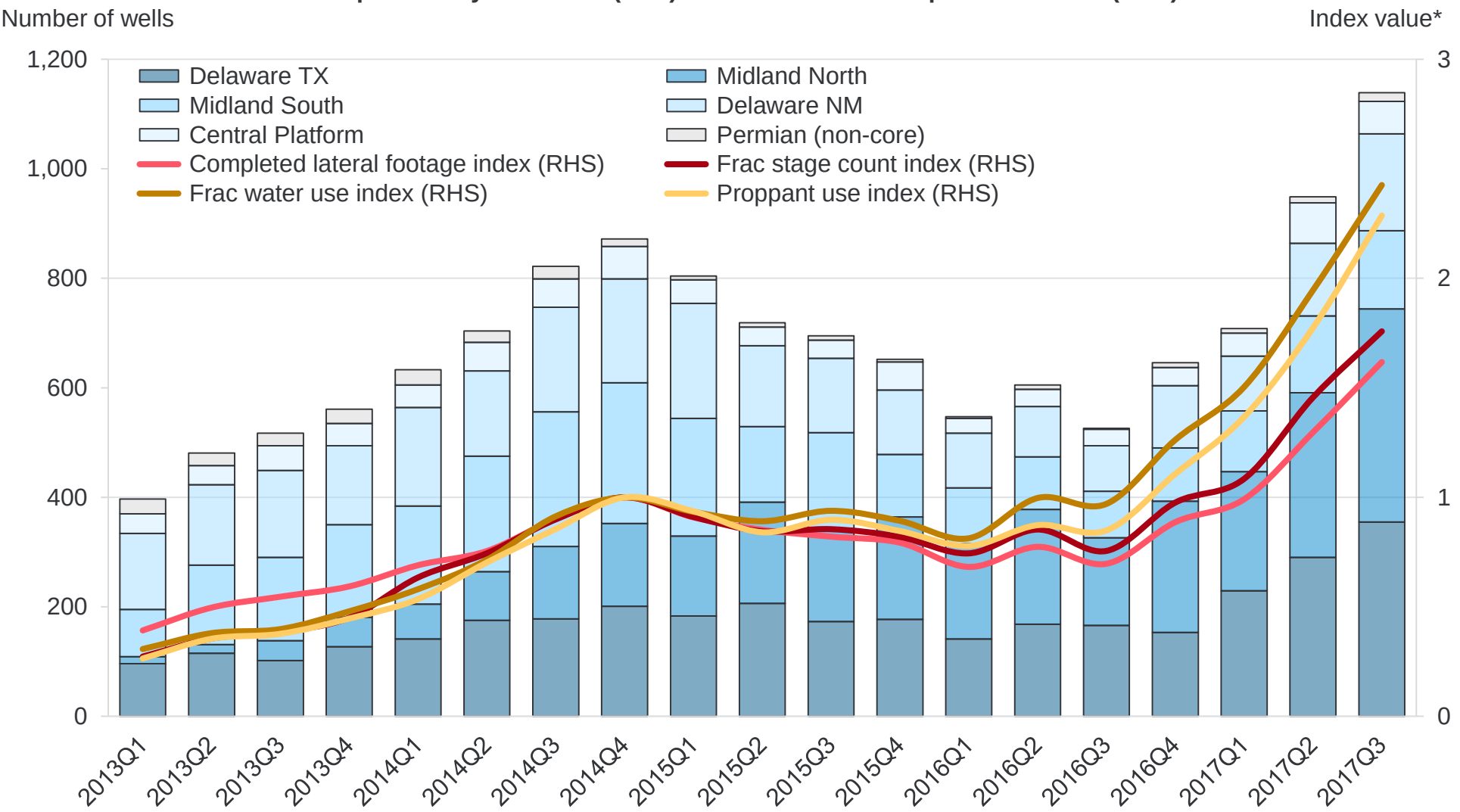
...and boosted well designs pushed all completion indexes to new all-time high levels

Permian Basin: horizontal completions by sub-basin (LHS) and evolution of completion indexes (RHS)



