INTERNATIONAL ENERGY FORUM

New Delhi | 24 November | 2016

# 5th IEF-IGU Ministerial Gas Forum

## What JODI Gas Shows

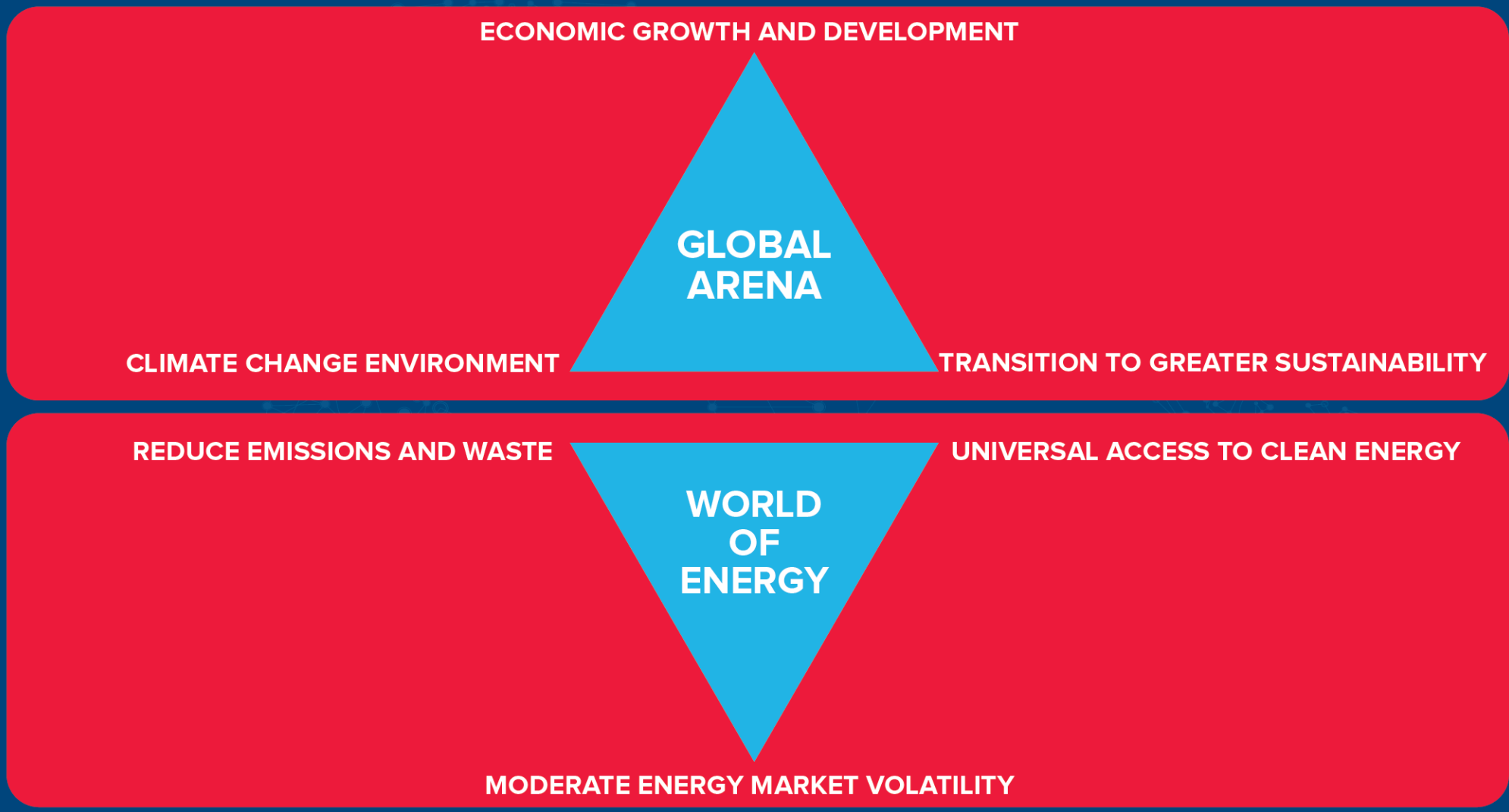
JodiGas
Joint Organisations Data Initiative

www.ief.org

# Overview

1. 3+3 Challenges
2. 7 Observations on gas markets
3. What the JODI Gas Data Base Shows
4. 3 Proposals

# 3+3 Challenges IEF Dialogue help overcome



# 7 Observations on gas markets

1. Gas demand will continue to grow to 2040, especially in Asia growth markets
2. LNG trade and new price signals create a global gas market
3. Abundant gas supplies show reduction in LNG investment
4. Lower spot prices mean higher longer term prices will remain subject to renegotiation
5. Traditional contract clauses on price indexation, destination, nomination and others are eased
6. US exports reduce Asian prices due to hub indexed prices and geography; panama canal
7. Gas is likely to play a larger role for longer in keeping up with future global energy demand

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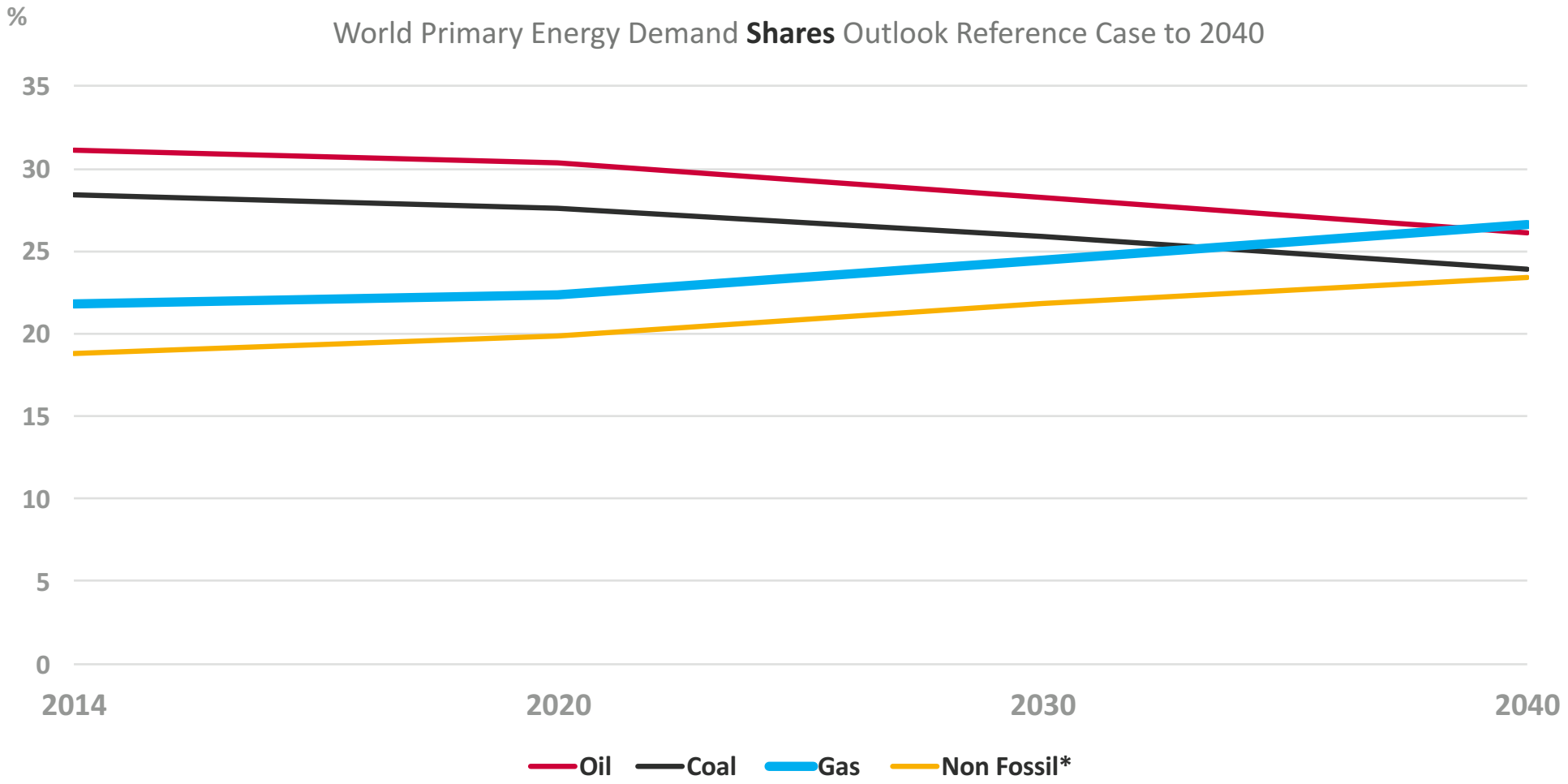
# Producers see gas take the largest share of demand




* Includes nuclear, hydro, biomass and other renewables

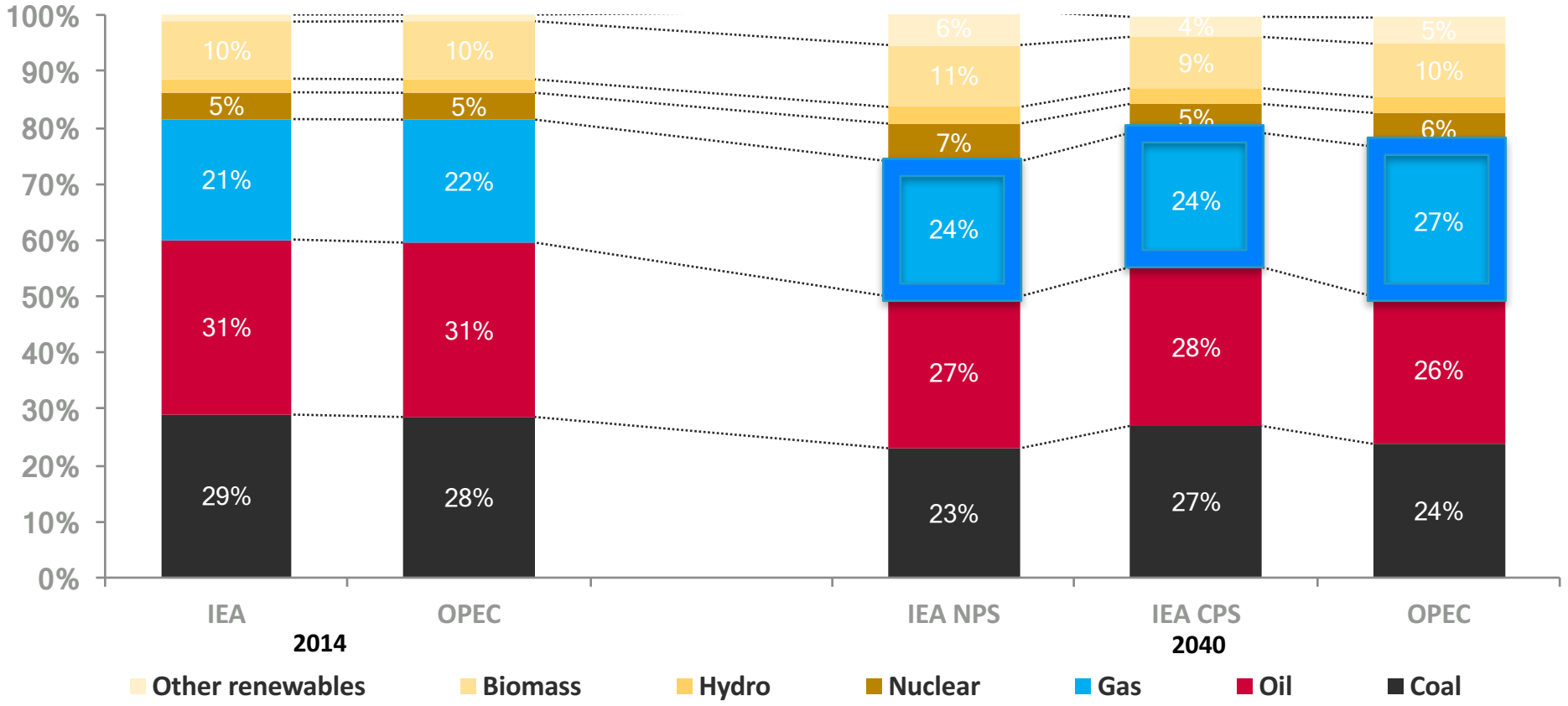
Data Source: OPEC World Oil Outlook November 2016

