THE OIL BATTLE: OPEC+ VS SHALE 2.0

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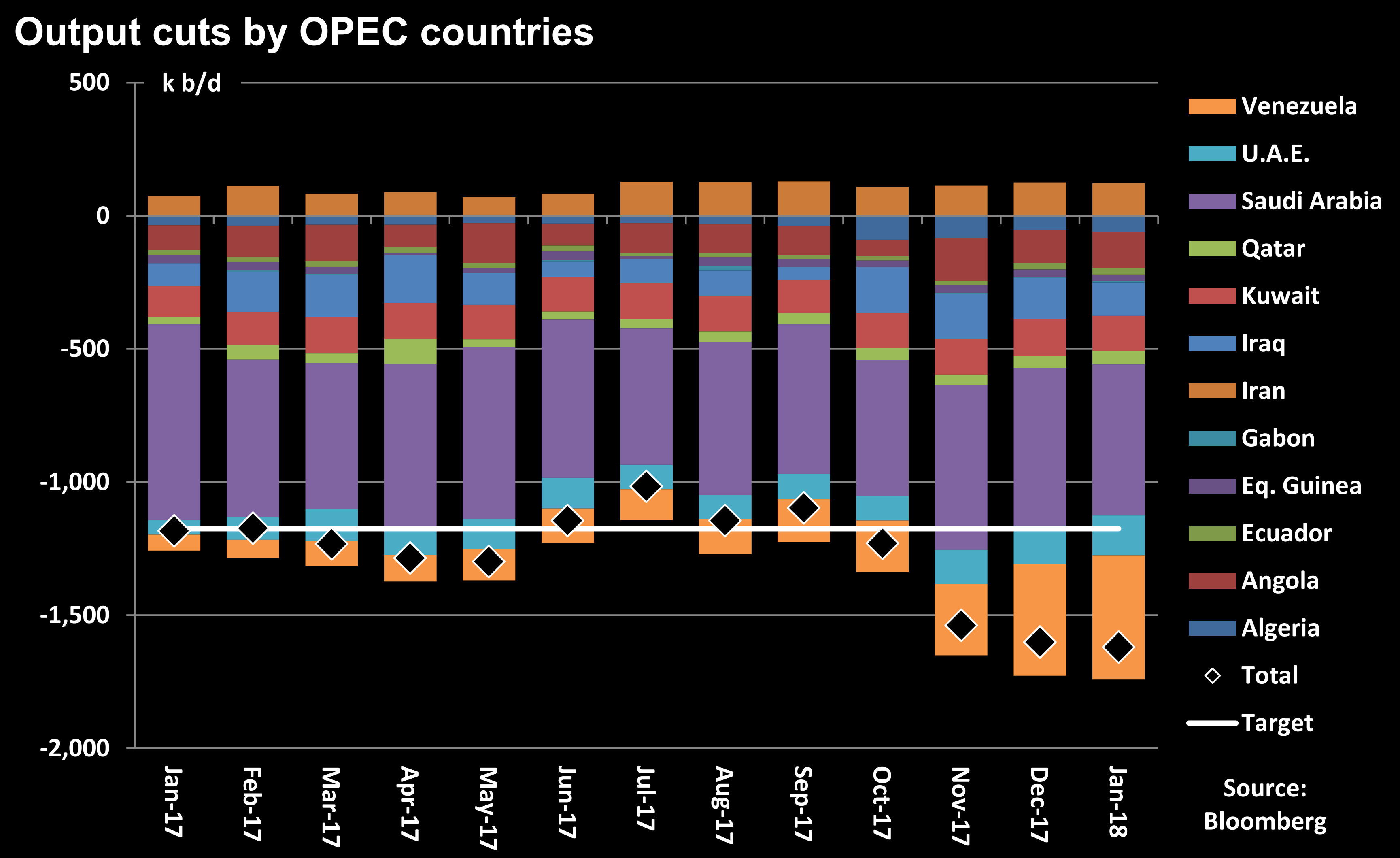
OPEC+ – ANATOMY OF RECOVERY

