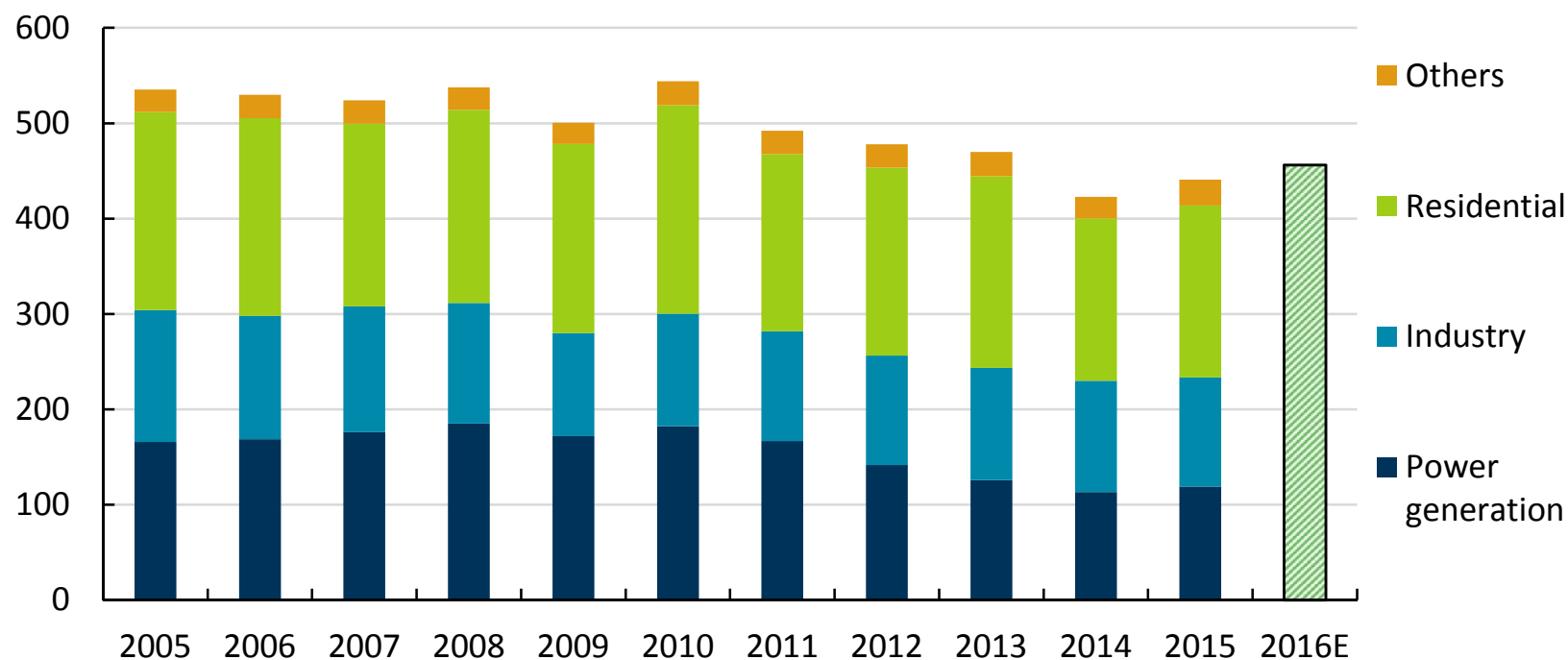


EU Energy Independence, Security of Supply and Diversification of sources

Peter Fraser

EU gas demand is off its lows...

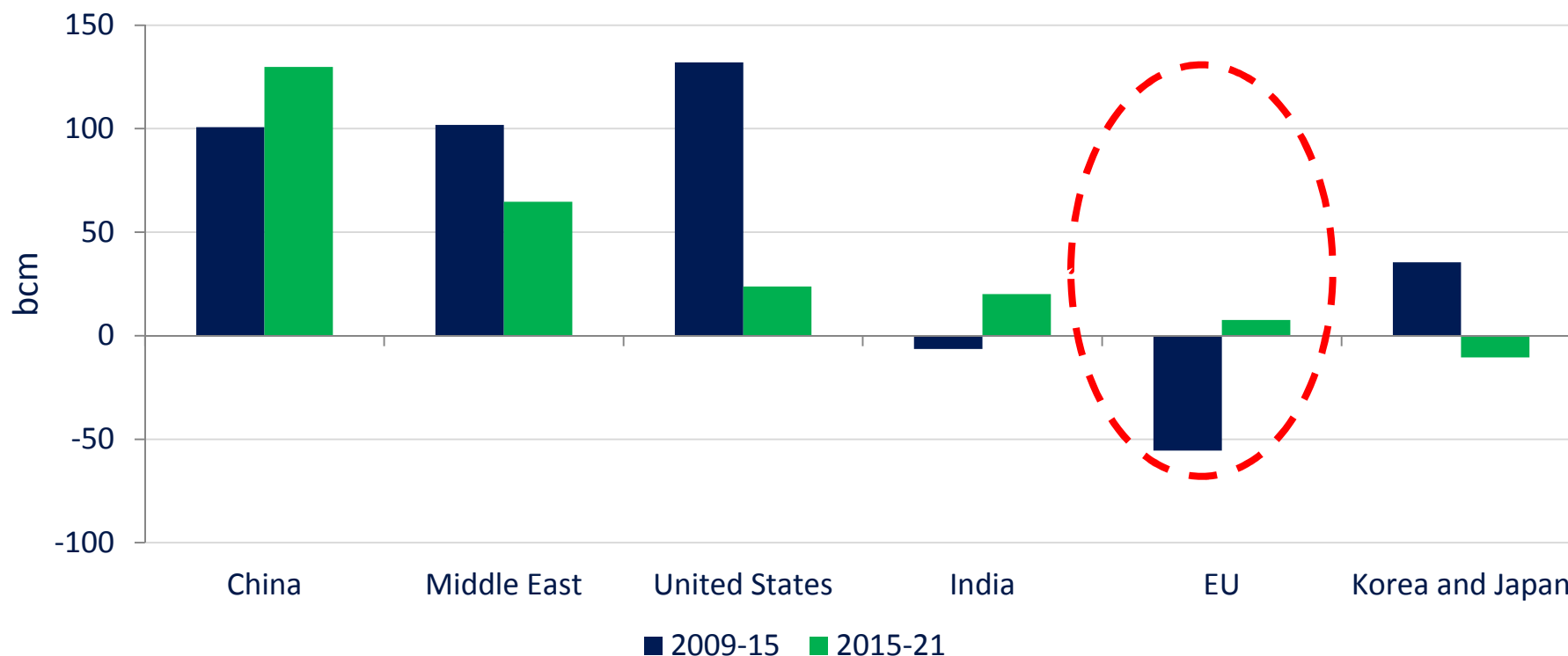
EU-28 gas demand, bcm



Following four-straight years of declines, European gas demand has stabilised in 2015-16 helped by lower gas prices.