*All indexes take a value of 1 in 4Q 2014

Source: Rystad Energy NASWellCube

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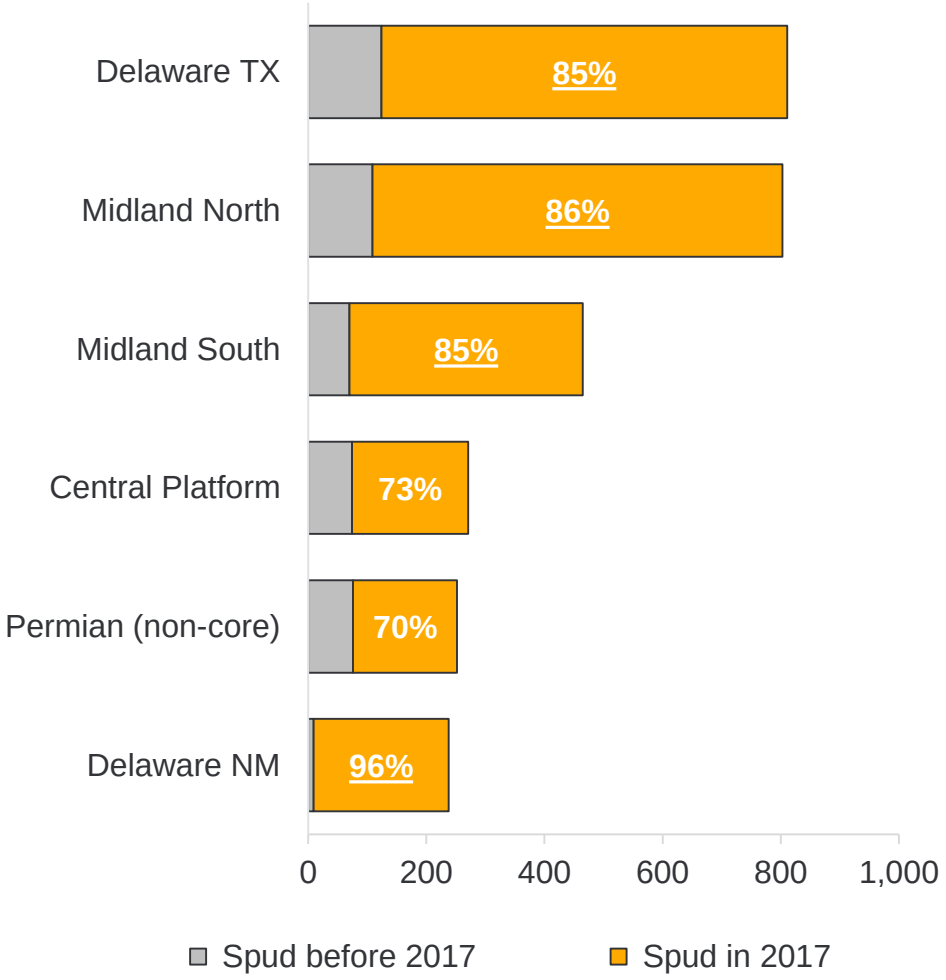
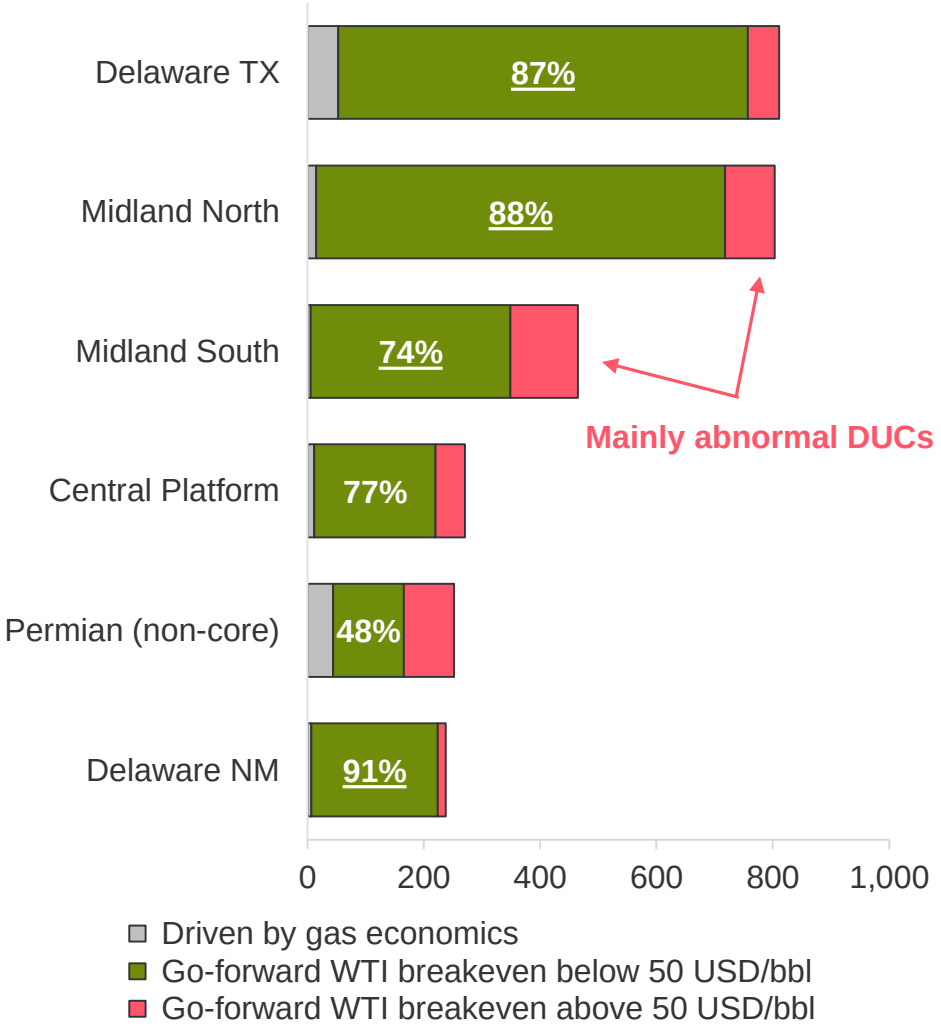
Impact of service-side bottlenecks on the DUC build-up in 2017 is often exaggerated
Limited number of abnormal DUCs is observed and current price environment is acceptable

Permian: DUC inventory by sub-basin and age (Oct 2017)
Number of wells



Permian: DUC inventory by go-forward breakeven* (Oct 2017)
Number of wells

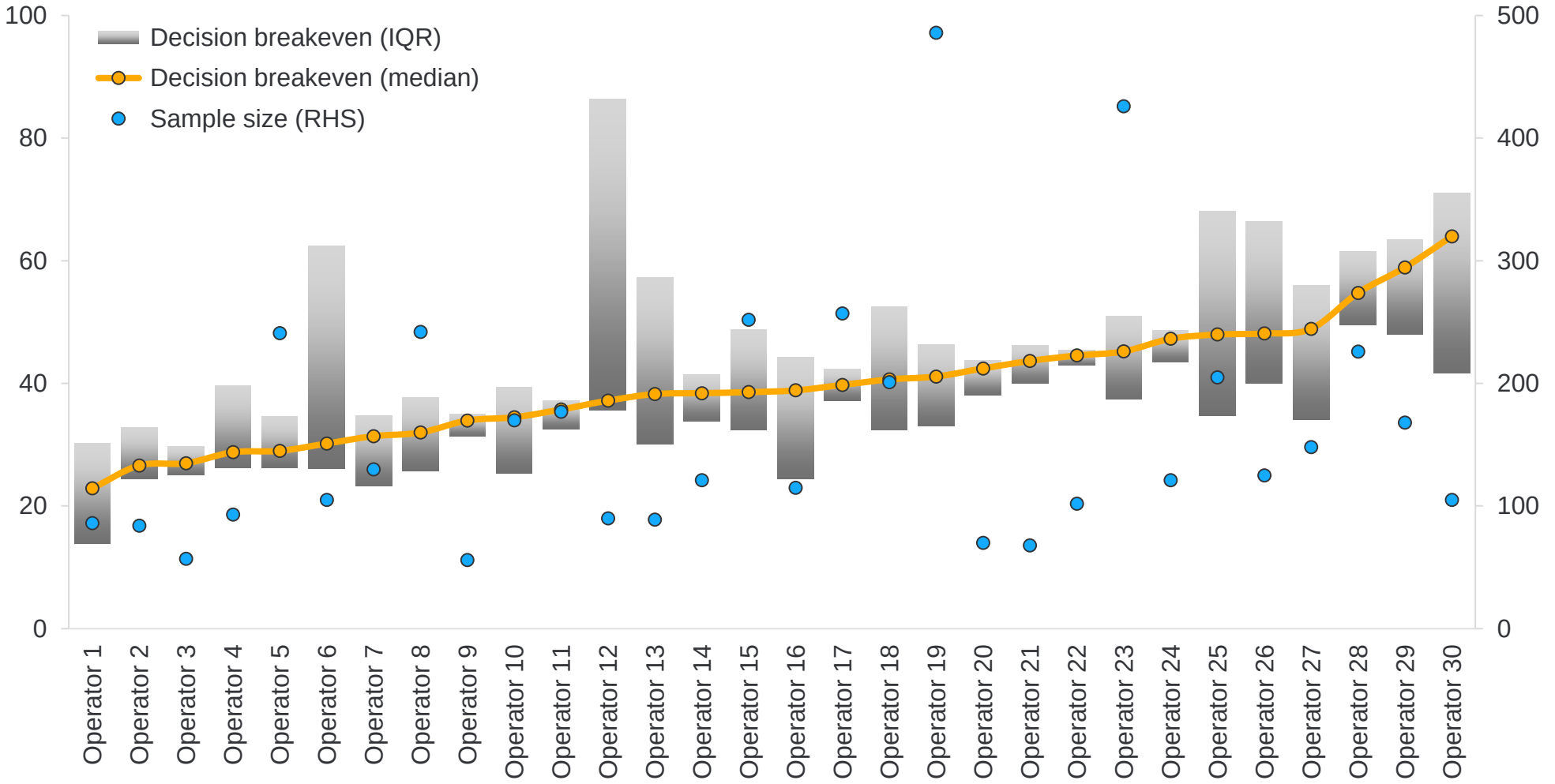


*Go-forward WTI breakeven oil price includes expected well productivity, completion costs, LOEs, production taxes, royalties, transportation costs, price differentials and G&A opex. A 10% discount rate is applied.
Source: Rystad Energy NASWellCube