Brent crude price

OPEC'S UNEXPECTED COMPLIANCE



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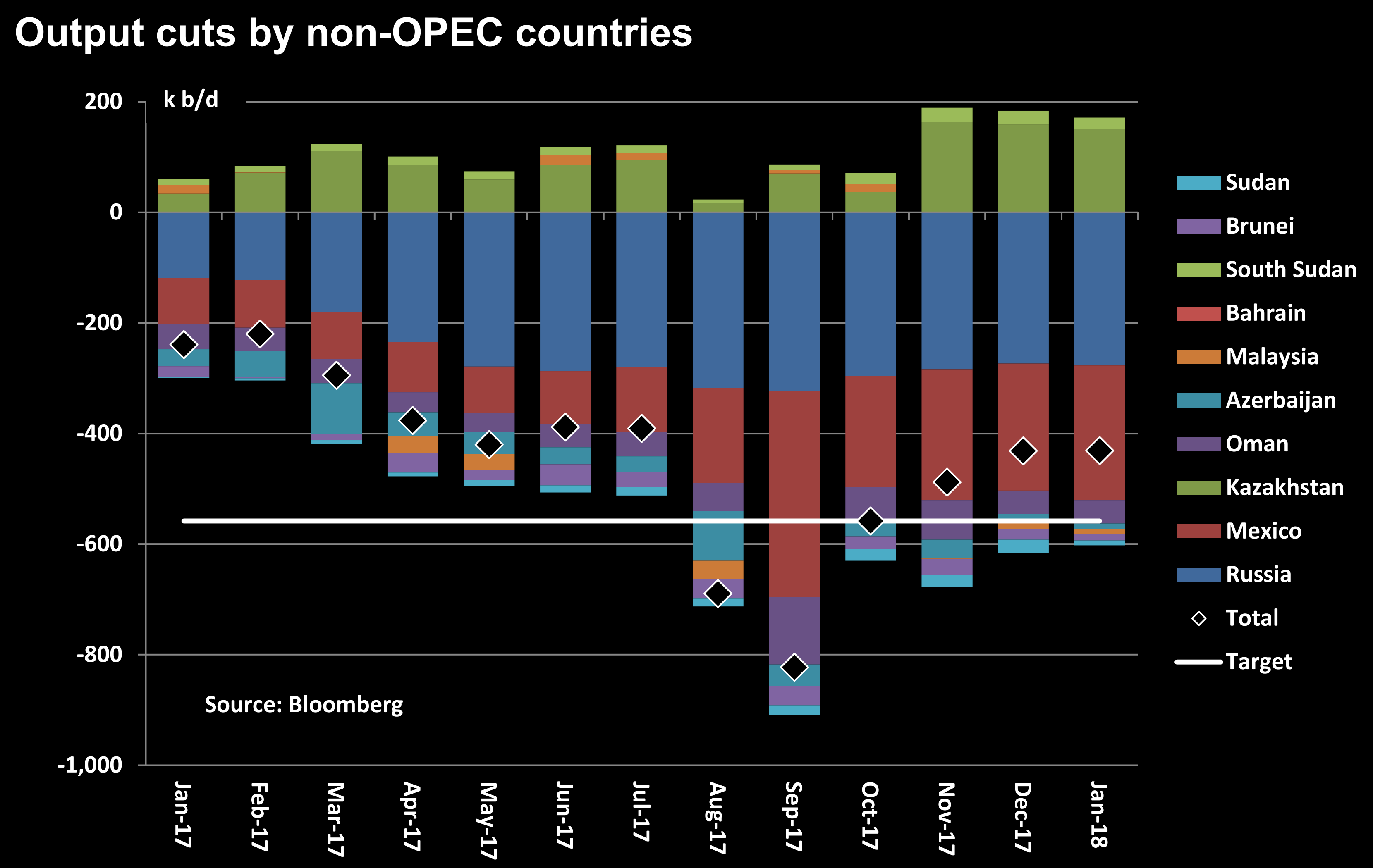
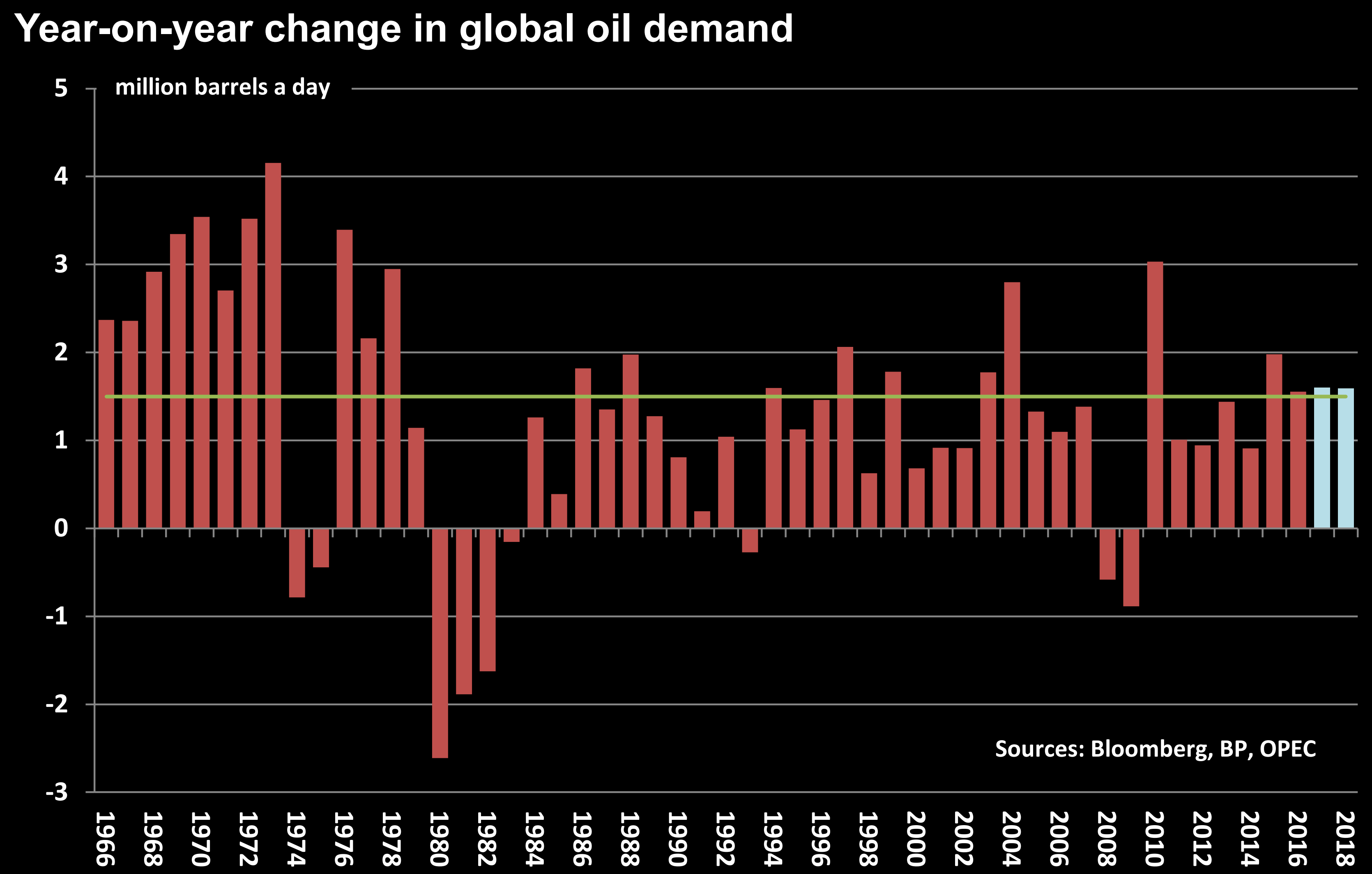
NON-OPEC DOES ITS BIT – SORT OF

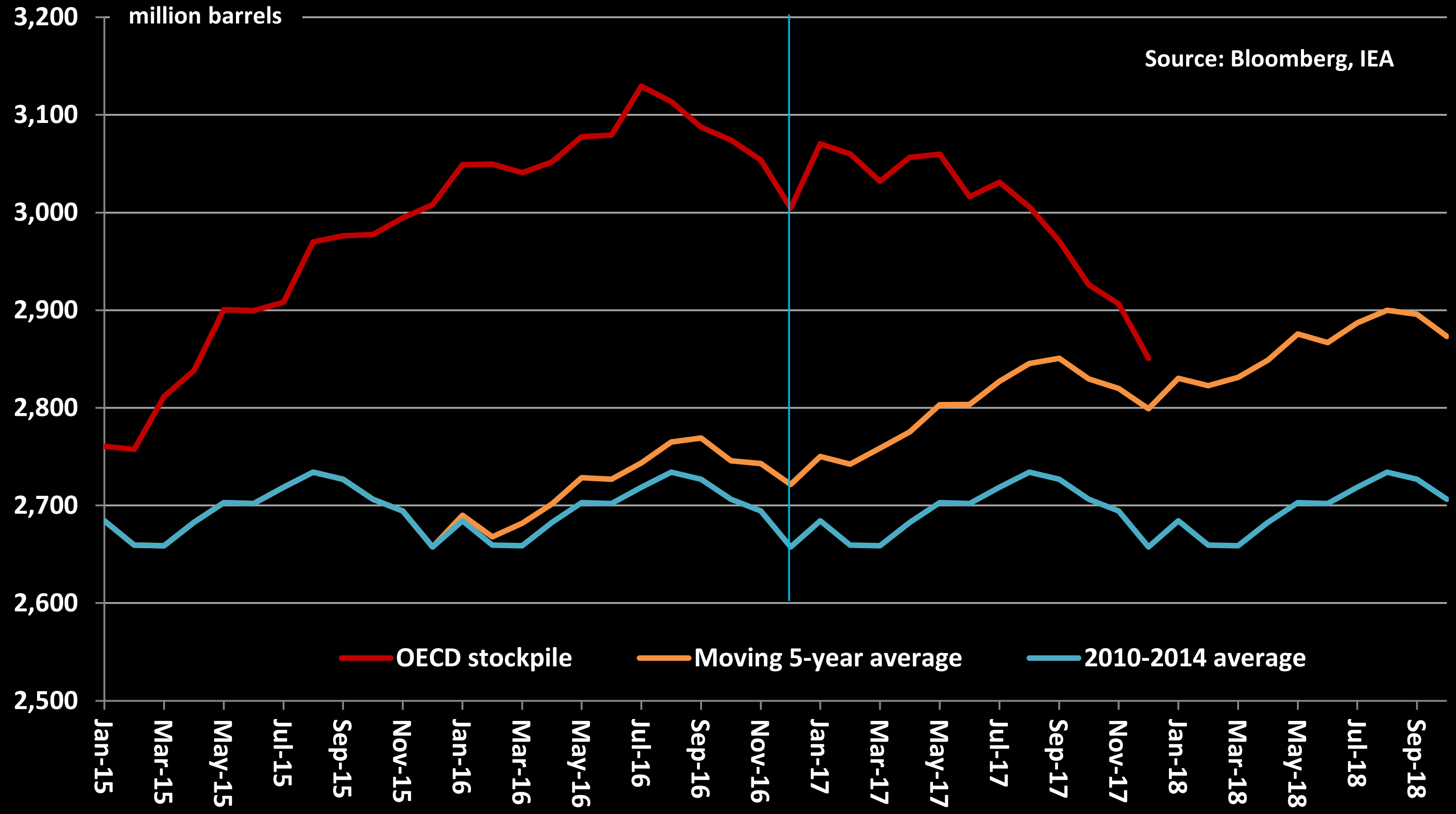


HELPED BY PERSISTENT STRONG DEMAND GROWTH



HAS OPEC+ REACHED ITS TARGET?

