

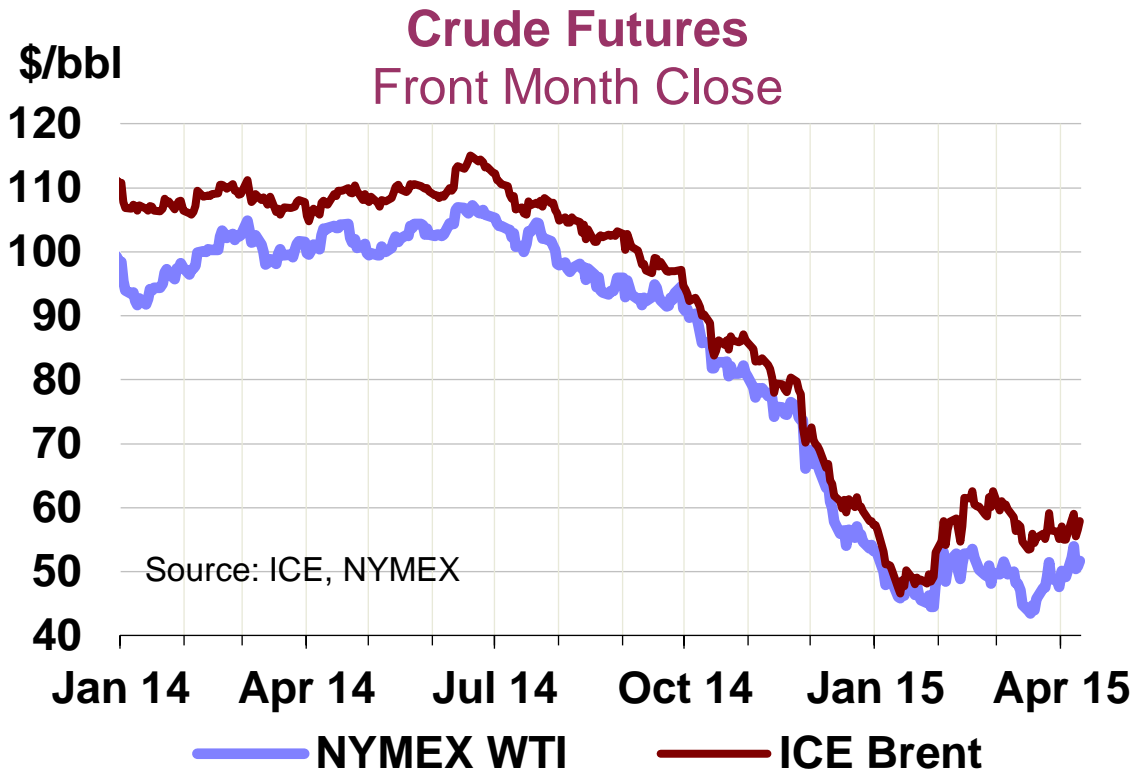


***Energy Markets Outlook
Tokyo, April 2015***

***Keisuke SADAMORI
Director of Energy Markets and Security
IEA***

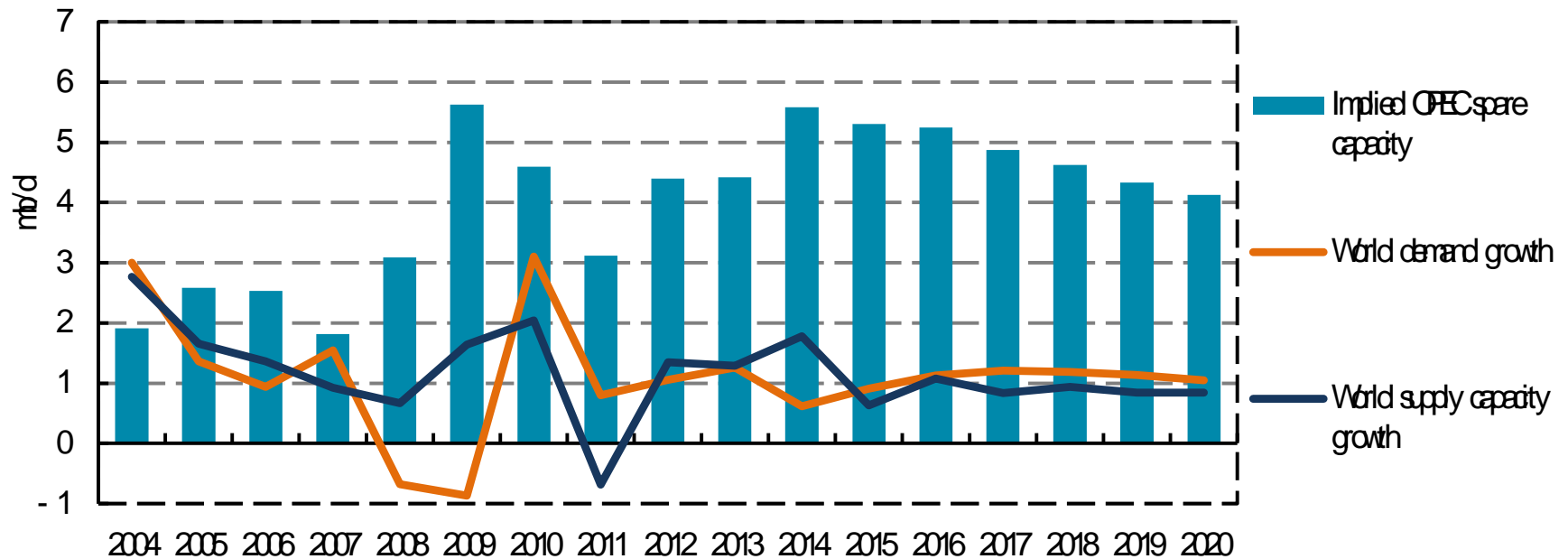


Oil prices ease in March, but recover in early April



- Higher Middle East exports pressure, Yemen tension supports

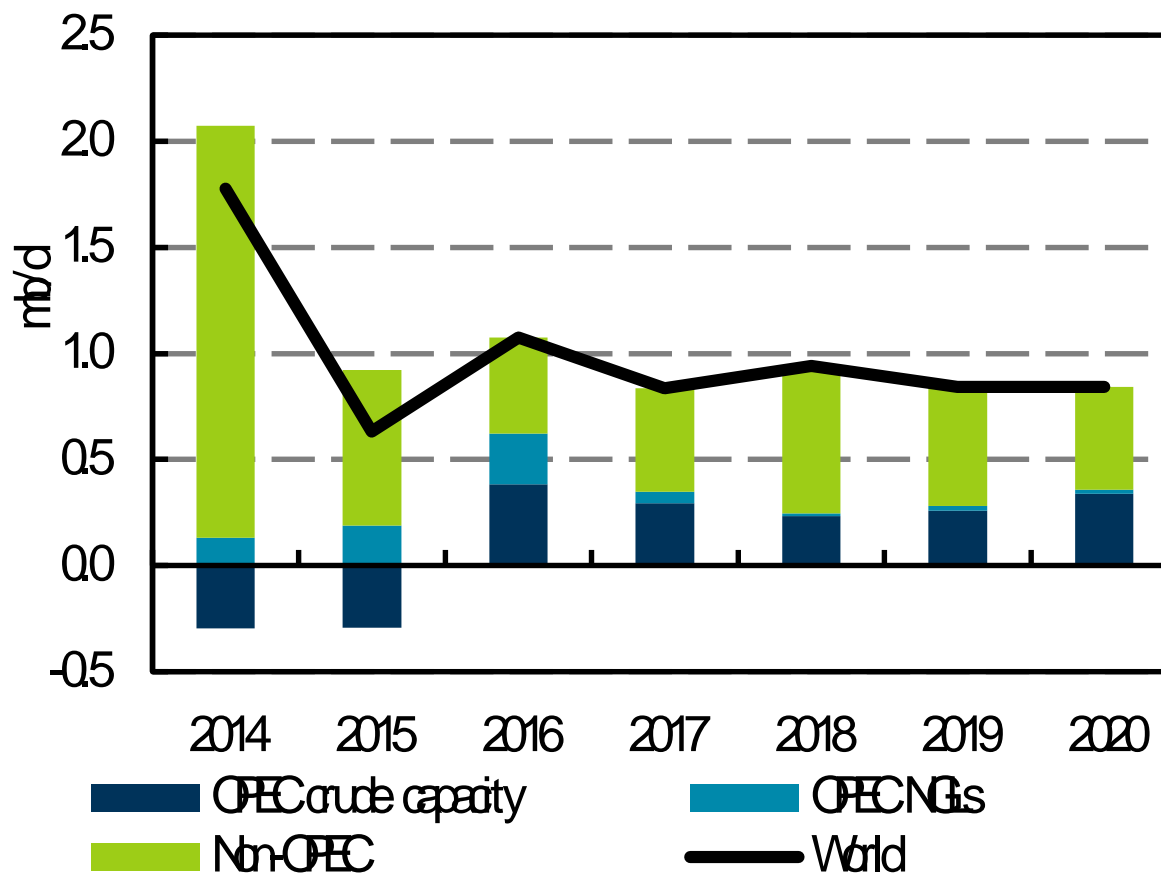
Business as unusual...



- Supply has become more price-elastic
- Demand less so

Oil price drop slows supply growth

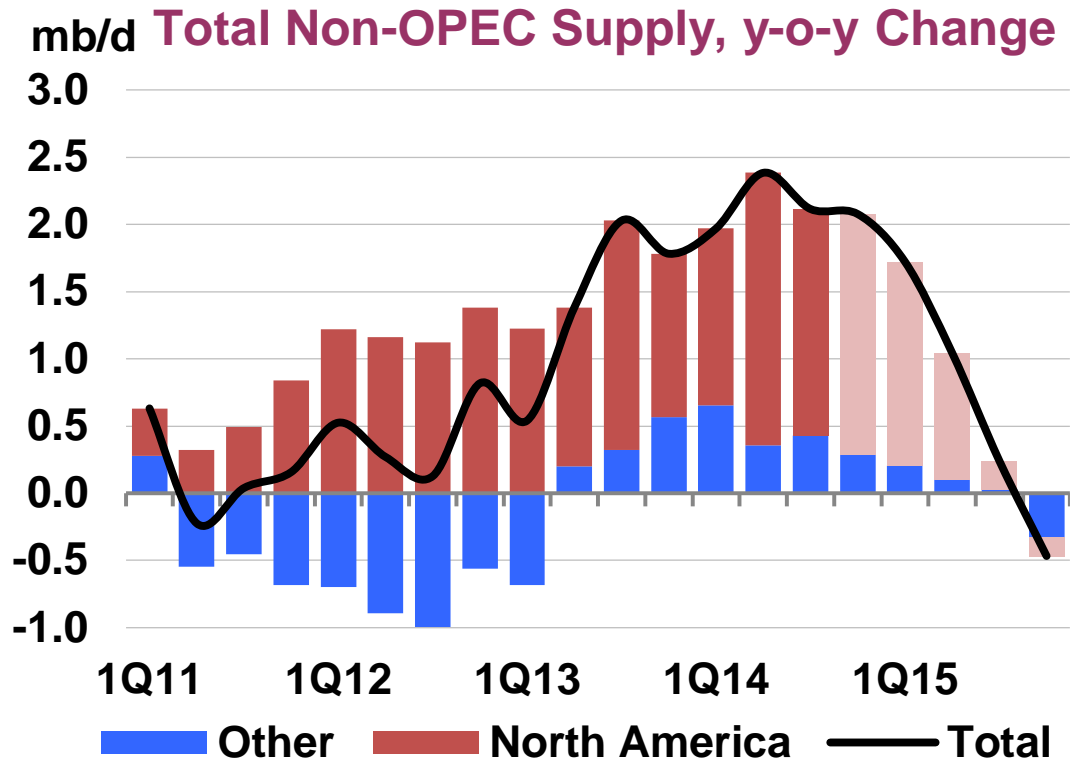
Medium-Term
Market Report
2015



- Global capacity growth slows to annual 860 kb/d through 2020 from 1.8 mb/d in 2014



