



*The 7th Asian Ministerial
Energy Roundtable*

Bangkok | Thailand

Plenary Session 1:

*Oil markets: Investment and security challenges
in a world in transition*

Background Paper



Disclaimer

The observations presented herein are meant as background for the dialogue at the 7th Asian Ministerial Energy Roundtable. They have been prepared in collaboration with The Boston Consulting Group and should not be interpreted as the opinion of the International Energy Forum or The Boston Consulting Group on any given subject

Introduction

Market context

Energy markets and longer-term policy and technology options are subject to growing turbulence and uncertainty. This is, in part, a consequence of a richly diverse range of opinion as to the optimal pace and orientation of transition, and differences in the energy policy and market contexts of Asia's interdependent and globally interconnected economies.

Investment to compensate for decline rates in the conventional fields has slowed for three consecutive years. Unconventional supply resilience, inventory build, and existing supply may well prove too narrow a backbone to shoulder demand growth expected to exceed the 100 mb/d threshold by 2020.

Session objectives

Ministers are invited to review recent oil market developments and the energy security implications of:

- Three years of deferred investment in conventional oil and gas production after the price slump,
- Various transition pathways that will remain reliant on the ready availability of sustainable supplies of affordable hydrocarbons.

Strengthen policy cooperation and market transparency among Asian oil market and clean technology stakeholders, to mitigate risk along energy transition pathways including enhancing oil inventory data.

Key question: How will Ministers help maintain oil market stability in longer-term transition trajectories in Asia?

Some technology step-changes and transition policy shifts are already happening

Technology

Shale can now deliver more than 5 mmb/d

- Outside OPEC decisions, the most responsive portion of supply
- Has increased Asian reliance on US imports
- Shale exists in many parts of the world, but expensive to begin first production

Investment reduced, shifting

- Technology focus on lower cost solutions
- Shift towards shorter cycle projects
- Skew towards natural gas over oil

Impact

- More barrels can be delivered more quickly, for less
- Changing region's energy security profile

Transition Policy

Reduced gasoline/diesel subsidies

- Increases demand elasticity
- Shift likely focus to alternative-fuel vehicles

Increased efficiency spending

- 2016: 21 bn additional spent in sector
- Asia accounted for 75% of increase

Push towards electric vehicles could upend demand growth- and cause peak demand

- For now, largely prospective rather than real
 - Country and company level goals made, but details still being developed
- Most EVs and ICEs sold in Asia

Impact

- Limited to date
- Given big goals but unspecified policy, the range of demand outcomes has widened

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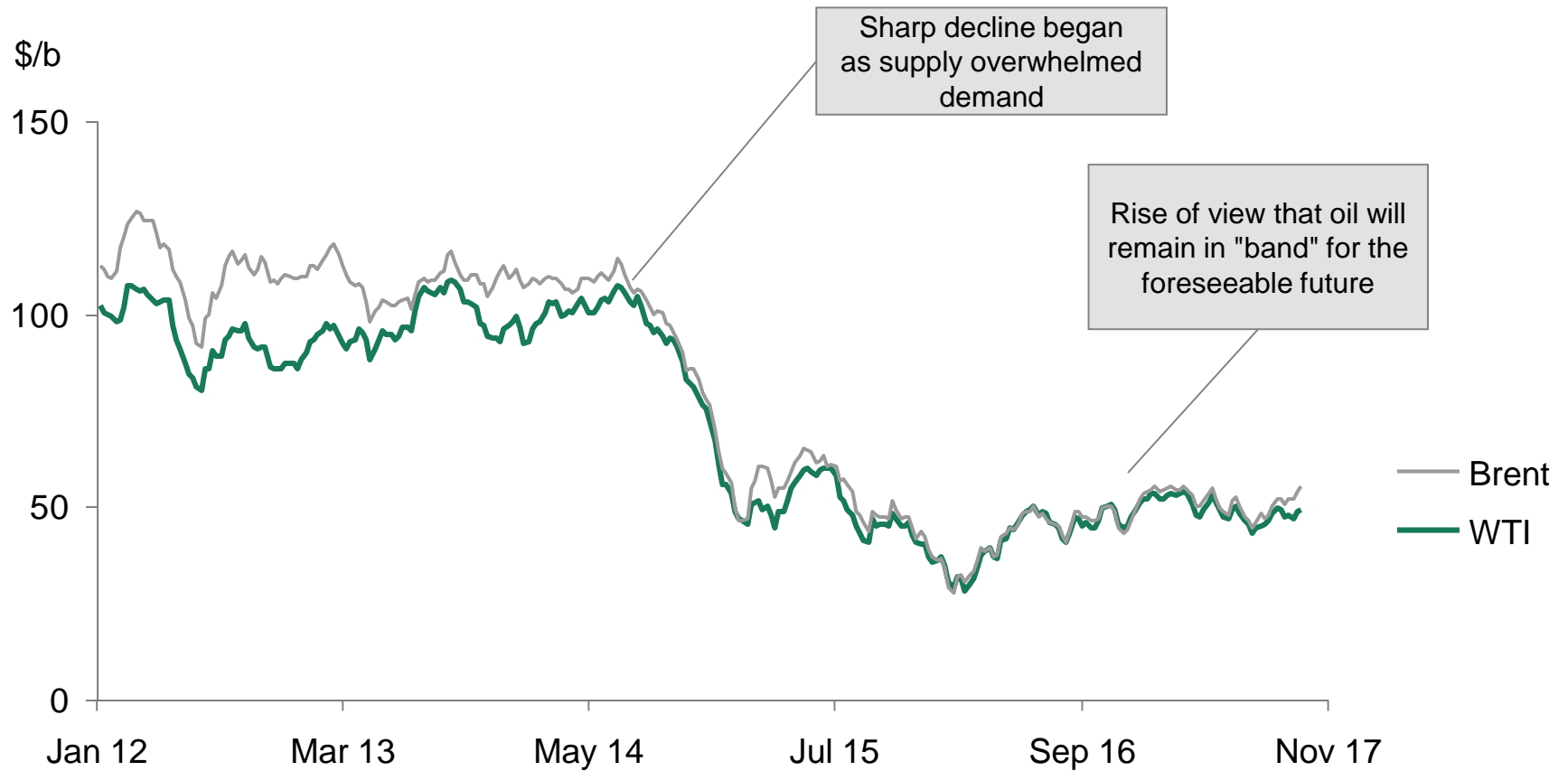
How has investment responded to lower prices?

Technology: What are the risks associated with shale?

How are process and transition policies affecting demand?