From a marginal activity perspective, operators in the Permian deliver at least 10% returns

Permian Basin: decision breakeven oil prices* for top-30 operators in 2016-2017

USD per barrel

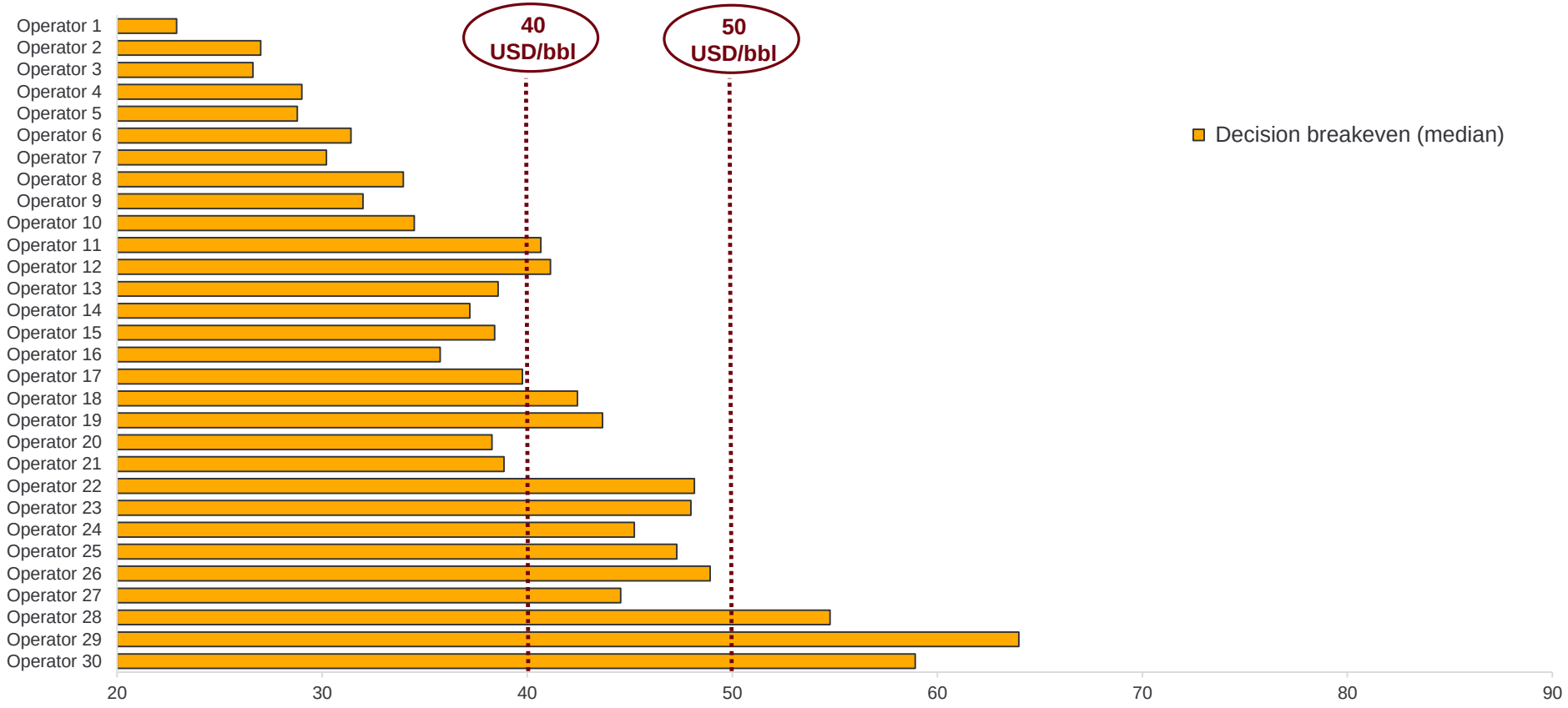


*Decision breakeven oil price accounts for well drilling and completion costs, LOEs, production taxes, royalties, transportation costs and price differentials in the calculation. A 10% discount rate is applied. Gas and NGL revenues are includes with 2 USD/mmbtu and 15 USD/bbl flat prices, respectively.

Source: NASWellCube, UCube, Rystad Energy research and analysis

Are we capturing all costs?

Permian Basin: full cycle breakeven oil price decomposition for top-30 operators
USD per barrel



Oil price needed to deliver 10% return on a marginal well

42.4 USD/bbl

Source: NASWellCube, UCube, Rystad Energy research and analysis

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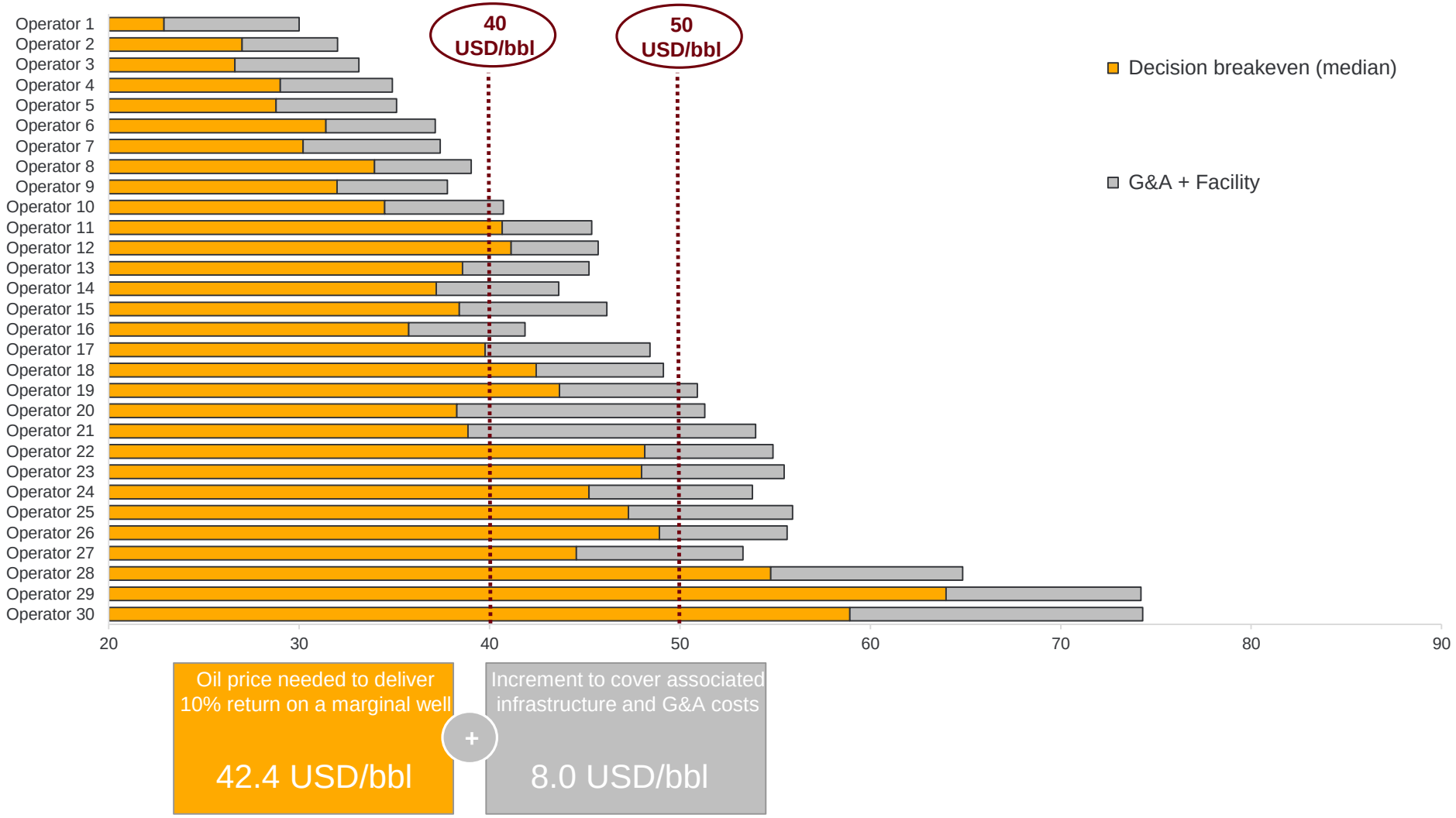
Facility, infrastructure and G&A costs boost breakeven prices by 20%