...But only a modest recovery is expected

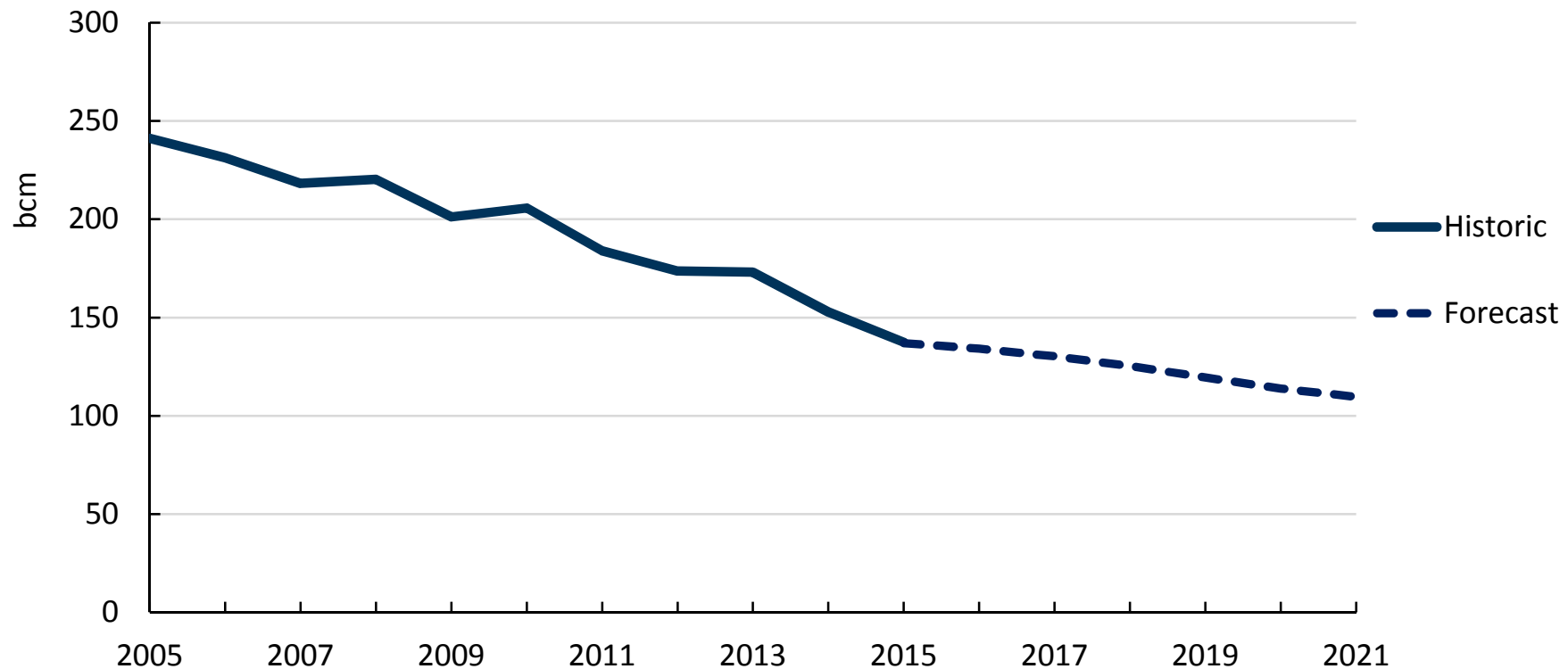
Change in natural gas demand by region (bcm)



EU gas demand gradually recovers on coal & nuclear power plant retirements but remain 13% below the 2007 level by 2021.