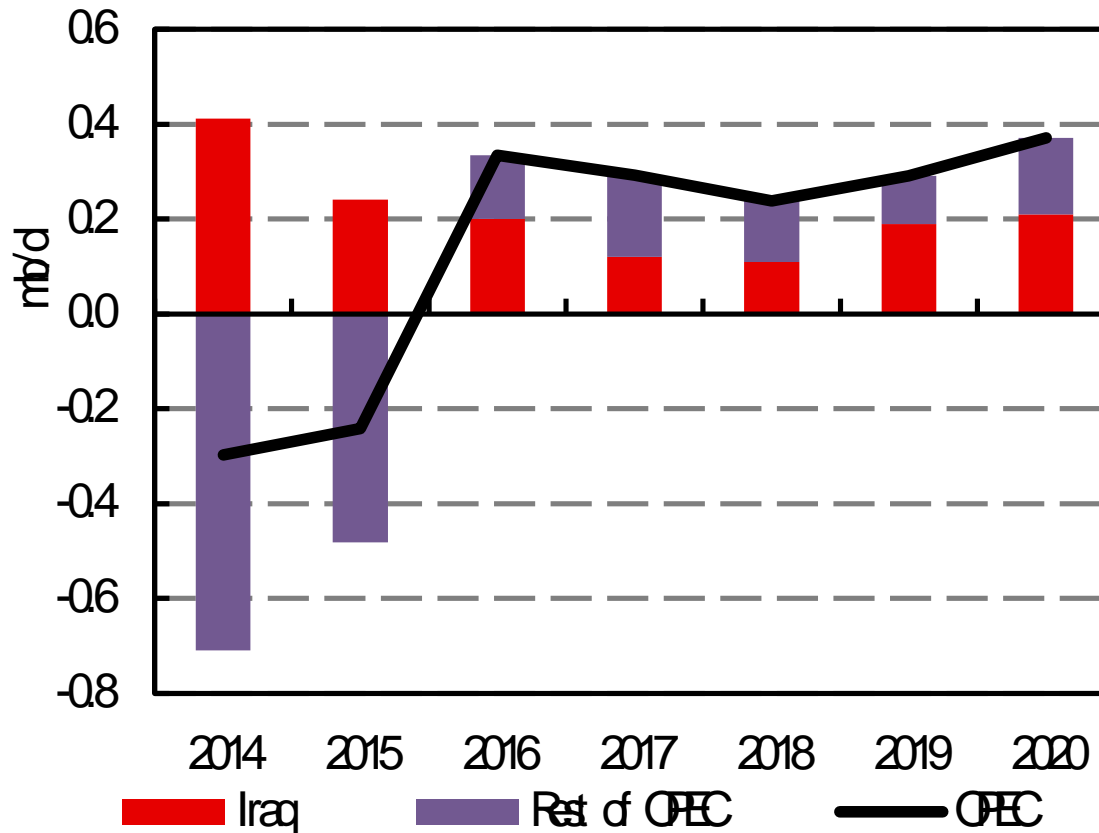
March non-OPEC supply rose on increased North America output, but growth is slowing



- **Non-OPEC production rose by 100 kb/d m-o-m in March, to 57.7 mb/d.**
- **Non-OPEC expected to grow by 630 y-o-y in 2015 vs 2014 growth of 2.1 mb/d**
- **Non-OPEC output expected to post first y-o-y decline in 4Q15 since 2Q11**

Iraq dominates OPEC capacity growth

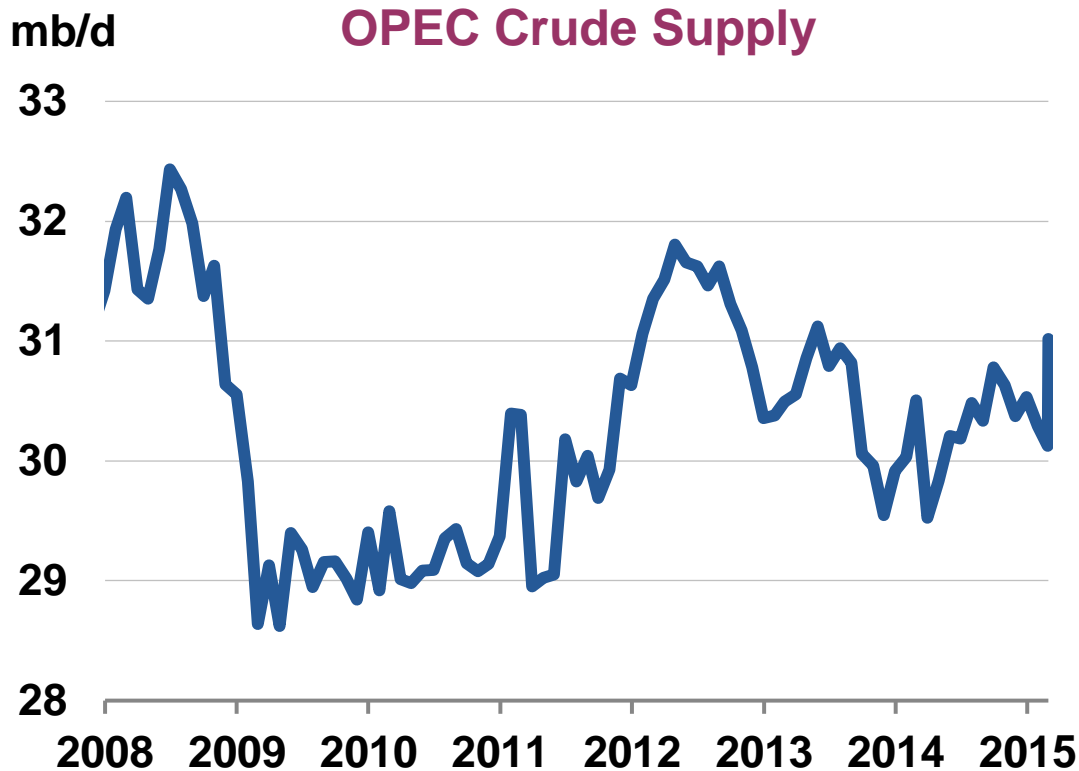
Medium-Term
Market Report
2015



- Oil price collapse, ISIL challenge yet to cause substantial slowdown
- Growth estimated at 1.1 mb/d in 2014-2020 period
- Elevated risks



OPEC supply soars to 31 mb/d in March, up 890 kb/d from February

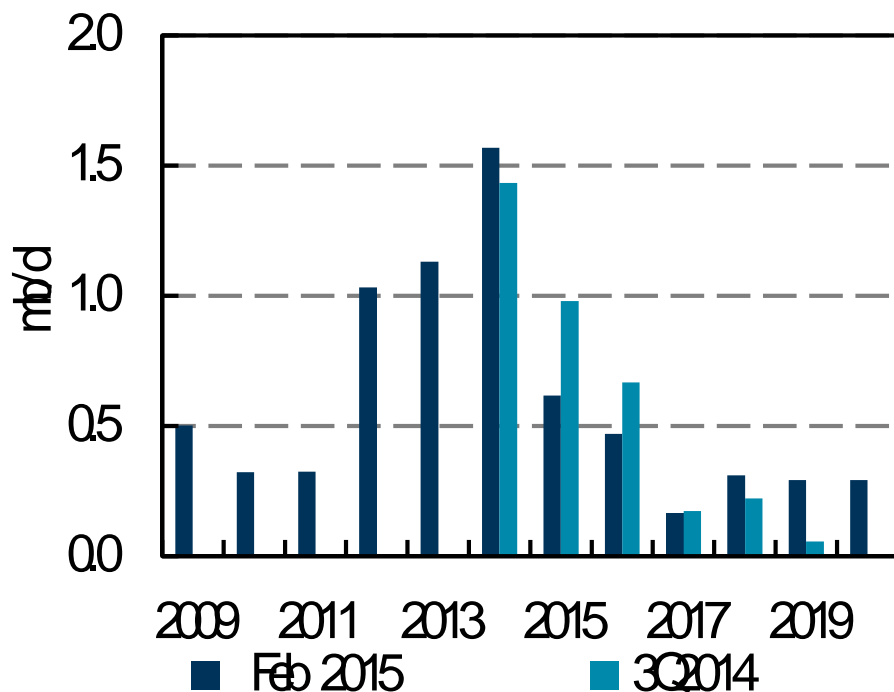


- Higher flows from Saudi Arabia, Iraq and Libya push output to highest in nearly two years
- Biggest month-on-month increase since June 2011

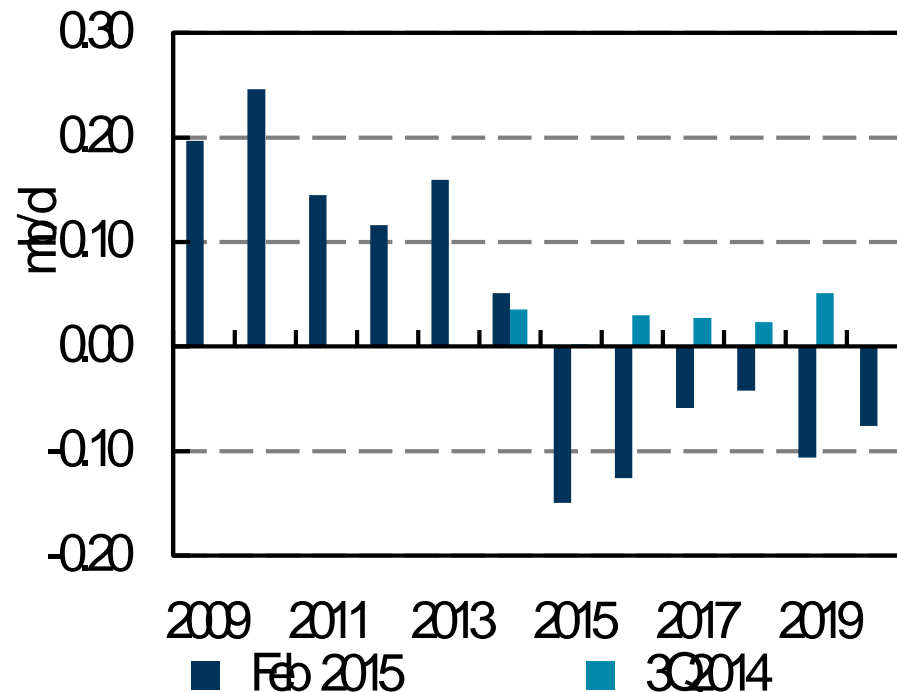
Survival of the fittest

Medium-Term
Market Report
2015

Change in US liquids production



Change in Russian liquids production

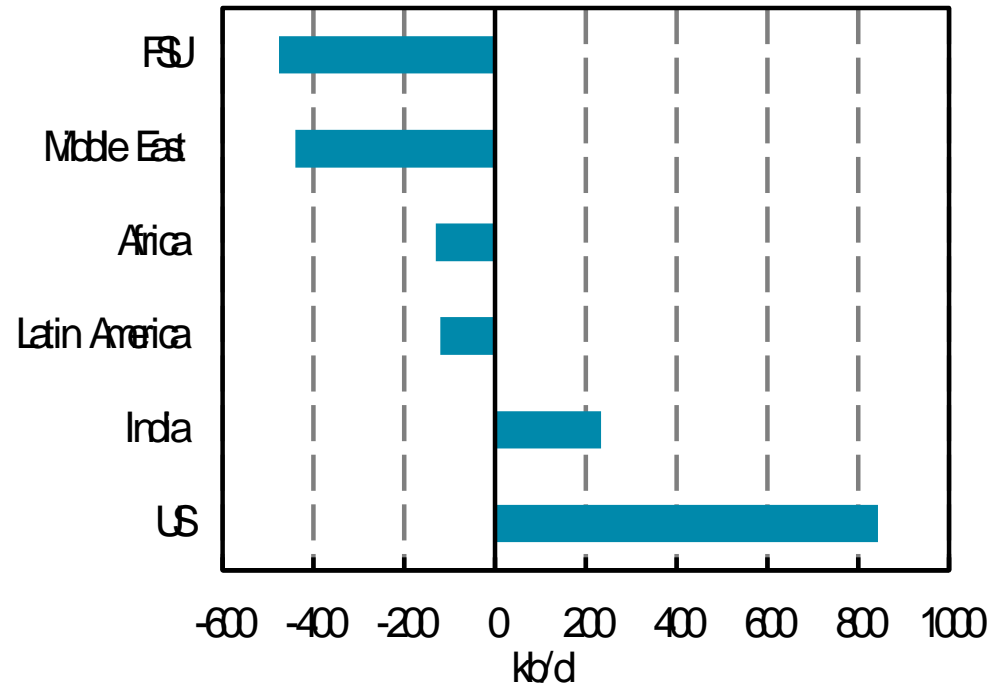


- US production growth slows in 2015-17
- Oil price, sanctions see Russian output contracting by 560 kb/d by 2020