Key questions and discussion

Market context: Almost two years in a new price band

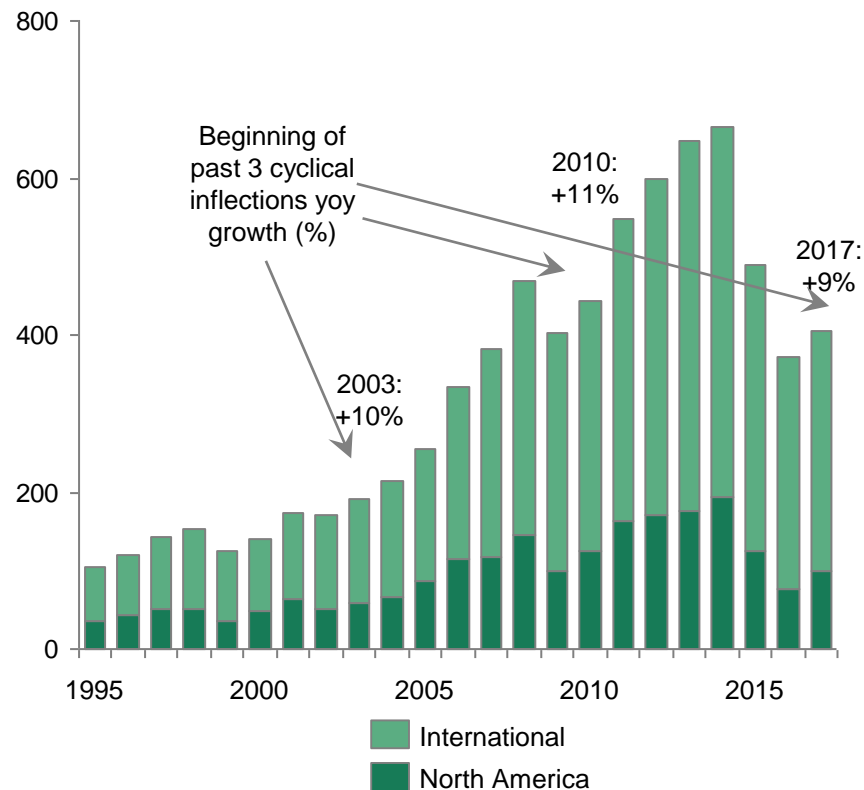


A supply hole may be emerging as a result

Upstream investments fell by 44% in the 2 years from mid-2014

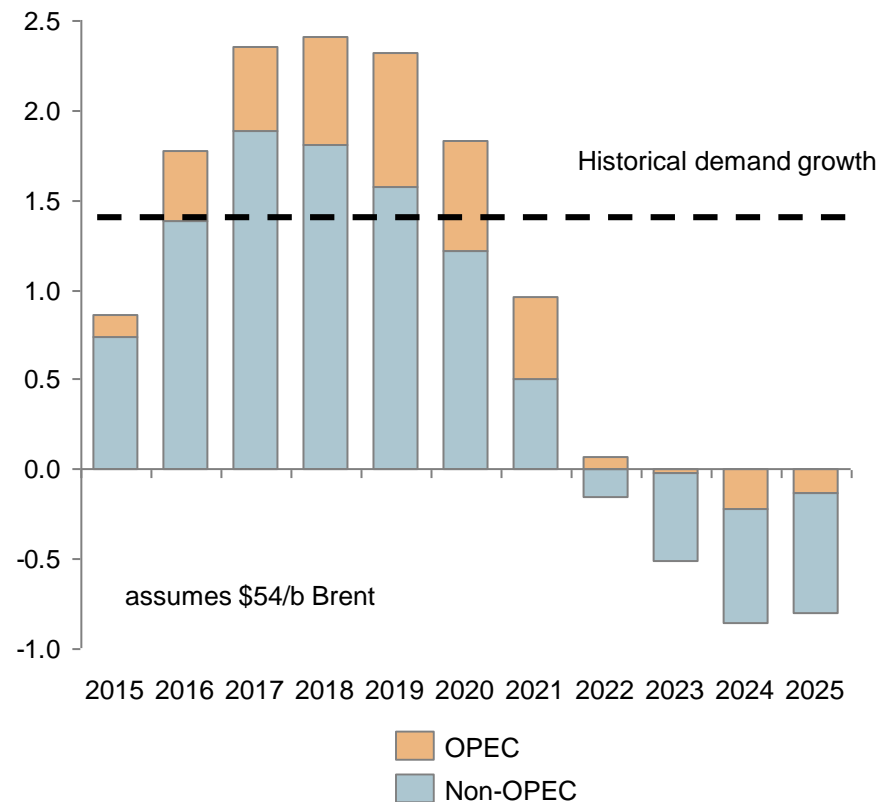
Upstream capex growth is increasingly focused on North America

Upstream capital (\$B)



Supply increases from new projects fall below demand growth post 2020

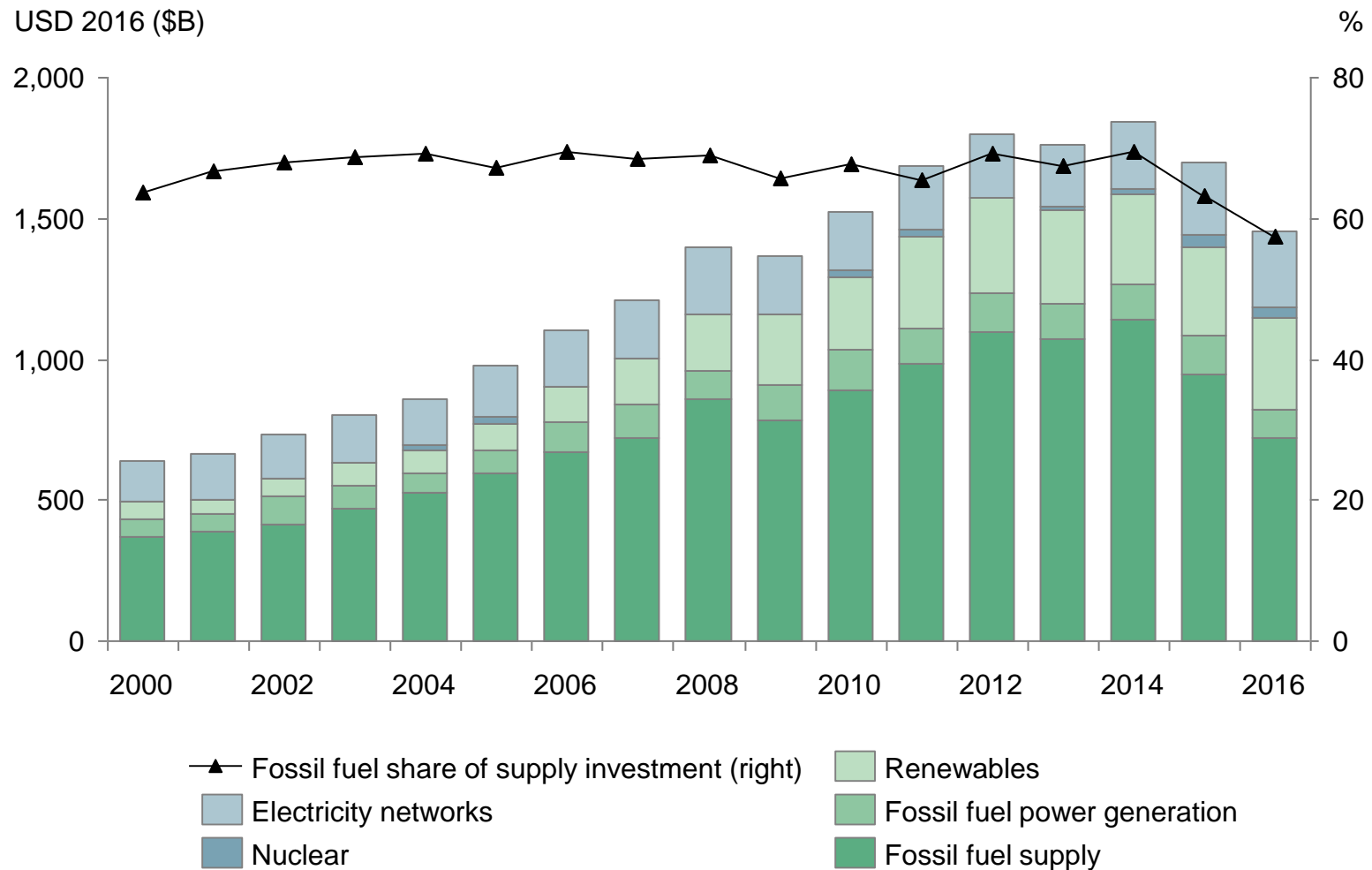
New project volume growth (mmb/d)