Domestic production is declining

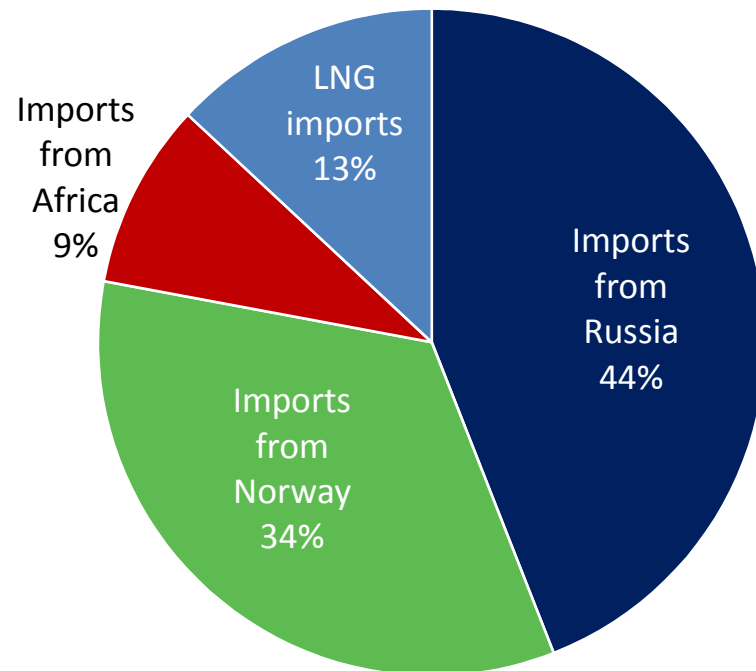
EU28 Indigenous production



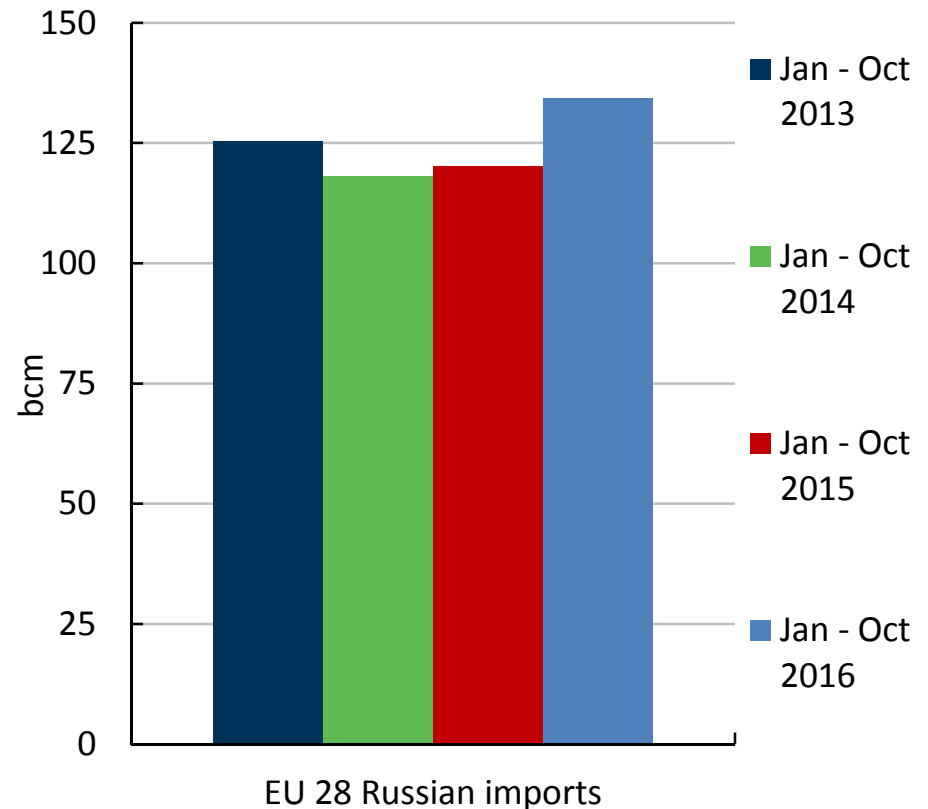
Europe gas production has fallen by 41% over the past 10 years. The drop is expected to continue, amid low investments and caps on Dutch production