# Consumers see more moderate natural gas growth

## IEA and OPEC project annual gas growth from 1.5%-1.9% to 2.1% up to 2040

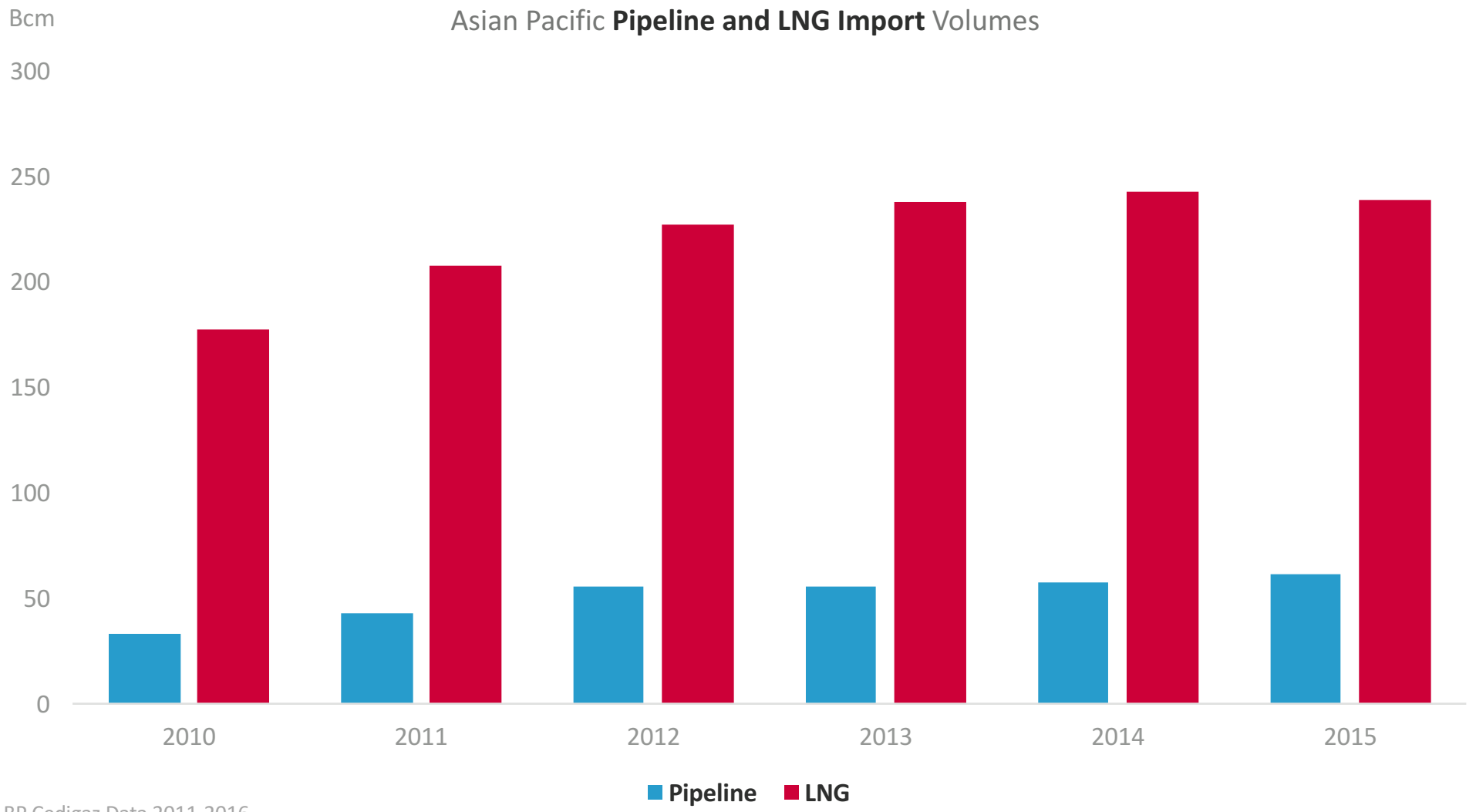
**Primary Energy Demand Shares**

in 2014 and 2040 IEA and OPEC New and Current Policy Scenarios and Reference Case



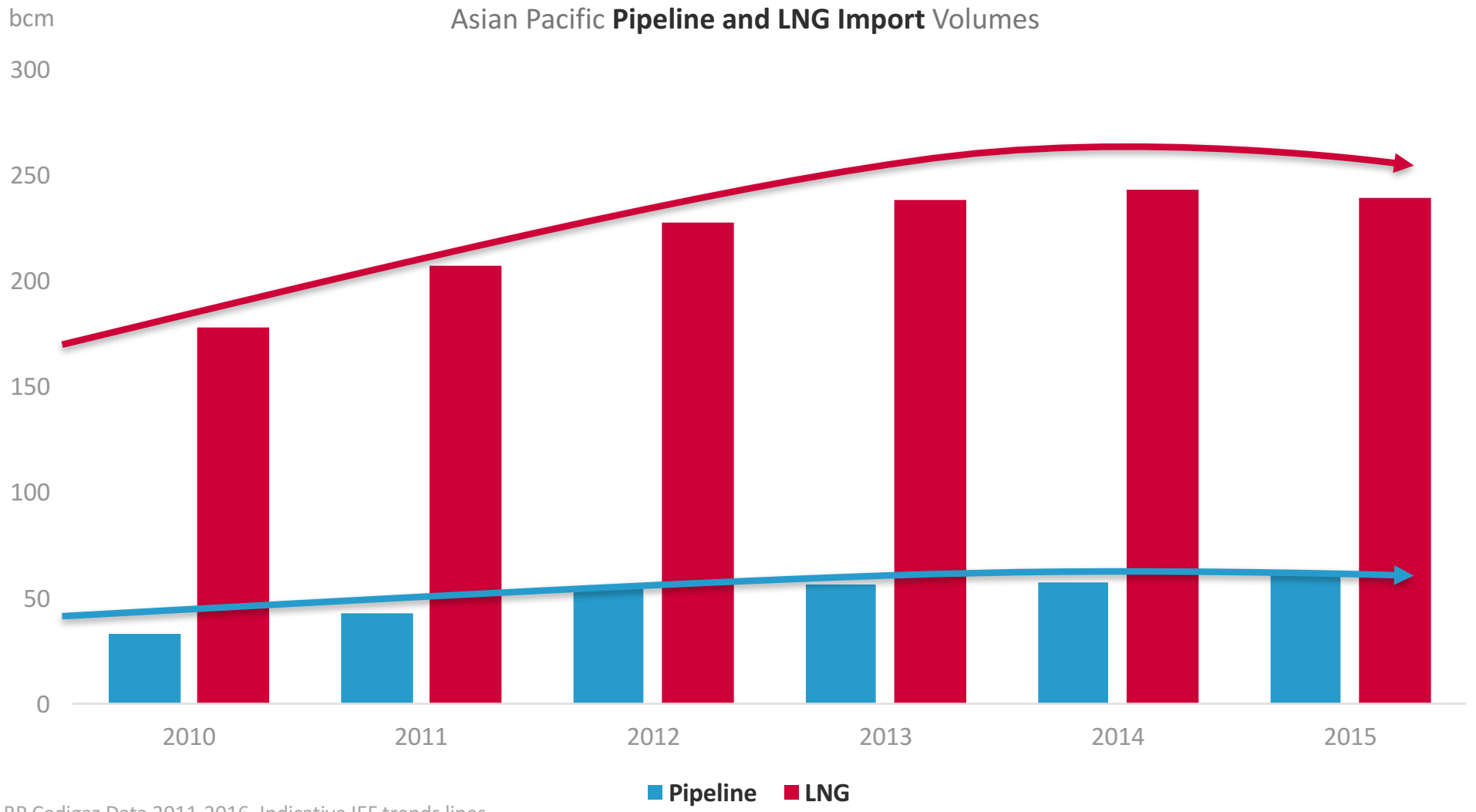

Data Sources: OPEC World Oil Outlook IEA World Energy Outlook November 2016

# Asian Pacific gas trade is dominated by LNG




BP Cedigaz Data 2011-2016

# But growth has peaked and slowed




BP Cedigaz Data 2011-2016, Indicative IEF trends lines

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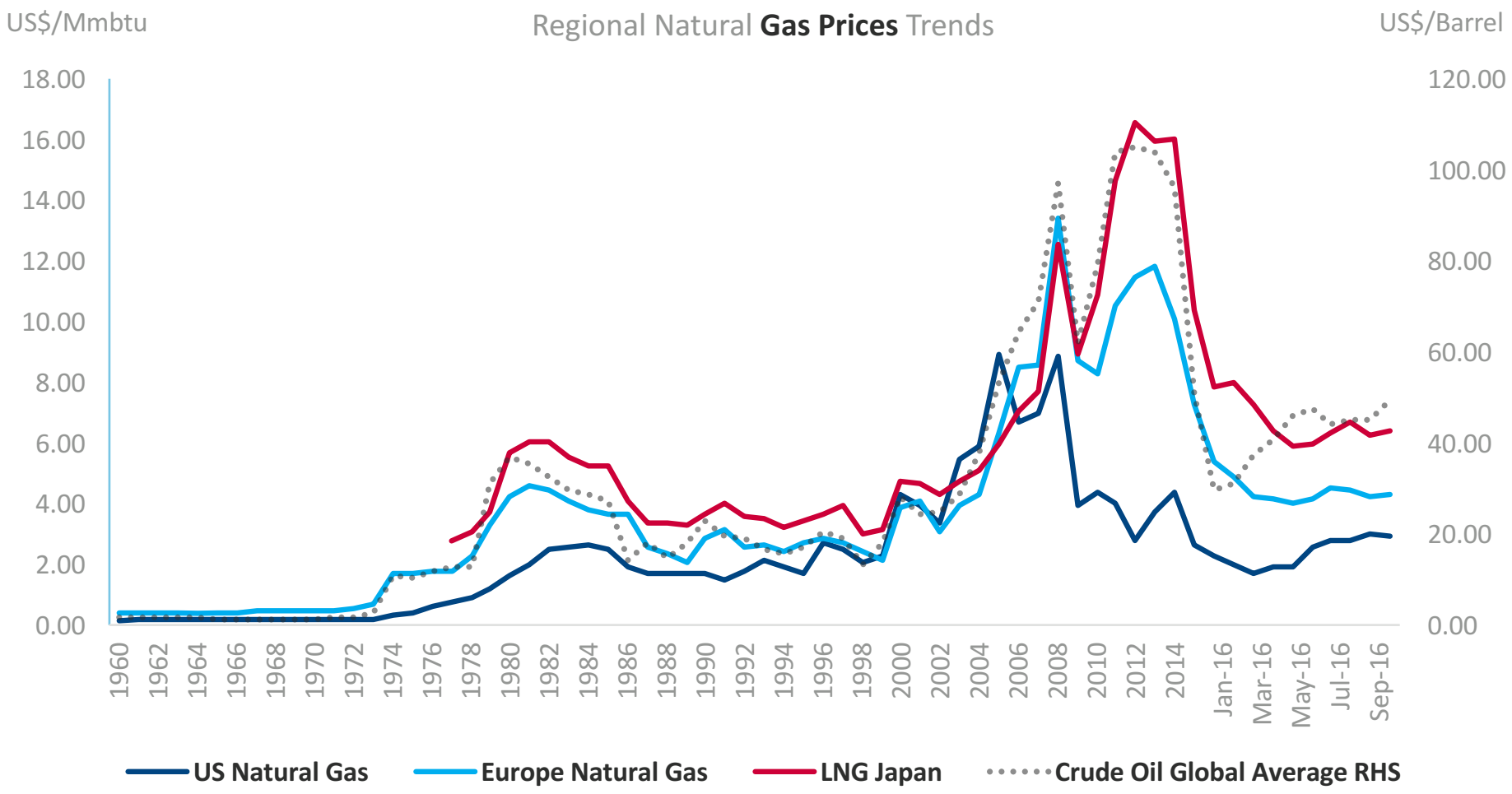
# Convergence show transferable prices across regions

## Gas is commoditizing but prices continue to reflect regional characteristics




Source: World Bank Average Annual Commodity Prices to 2015, and Average Monthly Prices from January to October 2016