Note: Project volumes exclude tight oil. 2017 upstream capex figures are estimates. Project volumes are based on \$54/b

Source: Rystad Energy Ucube, Barclays, IEA

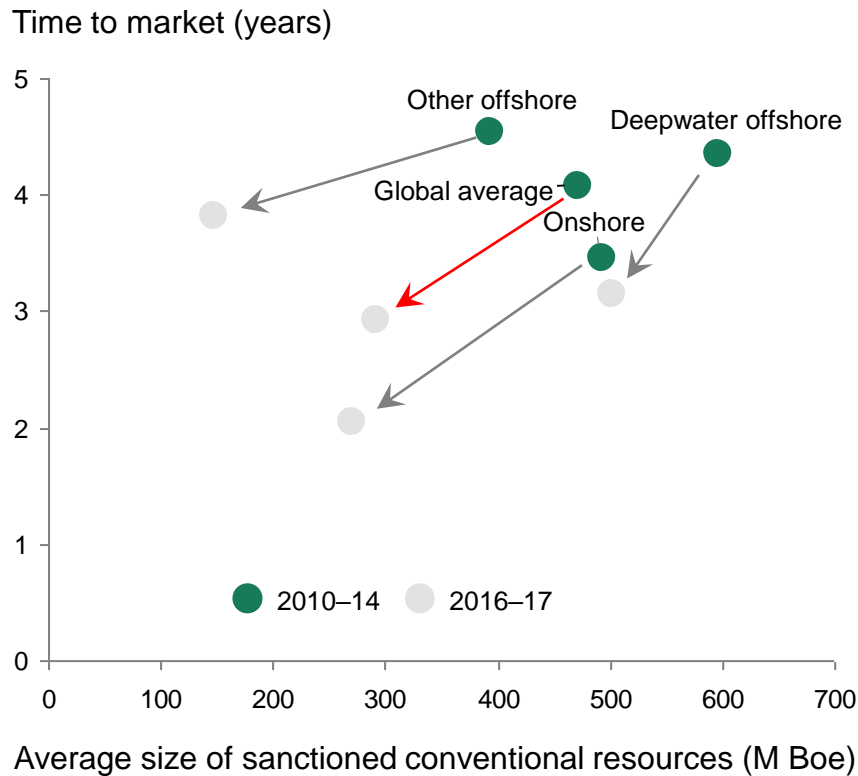
The absolute *and* relative level of hydrocarbon investments has been falling since 2014



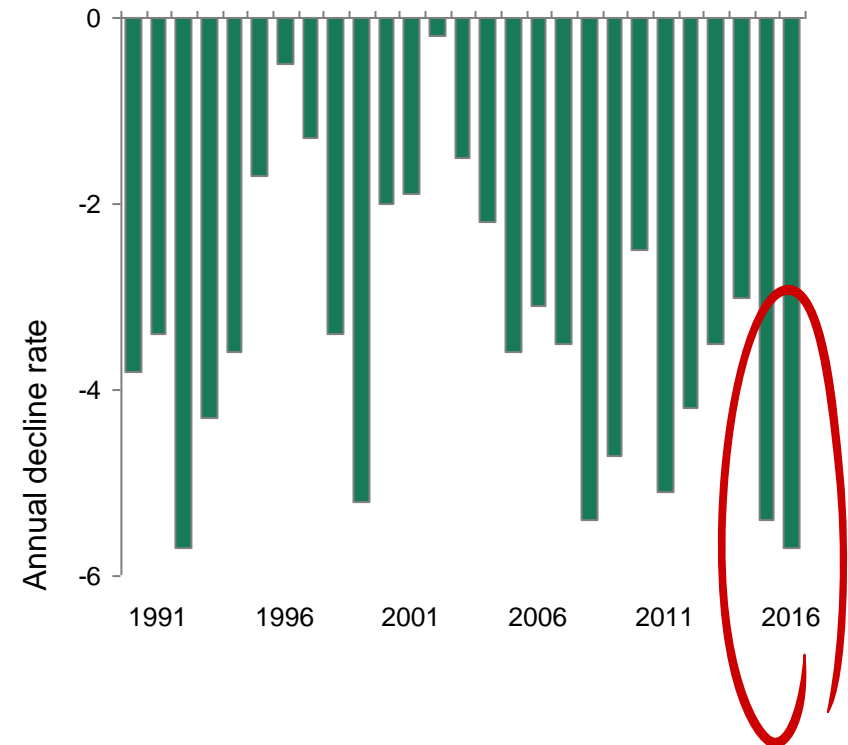
Decline rates are accelerating due to investment cuts