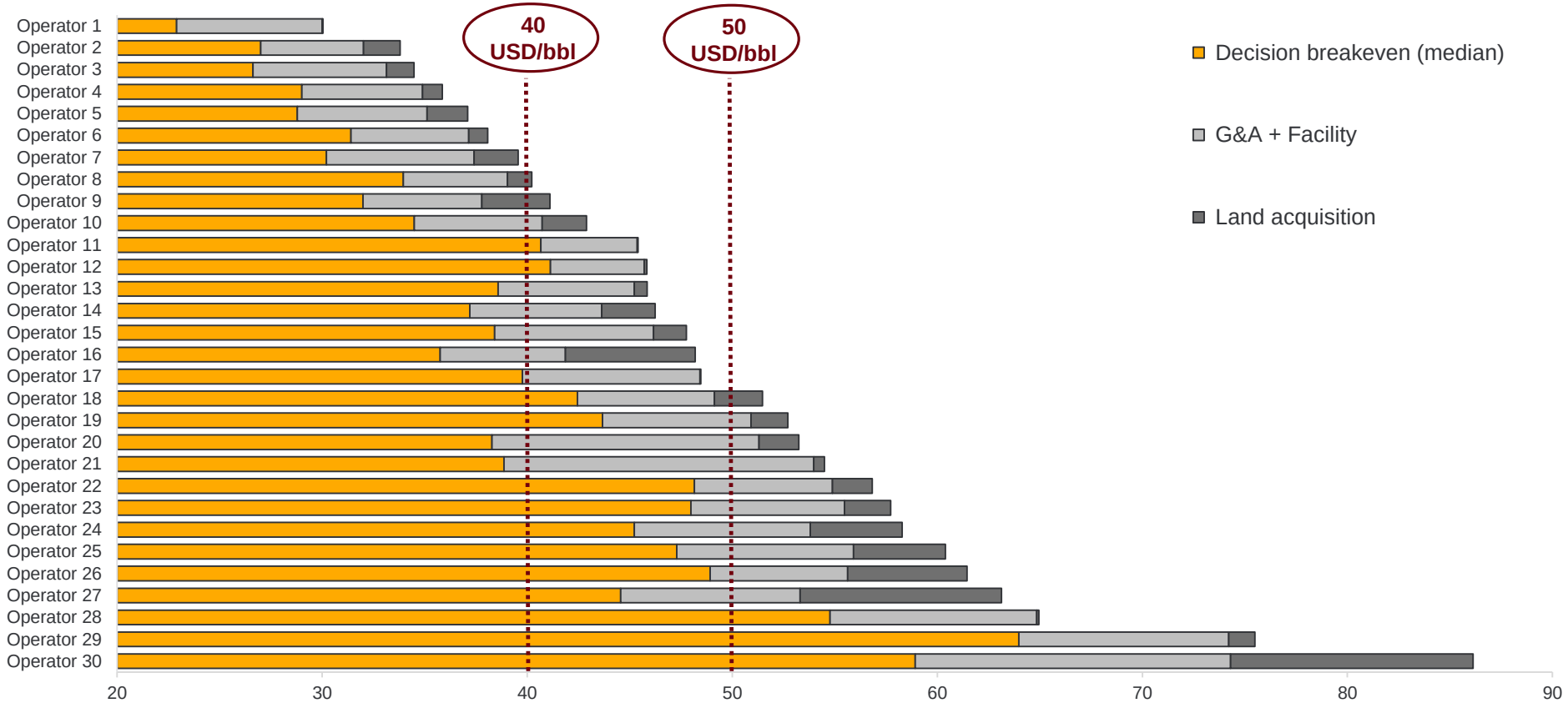
Permian Basin: full cycle breakeven oil price decomposition for top-30 operators
USD per barrel



Source: NASWellCube, UCube, Rystad Energy research and analysis

Acreage acquisition costs are sunk, but significant for the full-cycle picture of late entrants

Permian Basin: full cycle breakeven oil price decomposition for top-30 operators
USD per barrel



Oil price needed to deliver 10% return on a marginal well	+	Increment to cover associated infrastructure and G&A costs	+	Typical M&A costs distributed across all wells	=	Real full-cycle breakeven for a 10% return
42.4 USD/bbl		8.0 USD/bbl		3.2 USD/bbl		53.6 USD/bbl