Russian gas imports are near an all time high

EU 28 gas imports in 2015

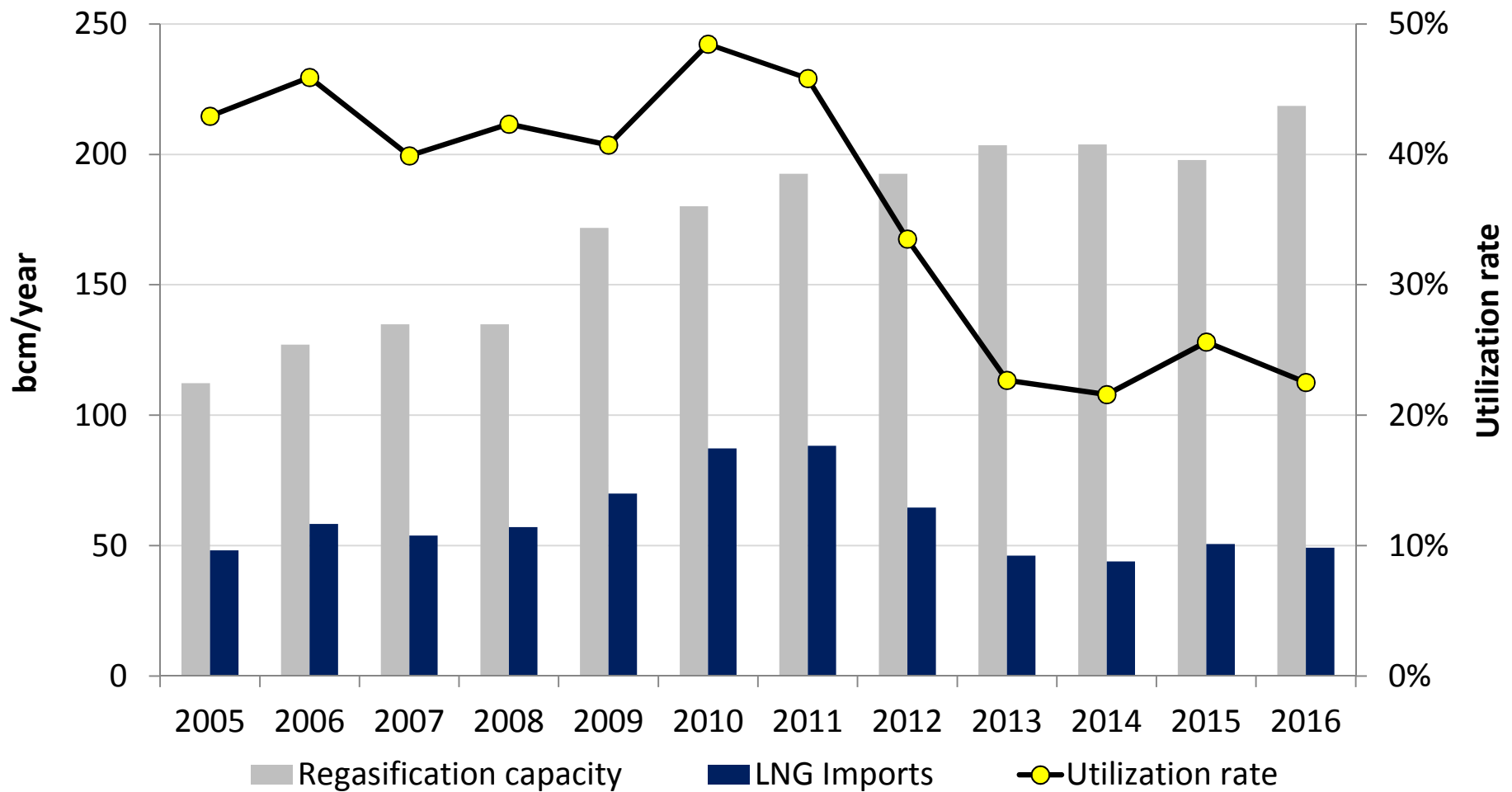


EU 28 Russian imports



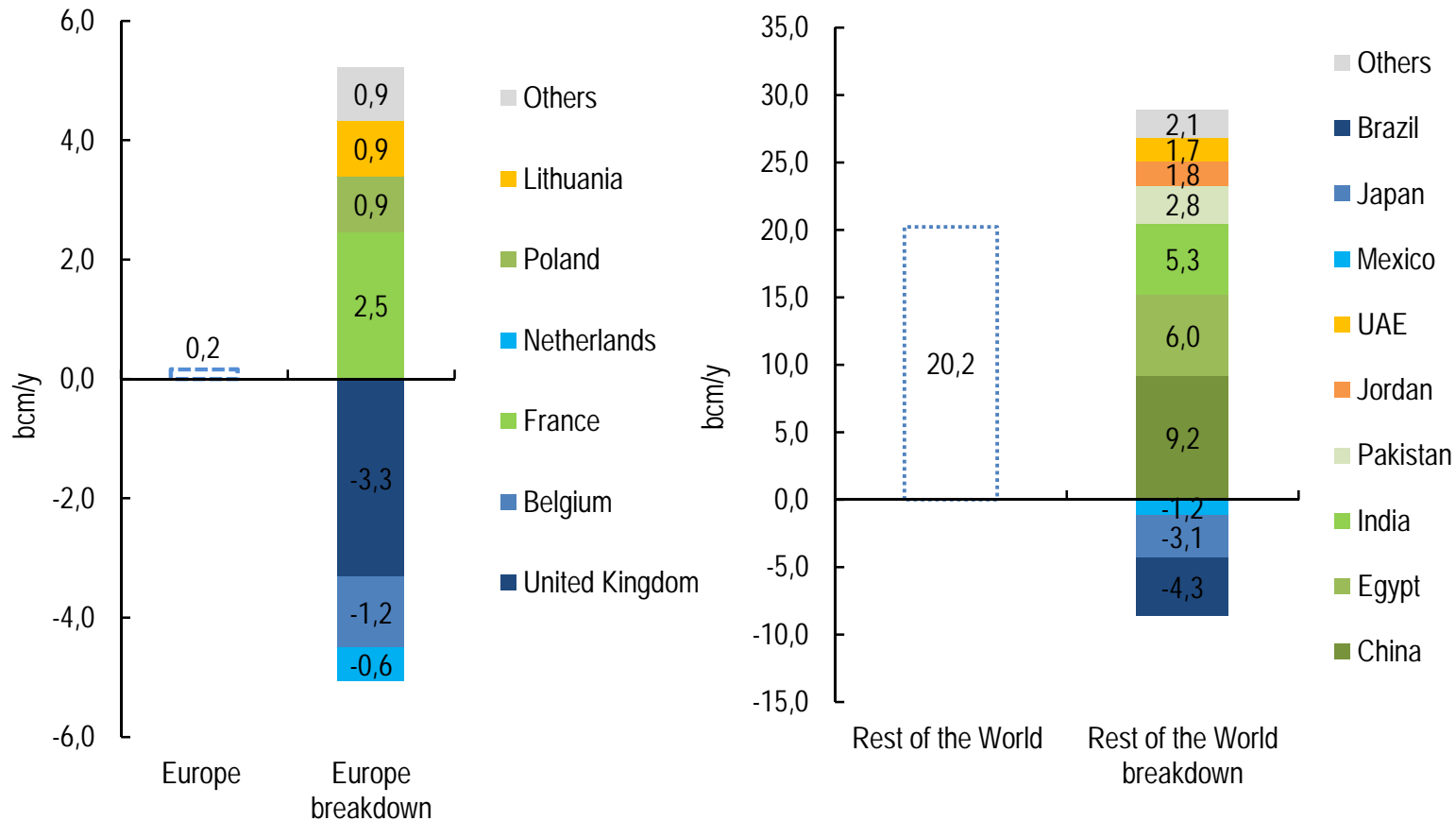
....And Europe has ample spare regasification capacity

LNG regasification capacity, imports and utilization rate in OECD Europe



....And LNG is heading somewhere else

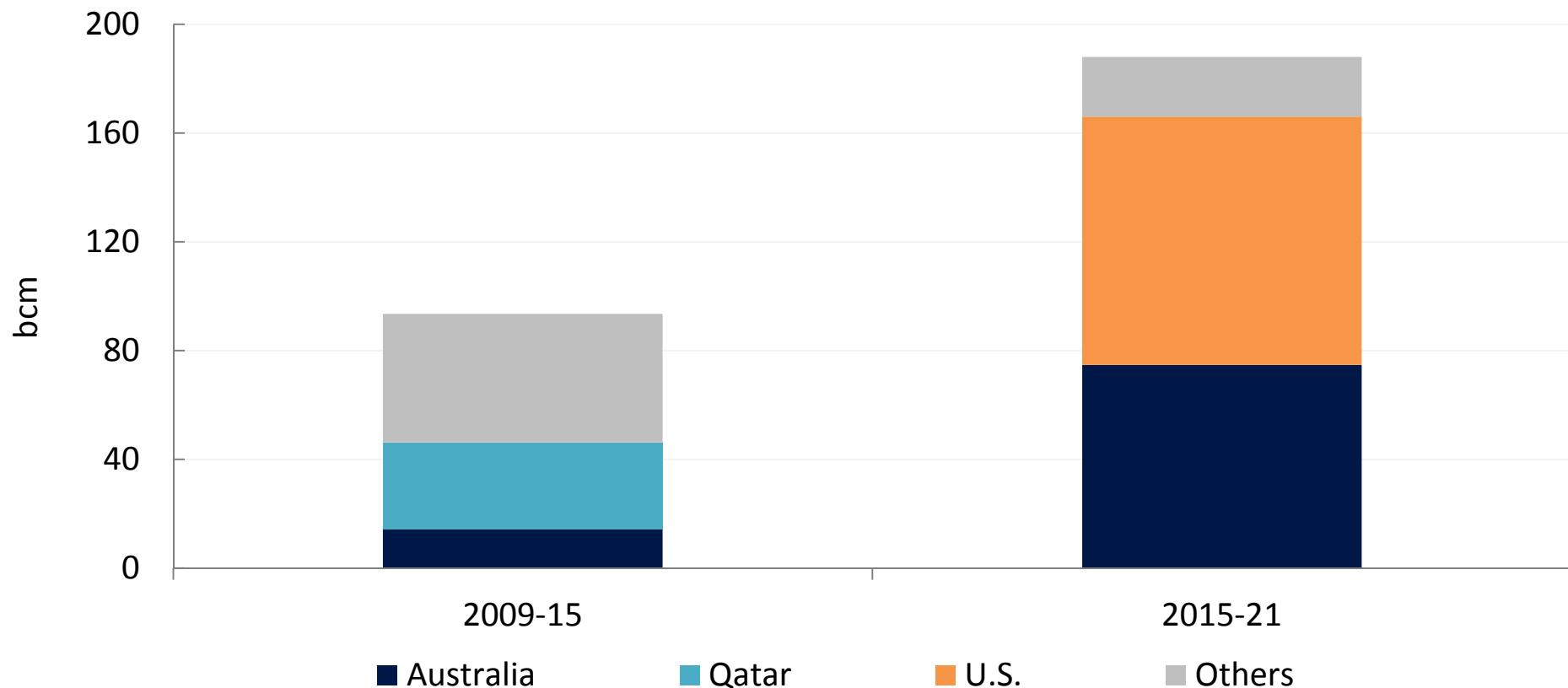
Change in global LNG trade 2016 vs. 2015