...but in parallel, projects are getting smaller and faster to respond

Conventional projects are becoming faster and smaller



Global decline at fastest pace since 1992



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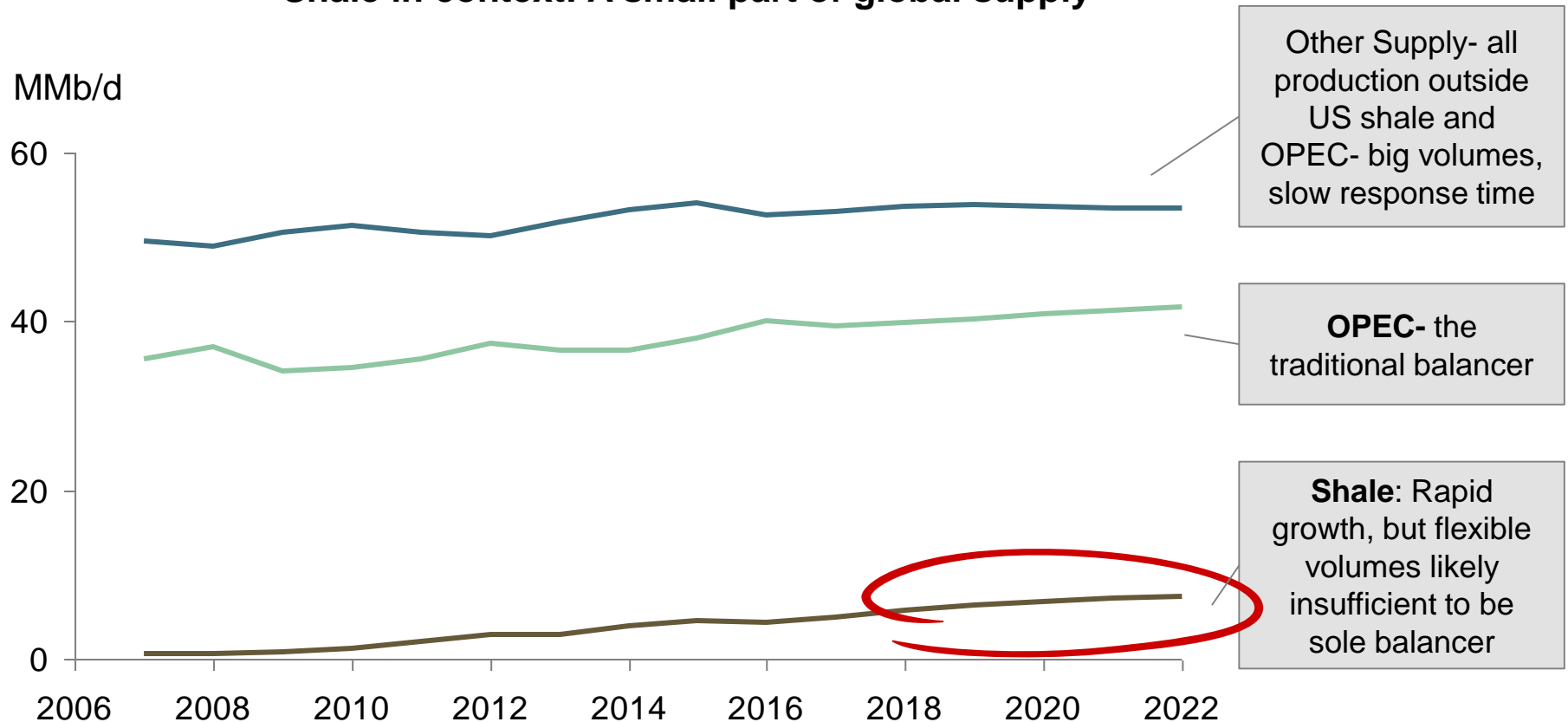
How are process and transition policies affecting demand?

Key questions and discussion

Shale is responsive- but is it big enough?

US shale changes do not remove energy security risks

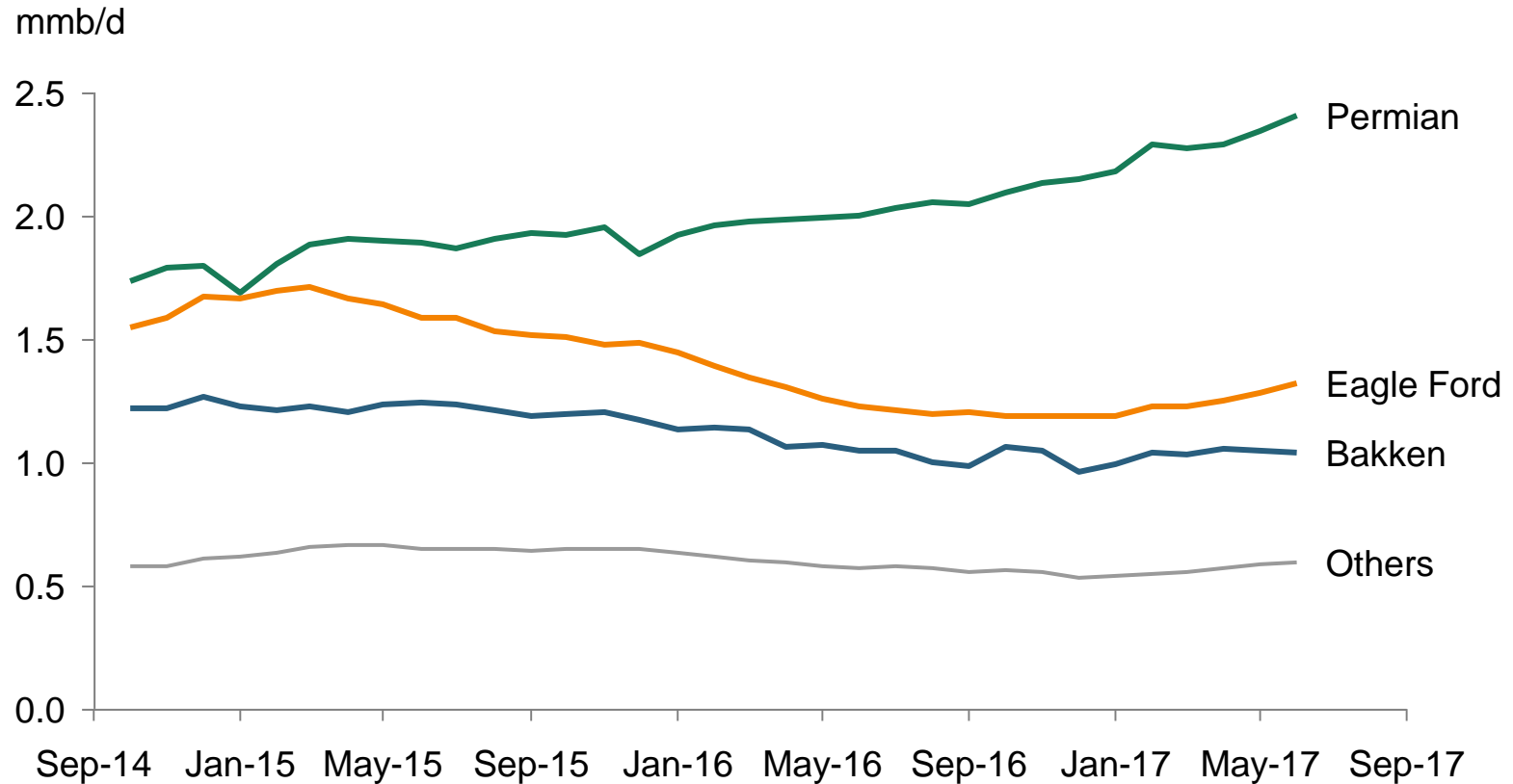
Shale in context: A small part of global supply



Shale production needed to drop ~40% in early 2015 to balance the market... Since then, it has grown