Source: NASWellCube, UCube, Rystad Energy research and analysis

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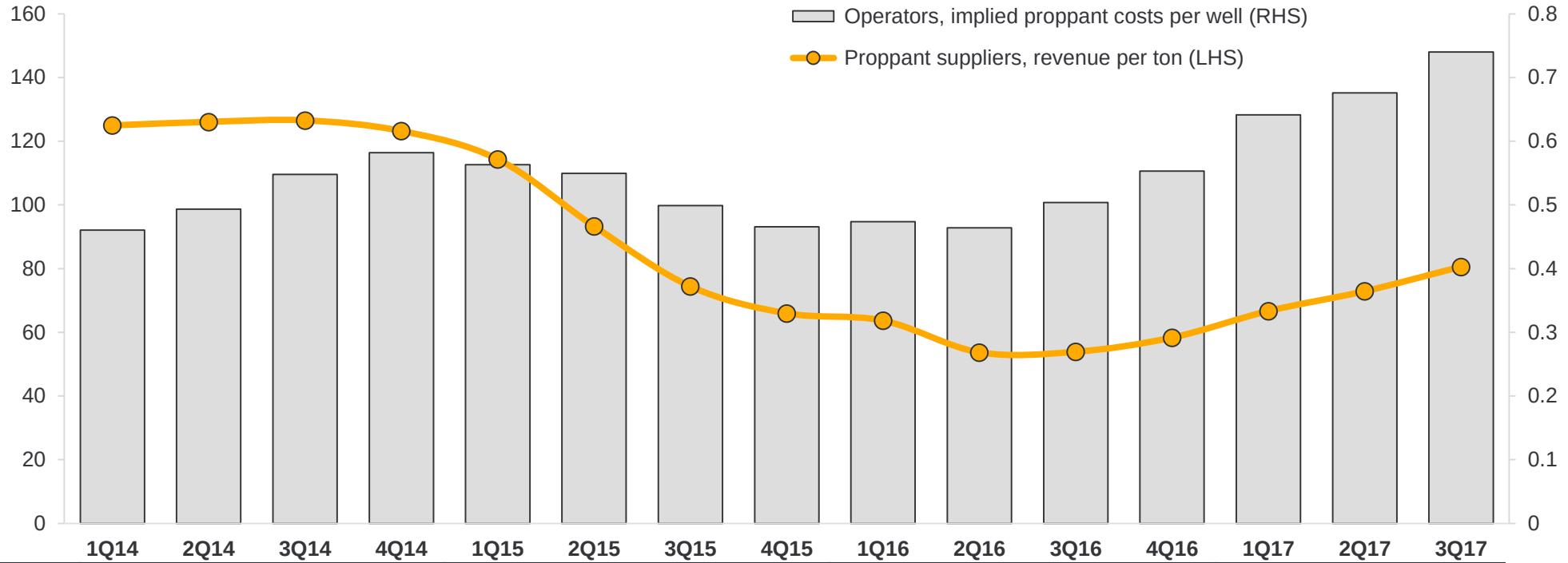
For E&Ps implied proppant costs per well increased by 47% from 3Q 16 to 3Q 17
Lower spread between proppant costs and realized proppant prices from a supplier perspective

U.S. Land: proppant prices and costs

USD per ton

Million USD



Price QoQ		1%	0%	-3%	-7%	-18%	-20%	-11%	-3%	-16%	0%	8%	14%	9%	11%
Price YoY					-8%	-26%	-41%	-46%	-44%	-42%	-28%	-12%	5%	36%	50%
Costs QoQ		7%	11%	6%	-3%	-2%	-9%	-7%	2%	-2%	9%	10%	16%	5%	9%
Costs YoY					22%	11%	-9%	-20%	-16%	-16%	1%	19%	35%	46%	47%

Source: NASWellCube, Rystad Energy research and analysis

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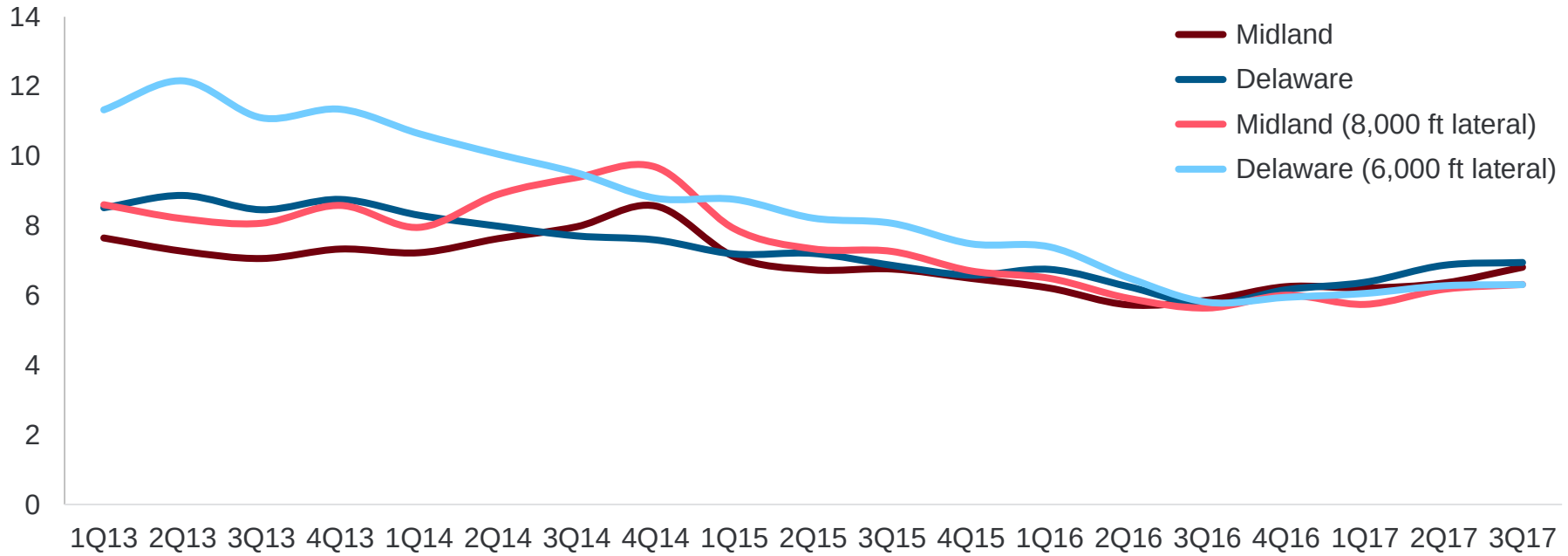
In 2017, drilling and completion works are still dominated by old cheap service contracts
Yet cost escalation gradually becomes visible in the high-level picture – more to come in 2018

Permian Basin: drilling and completion costs per horizontal well by quarter and YoY changes
Million USD



Midland	9%	-3%	-10%	-4%	-6%	5%	13%	17%	-2%	-12%	-15%	-24%	-13%	-15%	-13%	-4%	0%	11%	16%
Delaware	7%	9%	0%	3%	-3%	-10%	-9%	-13%	-13%	-10%	-11%	-13%	-6%	-13%	-16%	-6%	-6%	10%	21%
Midland 8,000 ft	-13%	-13%	-7%	1%	-8%	8%	16%	13%	-1%	-18%	-23%	-31%	-18%	-19%	-22%	-10%	-12%	4%	12%
Delaware 6,000 ft	0%	9%	-7%	-6%	-6%	-17%	-14%	-23%	-18%	-18%	-15%	-15%	-16%	-21%	-28%	-21%	-18%	-3%	9%