OECD stockpile vs 5-year averages



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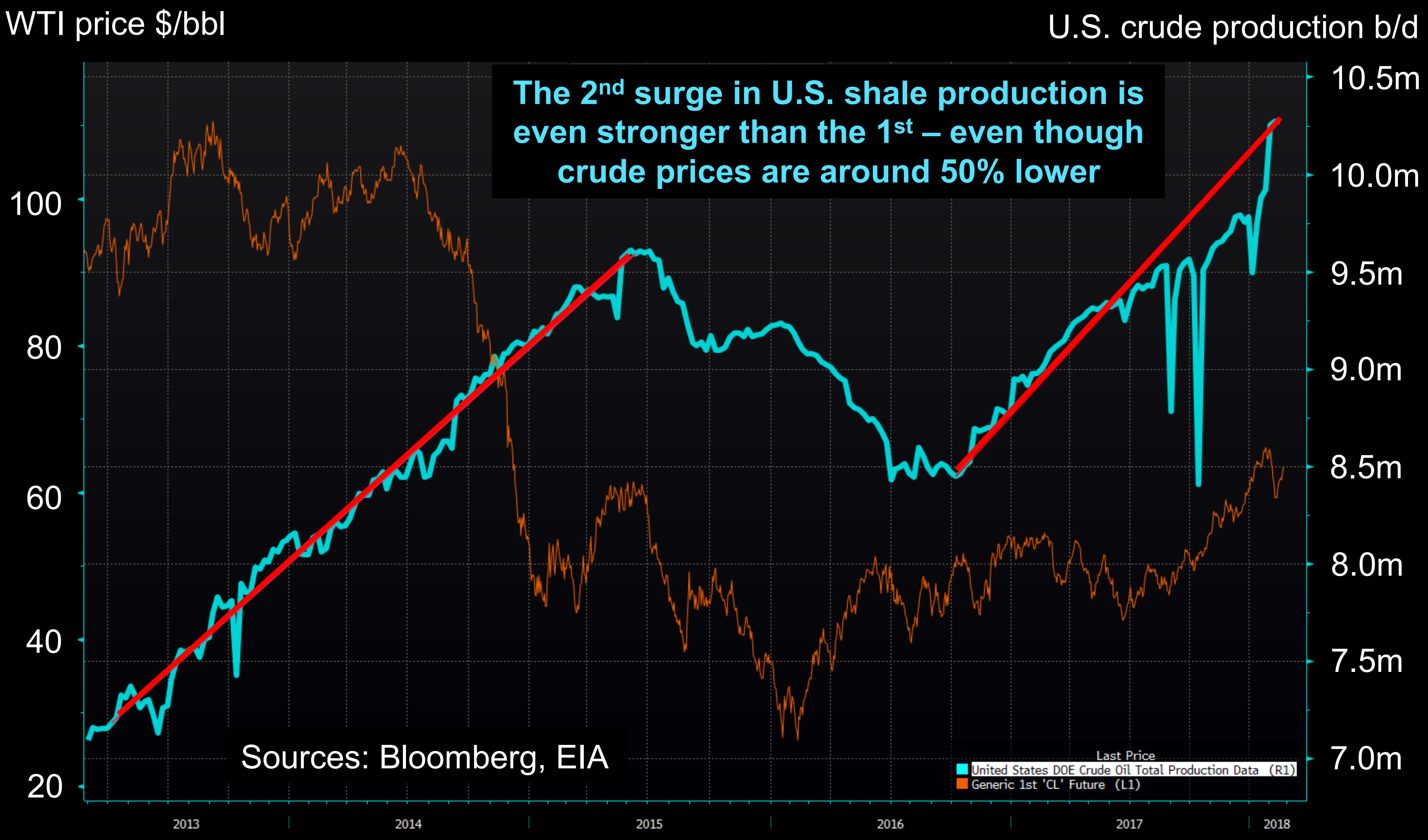
THE BRONCO OPEC JUST CAN'T BUST



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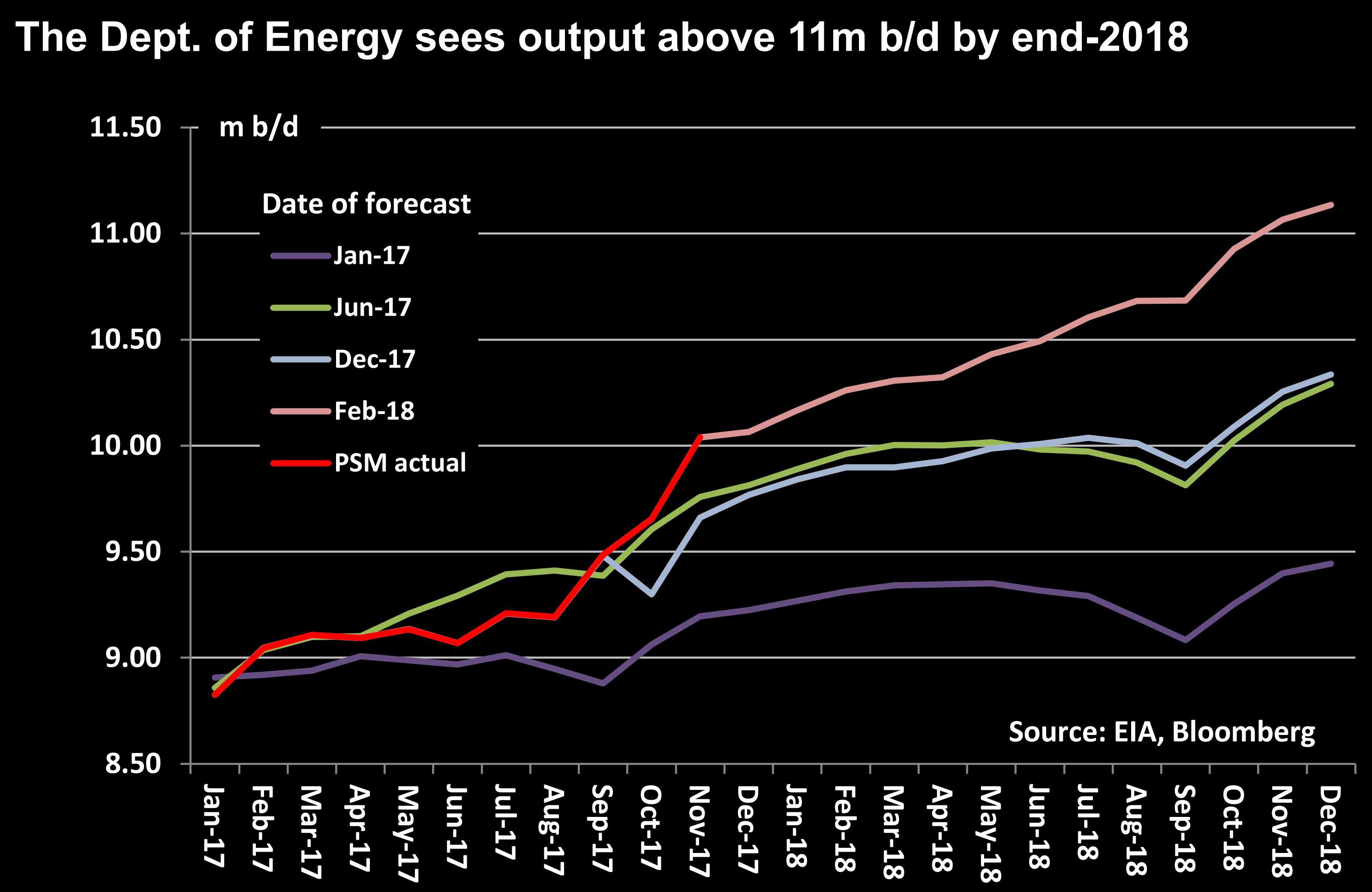
MORE TO COME