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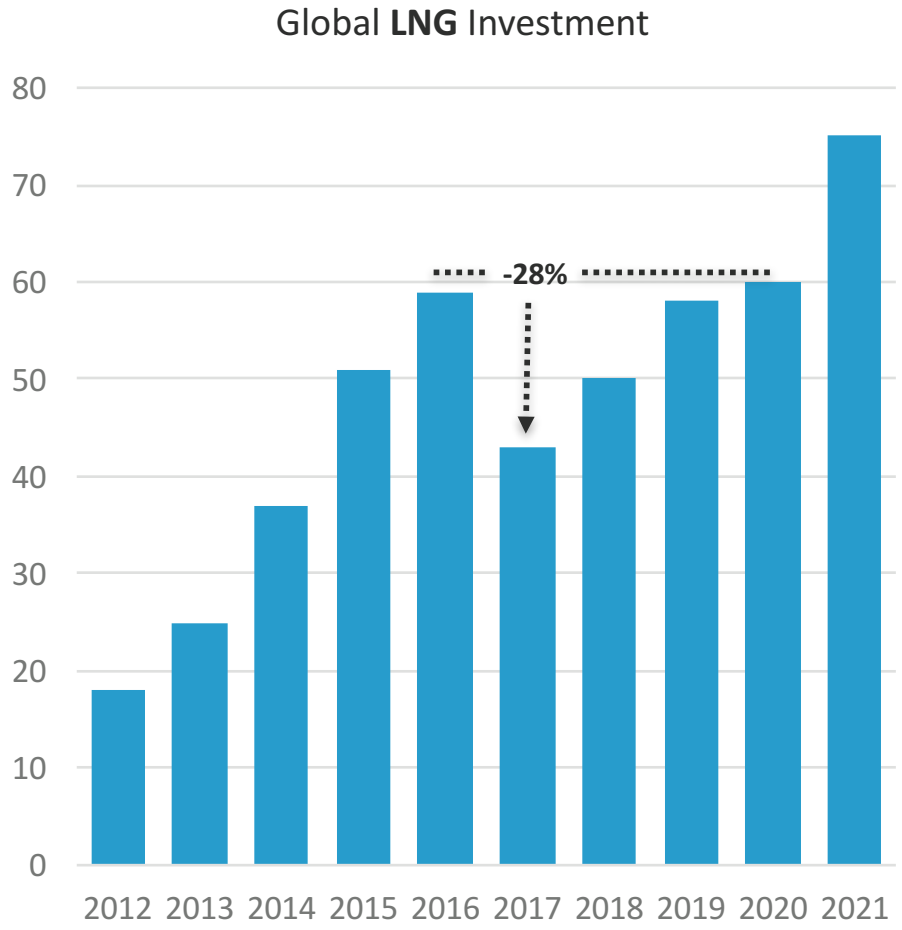
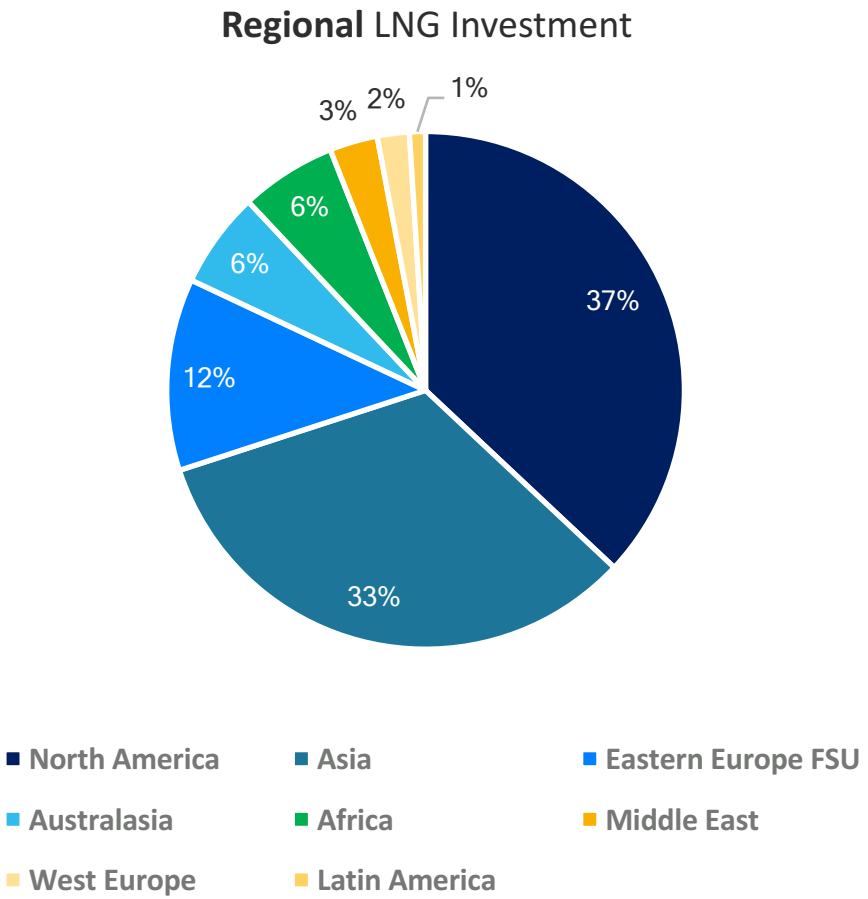
# Slow down in LNG investment recovers after 2020 with North America and Asia in lead




Sources 2016 Douglas Westwood World LNG Market Forecast 2017-2021

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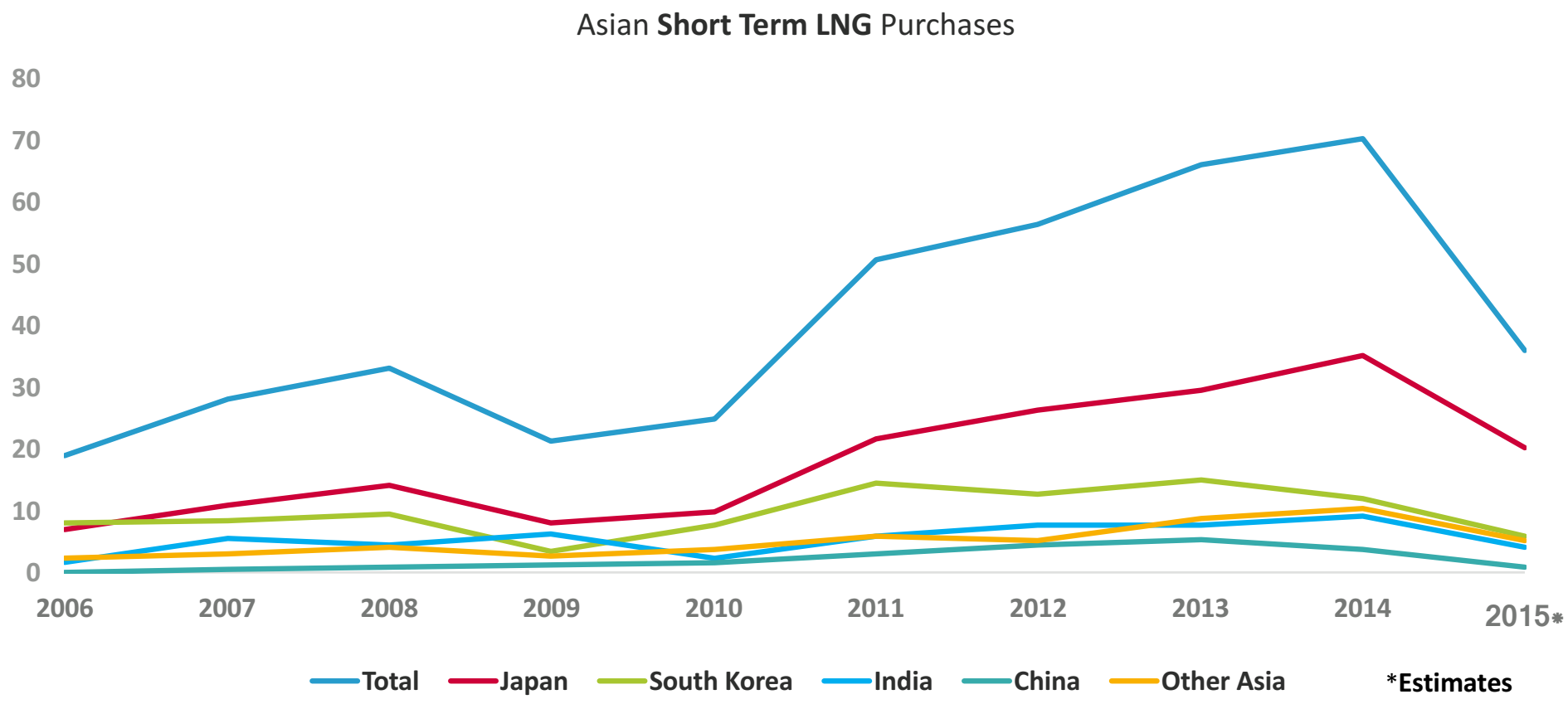
# Short-term LNG demand eased on reduced demand

Bcm




Sources Chi-Kong Chyong and Roman Kazmin *The economics of global LNG trade: The case of Atlantic and Pacific inter-basin arbitrage in 2010-2014* University of Cambridge Energy Policy Research Group Working Paper 1602, January 2016 Howard V. Rogers *Asian LNG Demand Key Drivers and Outlook.* Oxford Institute for Energy Studies NG 106, April 2016

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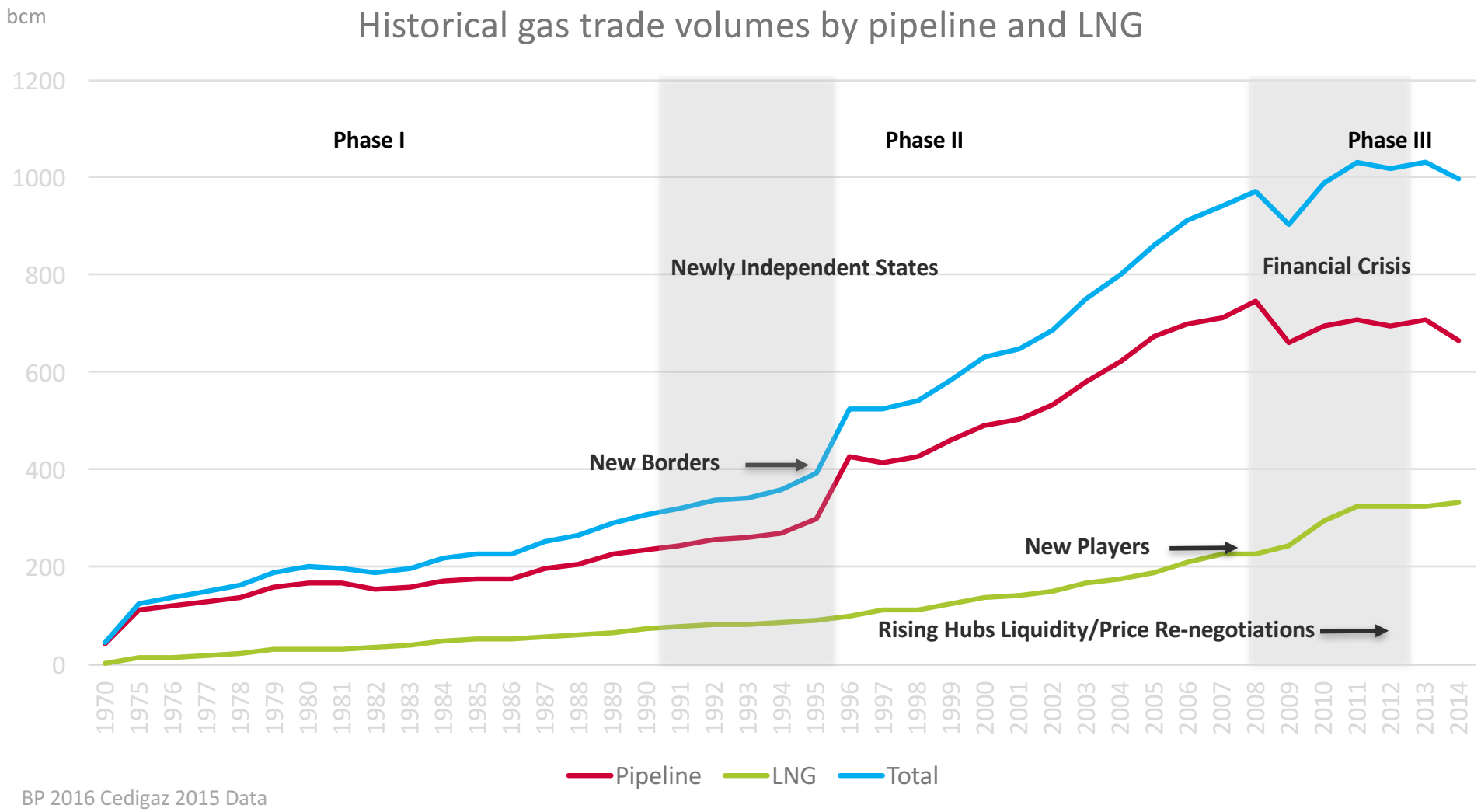
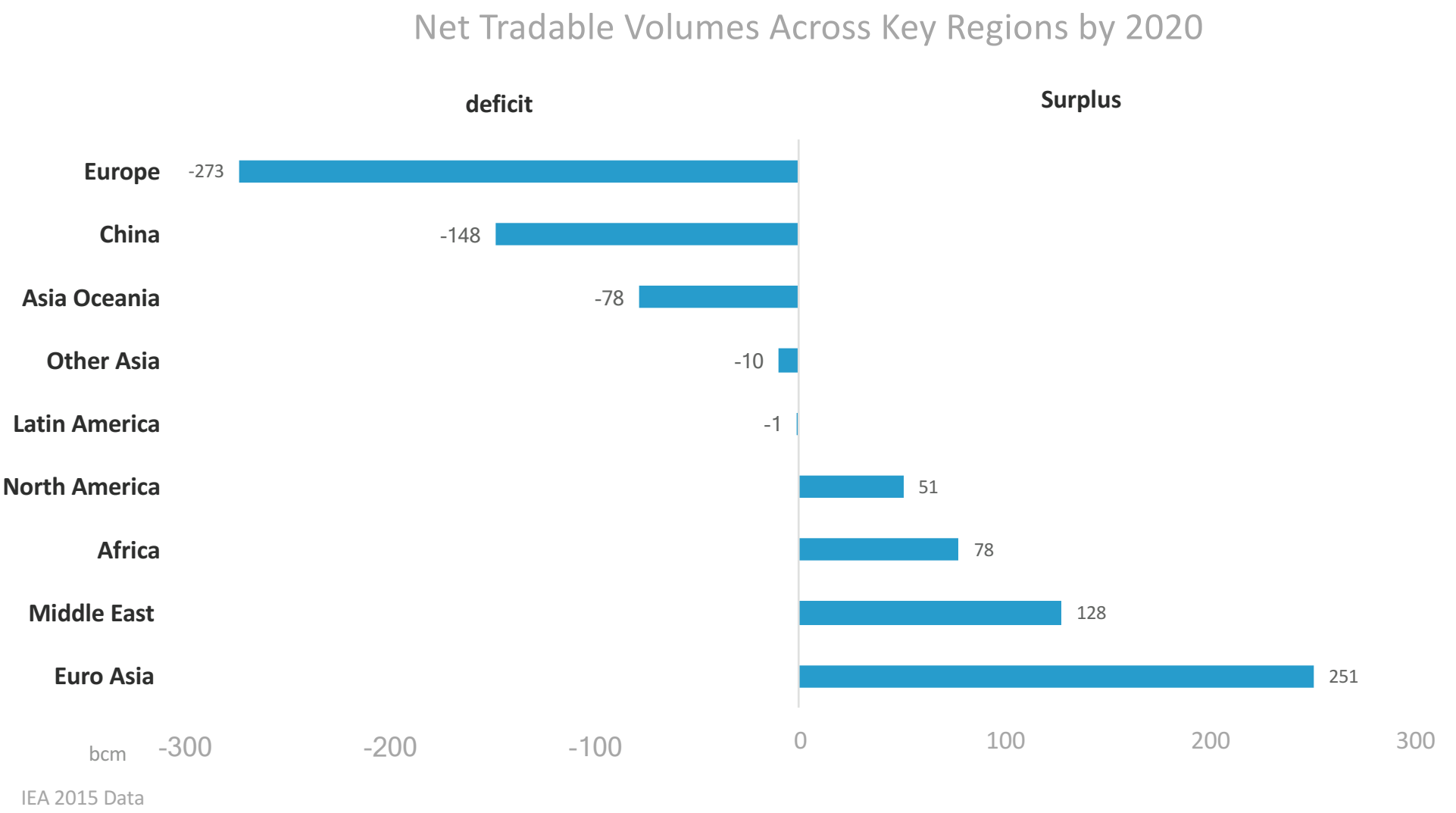
# LNG - pipeline interactions stage the future