Lower oil prices get a mixed demand response

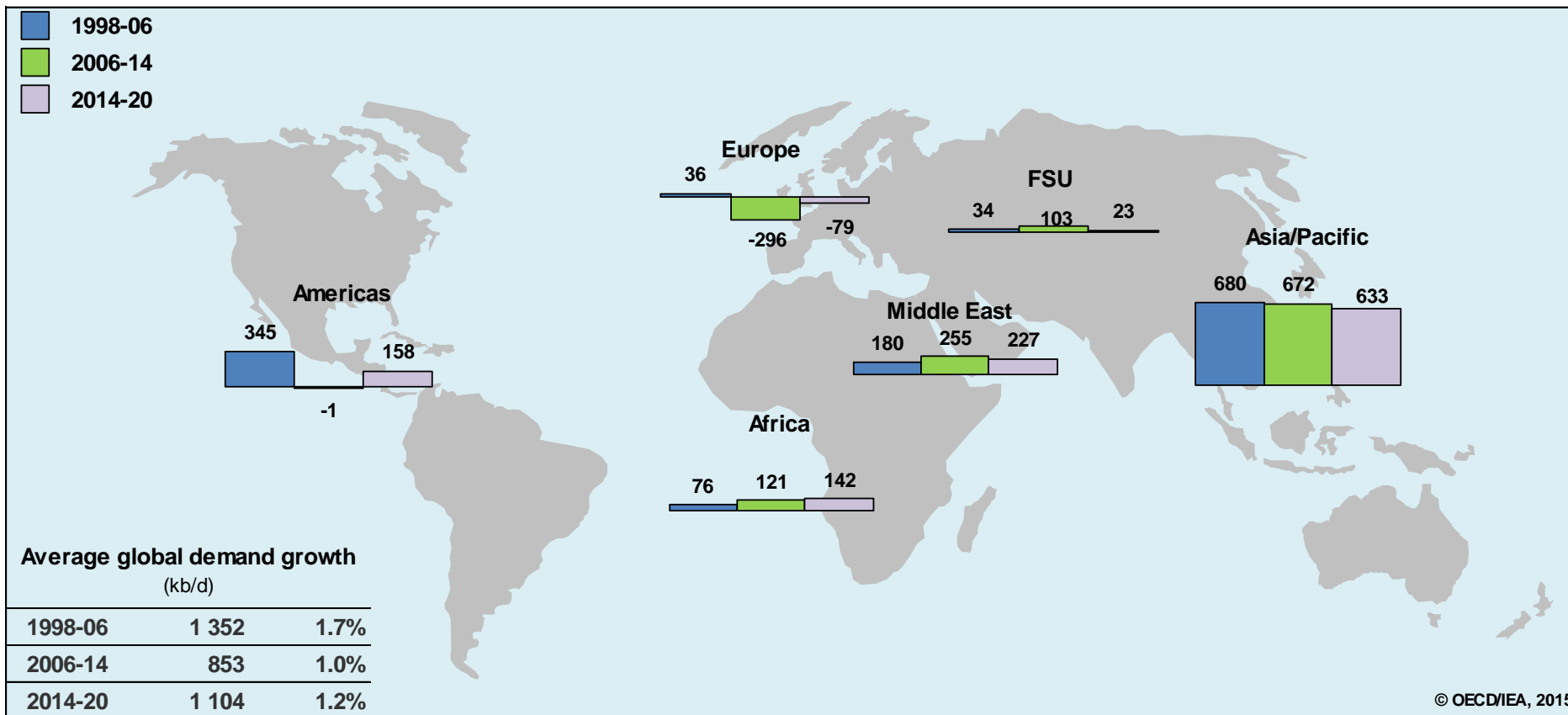
Medium-Term
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2015

Revised demand growth prospects 2014-2019



- Although many other factors come into play, lower oil prices generally dampen the demand outlook in net oil-exporters
- Raise the outlook in net oil-imports

Eastward pull unabated



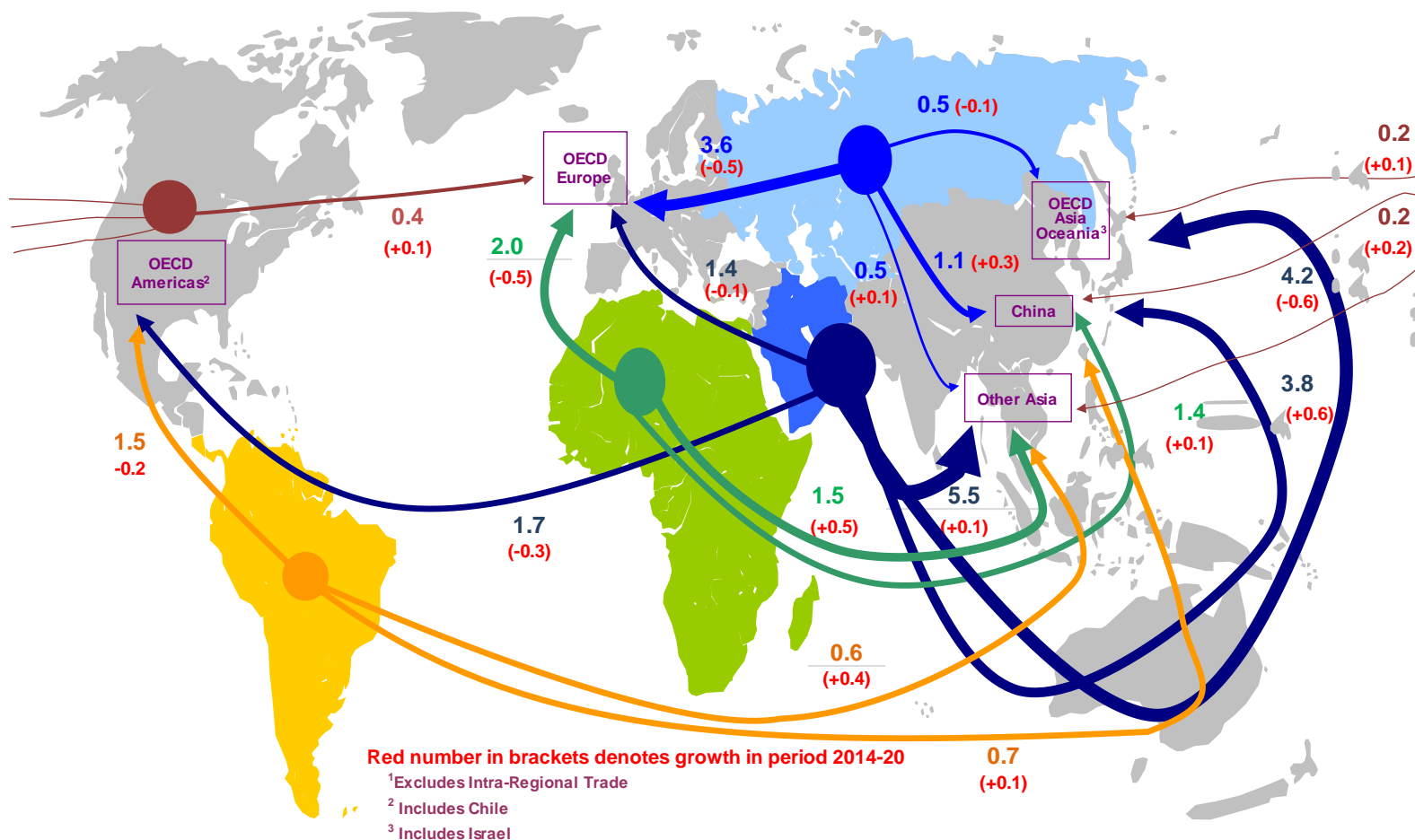
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Oil trade tilts to products

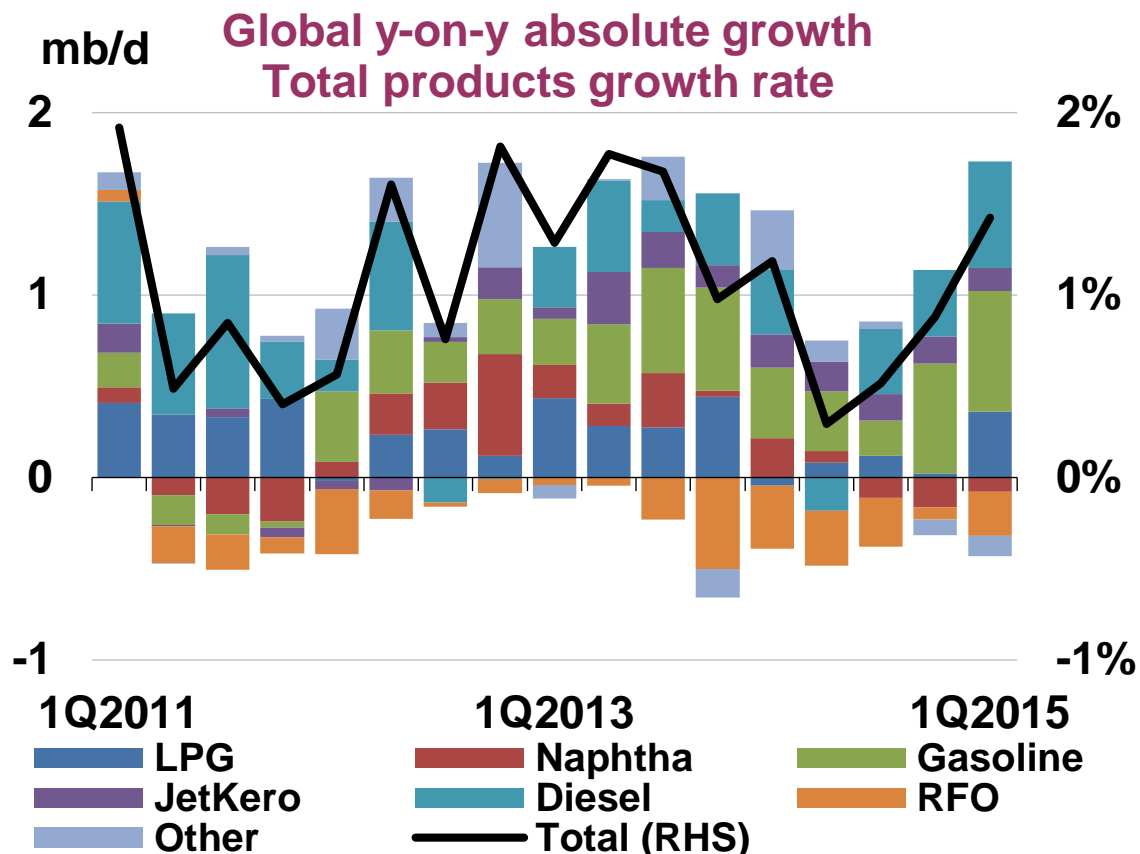
Crude Exports in 2020 and Growth in 2014-20 for Key Trade Routes¹

(million barrels per day)





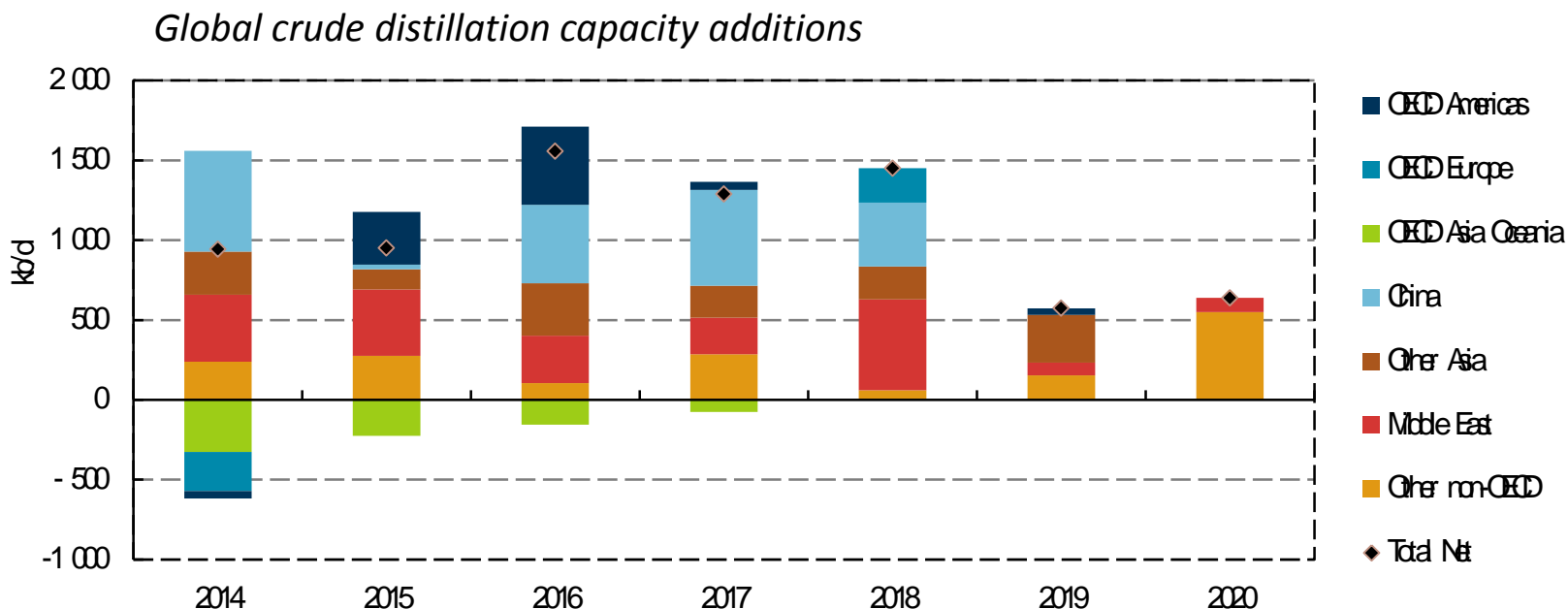
Global recovery in demand gathers pace



- **+1.3 mb/d in 1Q15, to 93.0 mb/d**
 - Colder weather provided a particular impetus
 - Very strong gains seen in Korea & India
- **Growth of 1.1 mb/d foreseen in 2015 as a whole, to 93.6 mb/d**
 - Up sharply on 2014's +0.7 mb/d gain

