
Natural Gas: Challenges for the Industry, the LNG Chain, and Implications for Market Structure

Plenary Session 2

Introduction

Market context

- **Low gas prices across all markets are a result of low oil prices and the existent oversupply situation in key markets (US, Europe etc.)**
- **There is limited capacity to develop new LNG projects in the current low price environment**
- **Natural gas demand could increase due to (1) its lower emissions vs. other fossil fuels, and (2) it becoming more competitive in the current context of low prices**

Session objectives

- **To discuss how natural gas market(s) will evolve in future**
- **To explore the impact of current low gas prices on the industry and government policy**
- **To discuss the impact of oversupply and increased LNG market liquidity in different regional gas markets**

Key Question:

What is the outlook for demand and can it absorb the excess in supply?

Agenda

Key observations on:

How has the 'shale gas revolution' impacted the US natural gas market?

How has Europe's gas demand responded?

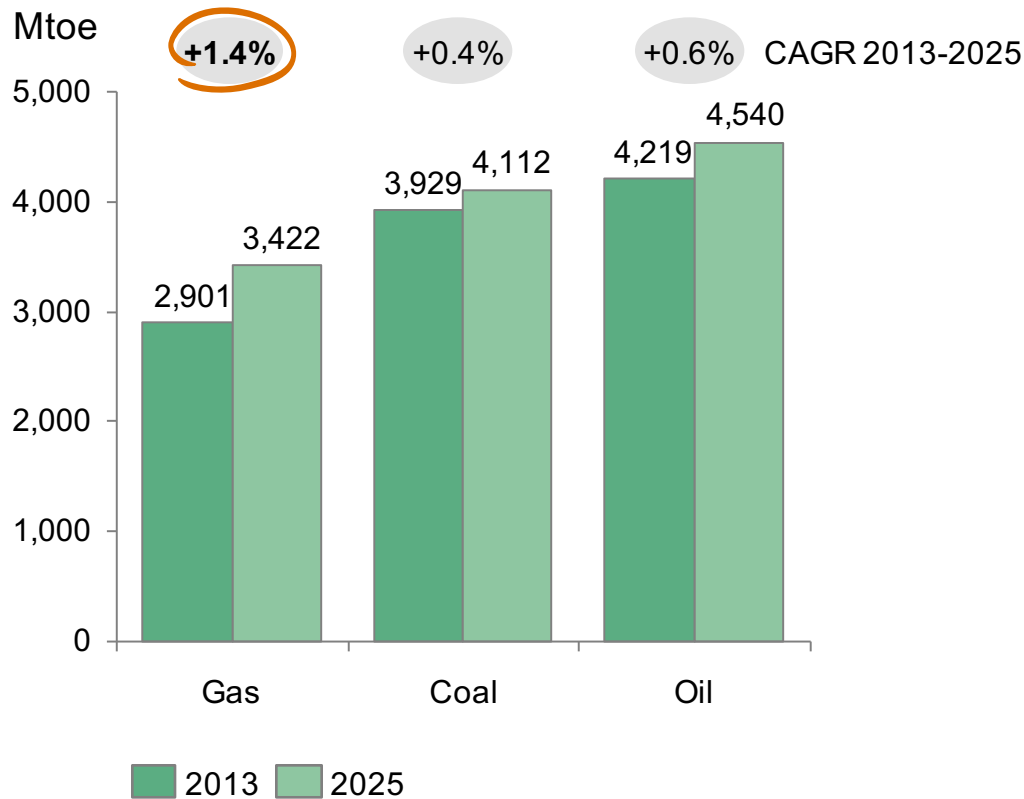
What has been the impact on gas prices?

What is the outlook of the LNG market?

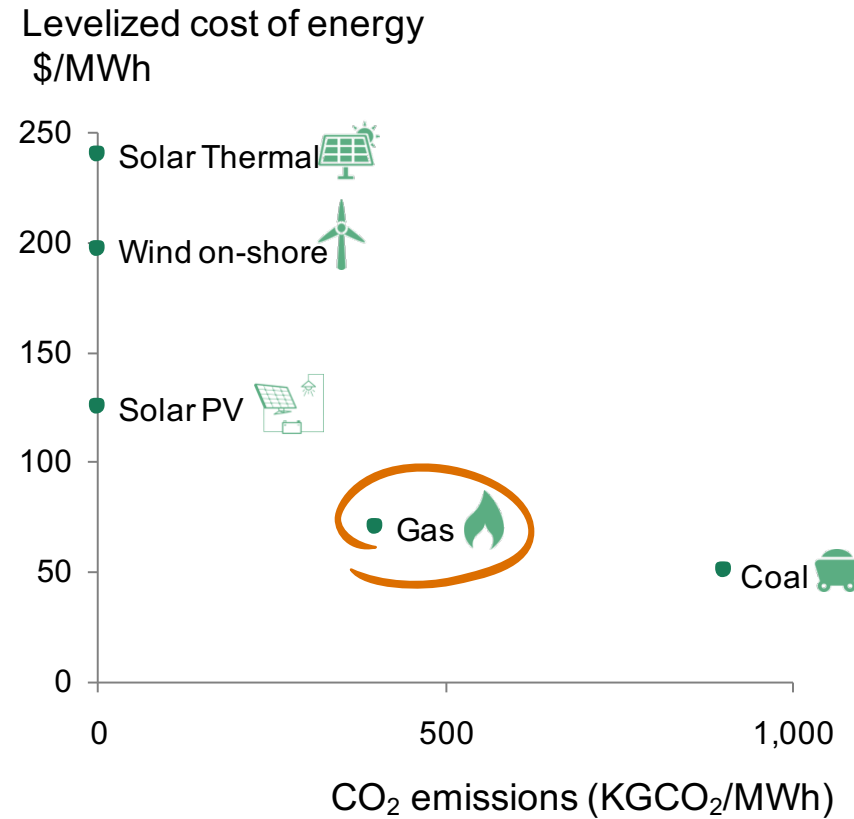
Key questions and discussion

Natural gas: the greatest growth fossil fuel

Predicted demand growth for natural gas leads other primary energy sources¹



Economic attractiveness and environmental sustainability favour it



¹New Policies Scenario
Source: IEA, BCG LNG Market Model

Key observations

Natural gas is expected to experience the greatest growth among fossil fuels due to its reduced emissions vs. other fossil fuels, together with its competitiveness

The shale gas revolution has altered the landscape of the US natural gas market, reducing US LNG imports

- The US has consolidated its position as an LNG exporter by developing multiple LNG export projects (Sabine Pass, Freeport, etc.)