Source: Rystad Energy NASWellCube

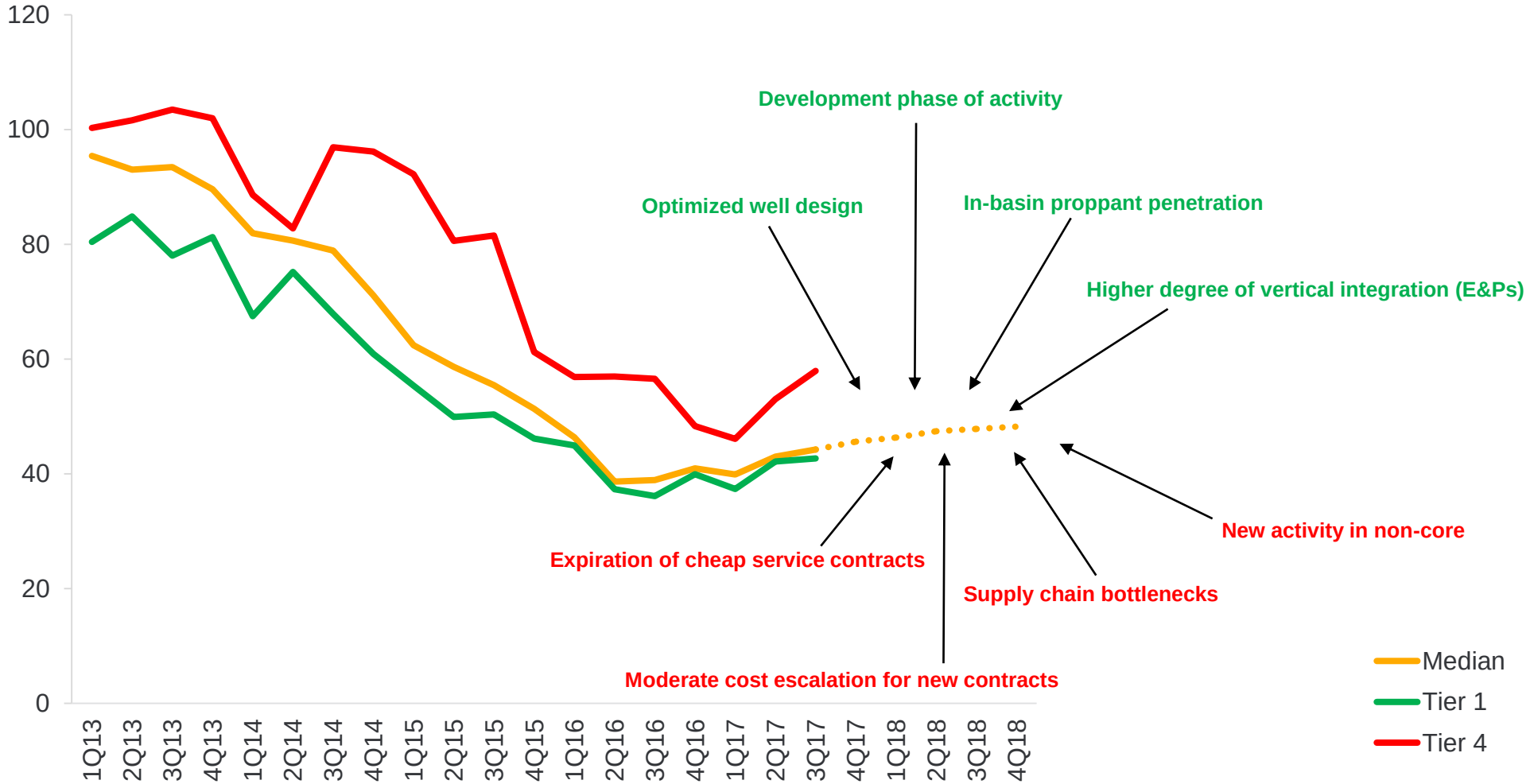
Decision breakeven prices increased by 5 USD/bbl from 3Q 16 to 3Q 17
This is not a portfolio effect as breakevens for Tier 1 locations are trending upwards

Permian Basin: decision breakeven oil prices for horizontal wells by completion quarter
USD per barrel

*Decision breakeven oil price accounts for well drilling and completion costs, LOEs, production taxes, royalties, transportation costs and price differentials in the calculation. A 10% discount rate is applied. Gas and NGL revenues are includes with 2 USD/mmbtu and 15 USD/bbl flat prices, respectively.
Source: NASWellCube, Rystad Energy research and analysis

Decision breakevens are set to trend towards 48-50 USD/bbl in 2018 in a 50-55 USD/bbl price environment
Complex interaction between service cost inflation and additional efficiency gains is expected

Permian Basin: decision breakeven oil prices for horizontal wells by completion quarter
USD per barrel



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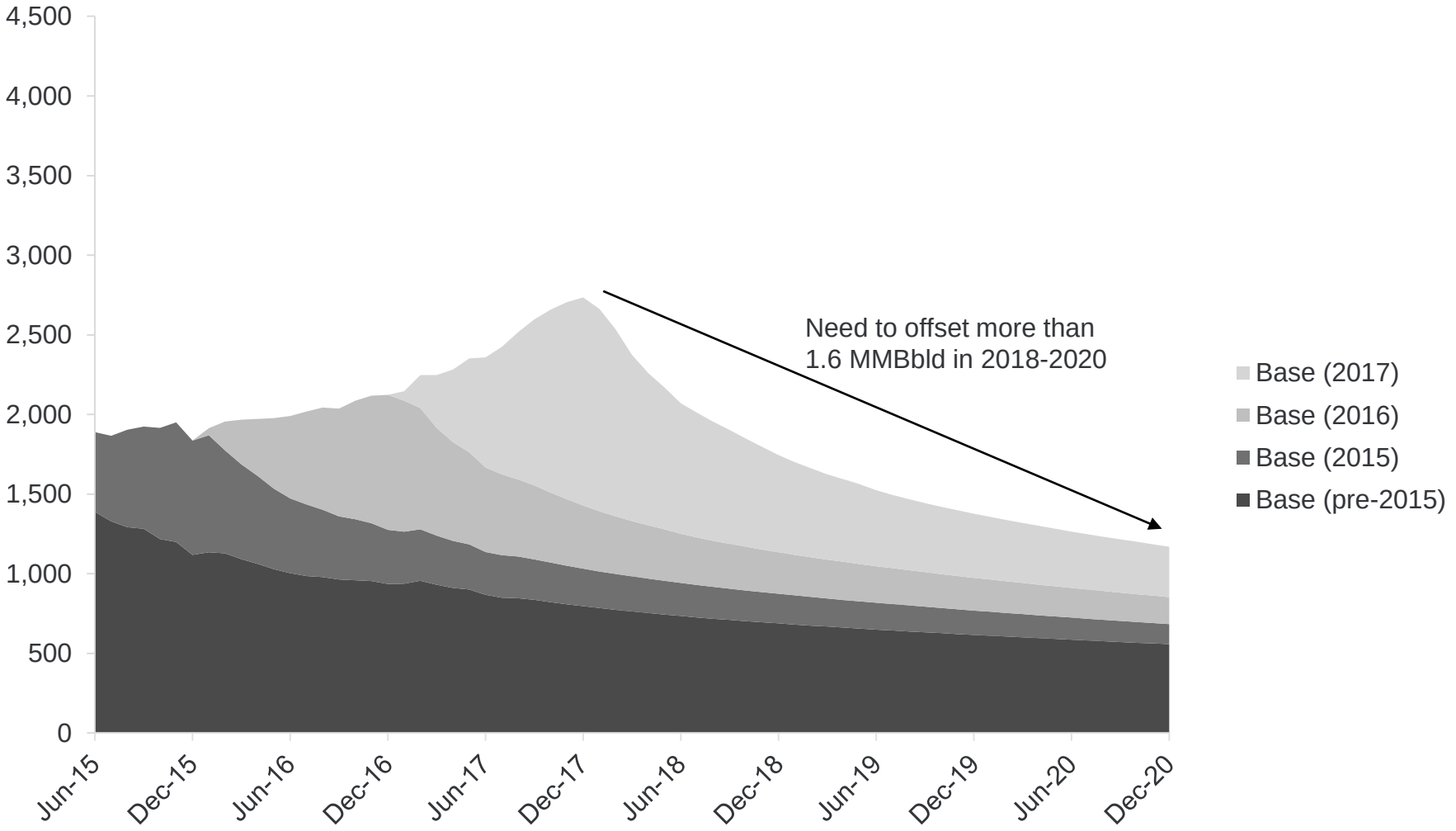
Source: NASWellCube, Rystad Energy research and analysis