The Dept. of Energy sees output above 11m b/d by end-2018
m b/d
11.50
11.00
10.50
10.00
9.50
9.00
8.50
Date of forecast
Jan-17
Jun-17
Dec-17
Feb-18
PSM actual
Source: EIA, Bloomberg
Jan-17
Feb-17
Mar-17
Apr-17
May-17
Jun-17
Jul-17
Aug-17
Sep-17
Oct-17
Nov-17
Dec-17
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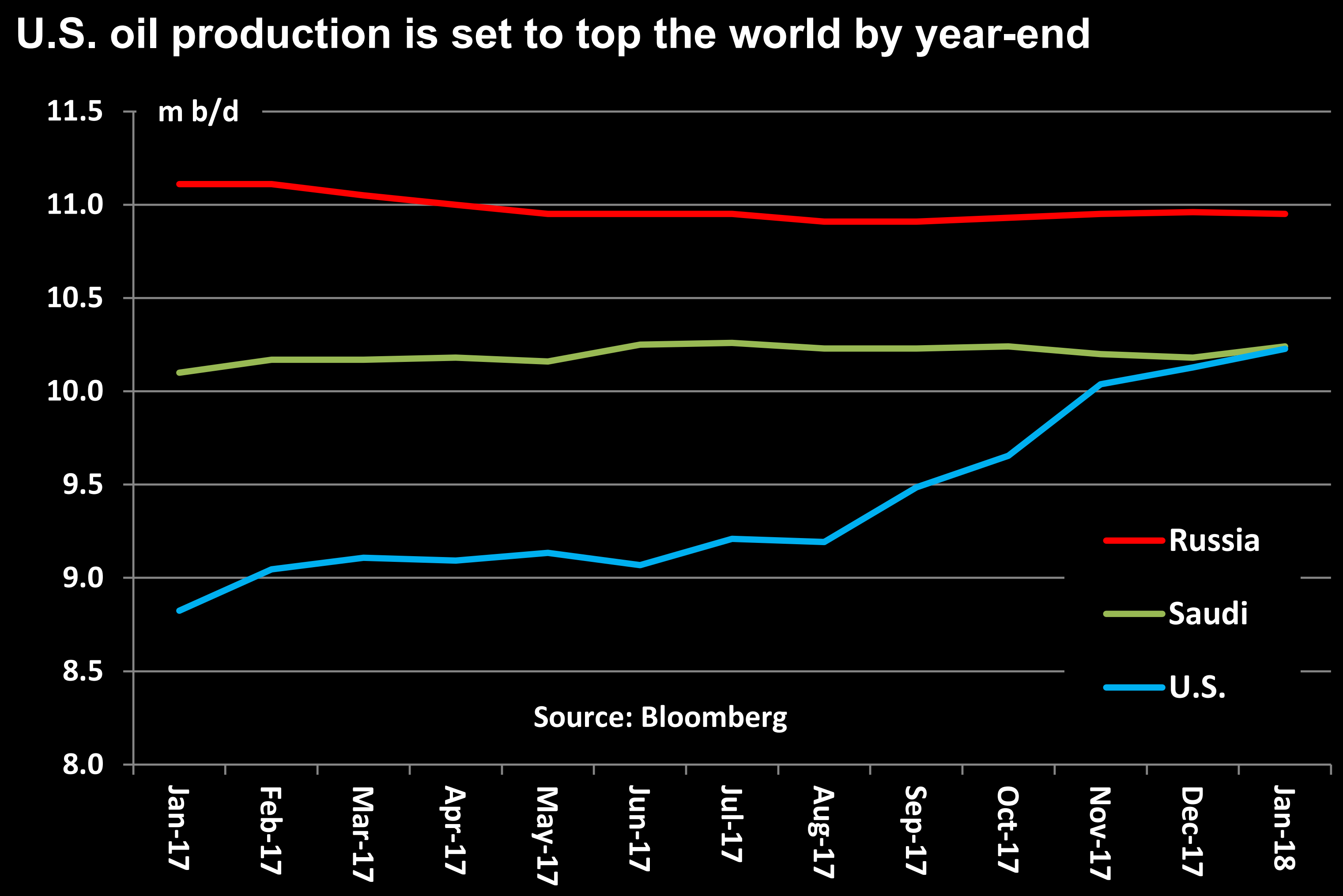
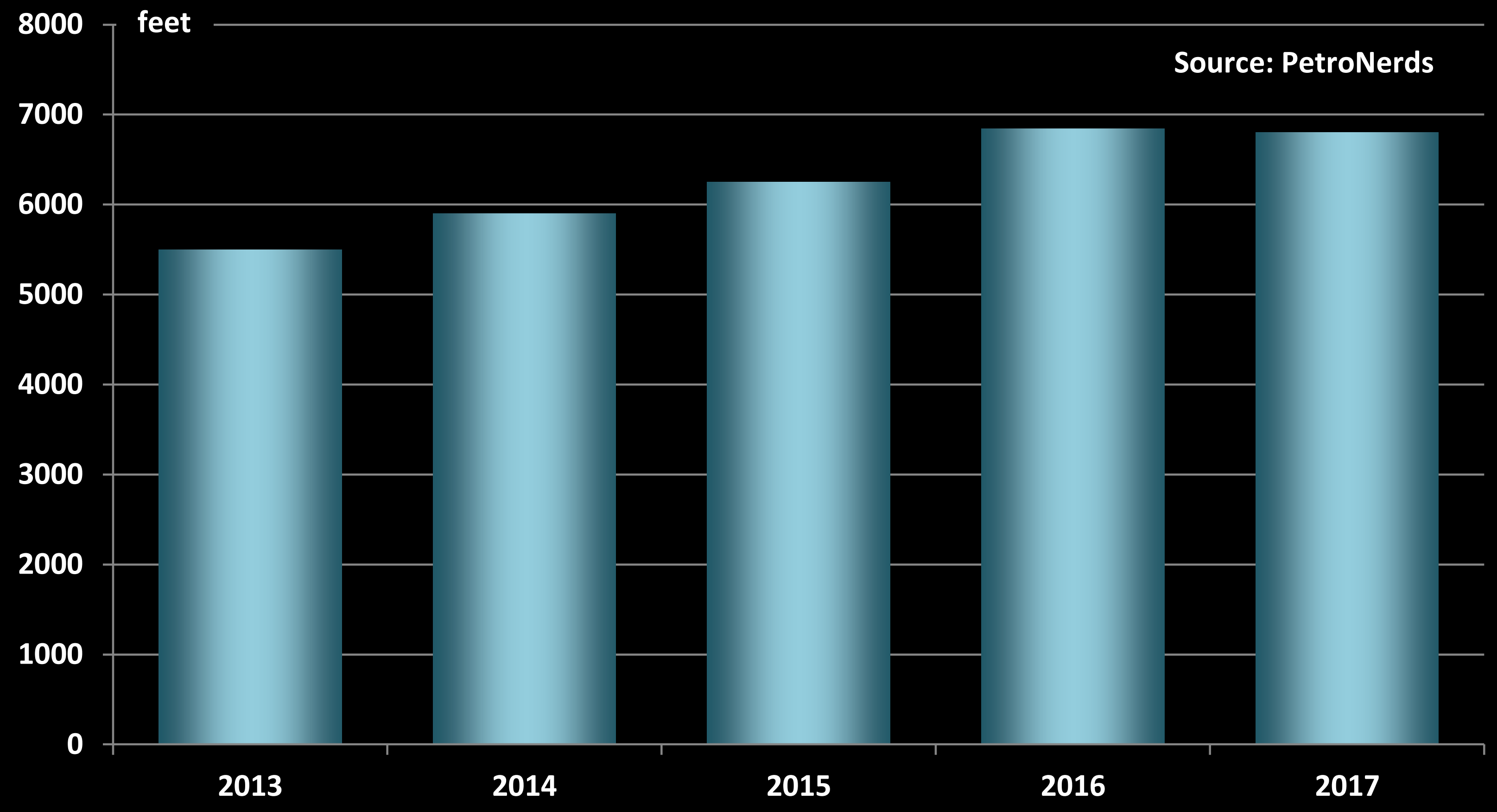
Dec-18