Shale growth depends on the Permian

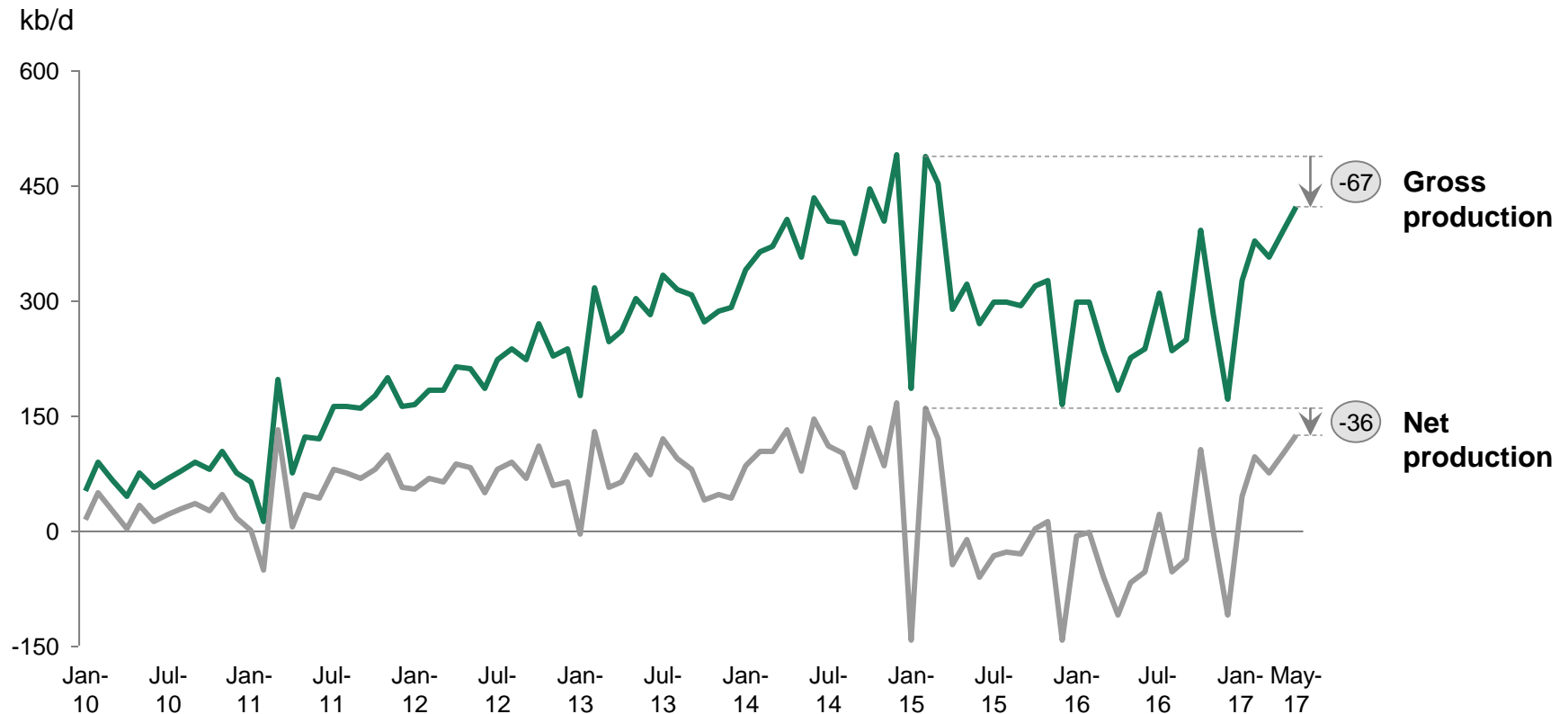
Since the price fall, all net growth has come from the Permian



The pace of growth neared 2014 levels in mid 2017

...but net production growth has to overcome severe declines

Monthly US shale production growth

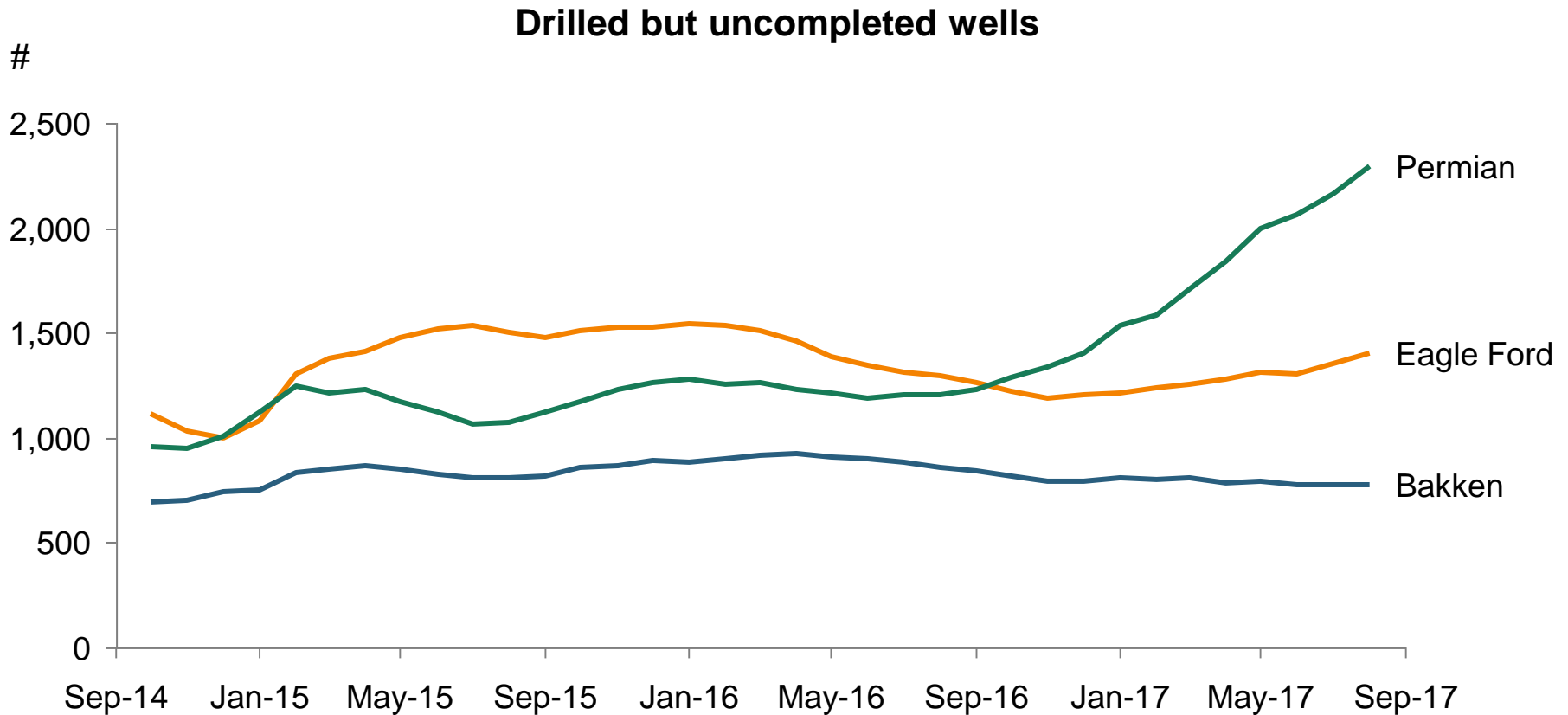


Note: Monthly production change for net production (top line) and gross production (top line growth plus change in monthly decline)