China + India account for half of the incremental LNG trade while the remaining half comes from MENA countries + Pakistan

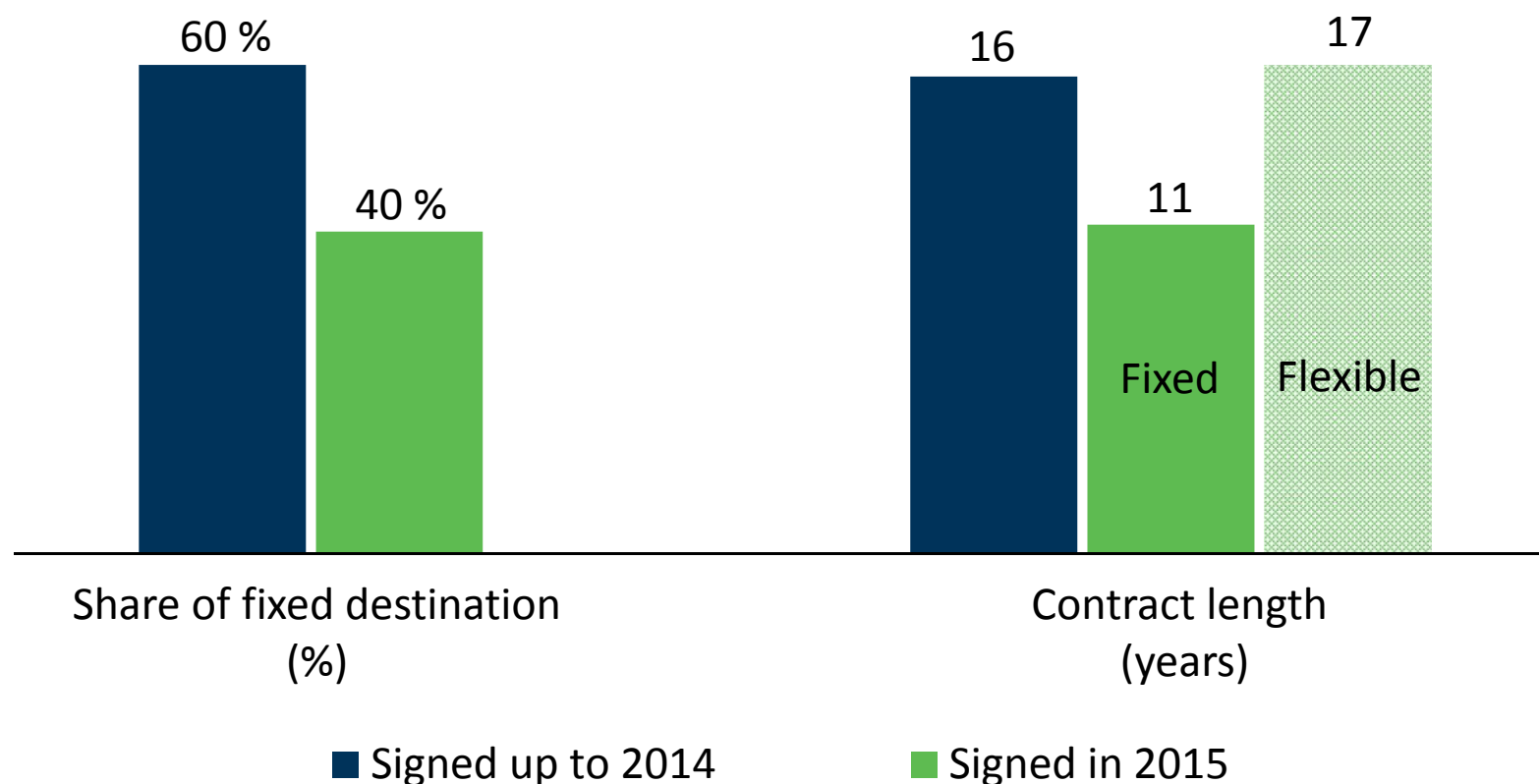
A large wave of new LNG export capacity is coming on line....