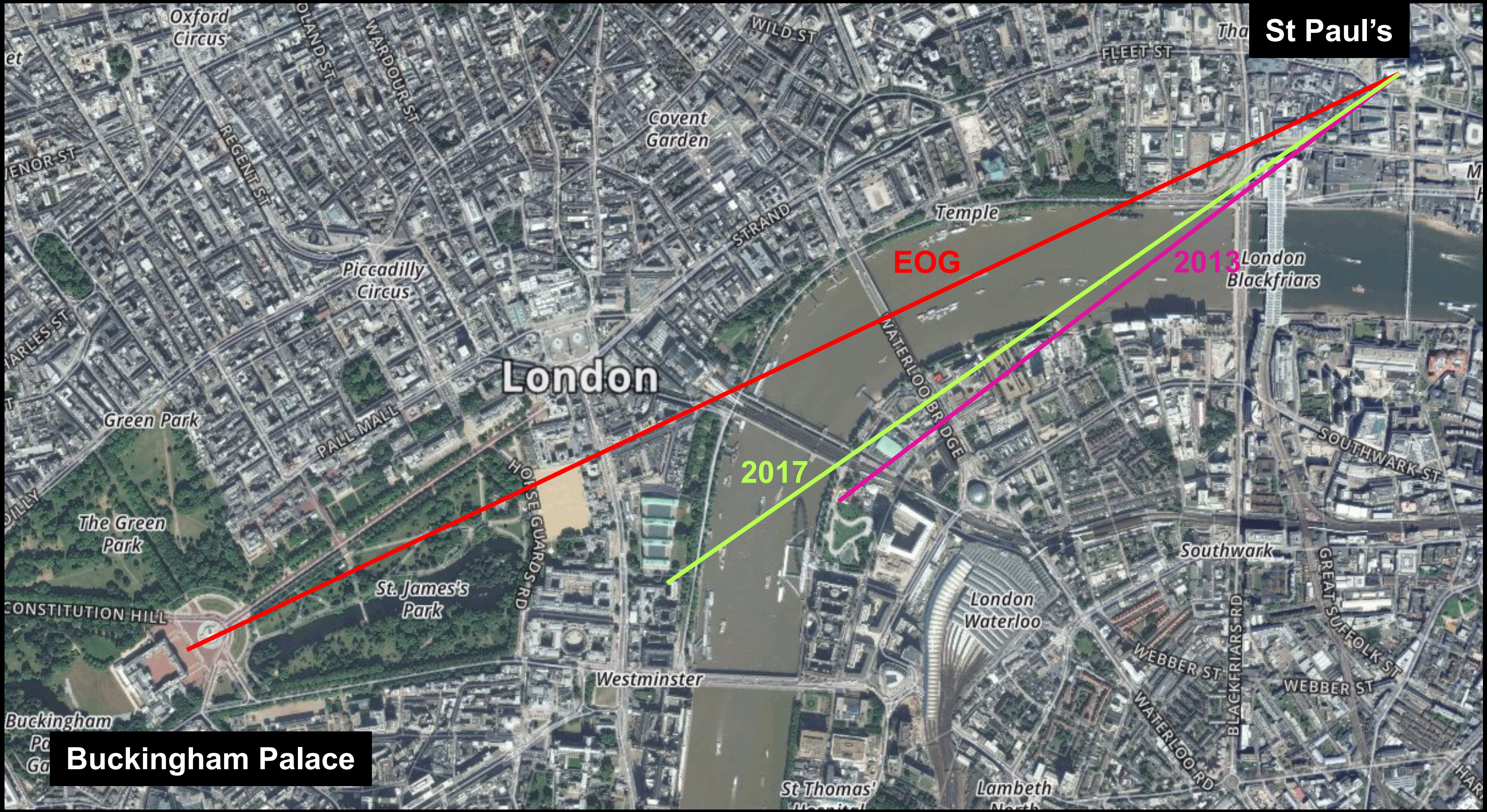
HEADING FOR THE TOP



SHALE 2.0 VS SHALE 1.0 – LONGER WELLS



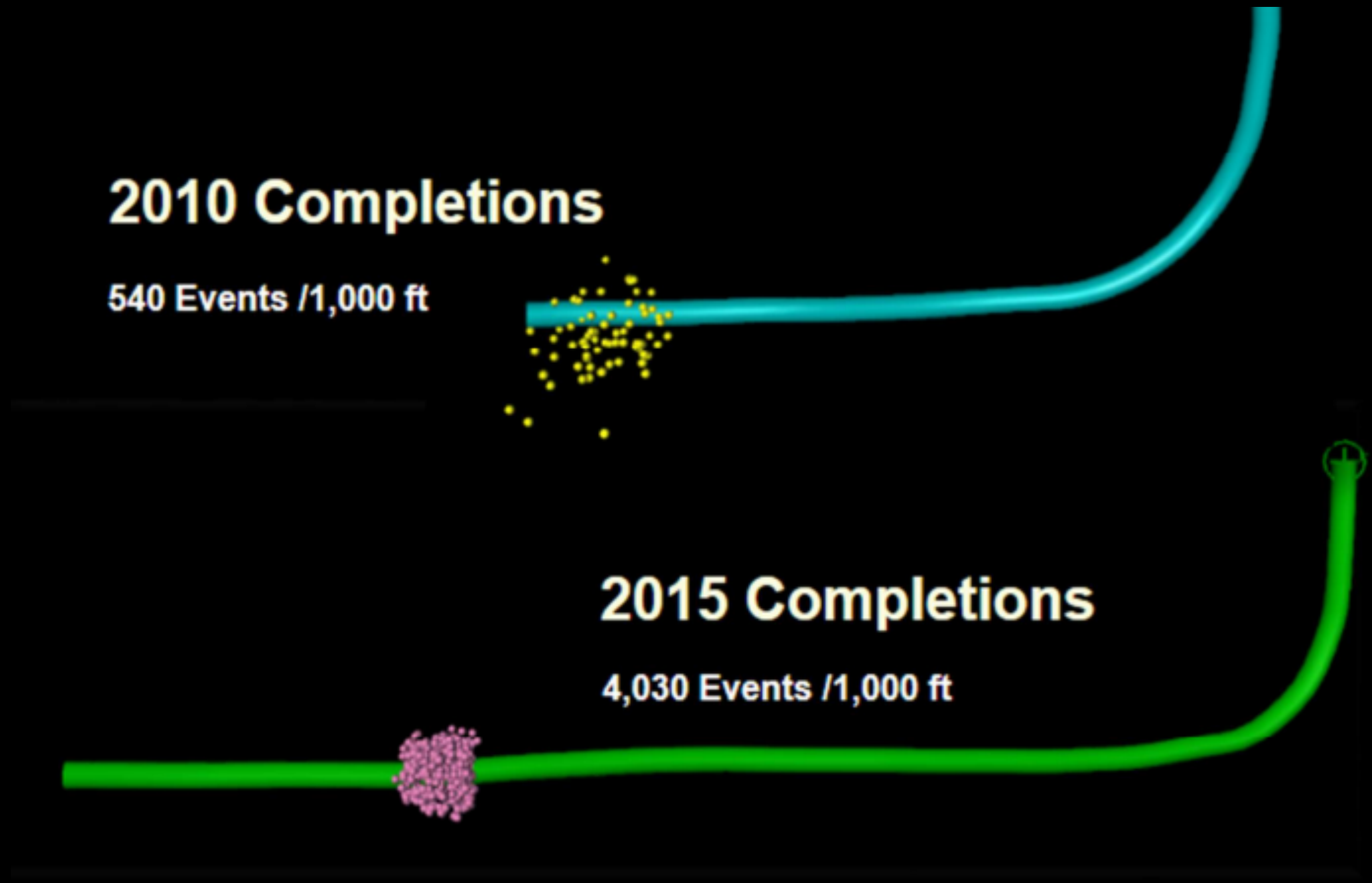
SHALE 2.0 VS SHALE 1.0 – LONGER WELLS