Source: EIA drilling productivity report, BCG analysis

But concerns about shale are becoming more clear

The stock of drilled but uncompleted wells has risen continually since mid 2016



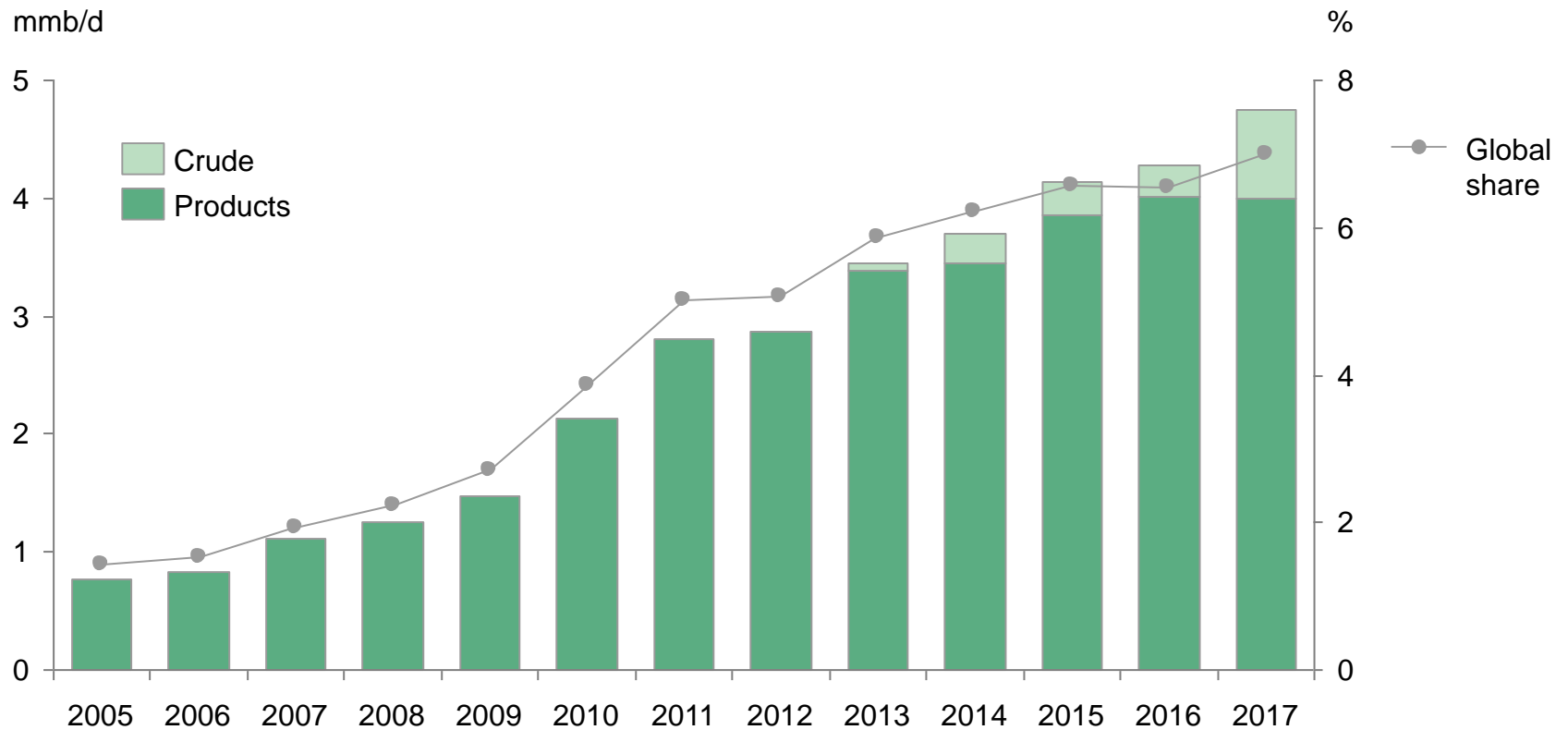
Note: DUC: Drilled but uncompleted wells. Graph rebases to October 2014, the beginning of the sharp price fall and activity

Source: EIA DPR DUC report, Aug 2017, BCG CEI analysis

AMER7-Session -1-Oil-Market-Investments-2017-IEF.pptx

Concentration risks have risen with shale

US Gulf exports now make up over 7% of global exports; 27 countries receive US crude



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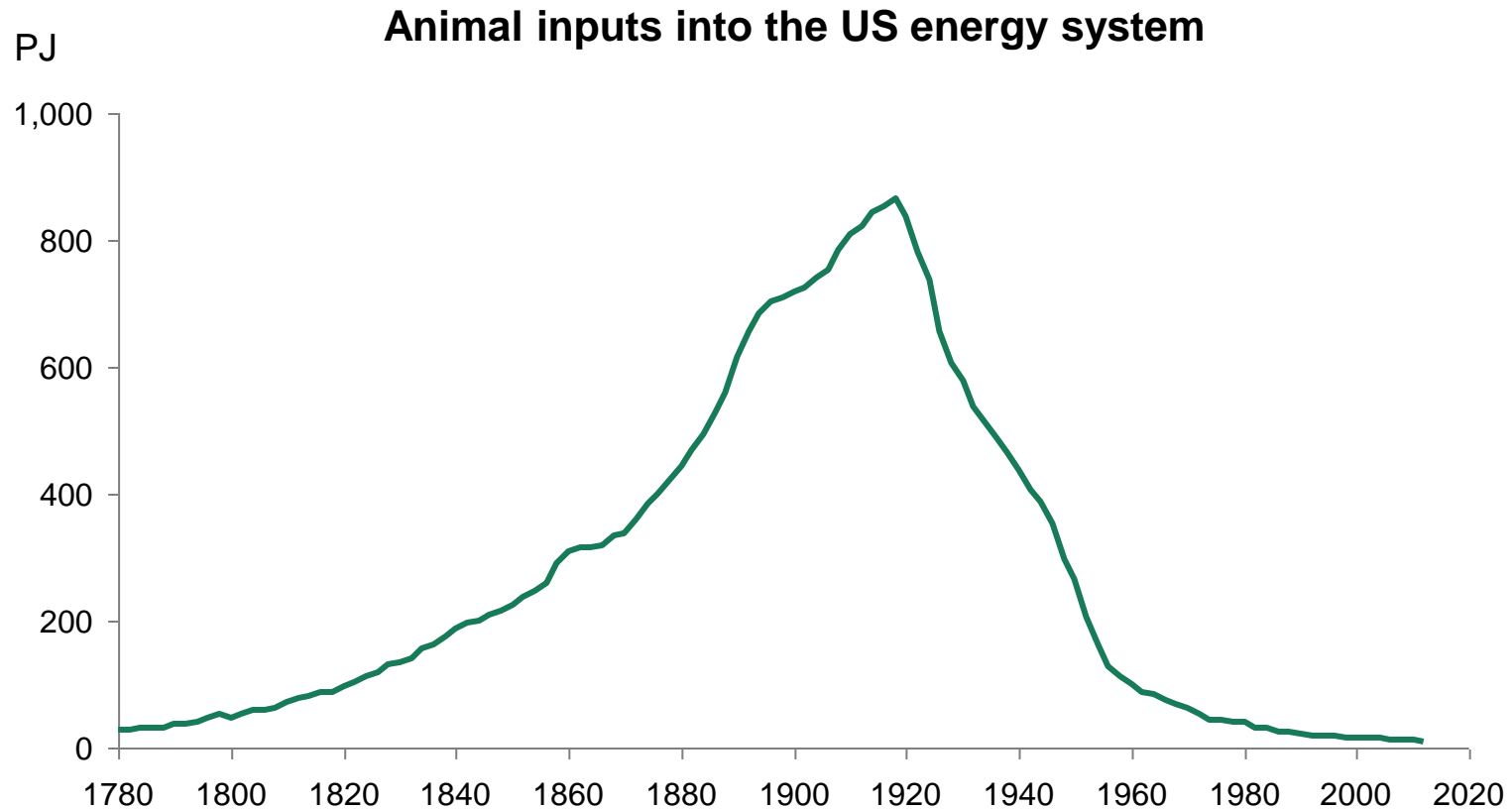
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Energy transitions: Surprises can happen