BP 2016 Cedigaz 2015 Data

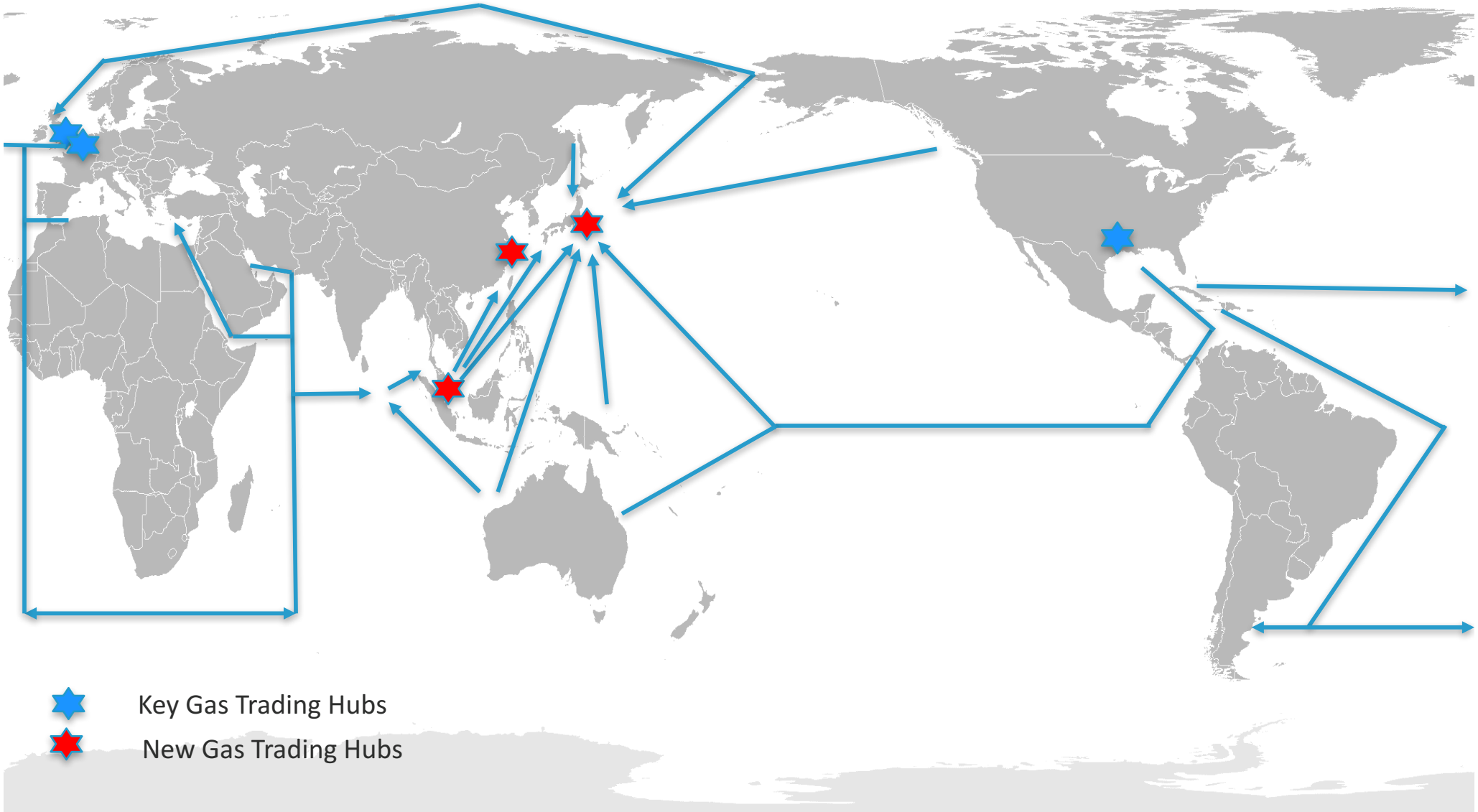
# Chances for gas to deliver transition are historic

## More dialogue and new approaches are needed




IEA 2015 Data

# New sources, routes and price discovery mechanisms create more competitive Asian Market



# LNG project launches in Australia

| Project | Partners | Total Capacity bcm/y | Expenditure $billion | First Start up |
|---|---|---|---|---|
| North West Shel Venture T 1-5 | Woodside, BHP Billiton, BP, Chevron, Shell, MIMI | 22 | 50 | 1989 |
| Darwin LNG T1/2 | ConocoPhillips, Inpex, Eni, Santos, Tokyo Electric, Tokyo Gas | 5 | 1.5 | 2005 |
| Pluto T1 | Woodside, Kansai Electric, Tokyo Gas | 5.8 | 15.3 | 2012 |
| *Arrow* | *Shell, Petro China* | *10.2* | *20* | *Cancelled in 2015* |
| *Browse FLNG* | *Wodside, Shell, BP, Japan LNG, PetroChina* | *n.a.* | *40* | *Cancelled 2016* |
| **Queensland Curtis LNG T1/T2** | **BG Group CNOOC, Tokyo Gas** | **11.5** | **23.7** | **2015** |
| **Gladstone LNG T1/2** | **Santos, Petronas, Total, Kogas** | **10.6** | **21.6** | **2015/2016** |
| **Australia Pacific LNG T1/T2** | **Origin ConocoPhillips, Sinopec** | **12.6** | **24.7** | **2015/2016** |
| **Wheatstone T1/2** | **Chevron, Apache, KUFPEC, Kyushu Electric Power Wheatstone** | **12** | **29** | **2016/2017** |
| **Gorgon T1-3** | **Chevron, ExxonMobil, Shell** | **20** | **54** | **March 2016-2017** |
| Ichtys T1/2 | Inpex, Total | 12.1 | 37 | 2017 |
| Prelude FLNG | Shell, Inpex, KOGAS, CPC Corporation | 4.7 | 13 | 2018 |
| **Total Australian LNG Capacity and Expenditure** | | **116.3** | **269.8** | |

Sources: The Australian Petroleum Production & Exploration Association and Individual Company Reports

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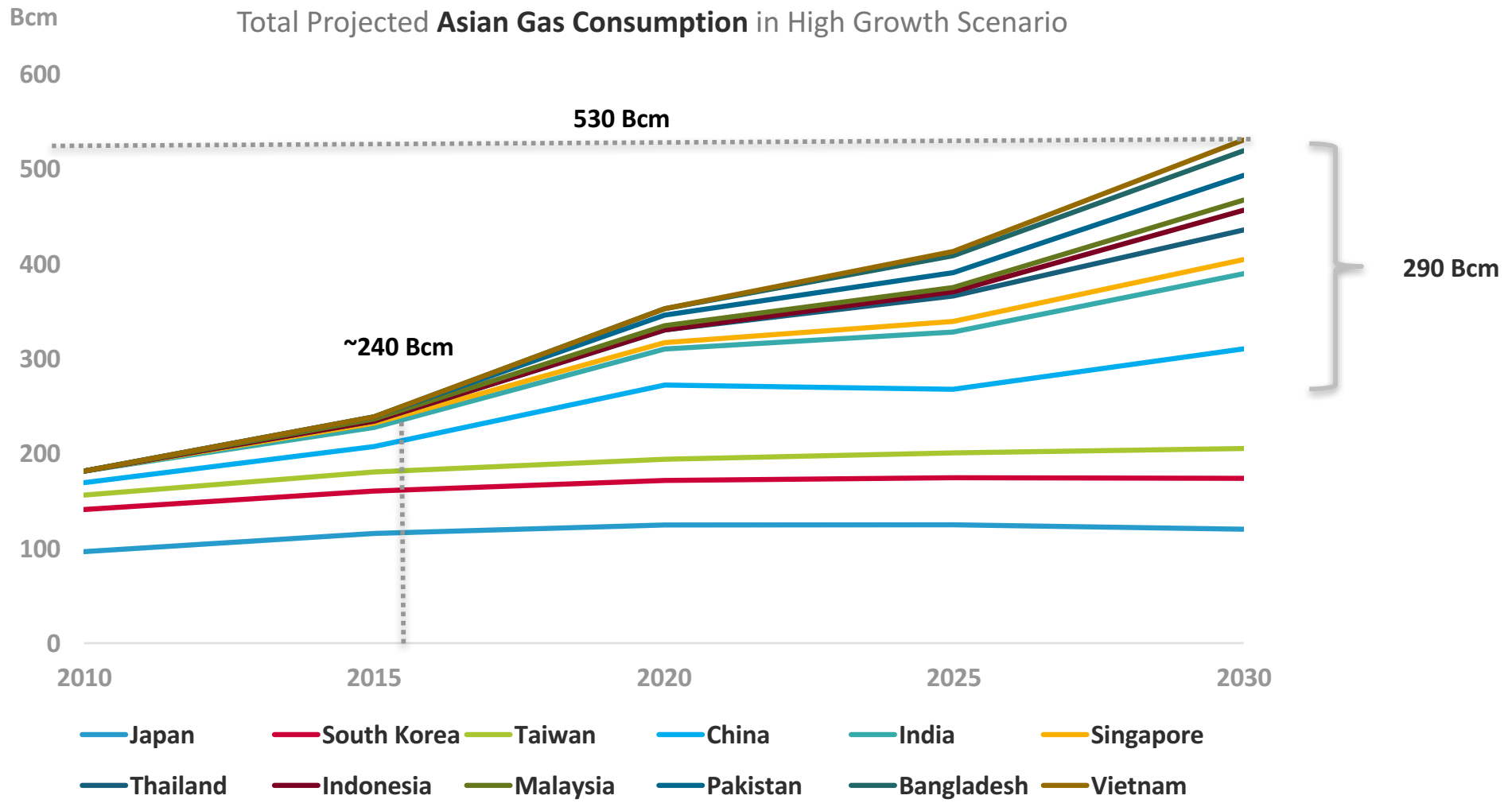
# Gas can play a larger and longer role in Asia