Refining surplus lingers despite scaling back

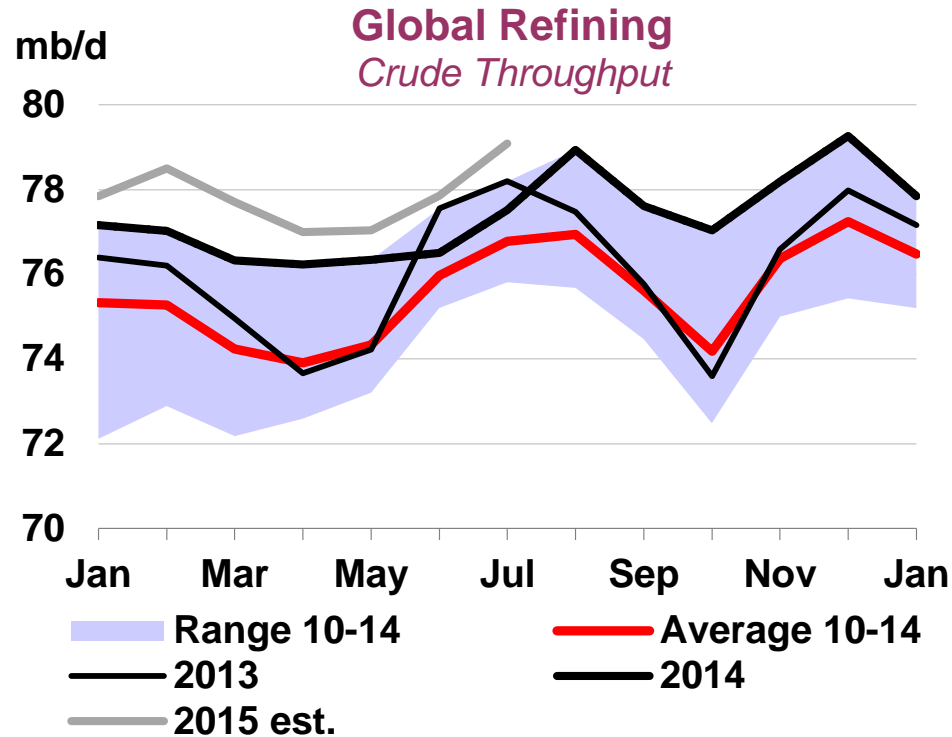
Medium-Term
Market Report
2015



- New capacity of 6.4 mb/d by 2020, led by non-OECD Asia, Middle East
- Brief margin respite in 2014 on shutdowns
- Startups lift surplus to 5 mb/d in 2020 from 6-yr low ~3 mb/d in 2014



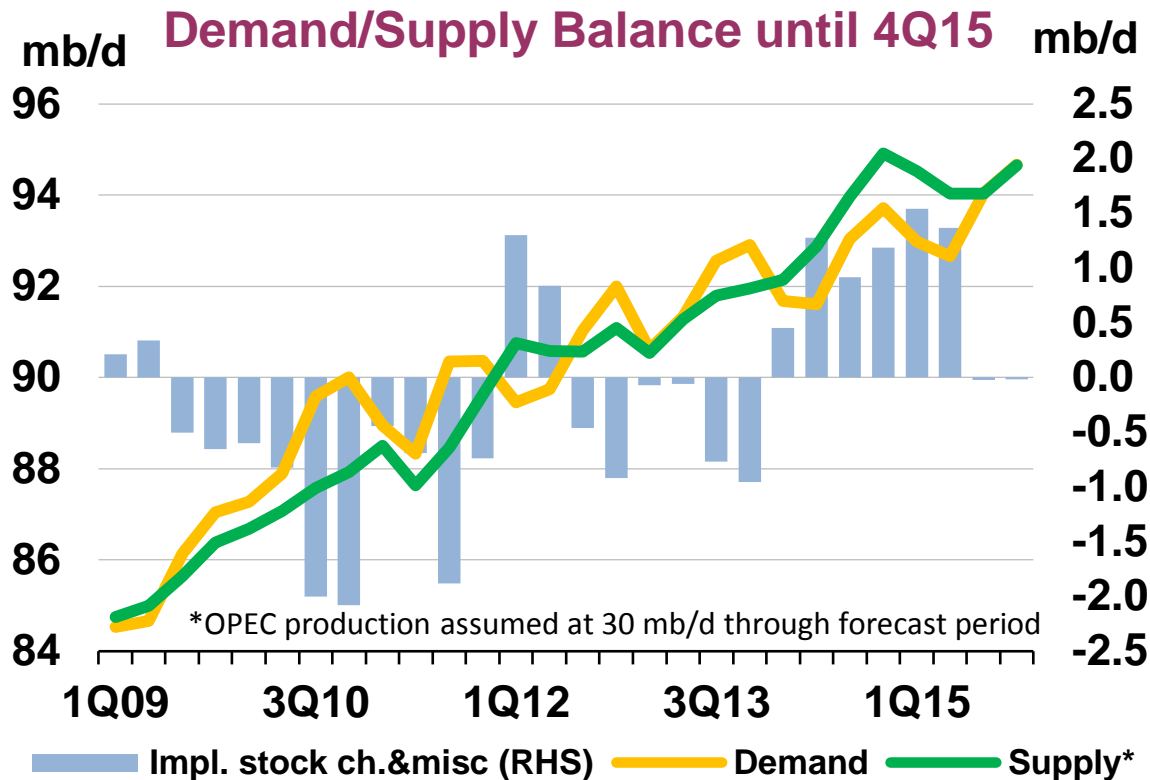
Global refinery crude demand fall seasonally through May



- **Global refinery runs rose in February, despite US refinery maintenance**
- **Global crude demand to fall through May, as European, then Asian turnarounds commence.**
 - **Asia takes as much as 2.5 mb/d of capacity offline at peak in May**

Recent inventory builds unbalanced

heavily skewed to crude and centered in the US and China

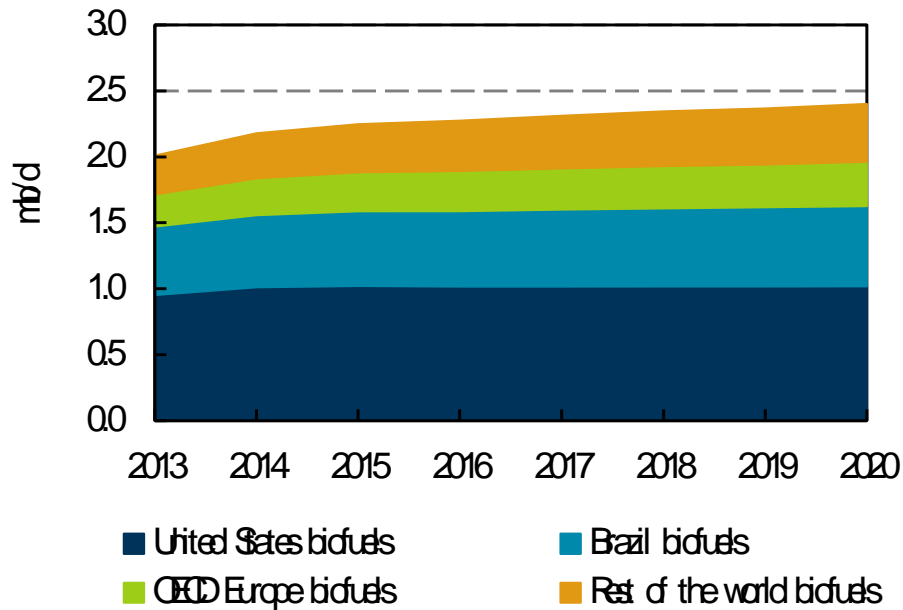


- **S&D balances imply 140 mb stock build in 1Q15**
- **90% of this can be identified from preliminary data:**
 - **OECD +50 mb**
 - **China + 76 mb**

Despite lower oil prices biofuels continue to grow

Medium-Term
Market Report
2015

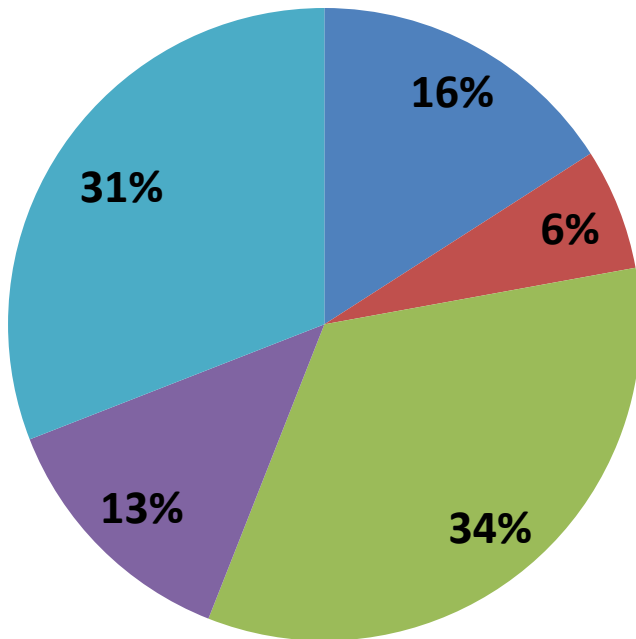
Global biofuels production



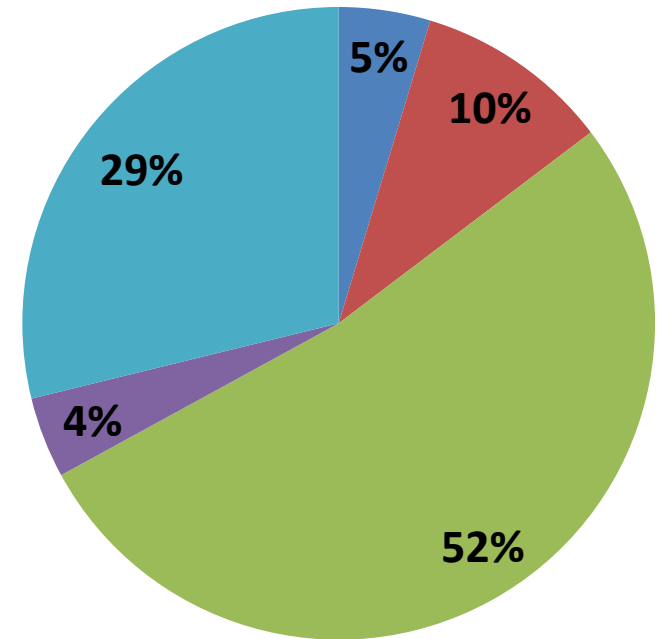
- **Biofuel production is mandate not price driven**

Oil consumption by sector (OECD)