But large technology or policy shifts would be required to sharply reduce oil demand



Note: Draft animal energy inputs in the United States (18,900 calories per animal per day)

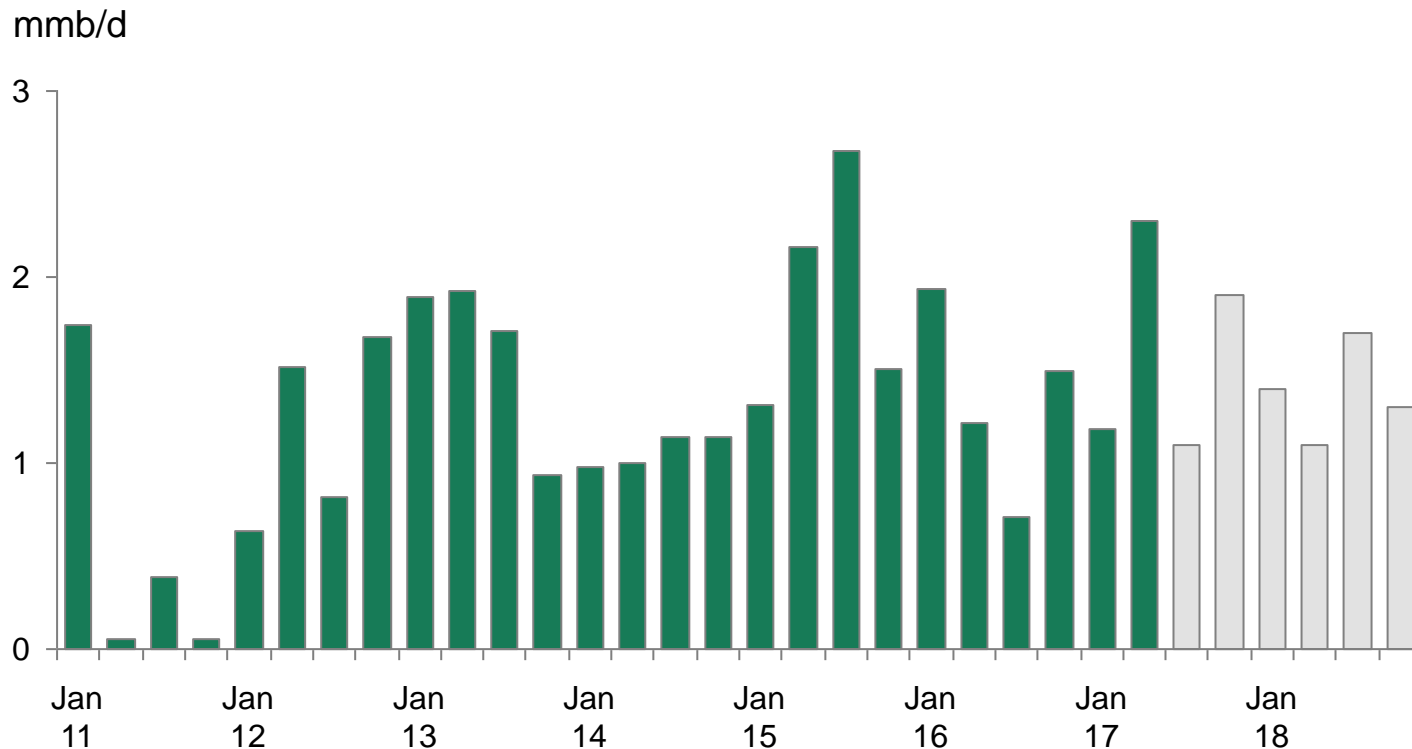
Source: US Energy Transitions, 1780-2010, Energies Journal

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But oil demand growth is accelerating in recent quarters

Driven by a shift to larger vehicles and stronger GDP growth in many consumers

Quarter on Quarter, total annual oil demand growth



Regular upward demand revisions have occurred during the price decline

A long-term fuel demand shift is underway

Eastward and up the barrel

Demand is trending eastward...

Shift to eastern demand firmly established

- Chinese growth fueled price rise in 2000's
- Non-OECD > OECD demand in 2013

Asia demand has more room to grow

- Population still expanding sharply
- GDP is quickly rising

Western demand will remain lackluster

- Many countries have reached peak demand for particular fuels
- GDP growth is positive, but limited on fuel
- Efficiency measures in place

...and will move higher up the barrel

Policies, efficiency measures push demand away from bottom of barrel

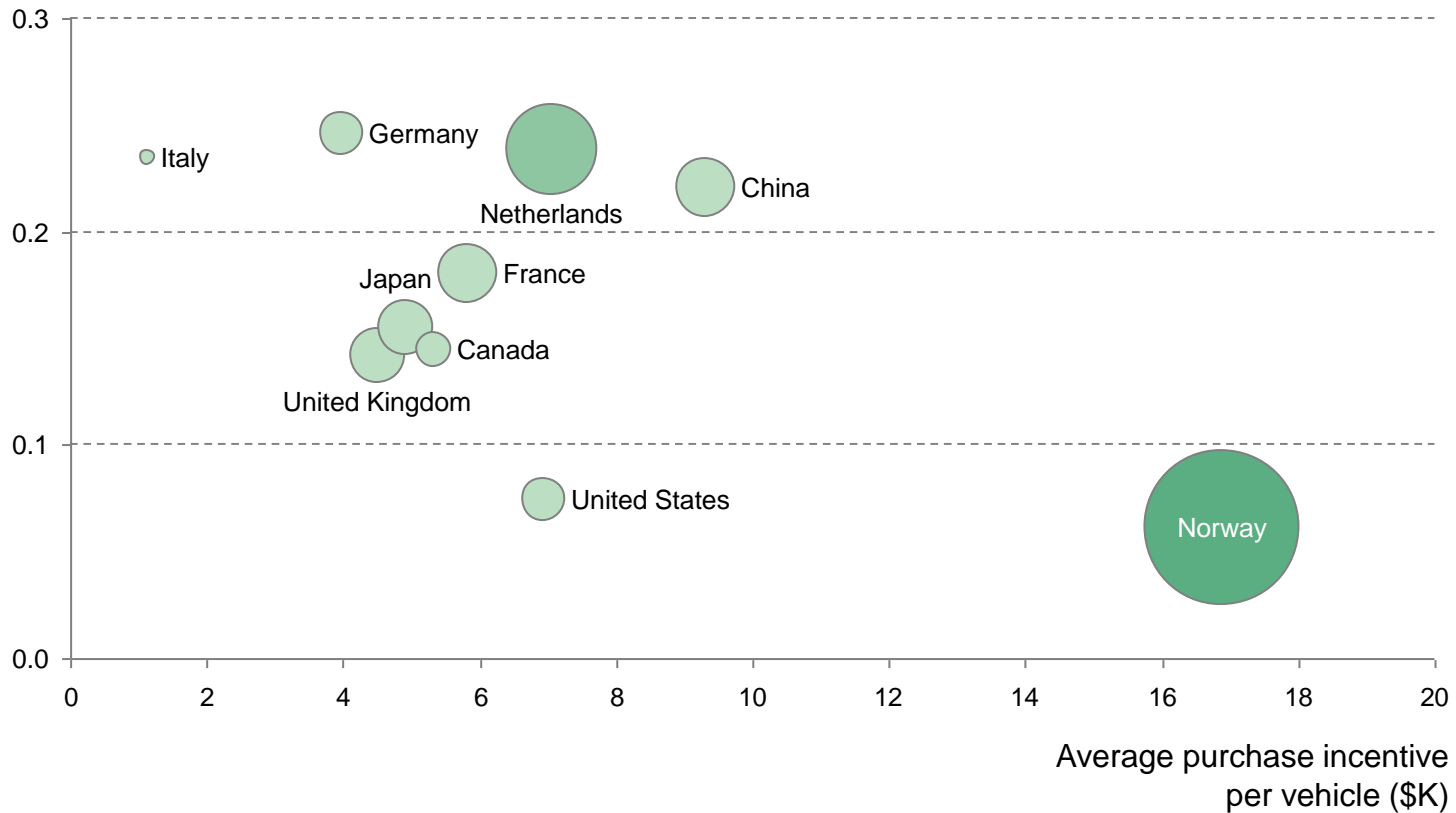
- Reduction in power generation demand (crude, fuel oil or diesel)
- IMO sulfur content requirements (fuel oil)
- Cement demand in China (diesel)
- Slowing dieselization
- Increased standards