Liquefaction capacity additions



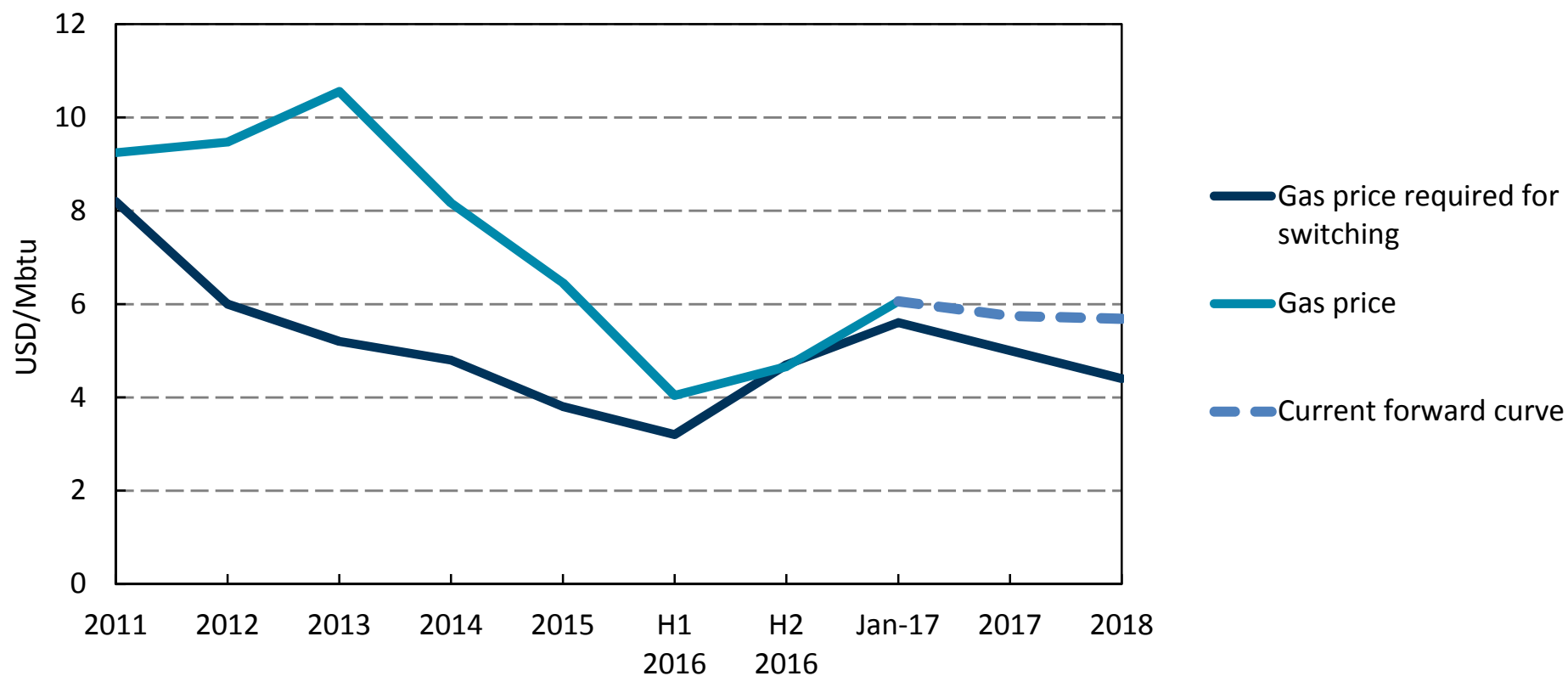
LNG capacity additions will be led by the US & Australia over the next five years; projects in Canada & East Africa could also move ahead if demand & prices recover

LNG contractual structures are not always fully flexible – although are becoming less rigid



Contracts with flexible destinations & shorter terms are becoming more common; buyers will accept longer contracts in exchange for increased destination flexibility

And changing incentives for coal to gas switching

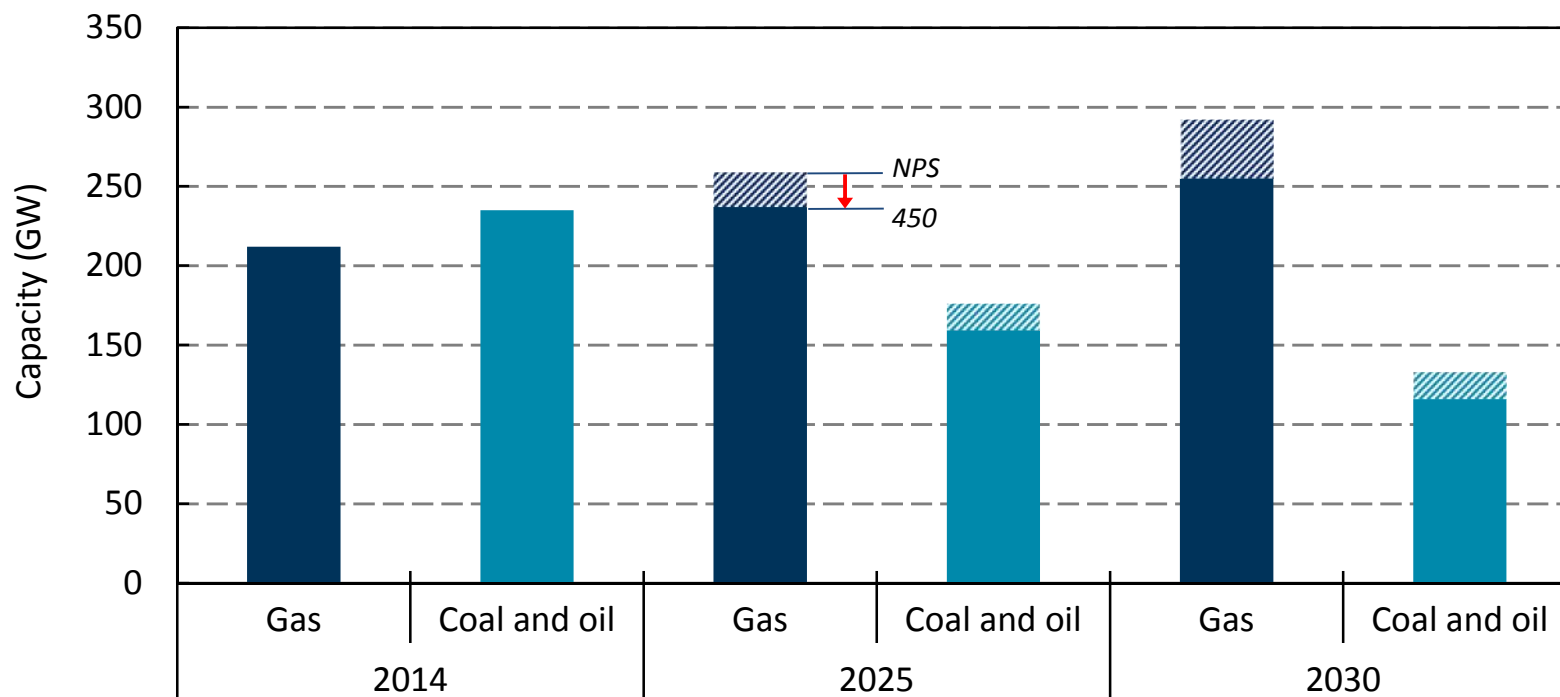


40% coal plant efficiency, 55% gas plant efficiency, forward curves of mid January

Power sector could be a source of gas demand growth, but not at expected coal or carbon prices.