Source: Howard V. Rogers *Asian LNG Demand Key Drivers and Outlook.* Oxford Institute for Energy Studies NG 106, April 2016

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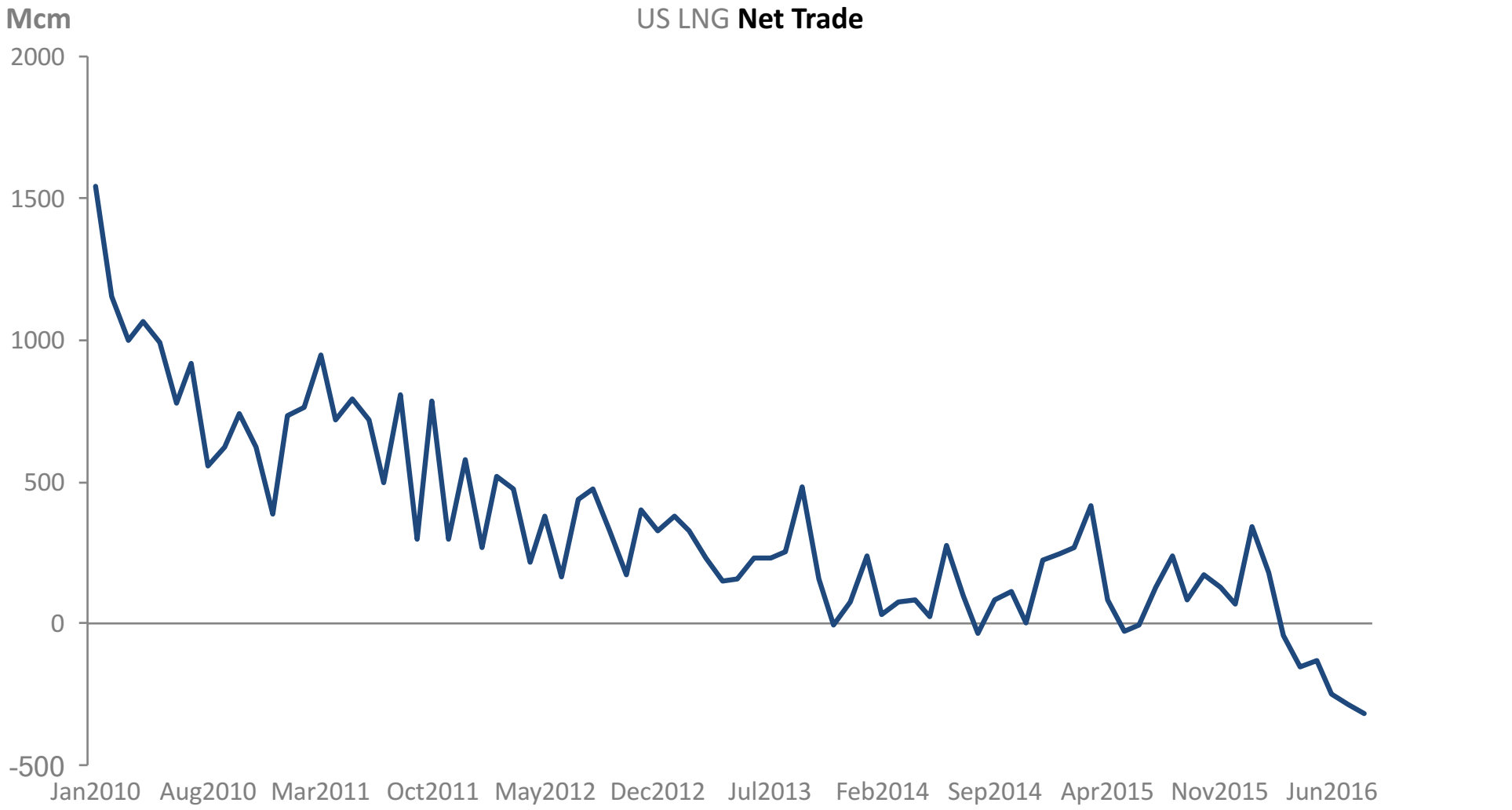
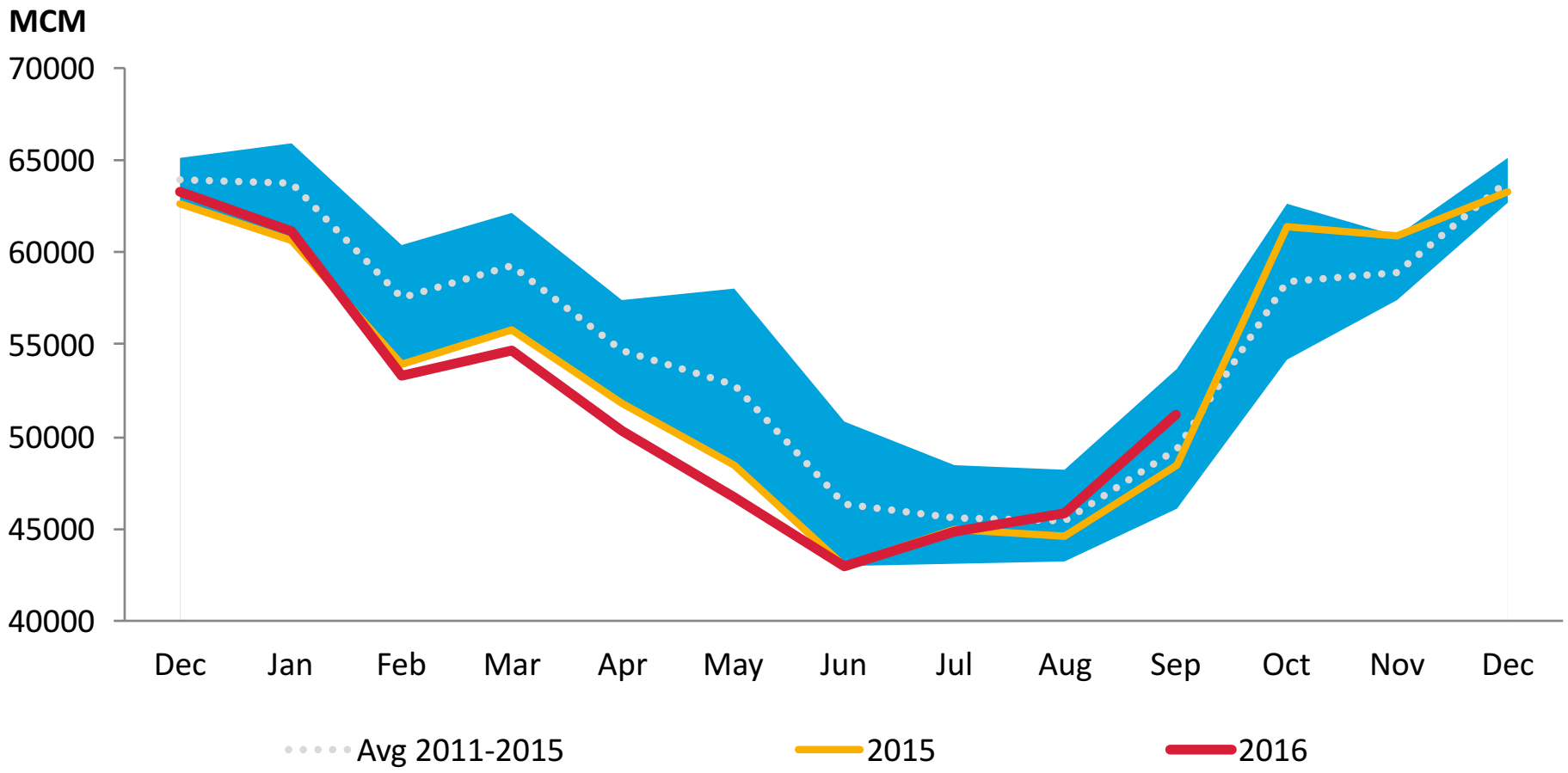
# The US turned into an LNG exporter in March 2016 bringing a 2nd wave to markets