Demand growth emphasize skews towards top of barrel

- LPG and naphtha into petrochemicals
- Jet fuel into increased passenger miles
- Gasoline into growing number of vehicles (often larger vehicles)

Electric Vehicle sales depend on purchase incentives or improving availability of public chargers

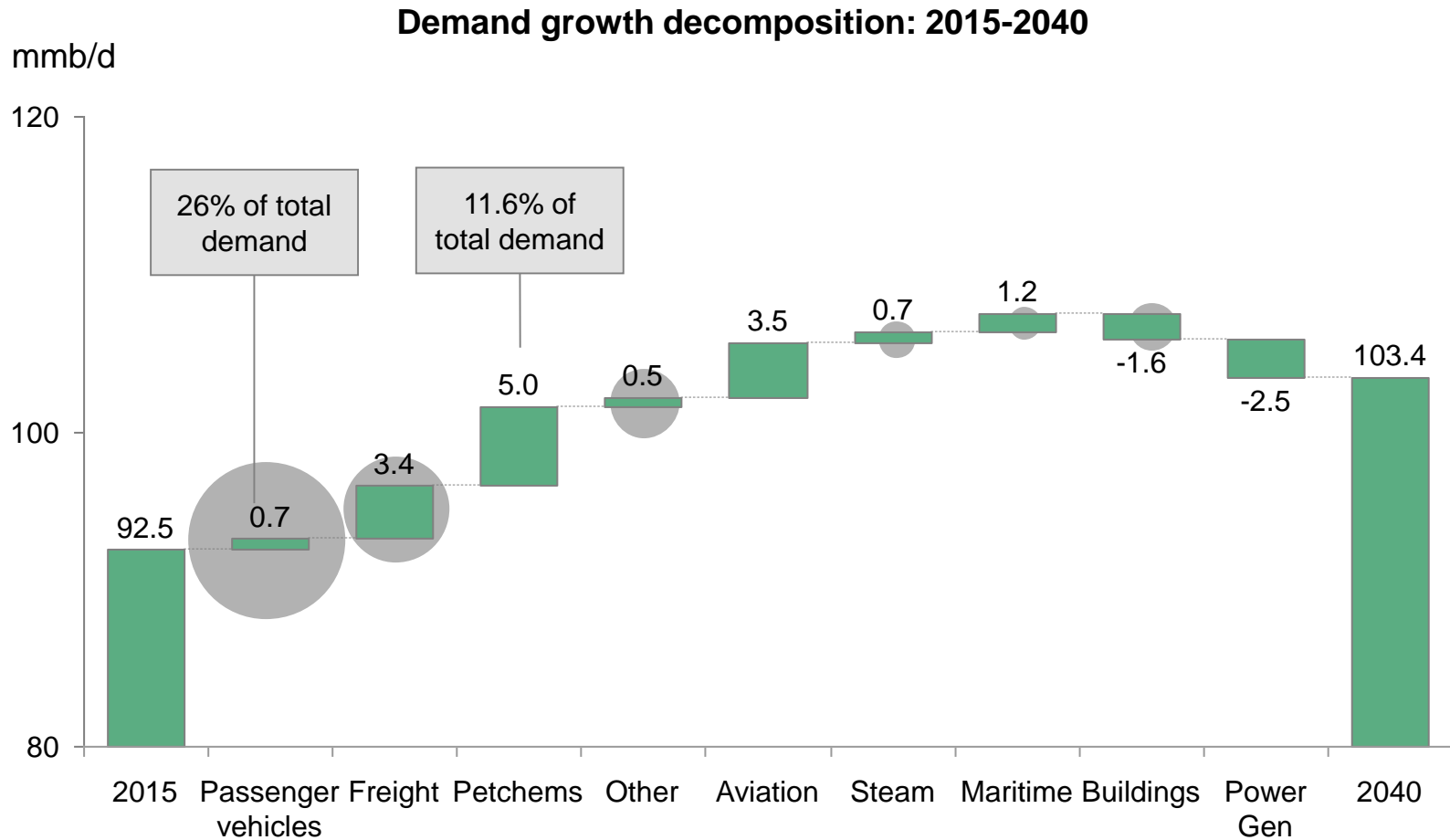
Public chargers per electric car



Note: Bubble area is proportional to EV share of all new car sales (e.g., 30% in Norway and 7% in the Netherlands). Incentives based on tax exemptions are estimated from average sales prices

Source: BNFF (2017) "EV policies dataset"; marklines (2017), "Automotive industry platform vehicle ..."

But demand growth will be difficult to reverse without substantial shifts and aggressive transition policies



Growth is in areas where it is more difficult to find alternative fuels

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Challenges of the new oil market environment

Key questions

- 1 What new policy measures will allow investment to move forward to avoid price spikes in future?**
 - Reconsider tax and investment terms to redistribute risk with private and foreign investors
 - Enable cross border investment in the upstream and downstream sector among consuming and producing countries to mitigate risk and diversify markets
 - Enhance NOC-IOC cooperation to lock in efficiency gains achieved in the low oil market environment
- 2 How does the shift to shorter cycle upstream oil investment and greater reliance on financial market instruments influence oil market volatility?**
- 3 How can ministers limit policy uncertainties associated with variable transition pathways and market realities across Asian countries to ensure adequate investment levels?**
- 4 How can Ministers enhance oil market data transparency in Asian countries and help improve data collection in the context of the Joint Organisations Data Initiative?**
- 5 Does the price cycle of recent years put a fundamental stop to certain types of development?**

Opportunities of the new oil market environment

Key questions

- 1** What can **Asian oil producers and consumers** do to advance **oil sector trade and investment opportunities** amongst themselves and enhance Asian oil market security?
- 2** How do **consumer and producer country governments and industries** create **win-win solutions** in their quest for sustainability? Where do oil markets contribute to transition?
- 3** How does the present **oil market environment** contribute to **economic diversification and sustainable development**?
- 4** How can **Asian Ministers** use the **IEF platform** to enhance dialogue on the implications of energy sector transition for national policy objectives and oil market security?