1973



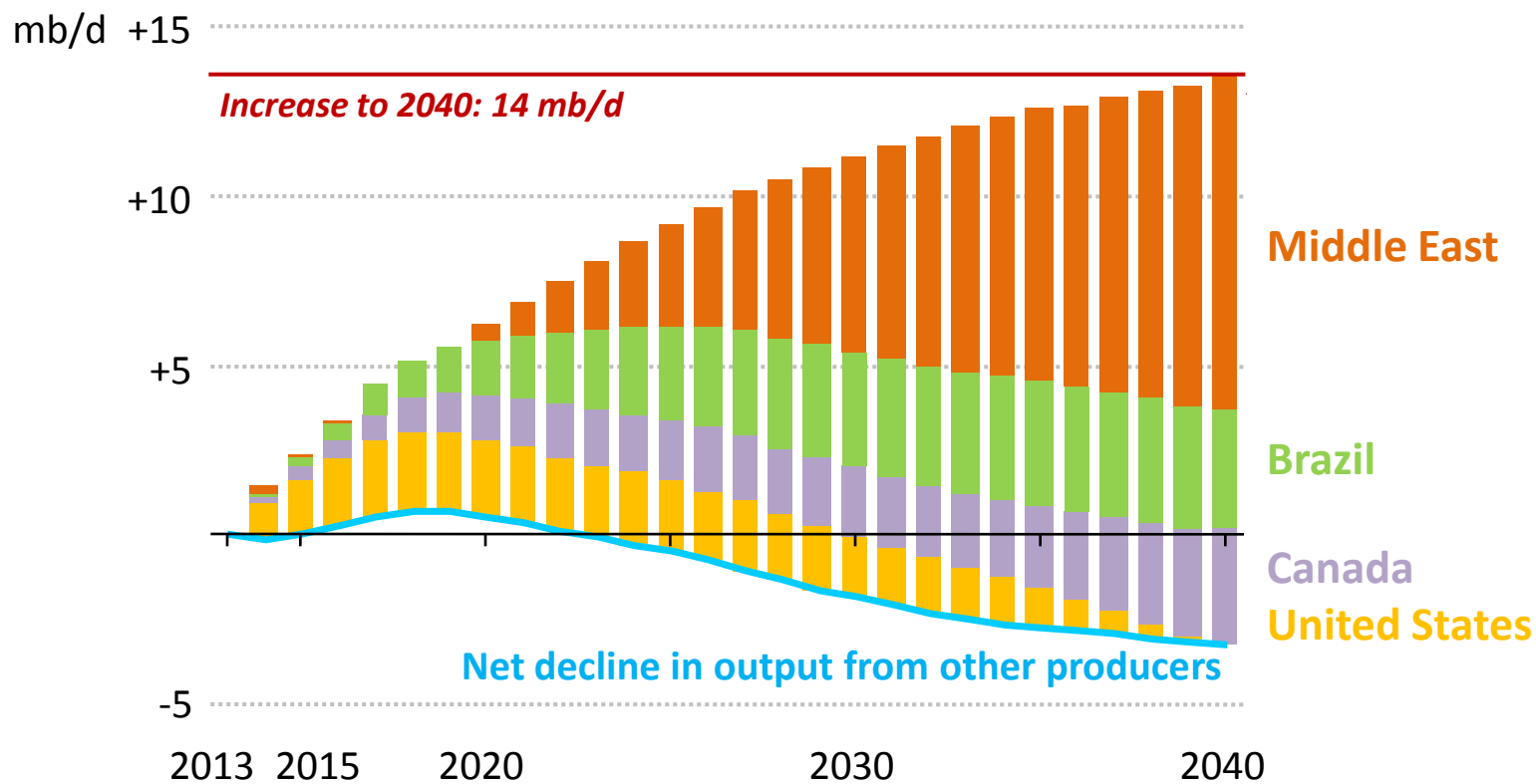
2012



- Industry
- Petrochemical
- Transportation
- Power generation
- Other

Instability in the Middle East a major risk to oil markets

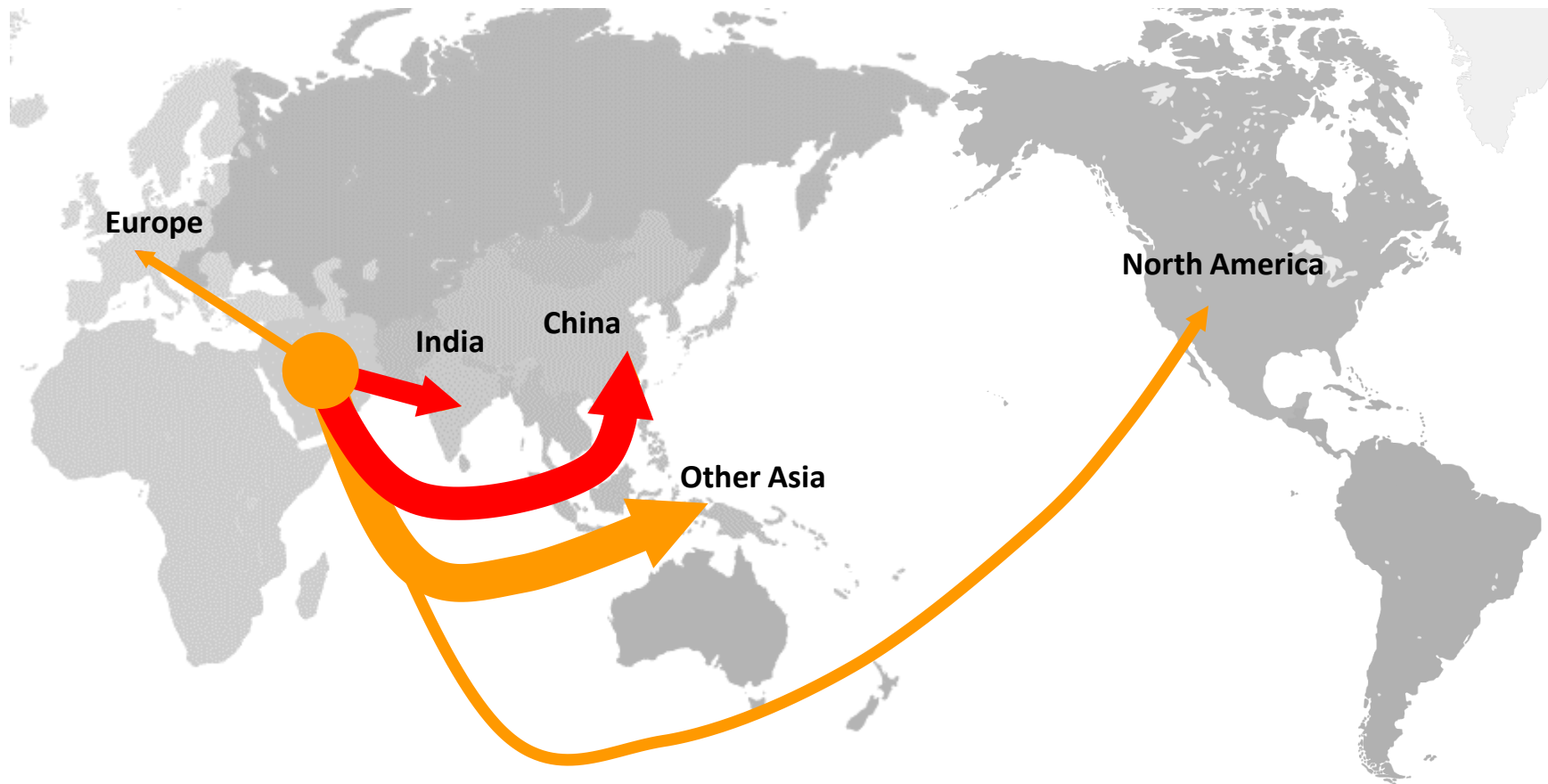
Oil production growth in United States, Canada, Brazil & the Middle East



The short-term picture of a well-supplied market should not obscure future risks as demand rises to 104 mb/d & reliance grows on Iraq & the rest of the Middle East

Ever-growing crude trade between Asia and the Middle East

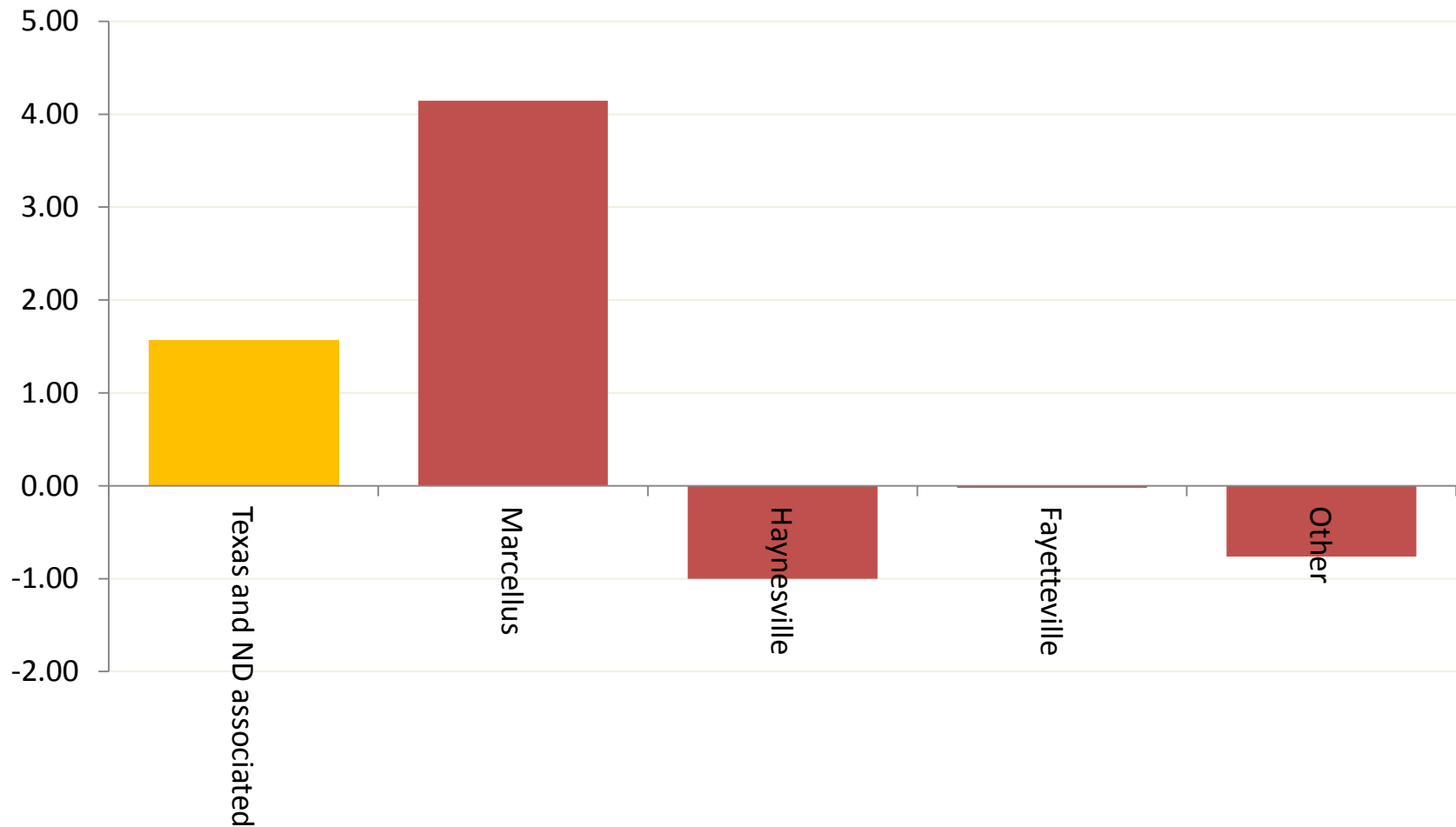
2040 crude oil imports



North America's oil imports fall as it becomes more self-sufficient, and Europe's decrease with falling demand, 90% of Middle East crude exports go to Asia by 2040

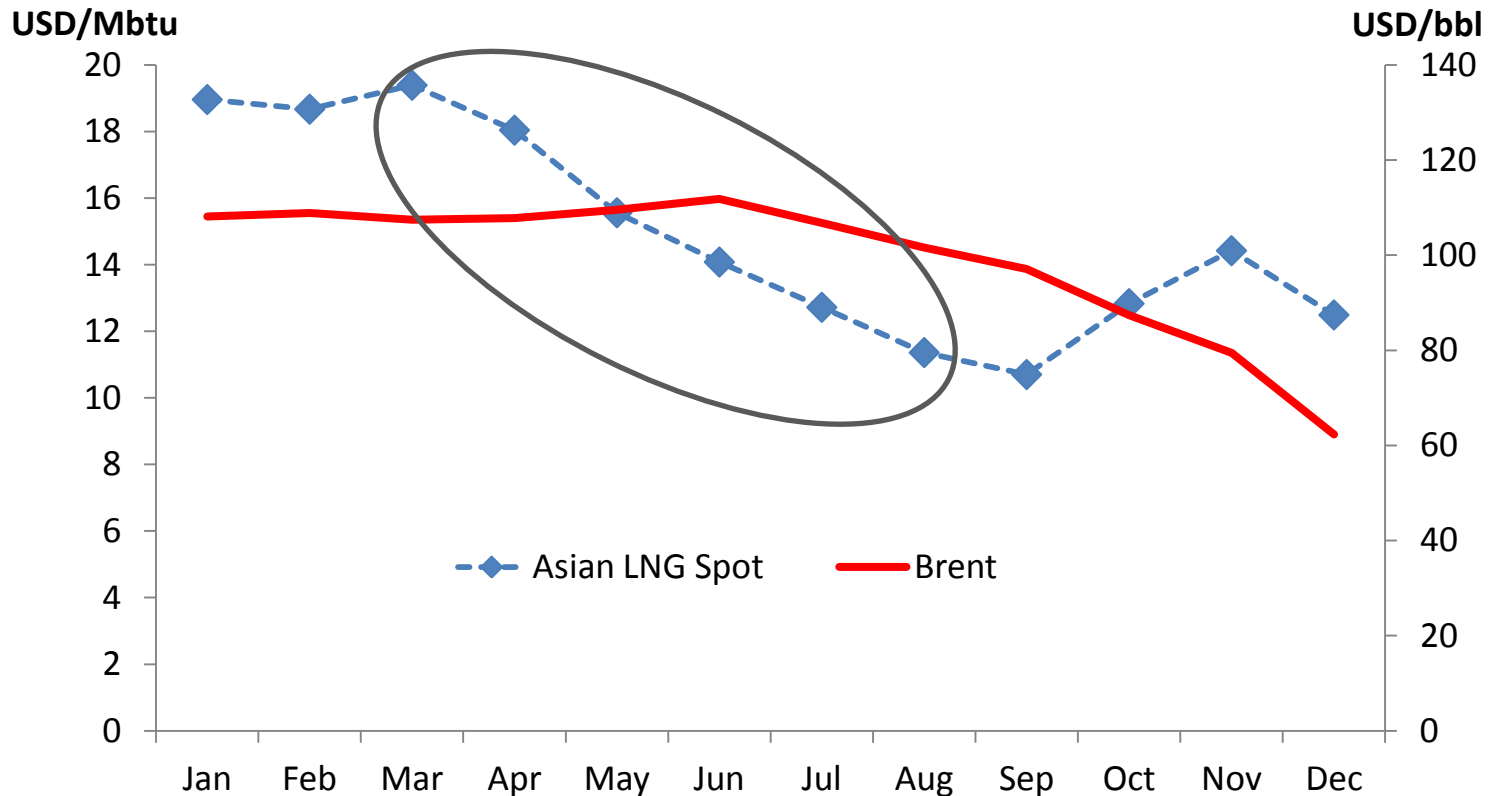
US shale gas: LTO associated gas might be hit, but benefits from lower drilling costs