Europe has experienced substantial reductions in gas demand due to the economic crisis, growing interest in renewable energy and gas' limited competitiveness vs. coal in power generation

- This has resulted in a situation of oversupply, thereby leading to low gas prices

Additionally, Western European markets have become liquid and, hence, Europe will act as the main regulation valve for the LNG market

LNG demand is expected to grow by 4-5% p.a. between 2014 and 2025—primarily driven by SE Asia, China and India, while demand in Japan, Korea and Taiwan will remain stable and global gas demand growth has slowed considerably.

- Gas demand growth has increased only by 1% since 2012. Less than half the preceding 10-year average of 2.2%.
- IEA expects gas demand to increase more slowly by 1.5% between 2015 and 2021

There is substantial risk of oversupply in the LNG market, as 13 projects with a combined capacity of 185 bcm/a (57% of global supply in 2014) will become operational in the next 3-5 years

- In this oversupply scenario, spot LNG prices will be low
- Additionally, liquidity will continue to increase in the years ahead, driven by (i) additional flexibility in supply, especially from the US, (ii) new market participants and (iii) long shipping market

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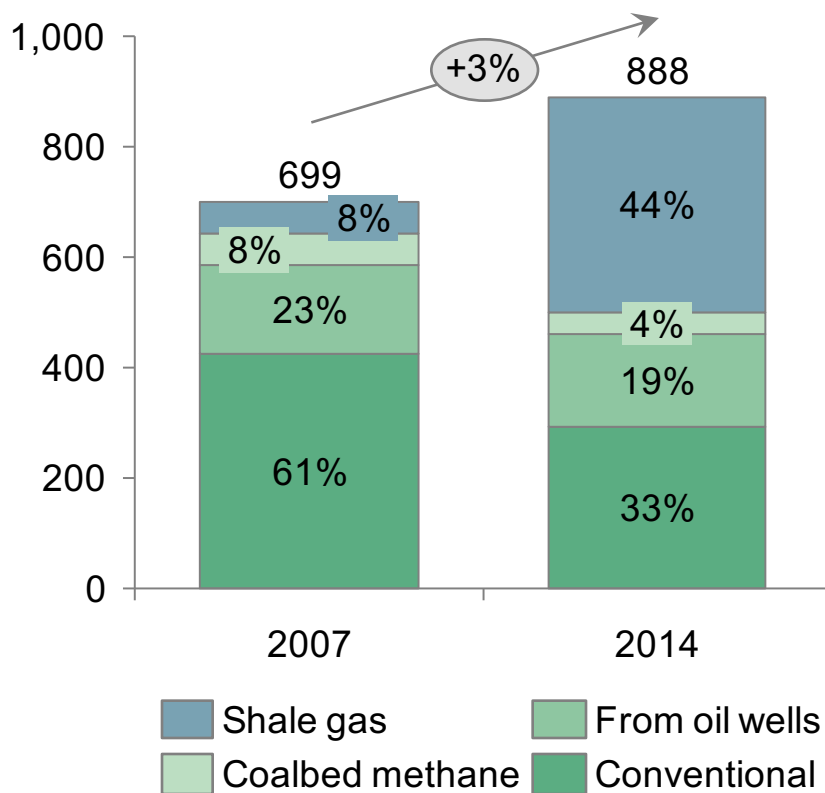
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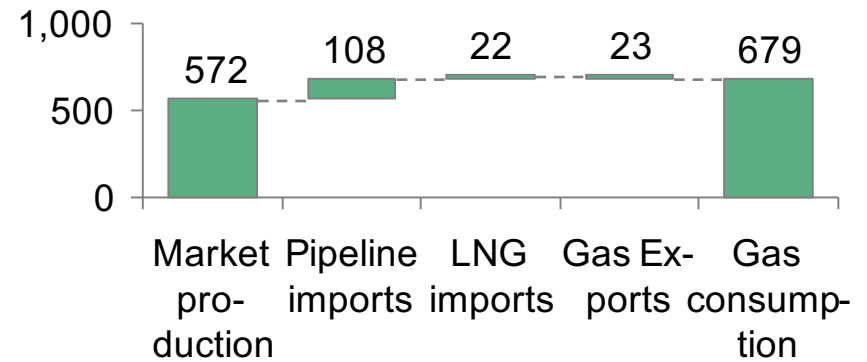
Shale gas already accounts for 44% of total production

Gross US natural gas production (bcm)

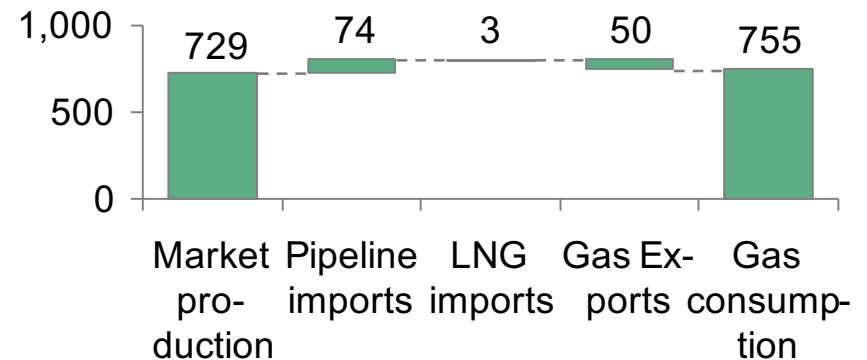


The raise of indigenous production has negatively impacted LNG imports

U.S. natural gas market (2007, bcm)