Cost of rapid growth is steeper base decline
First-year base decline increased from 500-550 MBbld in 2015 to 1,000 MBbld in 2018

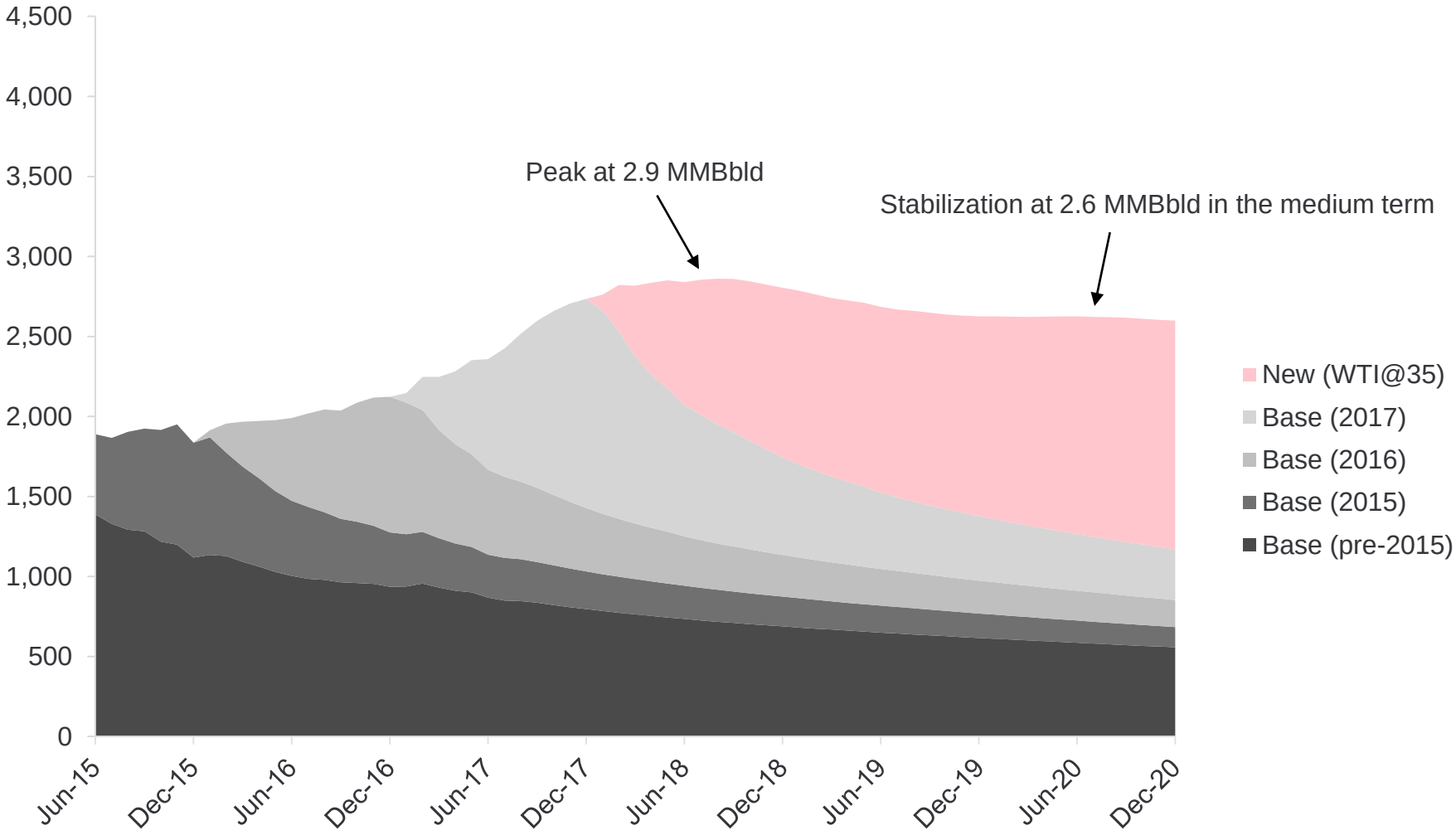
Permian Basin: oil production outlook
Thousand barrels per day



Source: NASWellCube, Rystad Energy research and analysis

If the WTI price collapses into mid-30s, inertial growth will still be observed throughout 1H 2018