US gas production growth across major shale plays (bcf/d)



Asia LNG spot prices started to fall sharply well ahead of the drop in oil

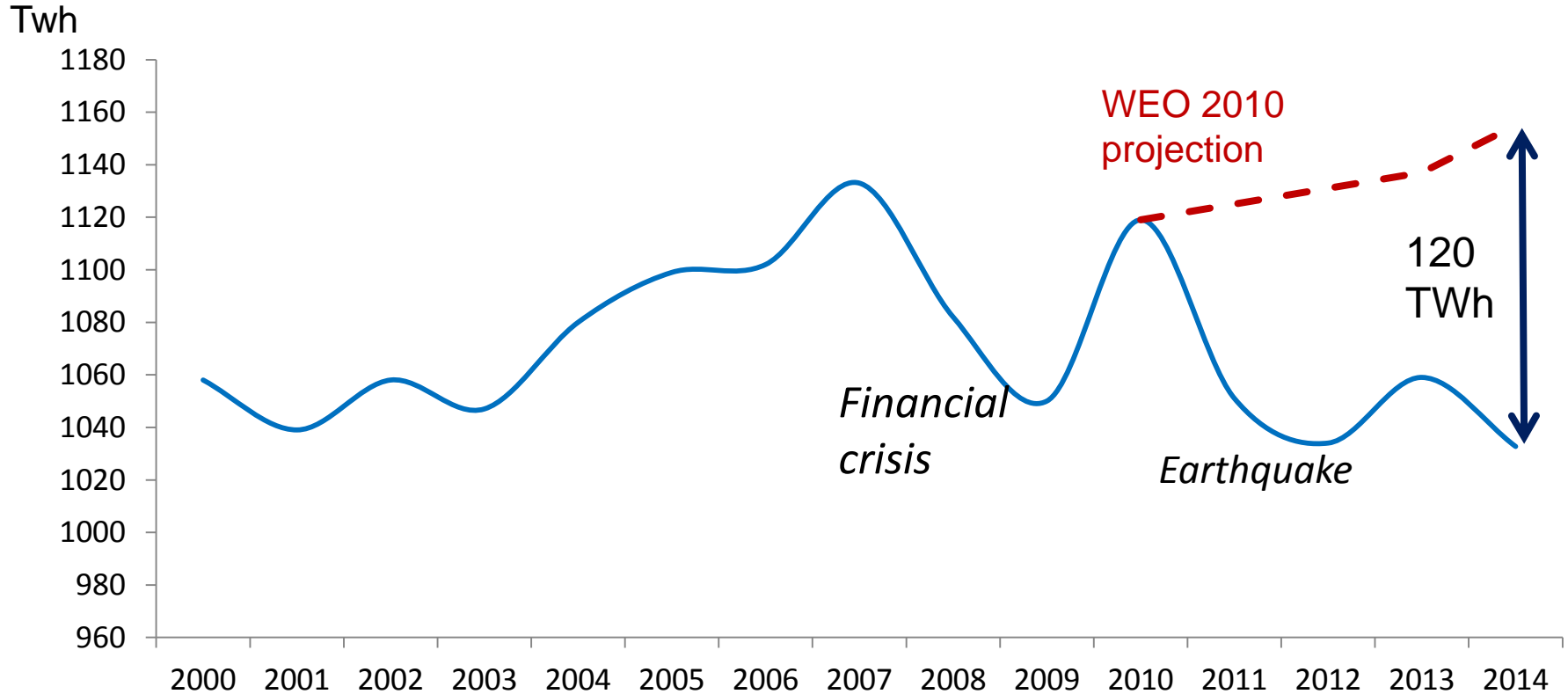
Oil and LNG prices in 2014



- LNG prices were already falling well ahead of the drop in oil
- Cheap oil linked gas from the new Australian contracts will reduce demand for spot gas

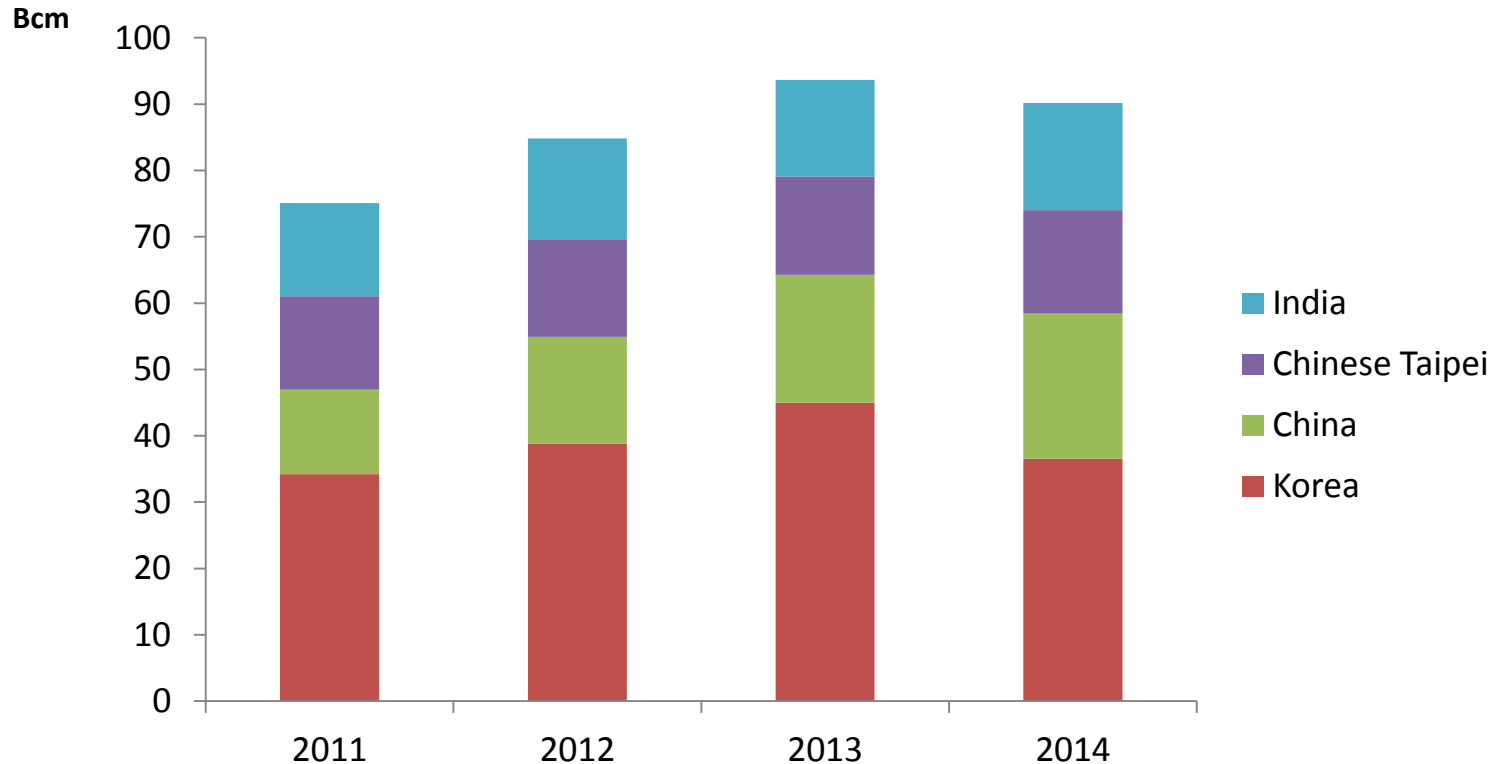
Japan: persistent electricity demand weakness limits LNG needs

Japanese power generation



Very high prices have had a major impact on Asian demand

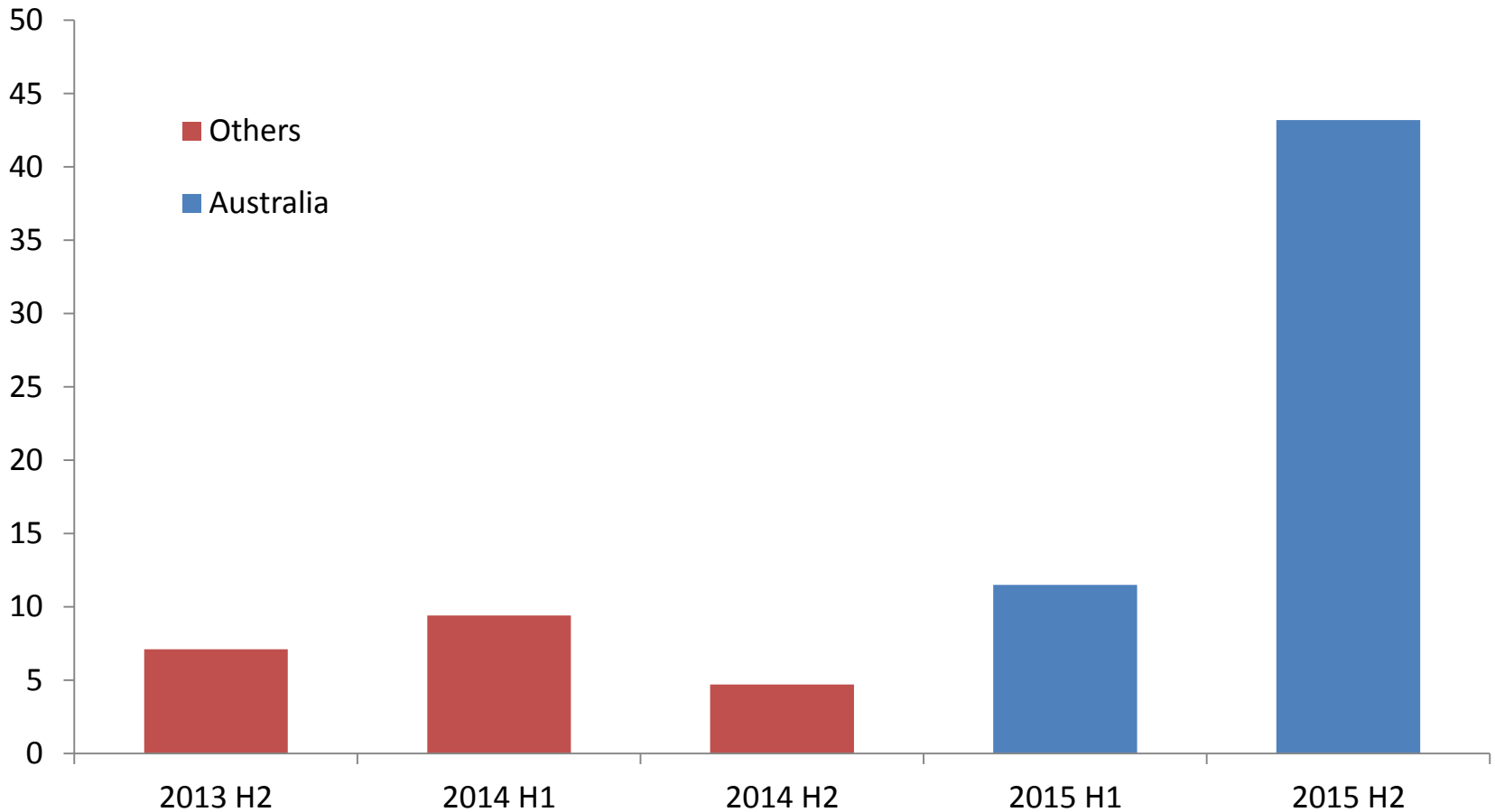
LNG import volumes in major Asian countries 2011-2014 (Jan-Oct)