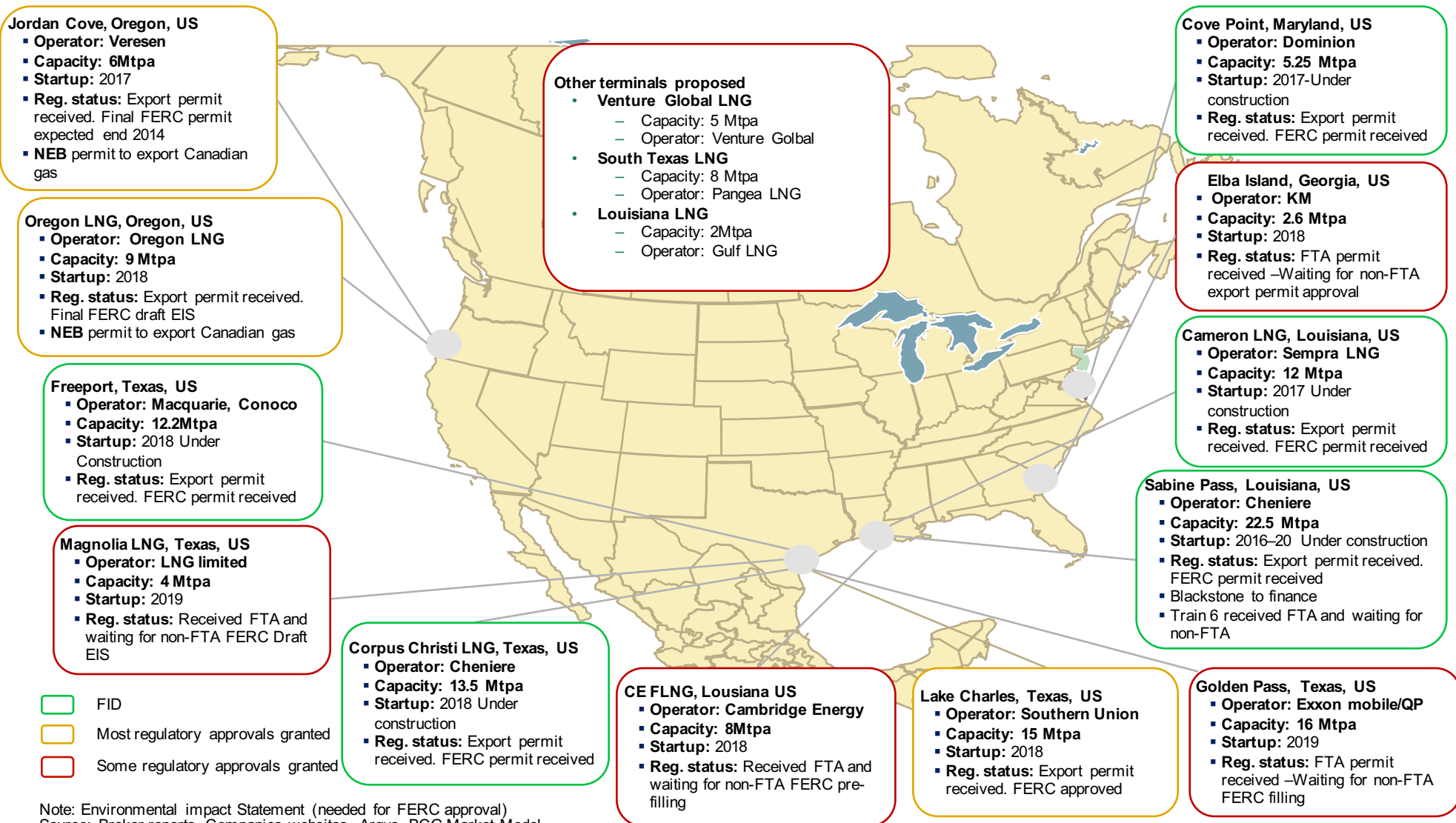


U.S. natural gas market (2014, bcm)



Note: Market production includes Natural Gas Plant Liquids Production; Natural Gas Total Consumption includes: Natural Gas Lease and Plant Fuel Consumption, Natural Gas Lease Fuel Consumption, Natural Gas Plant Fuel Consumption and Gas Pipeline & Distribution Use. Source: EIA natural gas information, BCG Analysis

15 LNG export terminals in the US were competing to monetize North American shale gas resources



Note: Environmental impact Statement (needed for FERC approval)
 Source: Broker reports, Companies websites, Argus, BCG Market Model

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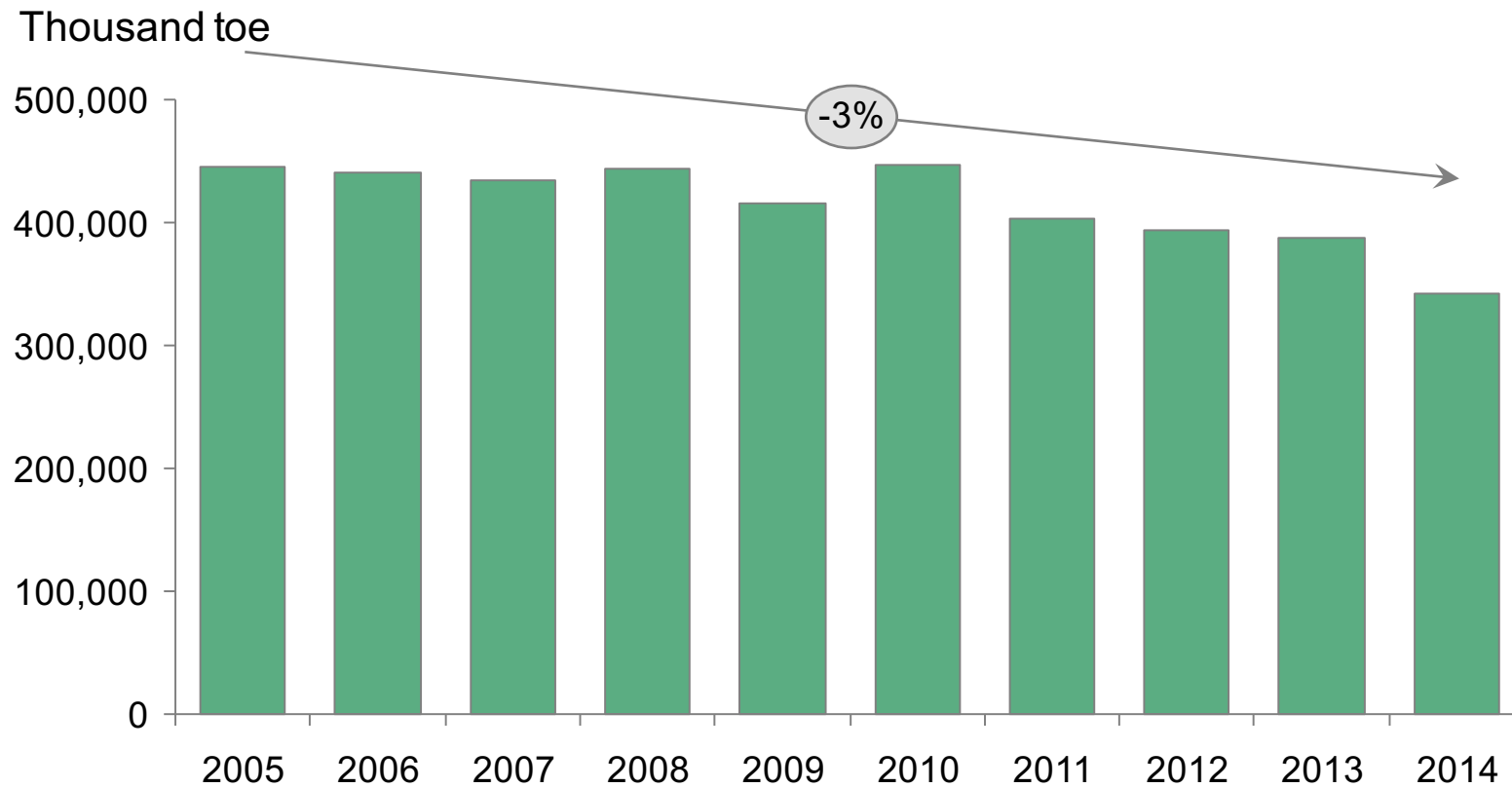
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Europe is experiencing substantial reduction in gas demand