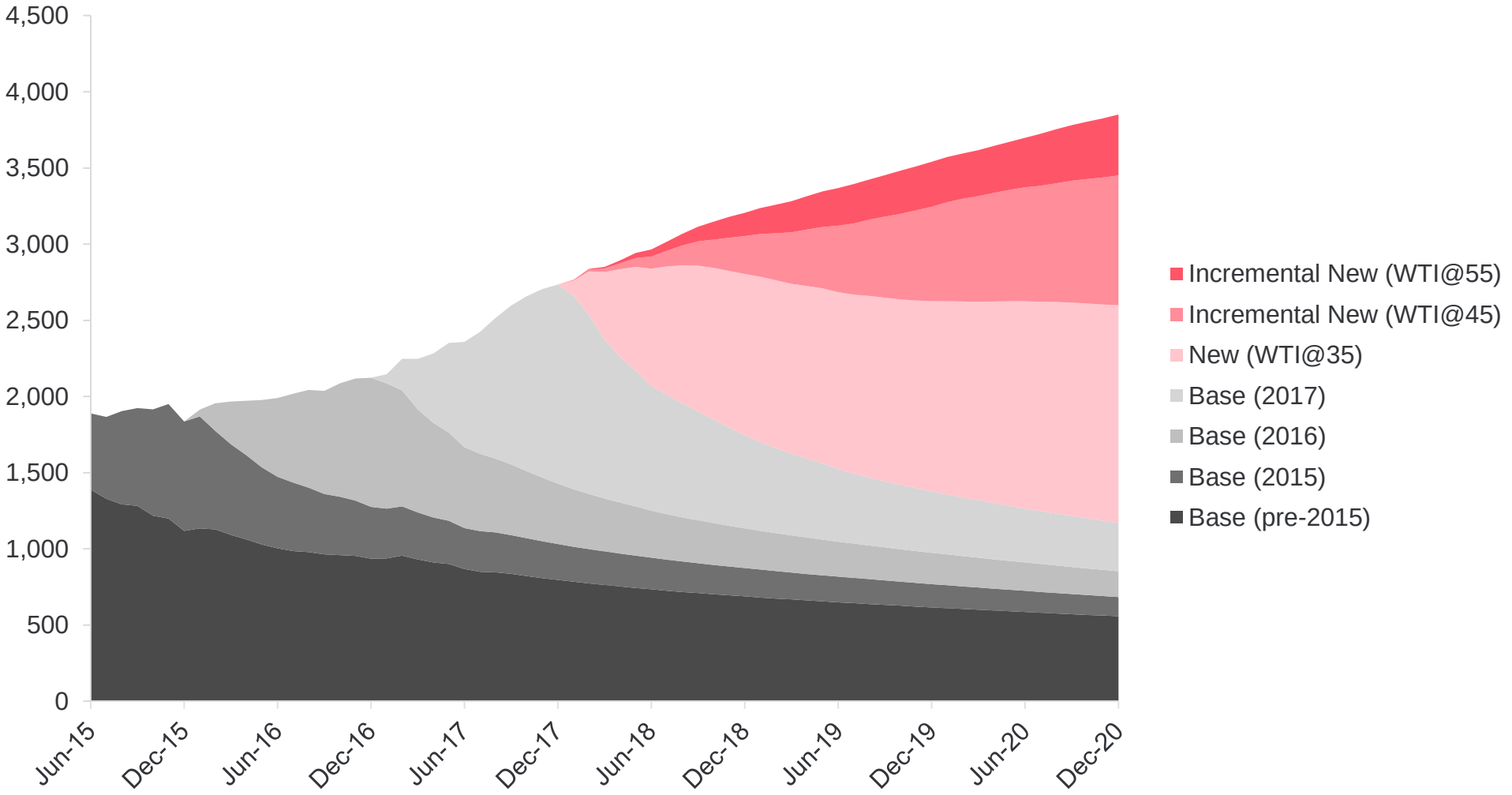
Permian Basin: oil production outlook
Thousand barrels per day



Source: NASWellCube, Rystad Energy research and analysis

45 USD/bbl is a requirement for sustainable moderate growth in the medium term
In a 55 USD/bbl world, 3.2 and 3.9 MMBbld are set to be reached by YE 2018 and 2020, respectively

Permian Basin: oil production outlook
Thousand barrels per day



Source: NASWellCube, Rystad Energy research and analysis

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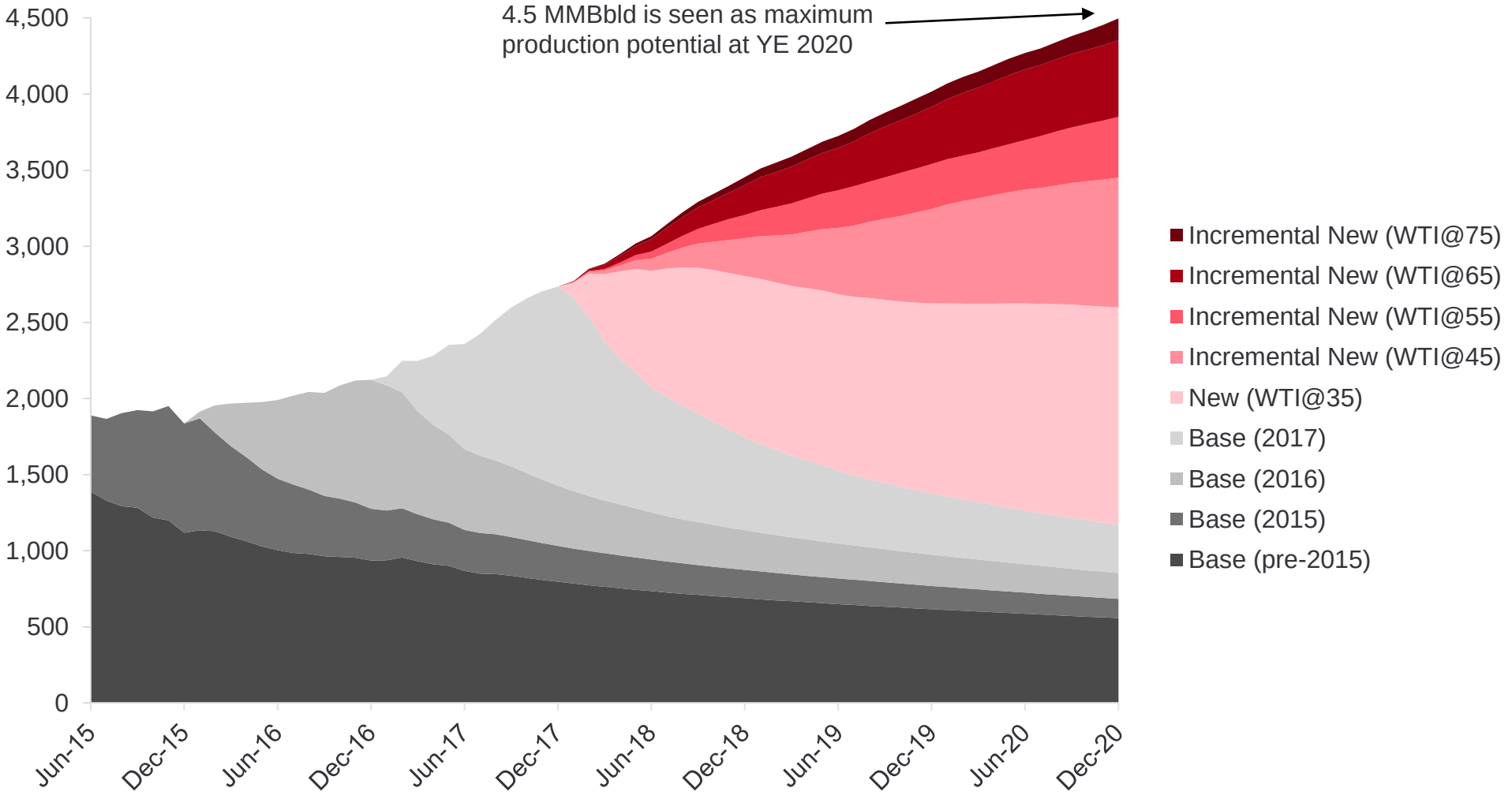
A move from 55 to 65 USD/bbl unlocks a lot of additional production potential
Further upside is constrained by service-side and logistics bottlenecks

Permian Basin: oil production outlook
Thousand barrels per day



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