On the other hand, Europe's gas demand response possibilities will change over time

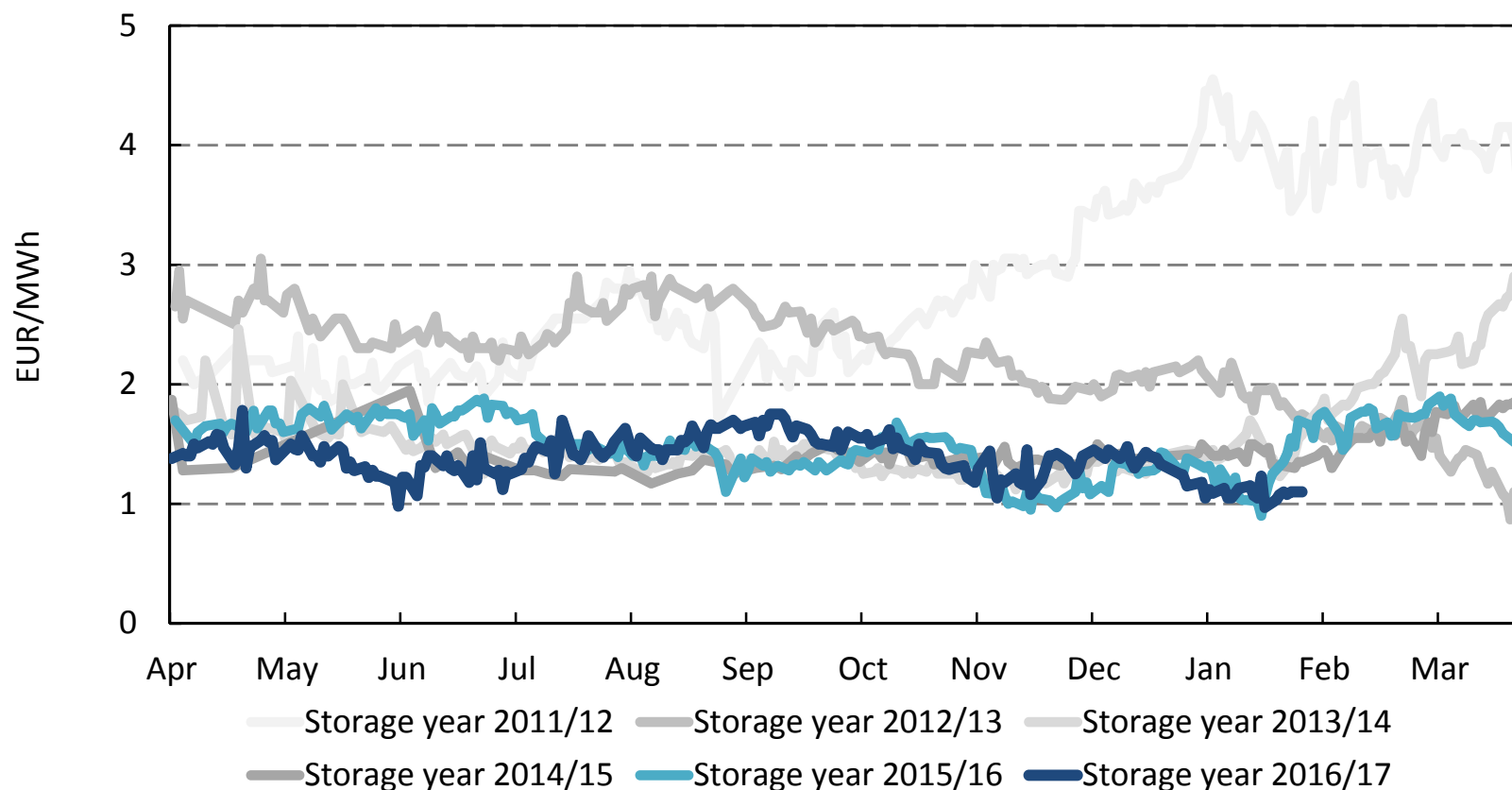
EU power generation capacity



On the other side of the spectrum: switching away from gas to coal in Europe has proven a useful market response mechanism during the Fukushima crisis, future coal capacity retirements however will limit this potential