Natural gas demand EU28

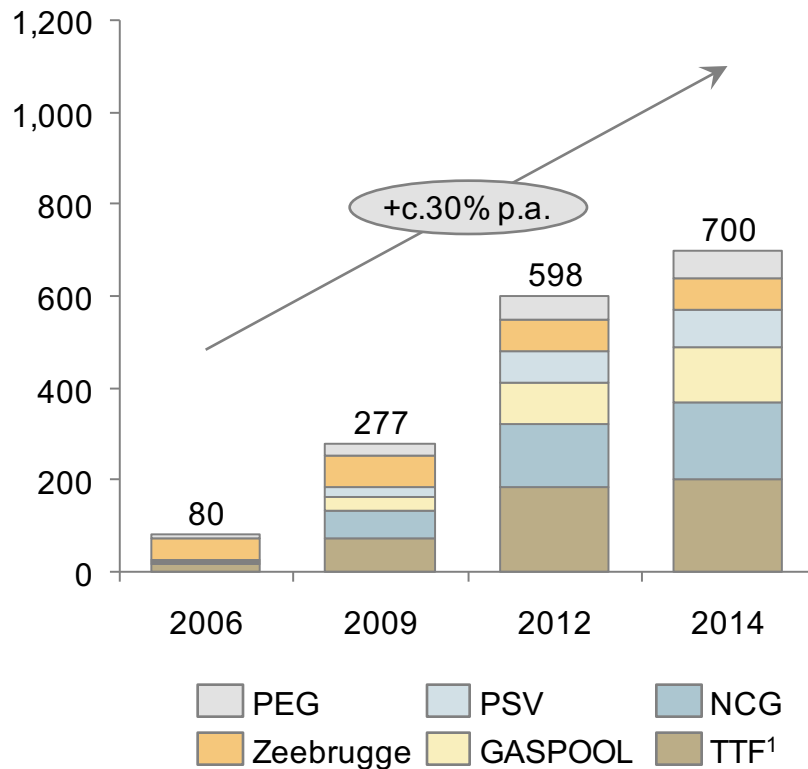


Source: Eurostat

Western European markets have become liquid; hubs are today the key price reference

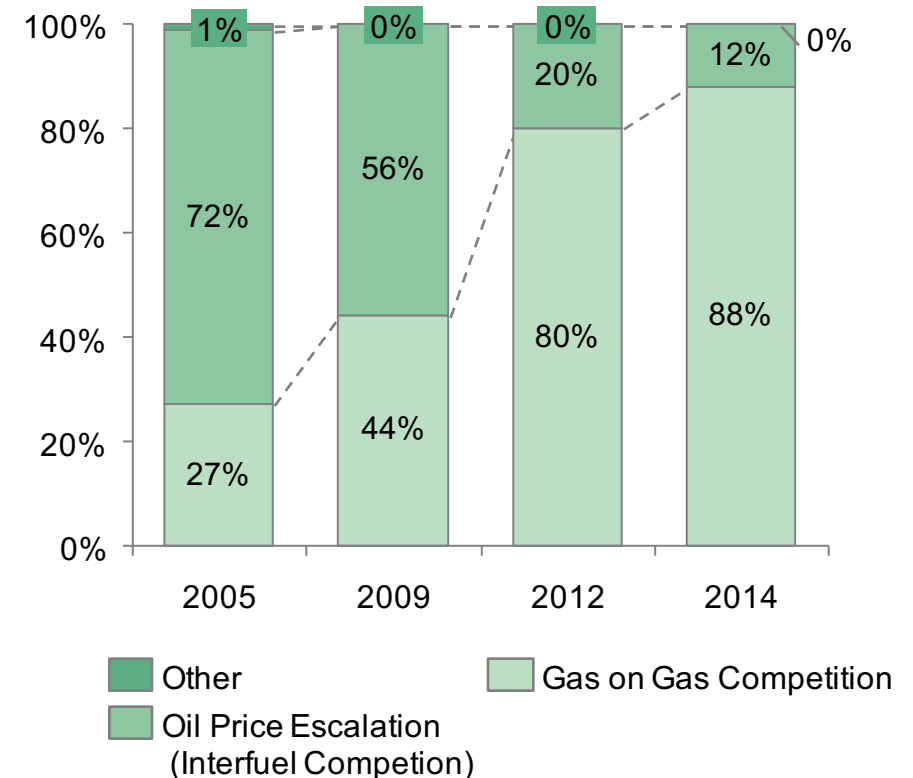
European hubs are becoming liquid during the last decade