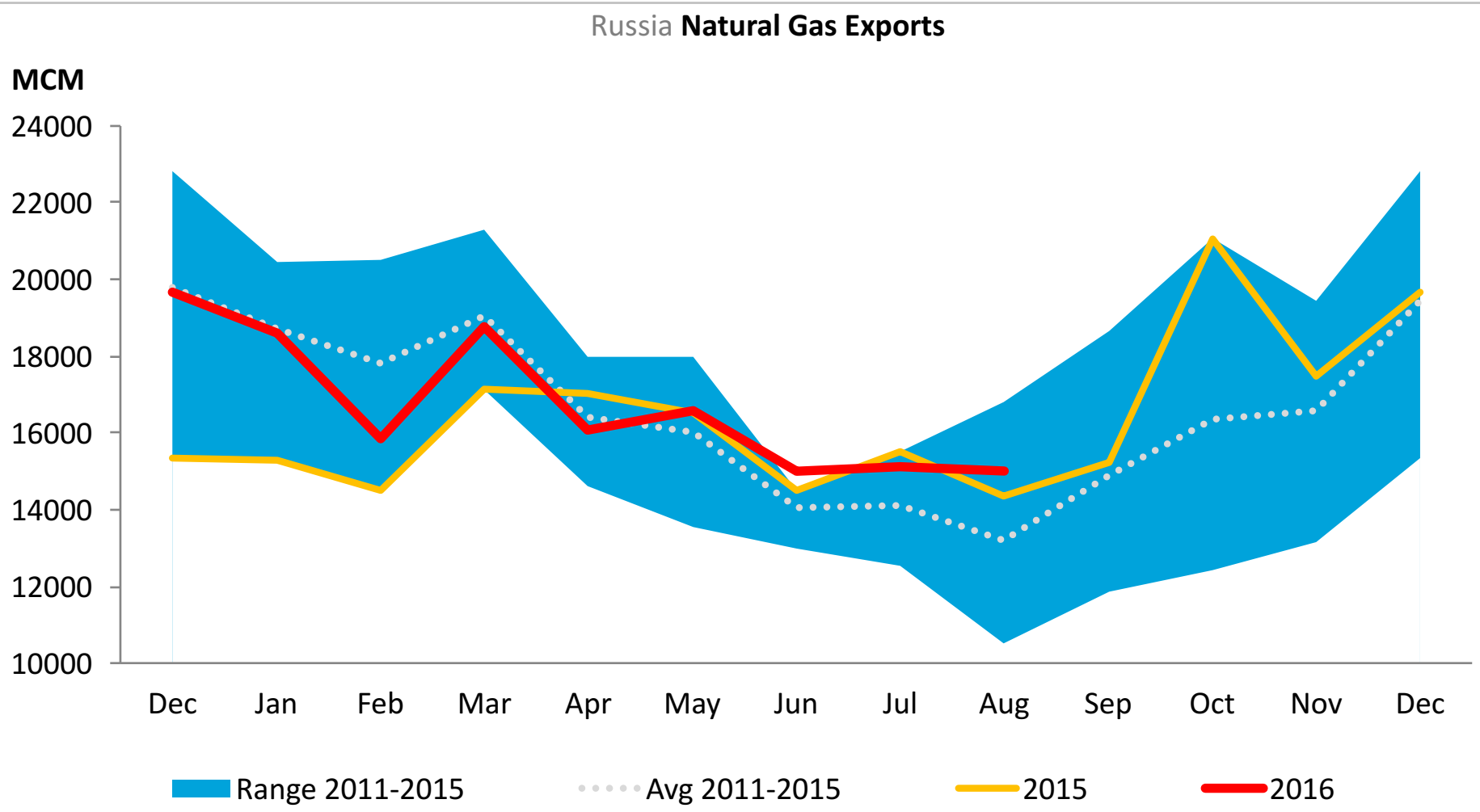


# Russian gas production picks up from lows caused by weak domestic demand

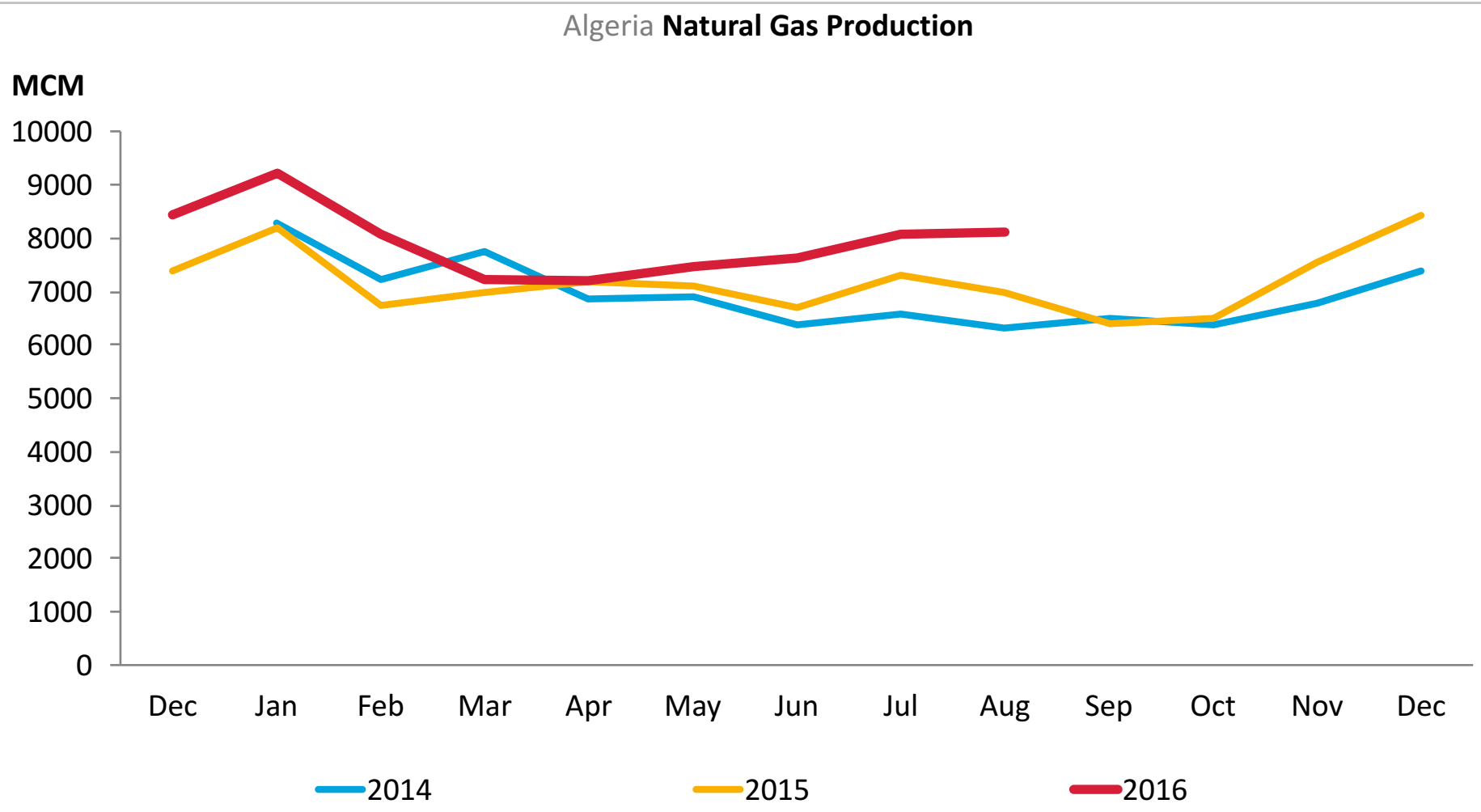
Russia **Natural Gas Production**



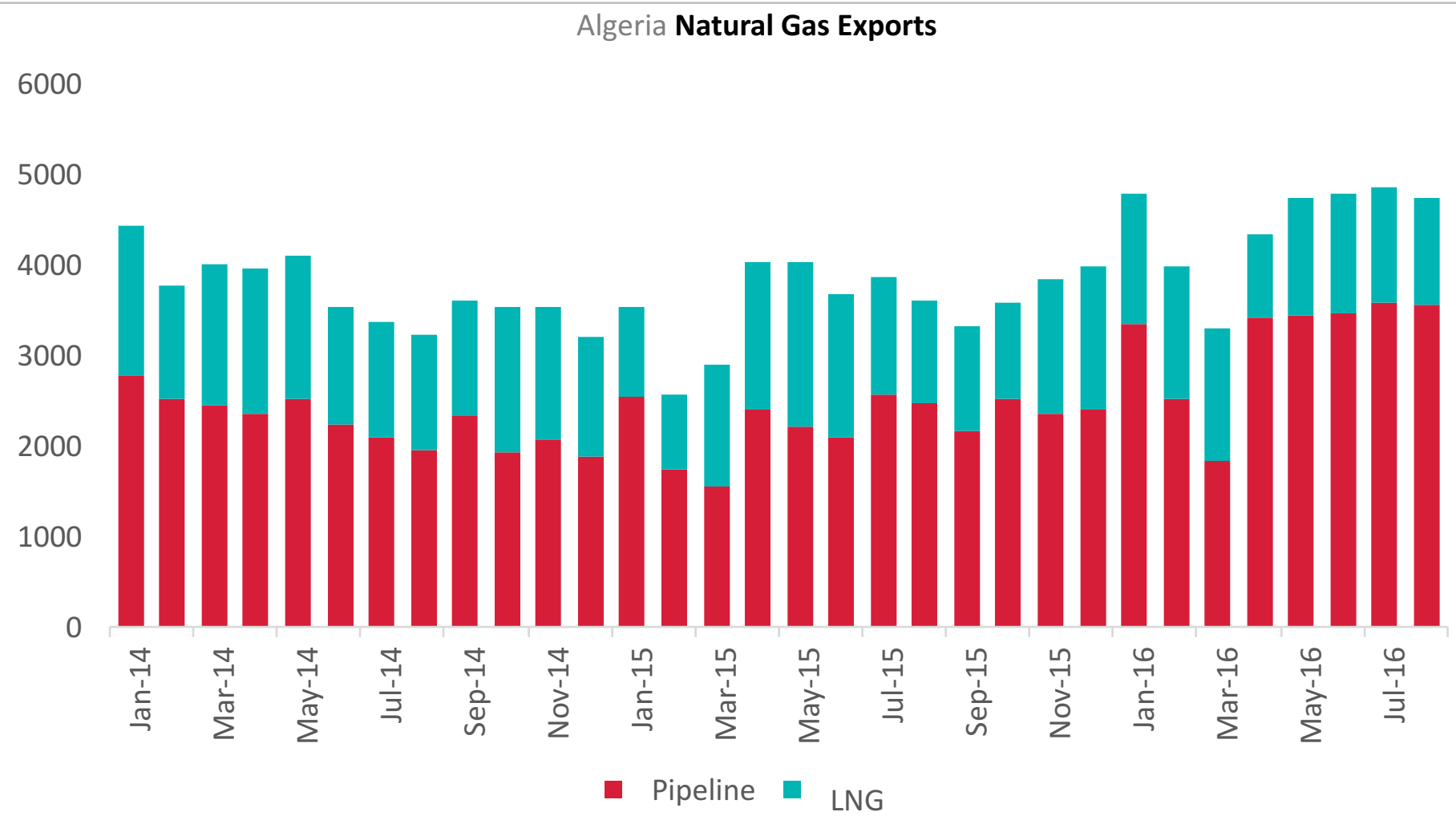
# Russian gas exports have recovered from 5 year lows reached in 2015



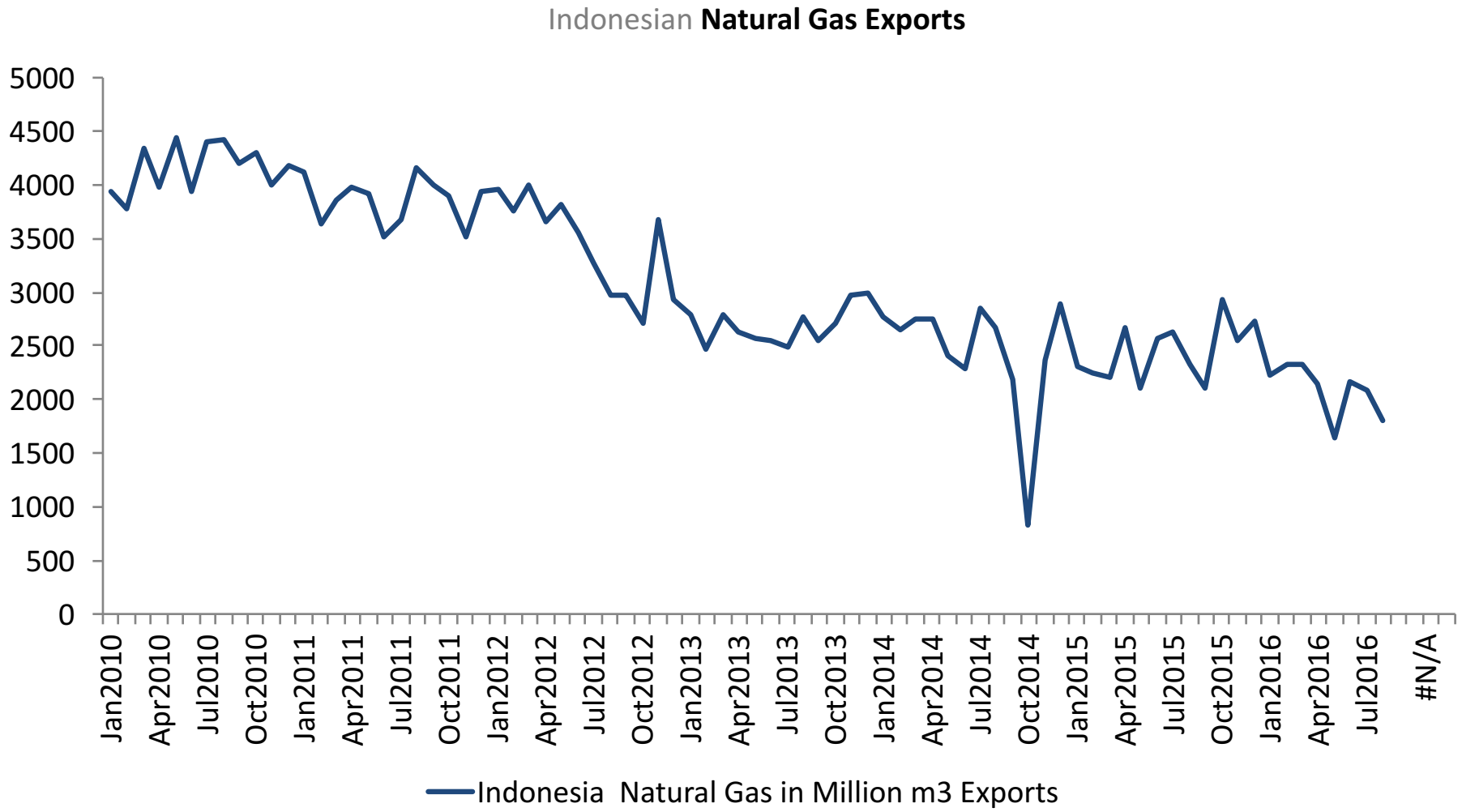
# Algerian gas production grew steadily



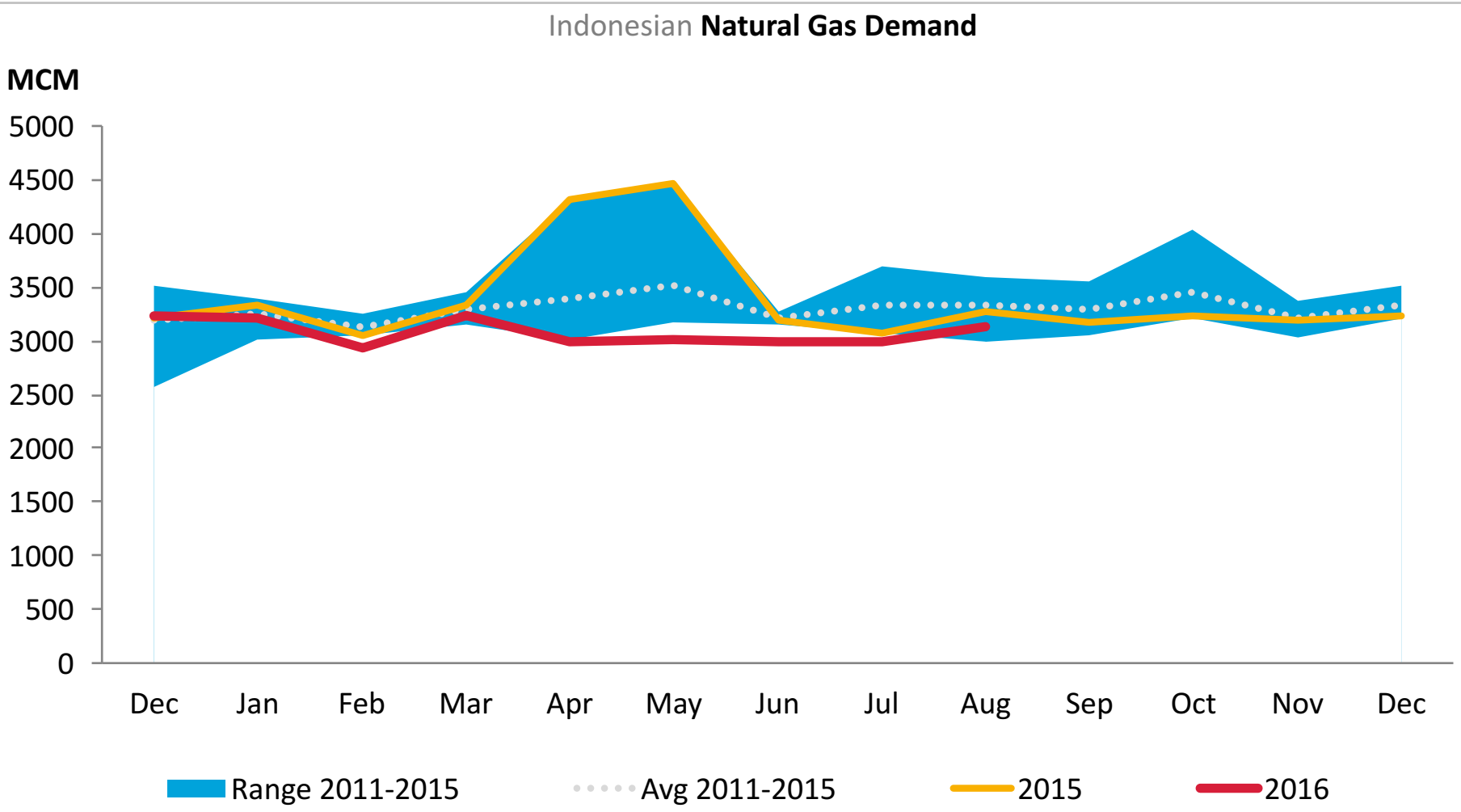
# Algerian pipeline exports have increased