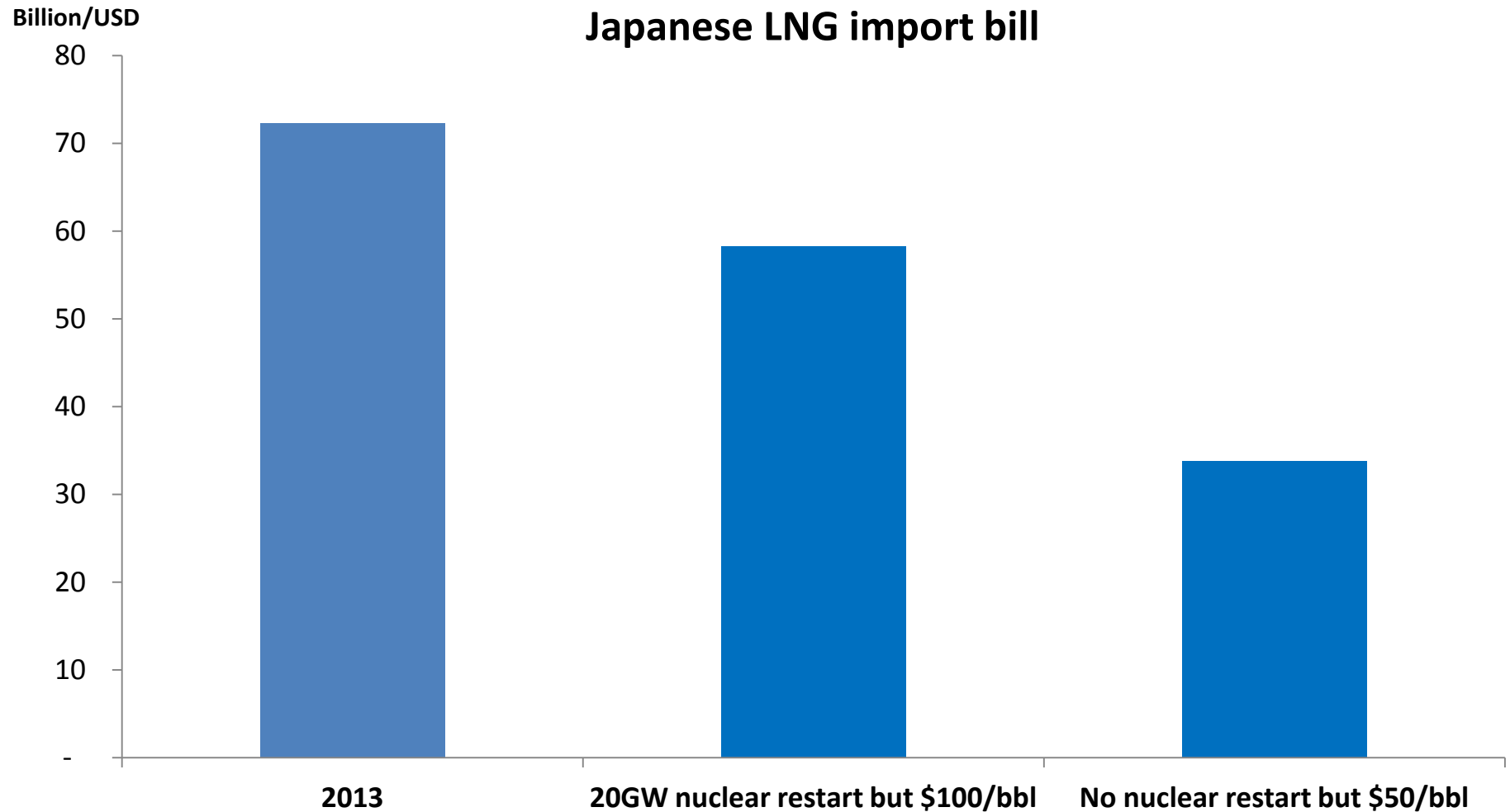
- Korean LNG demand has dropped significantly in 2014 due to the restart of nuclear capacity and switch to coal in the power sector.
- India and China underutilized their LNG infrastructure

A wave of new LNG supply is coming

Additional LNG capacity (growth relative to the previous period, bcm)

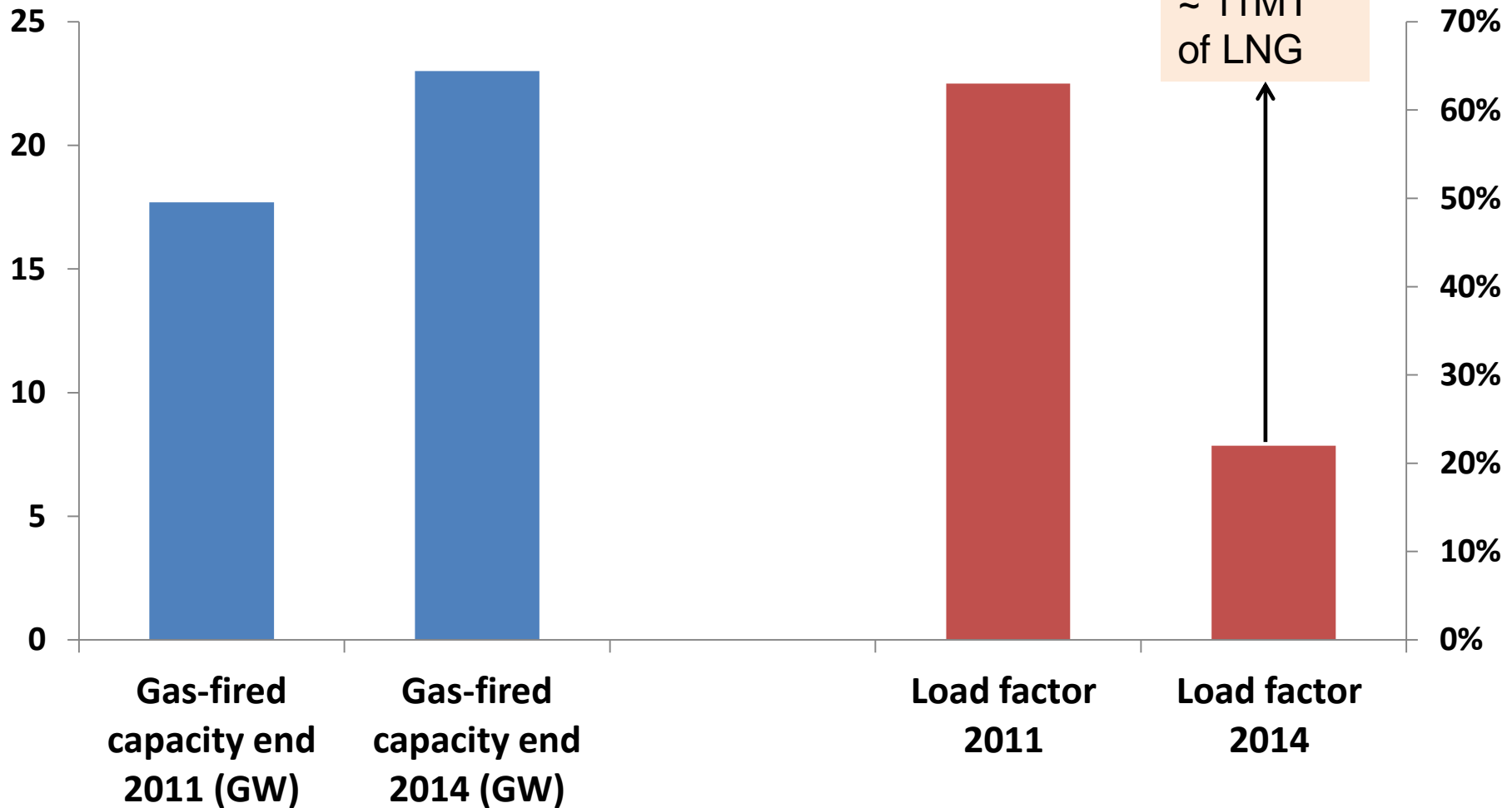


Large impact on Japanese energy costs

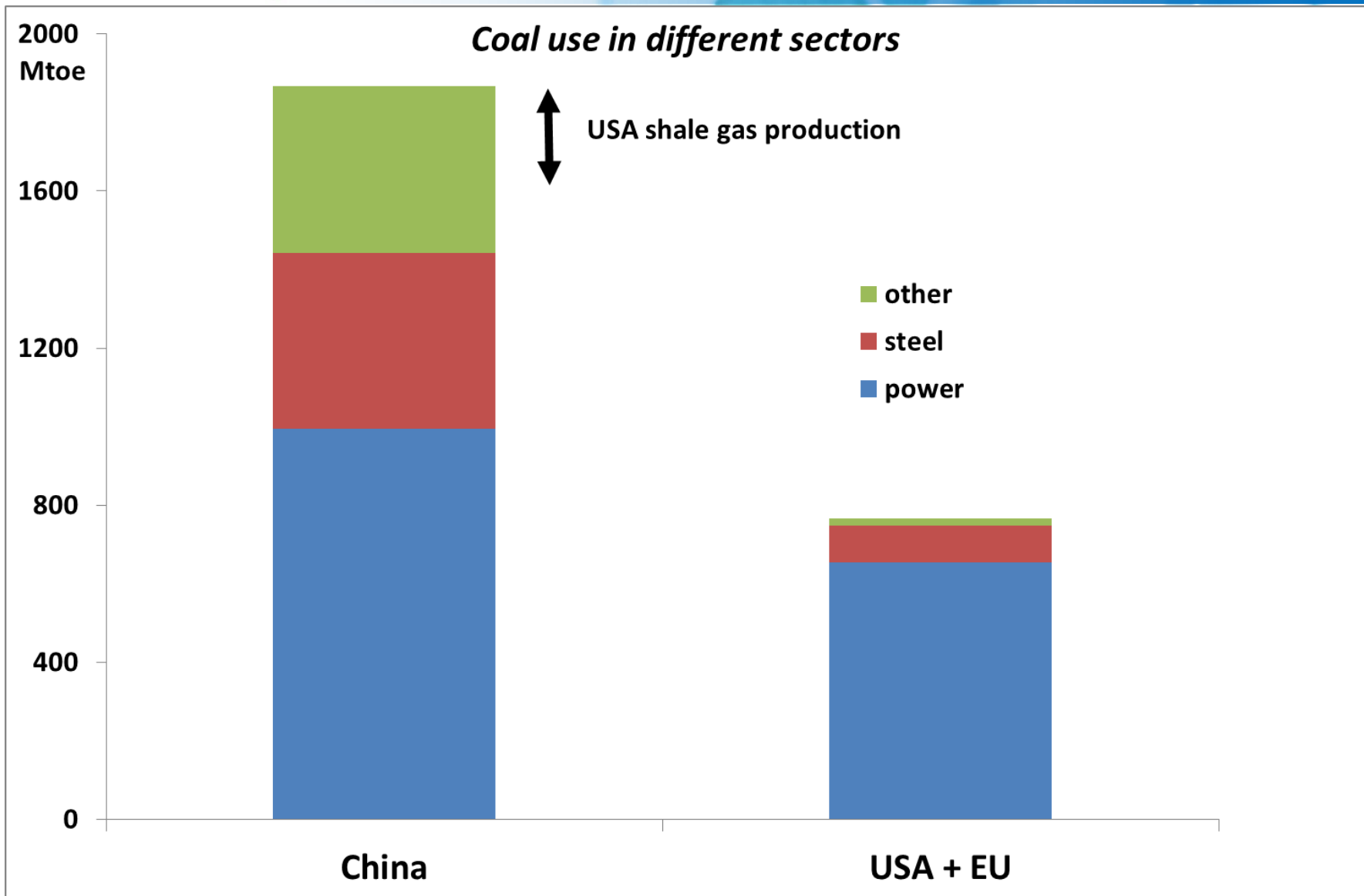


Cheaper LNG enables faster electrification in India

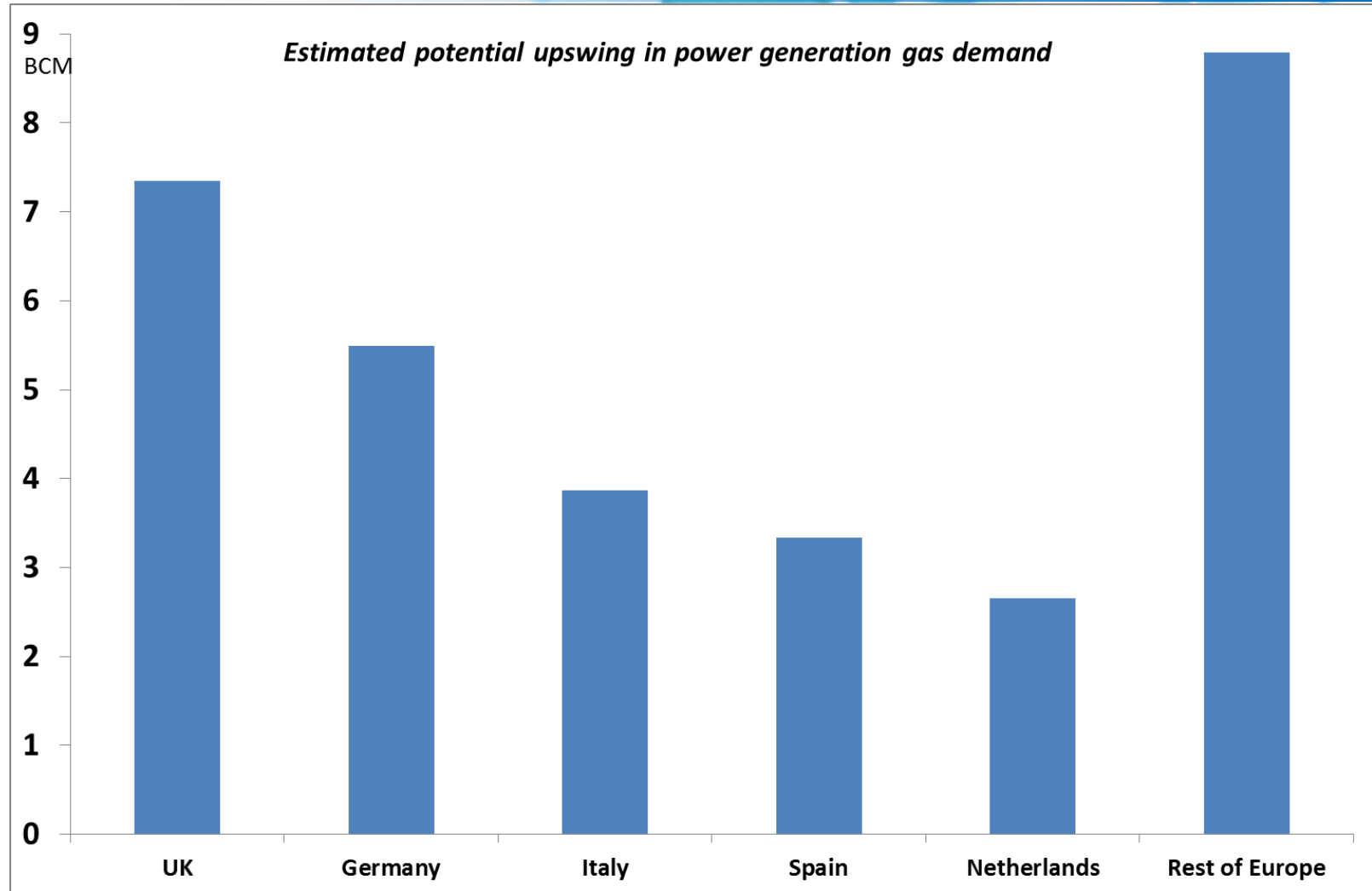
India gas-fired capacity and load factors