Evolution of traded volumes at the main Continental European hubs (bcm)



European hubs have become the key reference for gas prices in Europe

Wholesale Gas Price Formation in Northwest Europe (%)



1. Information for 2014 traded volumes at TTF not reported by Prospex: 2014 TTF traded volumes estimated based on delivered volumes at TTF
Source: Prospex, Gasunie Transport Services, IGU

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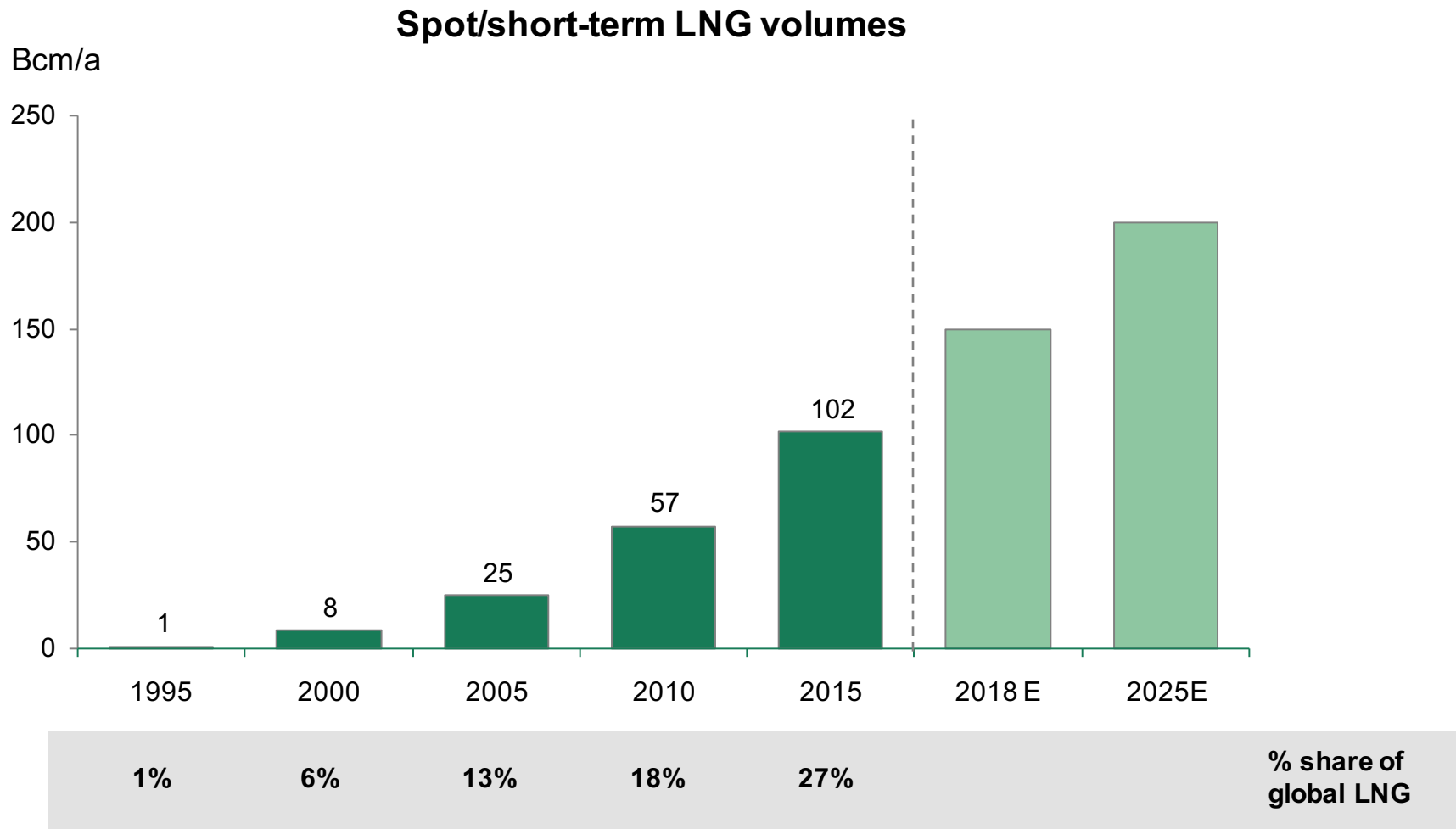
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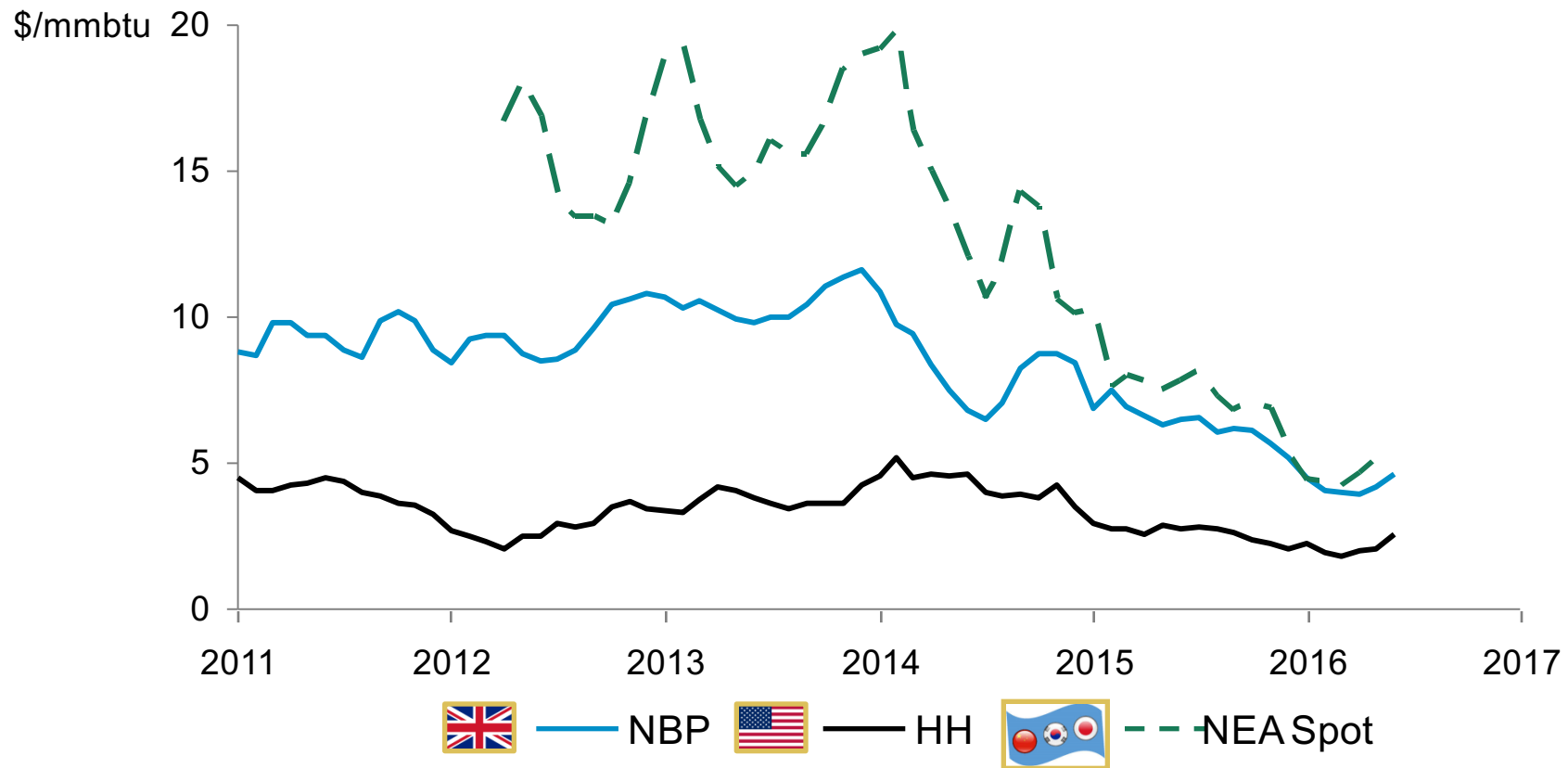
Increased liquidity in the LNG market