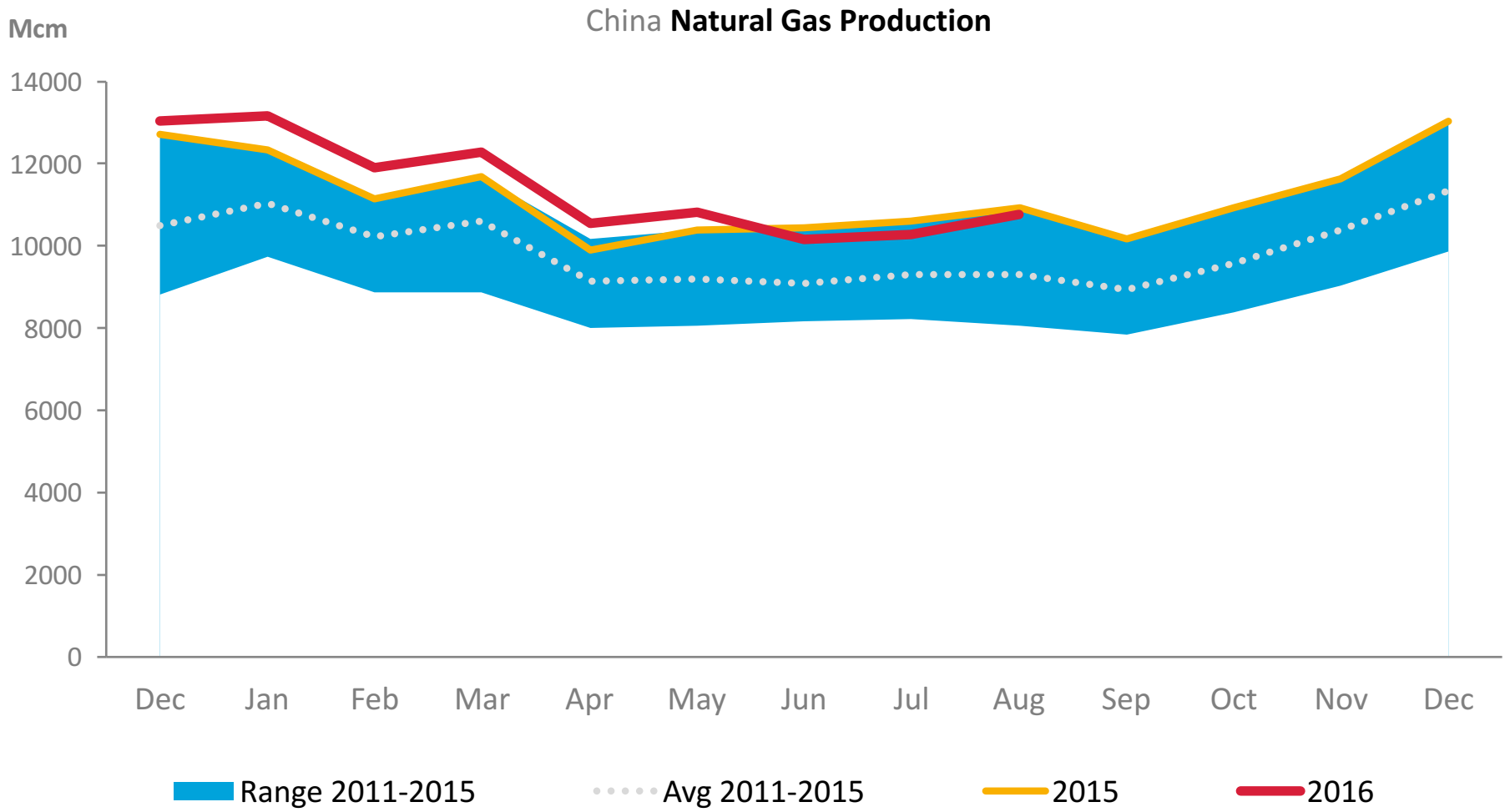
# Indonesian gas exports are in decline



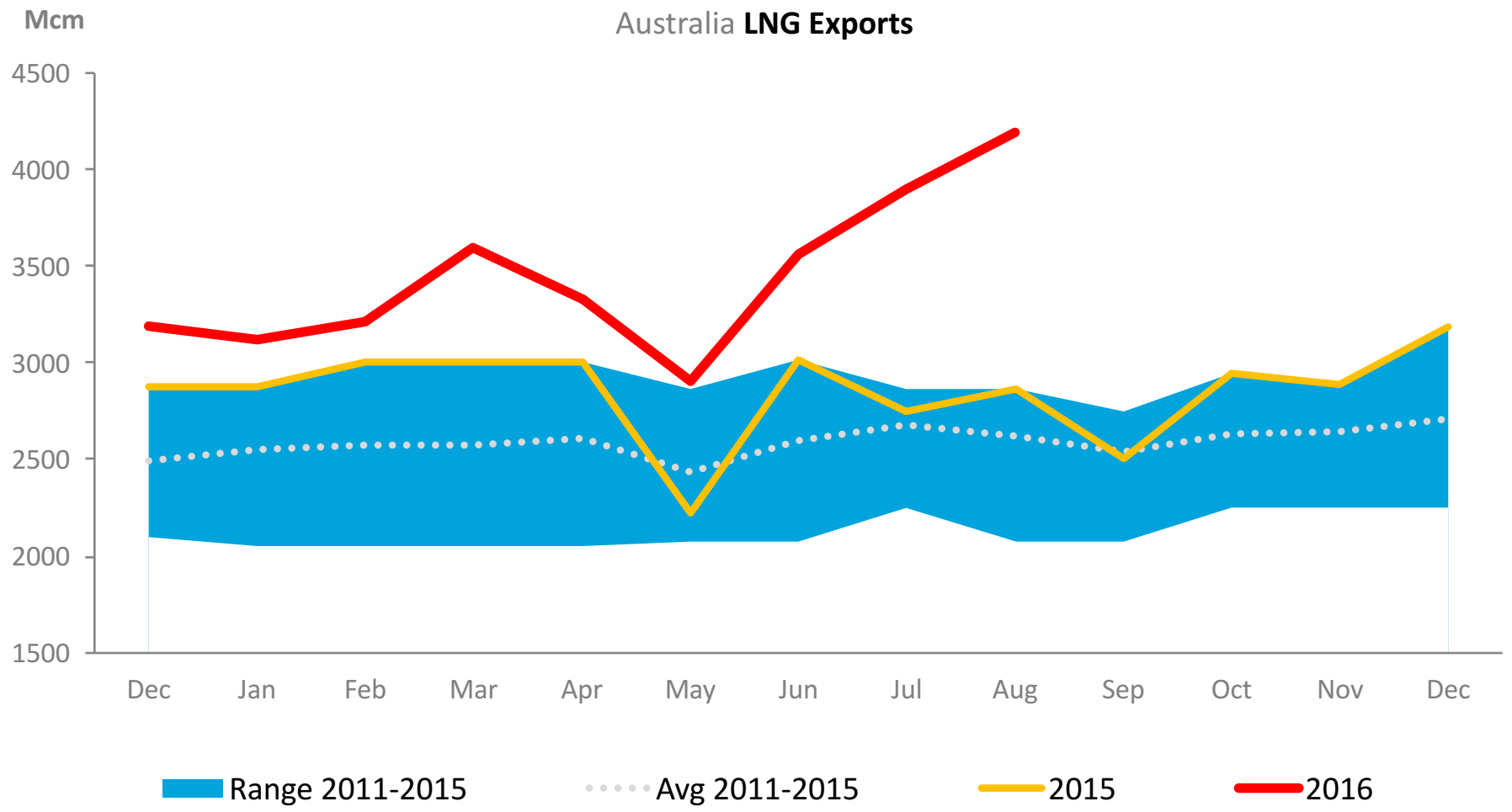
# Indonesian gas demand has fallen too



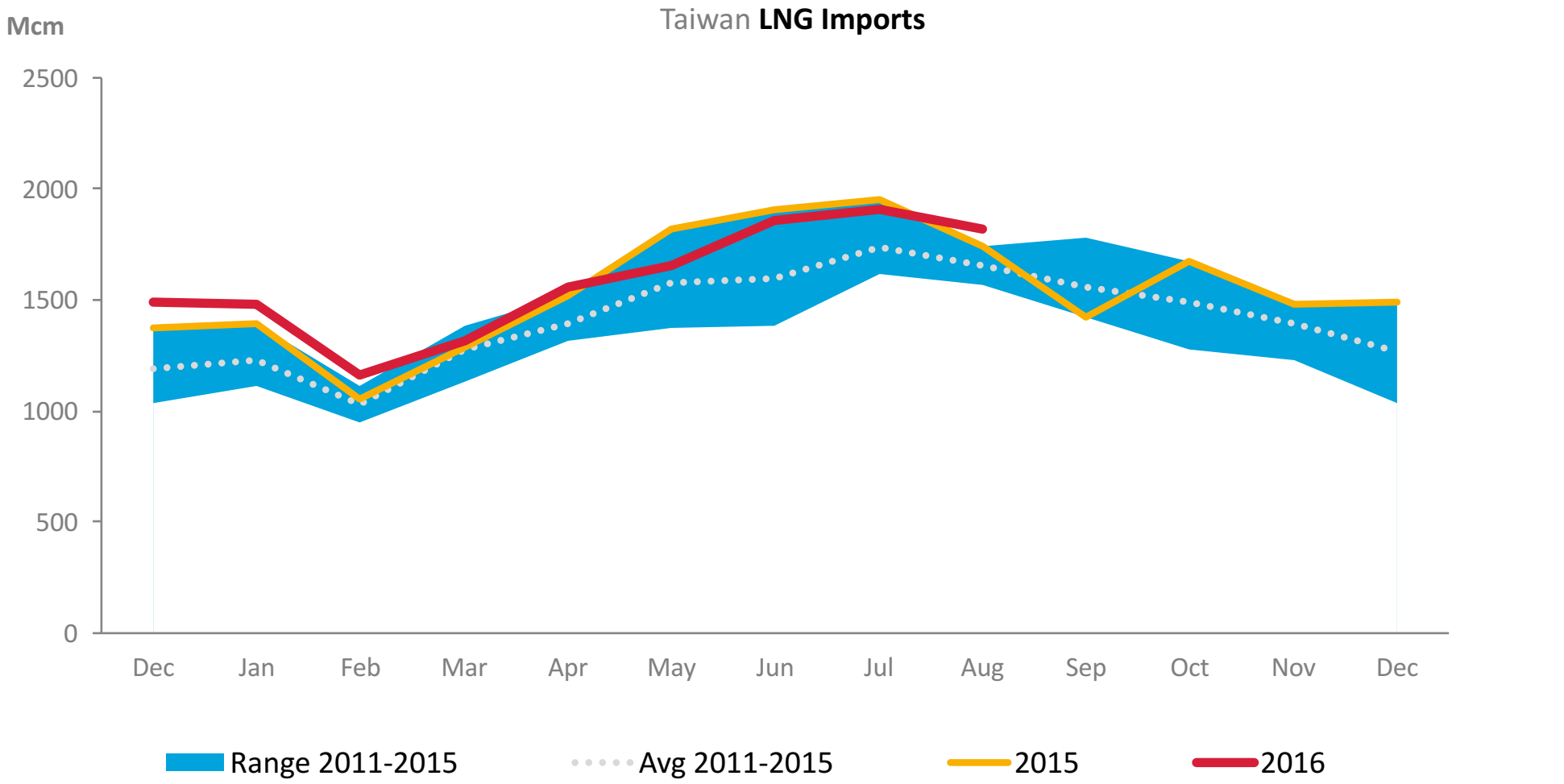
# Chinese production remains robust despite economic rebalancing