Gas reduces China's coal dependency outside the power and steel sectors

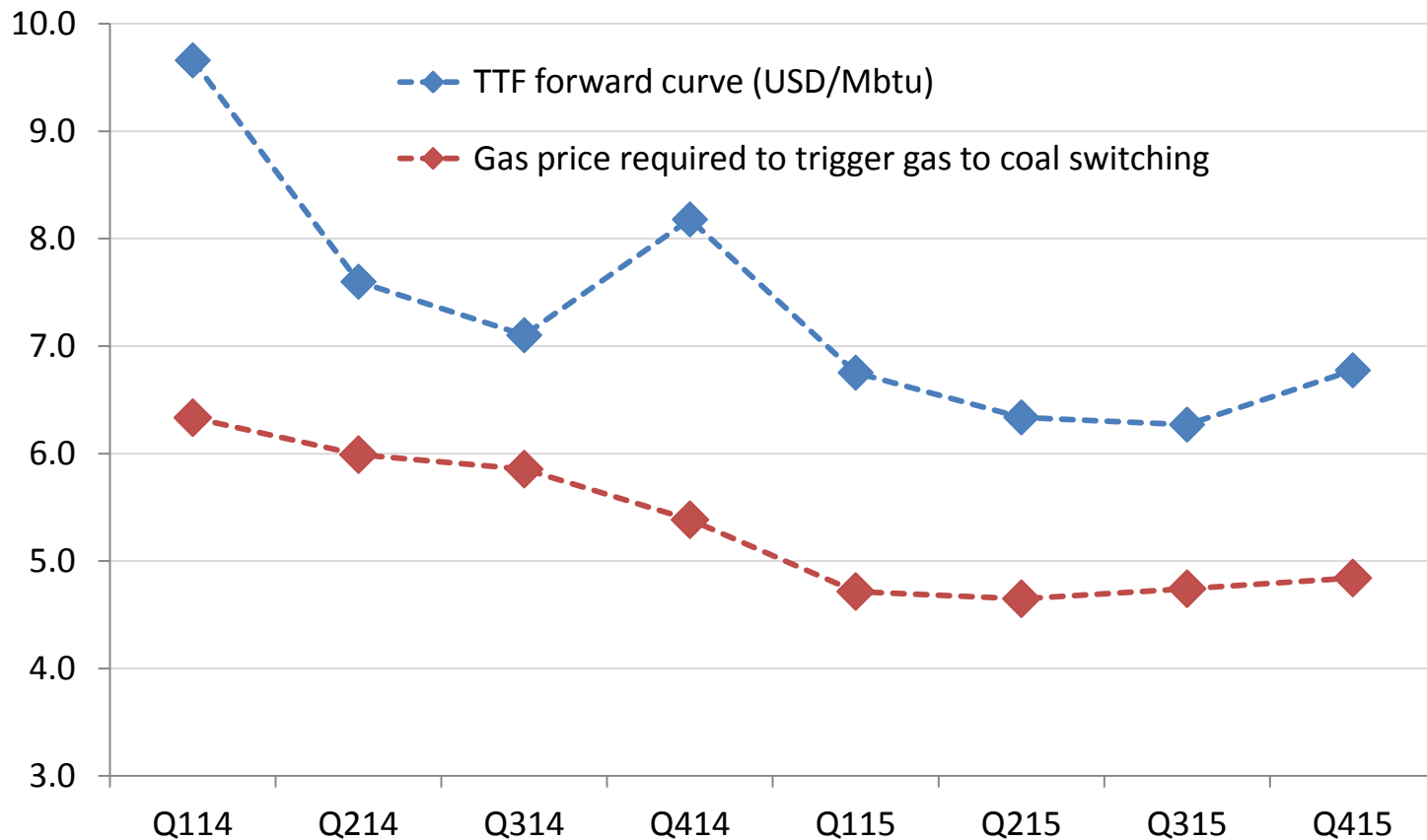


Significant upside potential in EU power generation



....But it requires even lower prices as coal prices are also in a freefall

European gas prices might need to drop towards \$5/mmbtu if gas-to-coal switching is the way to rebalance the market

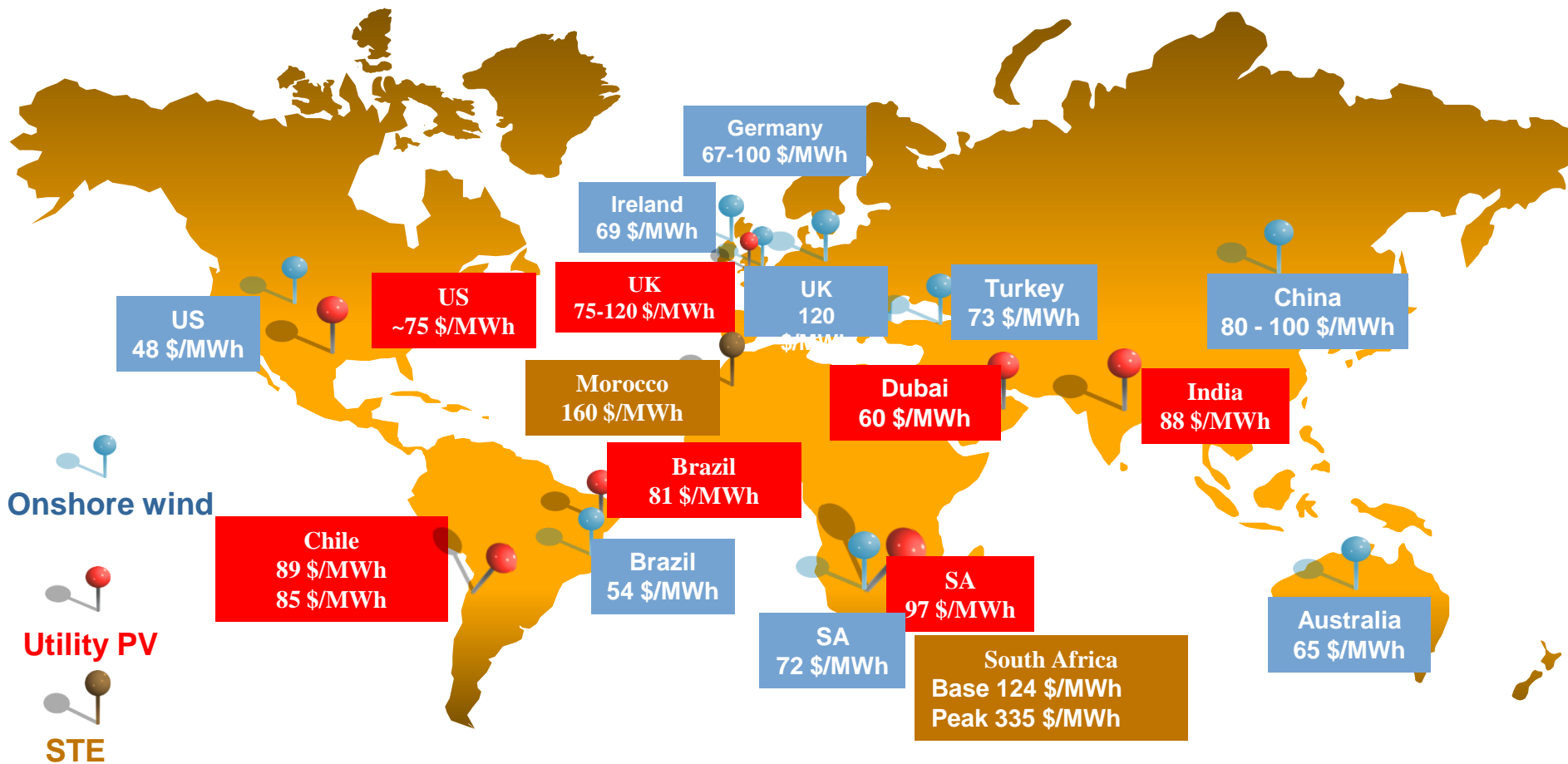


Note: Based on gas, coal, and carbon forward curves as of May 20 2015 – approximate switching price



Increasing examples of wind and solar PV costs comparable to new-build alternatives

Recent long-term remuneration contract prices (e.g. auctions and FITs)



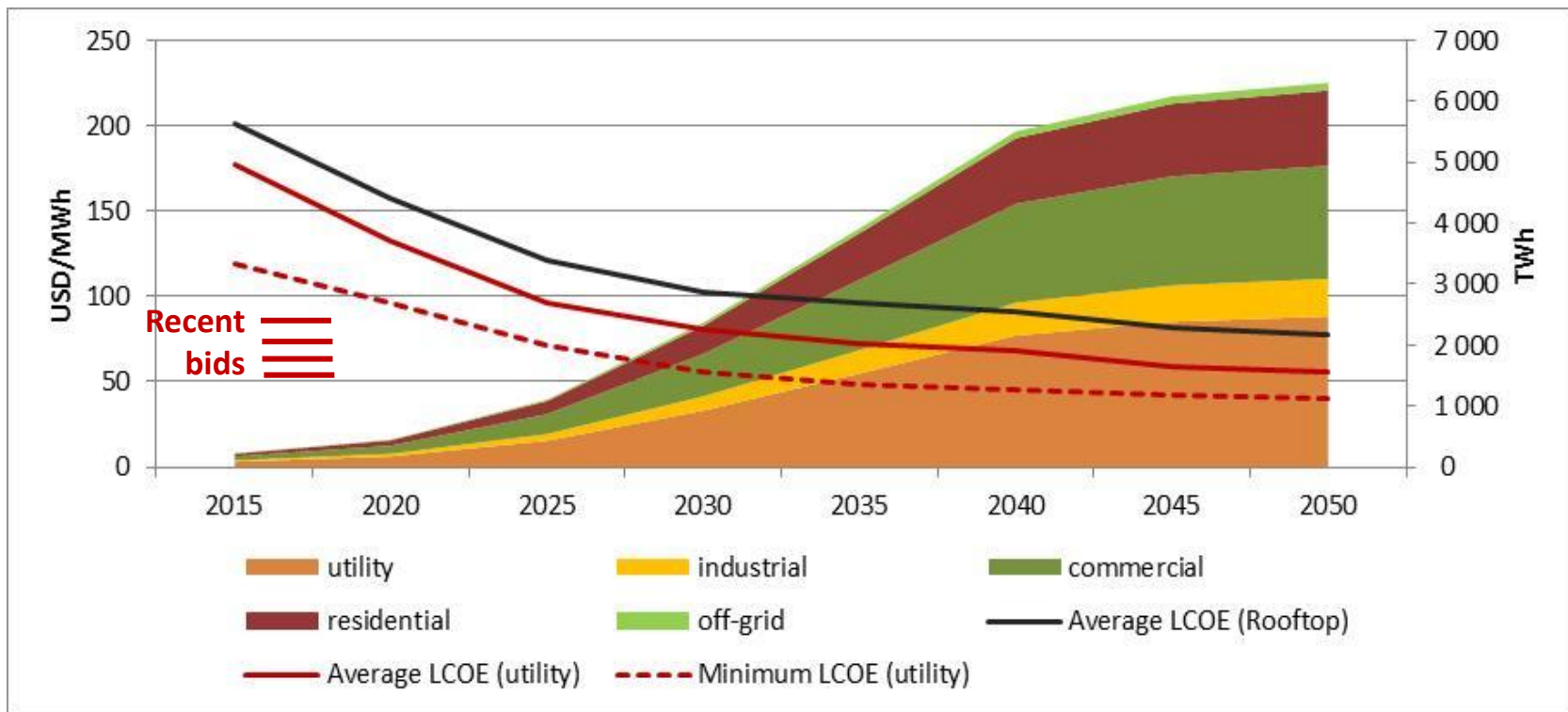
Transition to new era of economic attractiveness for renewables where good resource and appropriate policy and regulatory framework are in place



Photovoltaic Energy

2014 Edition

Long term scenario of the Technology Roadmap



- PV could provide 16% of global electricity by 2050 and 20% of CO2 emission cuts
- Based on cautious cost assumptions and 8% WACC
- Key factor will be flexibility of power systems to integrate large share of v-RE; STE will play a complementary role to PV