Source: Cedigaz, Waterborne LNG reports, Quant, GIIGNL BCG analysis

Gas Price Evolution in major LNG reference markets

Evolution of LNG prices in major reference markets 2011-2016



Source: IEA, Bloomberg

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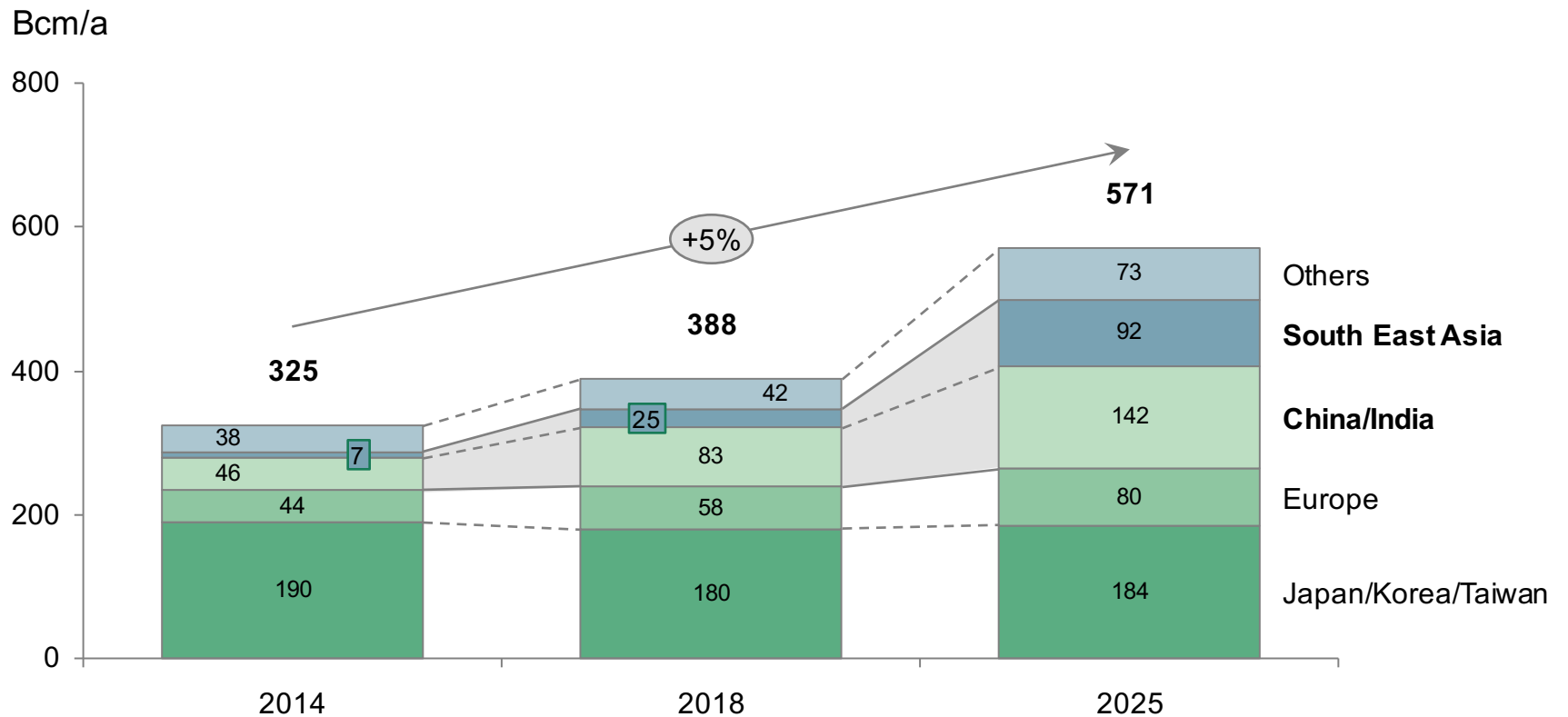
What is the outlook of the LNG market?