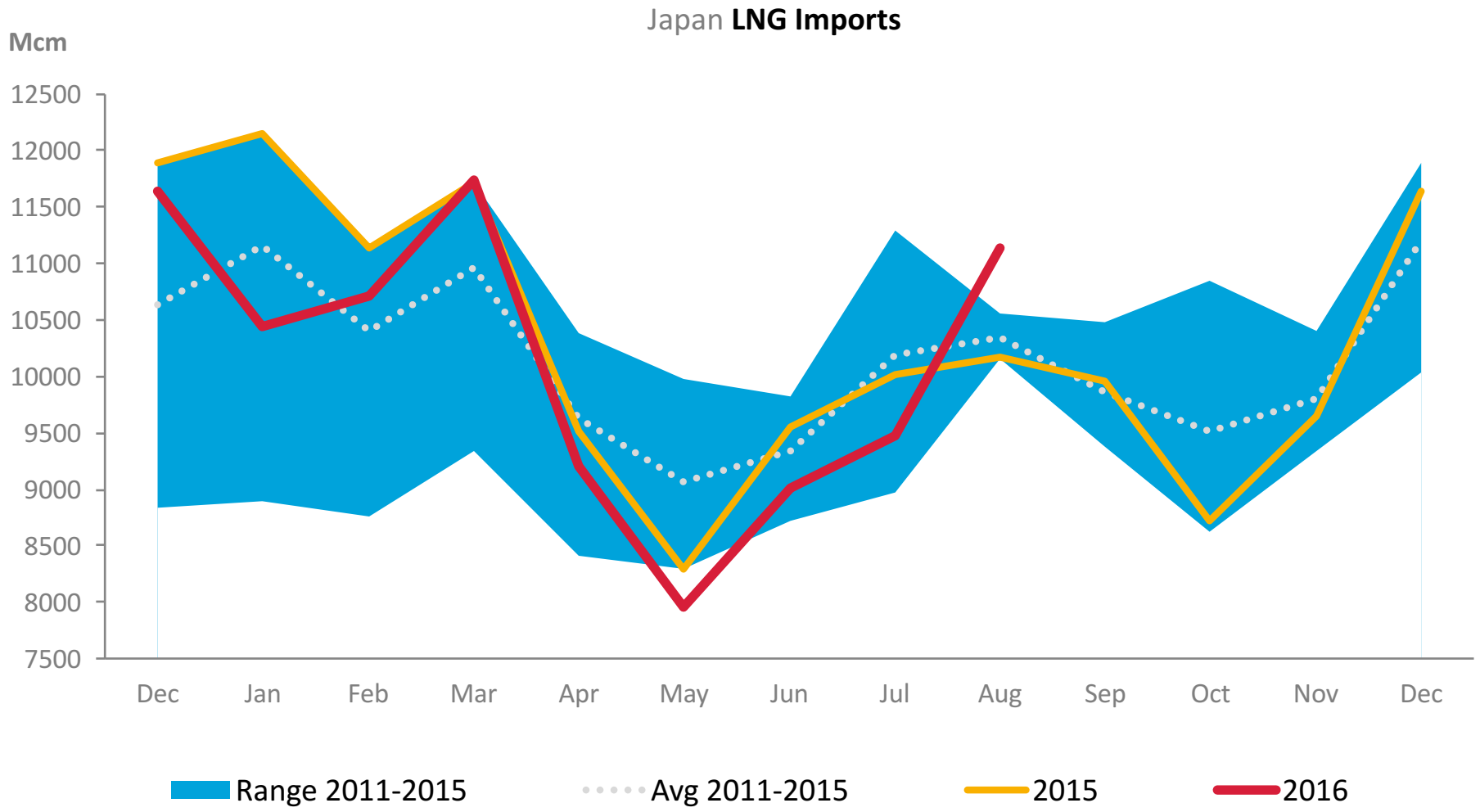
# Australia LNG exports have taken off since October 2015 reaching new record levels



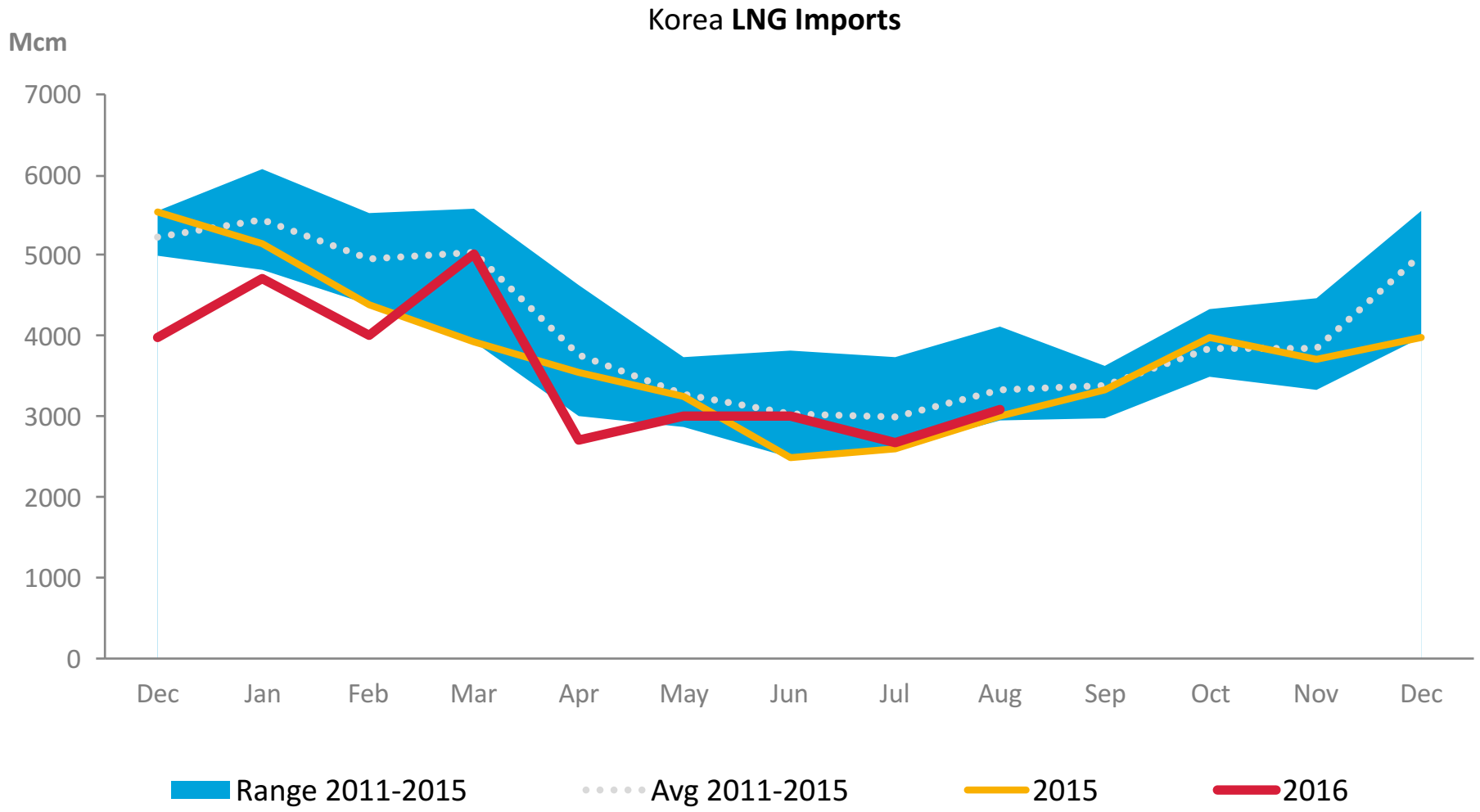
# Unlike Japan and Korea, Taiwan LNG imports remain robust at five year highs



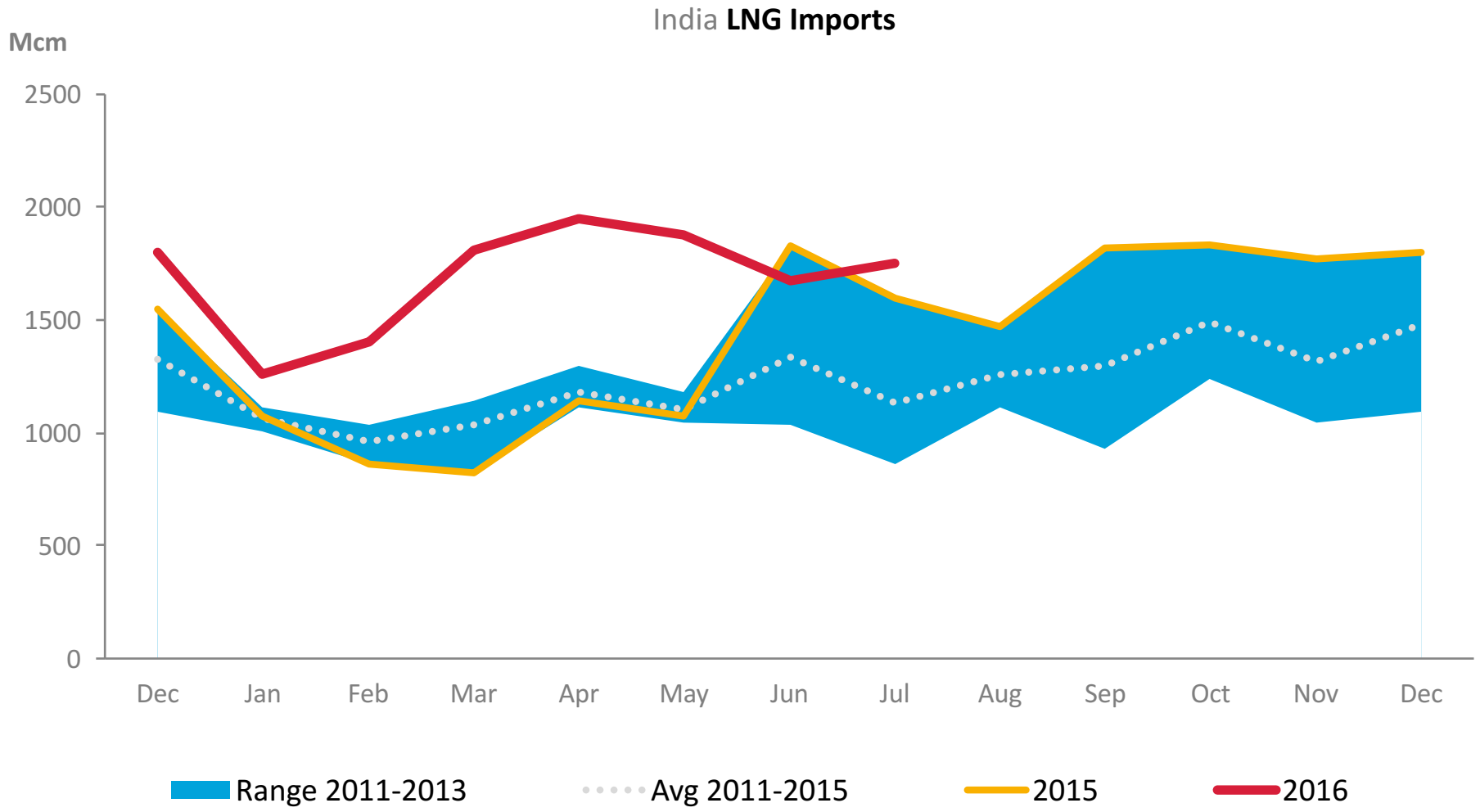
# Japanese LNG imports have slowed since April 2015



# Korean LNG imports slowed as well at the lower end of the five year range



# Greater supply flexibility push Indian LNG imports beyond five year trend



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# 3 Proposals

1. JODI Gas already covers 90% of world gas demand and supply but **data reporting timeliness, completeness and use must be improved**.

2. Asia needs to move forward with the **establishment of a transparent and effective functioning gas pricing hub**.

3. A **rolling energy dialogue** on gas markets enables producers and consumers to improve prosperity in healthy energy markets.