Sources: PetroNerds, EOG Resources

SHALE 2.0 VS SHALE 1.0 – TIGHTER FRACTURES

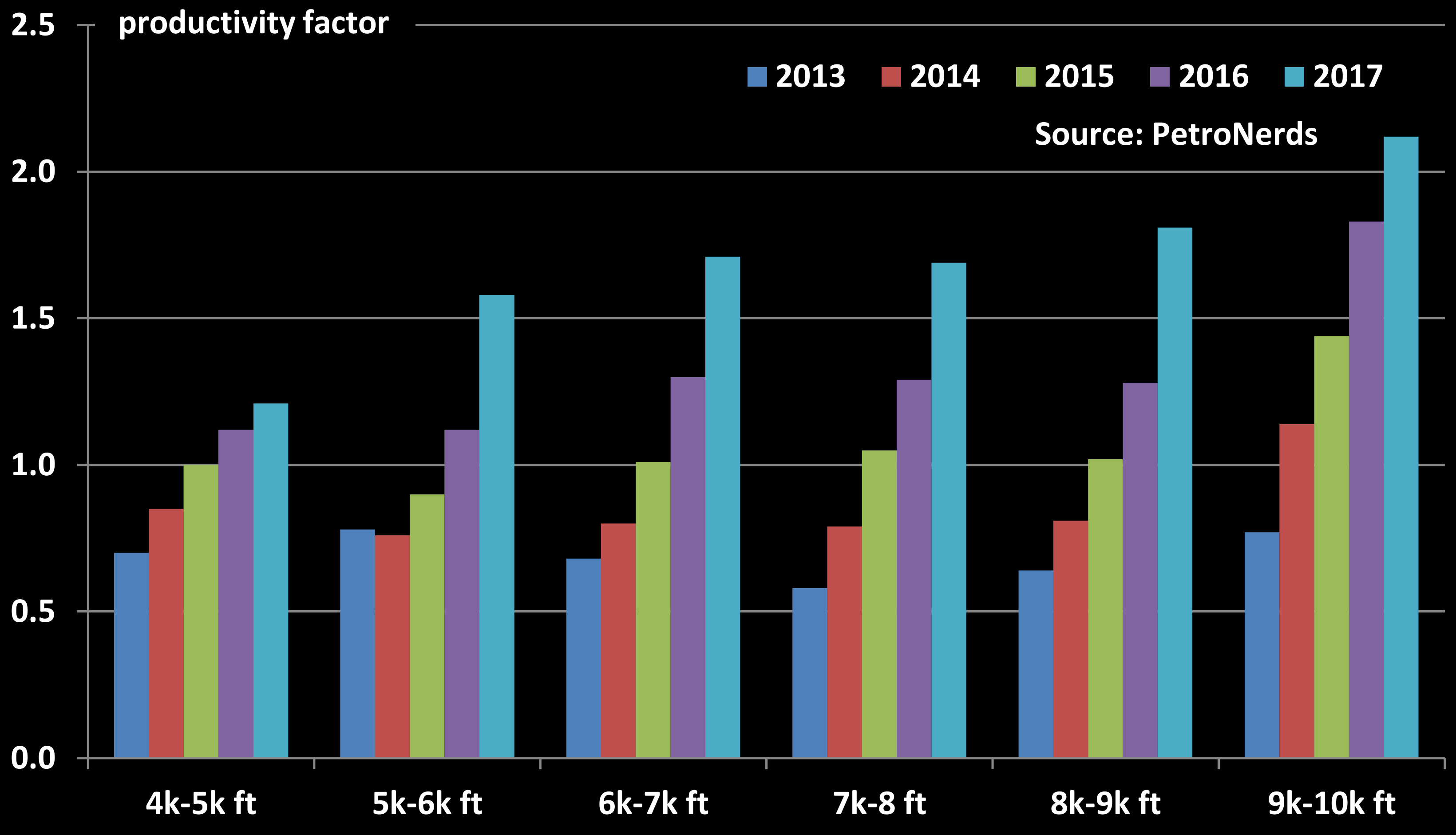
Denser fracture pattern closer to the wellbore