But difficult economic environment for European storage operators

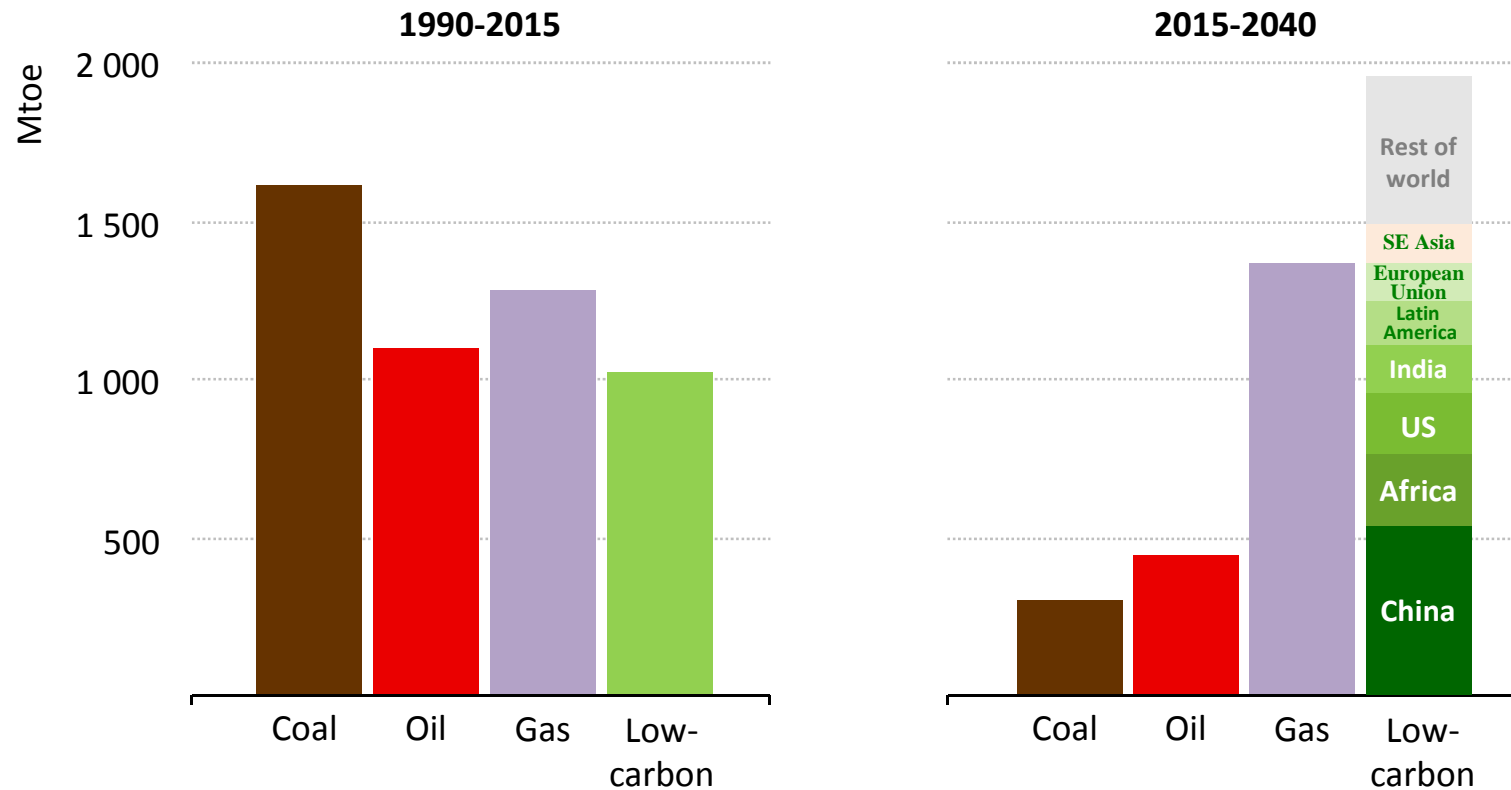
TTF summer-winter spreads



the market may face further storage decommissioning in the next years

A new fuel in “pole” position

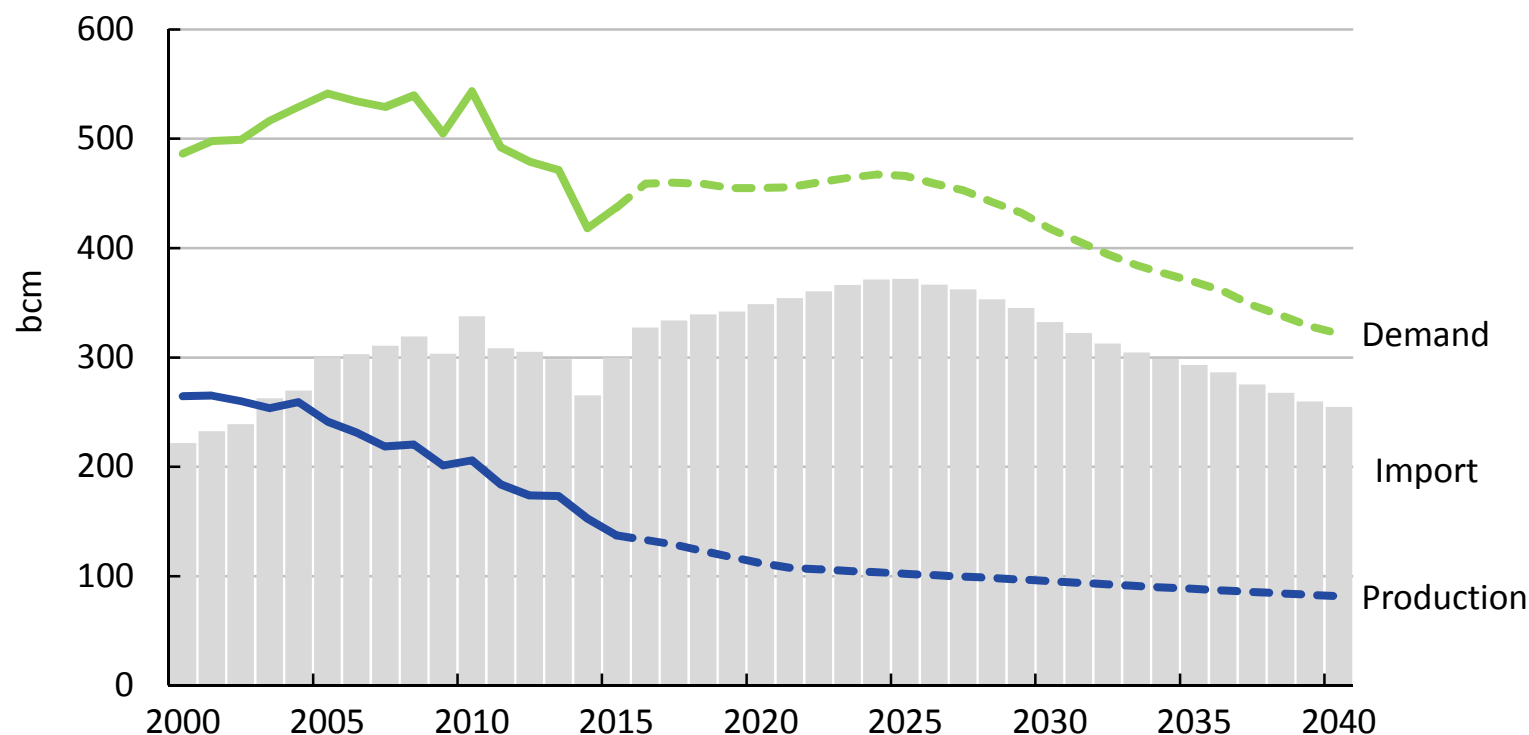
Change in global primary energy demand



Low-carbon fuels & technologies, mostly renewables, supply nearly half of the increase in energy demand to 2040

On a 450ppm path energy efficiency and renewables compensate upstream decline

EU gas balance in the 450 Scenario



In a 450 Scenario, all sectors except gas for transport are in retreat by the mid-2020s: import dependence remains high but volumes fall back below 300 bcm