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LNG demand to grow by 4-5% p.a. between 2014 and 2025

Driven by new players (SEA/China/India) as existing major users stagnates (Japan/Korea/Taiwan)

Global LNG demand base scenario



Source: BCG LNG Market Model

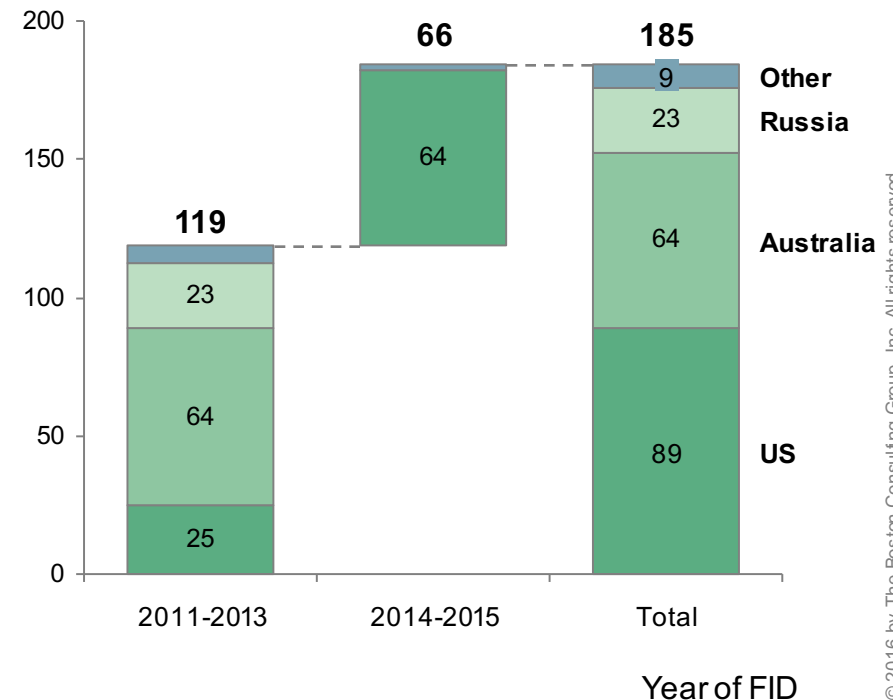
There is substantial risk of oversupply in the LNG market, as 13 projects will become operational in the next 3-5 years

13 projects with FID to come on line during the next 3-5 years

Country	Project	Announced start up	Operator	Capacity (bcm/a)
Australia	AP LNG T1/T2	2015	Conoco	12.6
US	S. Pass T1-T5	2015-2018	Cheniere	31.5
Australia	Gorgon LNG	2016	Chevron	21.8
Malaysia	MLNG Train 9	2016	MLNG	5.0
Australia	Wheatstone	2016	Chevron	12.6
Malaysia	Kanowit	2016/18 ³	Petronas	3.8
Australia	Ichthys	2017	Total / Inpex	11.8
Australia	Prelude FLNG	2017	Shell	5.0
Russia	Yamal	2019	Novatek	23.1
US	Freeport T1 -T3	2018	Freeport LNG	18.5
US	Cameron T1-T3	2018	Sempra	18.9
US	Cove Point	2018	Dominion	7.3
US	Corpus Christi LNG T1 T2	2018	Cheniere	12.6

Recent FID activity has been heavily concentrated in the US

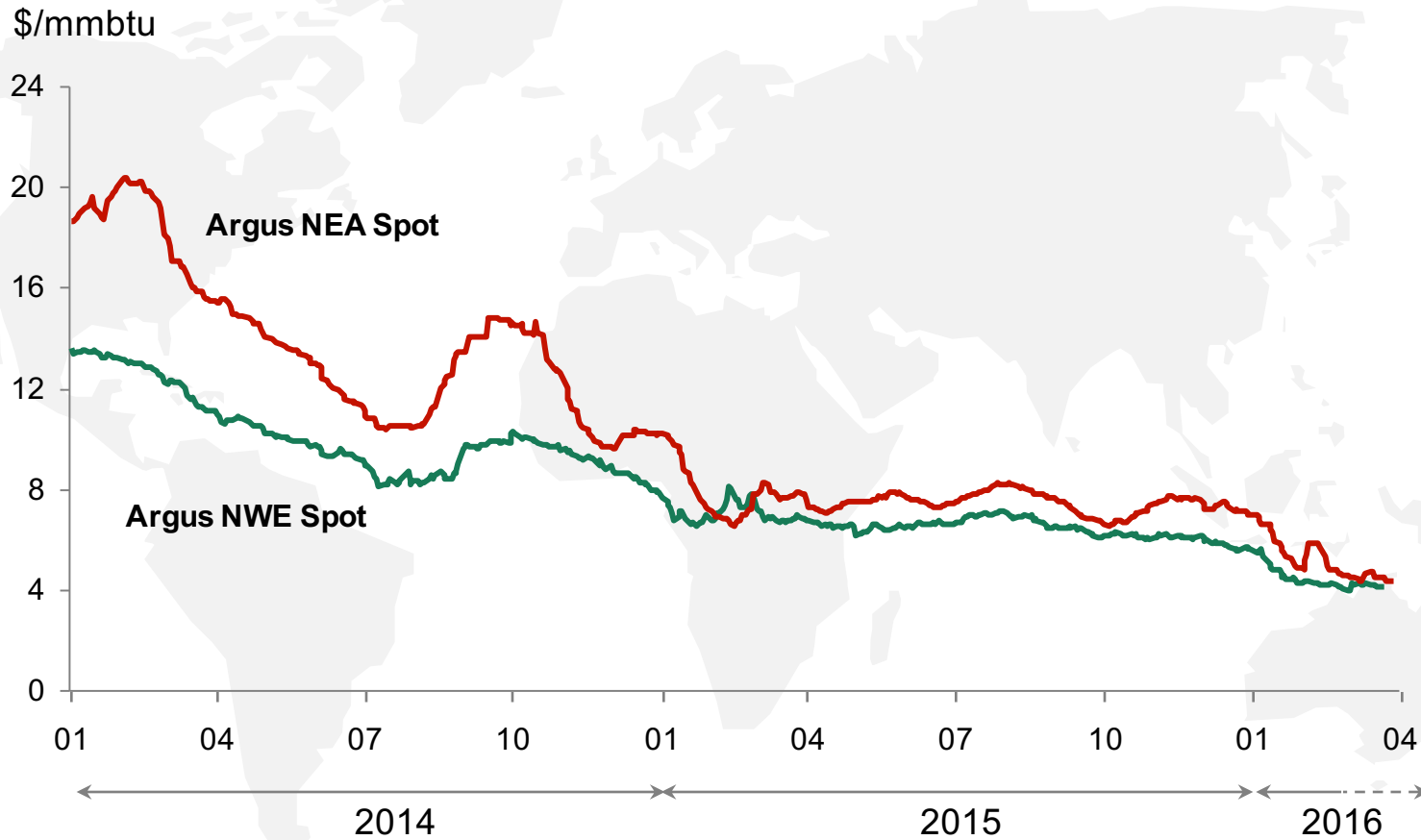
Capacity committed with FID per year Bcm/a