Source: EOG Resources 3Q17 investor presentation

SHALE 2.0 VS SHALE 1.0 – HIGHER PRODUCTIVITY

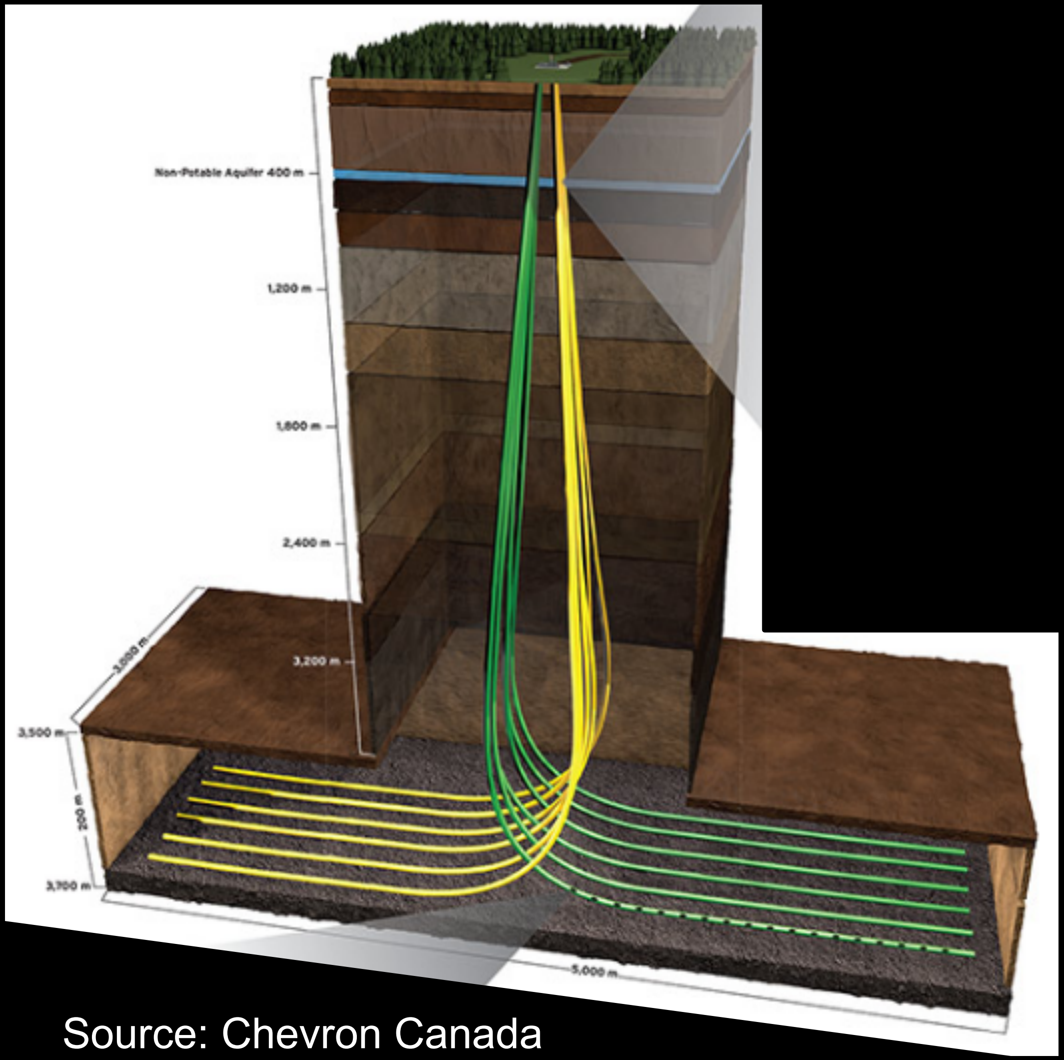
Permian Basin well productivity



SHALE 2.0 VS SHALE 1.0 – MULTI-WELL PADS

Drilling multiple wells from a single pad reduces environmental footprint and cuts time and cost.

Wells can be spaced both vertically and horizontally to access the full volume of the source rock.



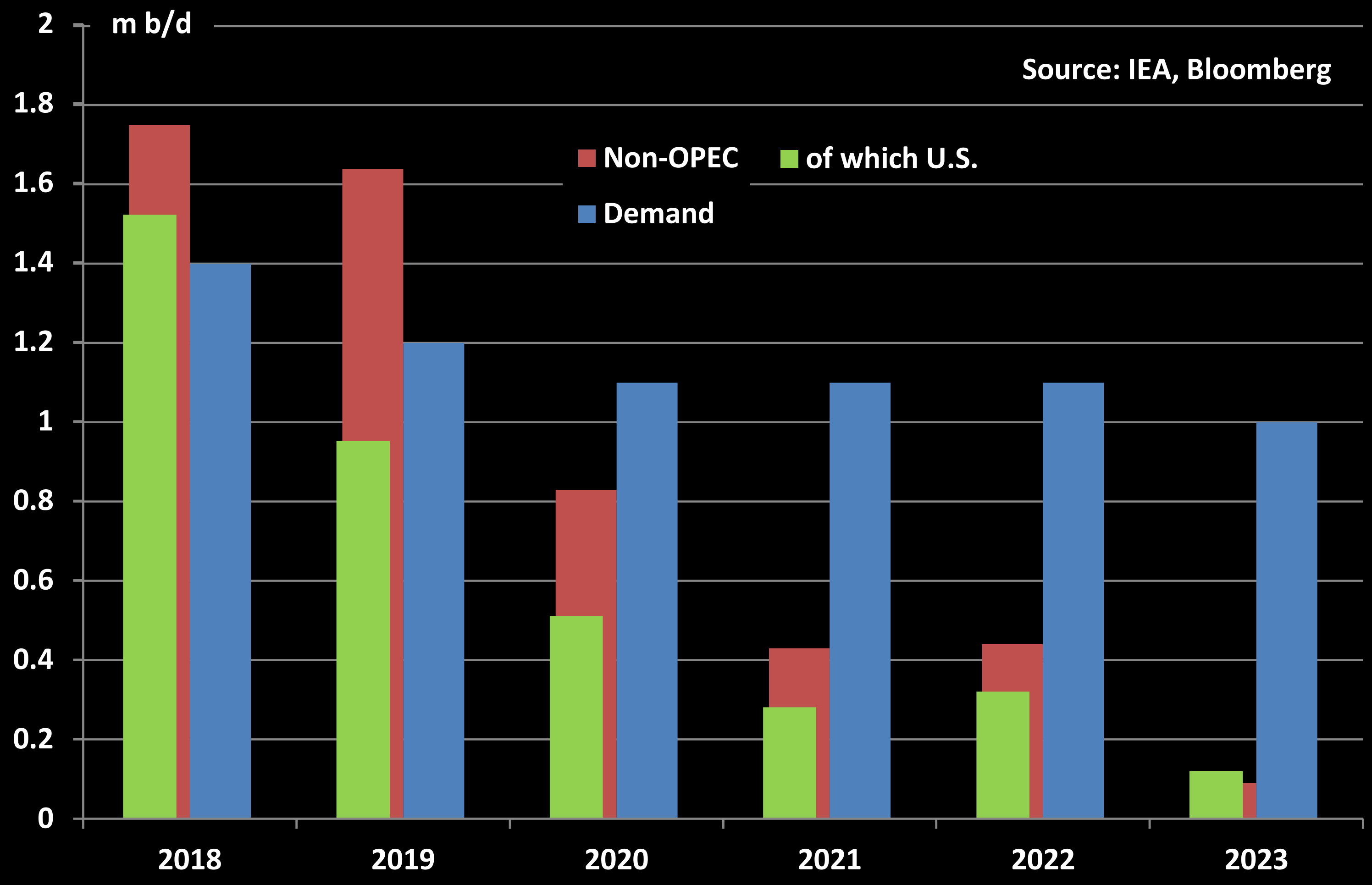
Source: Chevron Canada

SHALE 2.0 VS SHALE 1.0 – WHAT DOES IT MEAN?

- Shale 2.0 is a more complex proposition than Shale 1.0
- Wells are longer, more productive and more expensive
- Bigger companies are moving into the shale sector, including the majors
- This means longer lead times, bigger and more complex drilling campaigns
- Production will be slower to respond to price changes, but once they begin, the changes will be bigger and last longer
- Bad news for OPEC+