Source: CEDIGAZ, LNG consortiums, Wood Mackenzie, BCG LNG Market Model

In this context, LNG spot prices could continue registering low levels for the coming years

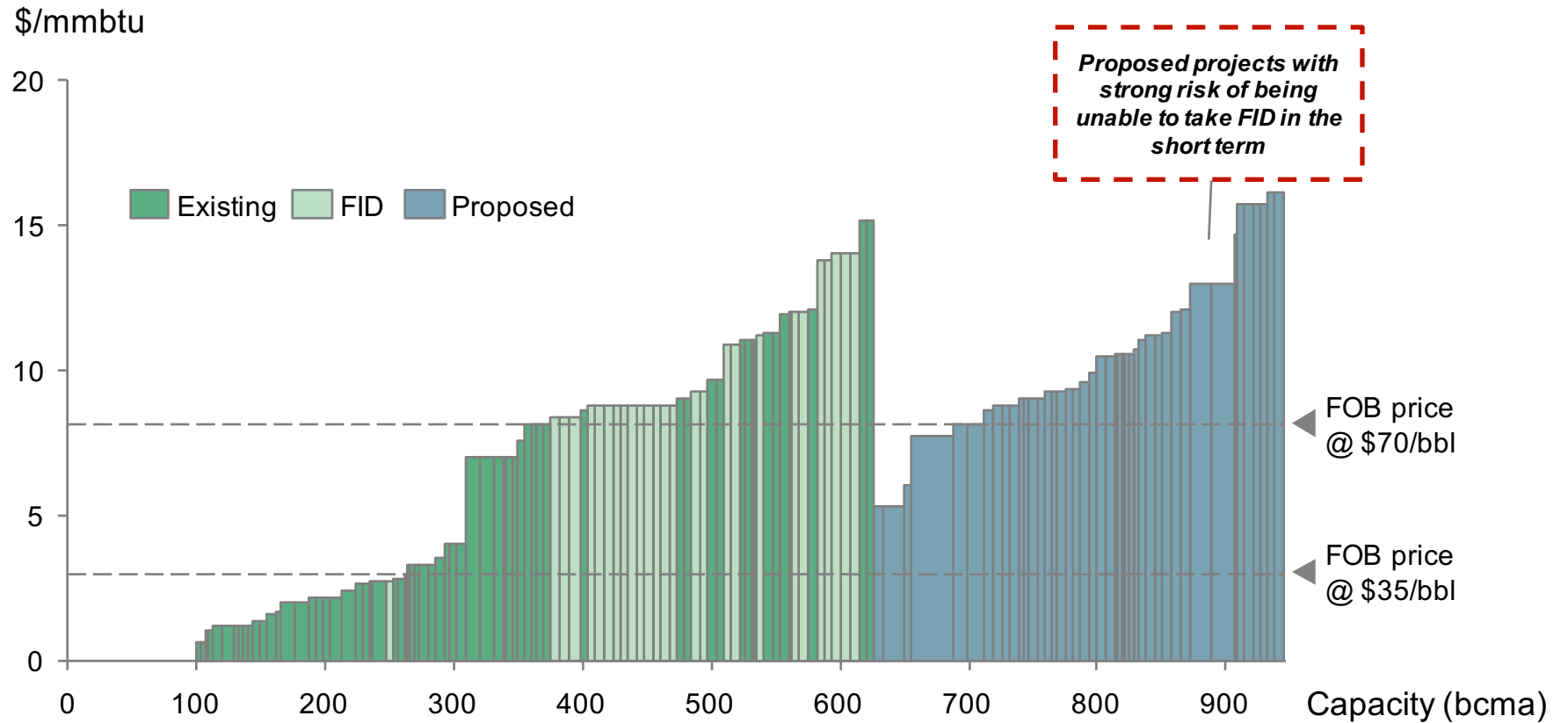
Argus LNG spot prices June 2014 – March 2016



Note: NEA= North East Asia 2. NWE = North West Europe
Source: Argus LNG

Strong risk of delays on new project developments possible, given the mismatch between development costs & LNG prices

Supply cost curve (FOB)



Note: 2\$/mmbtu have been deducted from DES prices in order to make them comparable with FOB prices
 Source: BCG LNG Market Model

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Challenges of a low gas price environment

Key questions

- 1 Will gas prices remain low and how does this affect competition with coal and renewables?**
- 2 Will lower prices revitalise demand, as envisioned a decade ago or should governments engage more?**
- 3 Will the industry be able to reduce costs in the new price context to grow sales?**
- 4 Will projects located in challenging geographic locations be able to meet the required low development costs?**
- 5 What role will innovation and technology play (e.g., floating technology)?**
- 6 What will be the appropriate method for pricing gas; how will governmental agreements and industry contracts evolve?**

Opportunities of a low gas price environment

Key questions

- 7** What consequences will the expected LNG oversupply have in the different regional markets?
- 8** Will increased gas market liquidity eventually result in prices linked across all regions (US-Asia-Europe)? How will this affect flows.
- 9** Will the entry of small scale LNG and other new gas technologies in the transport sector benefit or not?
-  Where and how could gas market data transparency be improved?

Disclaimer

The observations presented herein are meant as background for the dialogue at the 15th International Energy Forum Ministerial Meeting. 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.



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