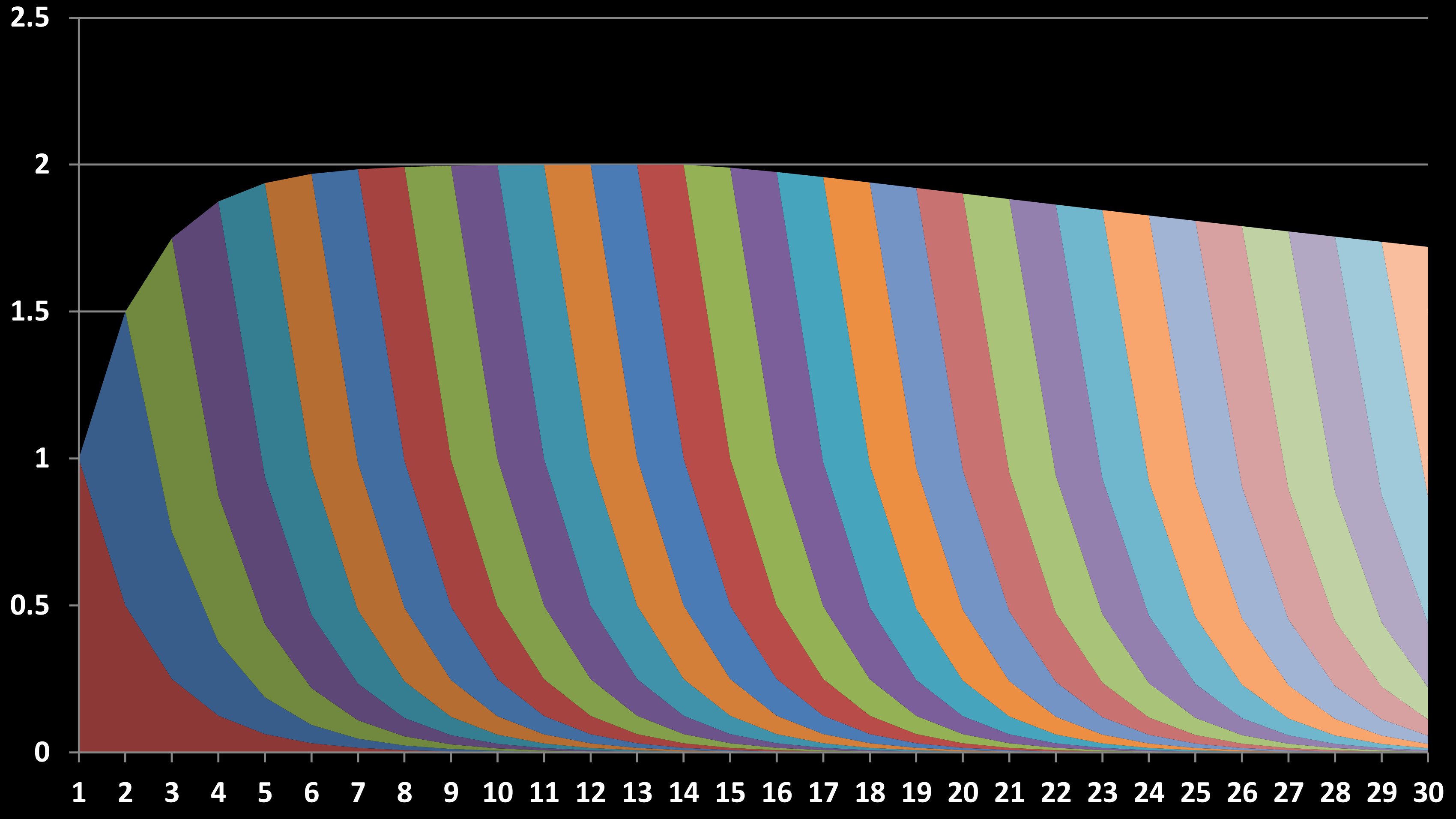
NO ROOM FOR MORE OPEC OIL IN THE SHORT TERM

Year-on-year change in demand and non-OPEC supply

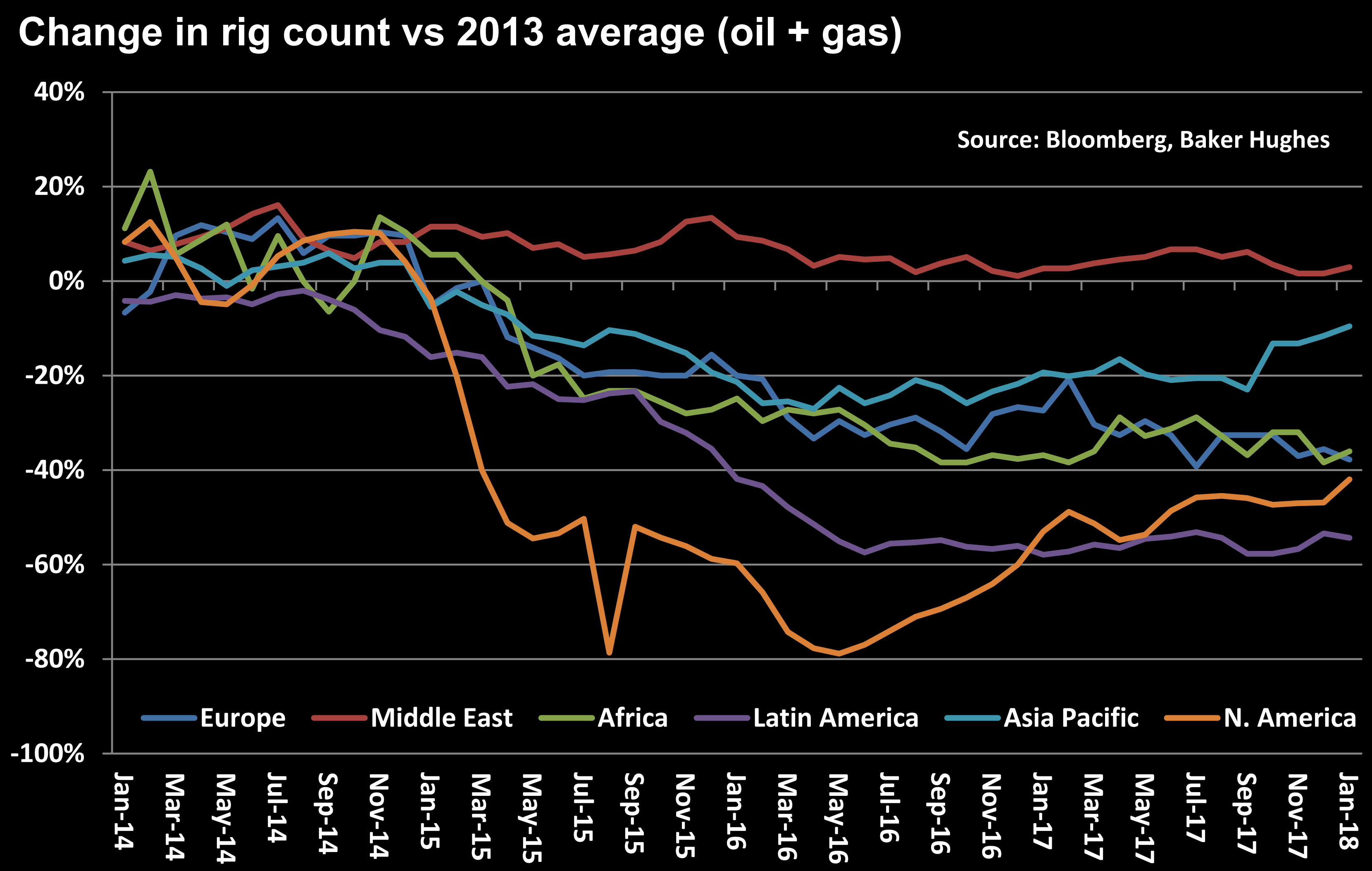


THE RED QUEEN PROBLEM – RUNNING FASTER TO STAND STILL

Shale supply can't grow forever



OPEC+ VS SHALE 2.0 – WHERE NOW?



OPEC+ VS SHALE 2.0 – WHERE NOW?

IEA "Oil 2018" – outlook to 2023

- The recovery from the historic drop-off in investments by 25% in both 2015 and 2016 has barely started.
- Upstream investment is overwhelmingly focused on U.S. light tight oil and may be inadequate to avoid a significant squeezing of the global spare capacity cushion by 2023.
- U.S. export capacity could approach 5m b/d by 2023 and the U.S. will be ideally placed to meet the need, post-2020, for more low-sulphur crude, with a low yield of fuel oil.
- Through 2020, record supply from non-OPEC countries more than covers expected demand growth.
- But by 2023, if investments remain insufficient, the effective global spare capacity cushion falls to only 2.2% of demand, the lowest since 2007.