

The New Global Gas Market Dynamic

Emmanuel Grand, FTI-CL Energy

May 2017



Contents

I. Key uncertainties on gas demand

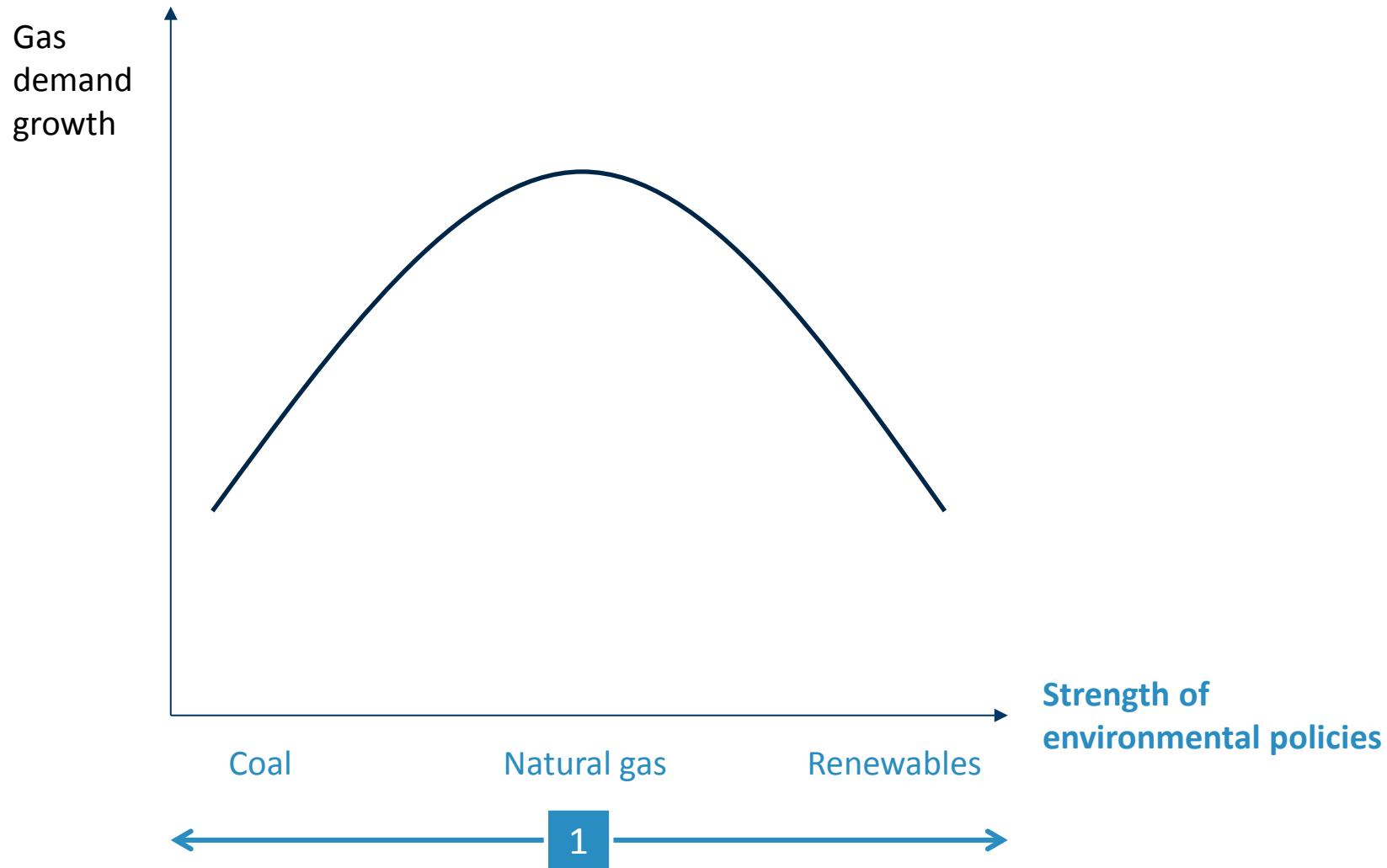
II. Drivers of global LNG prices

III. Conclusion

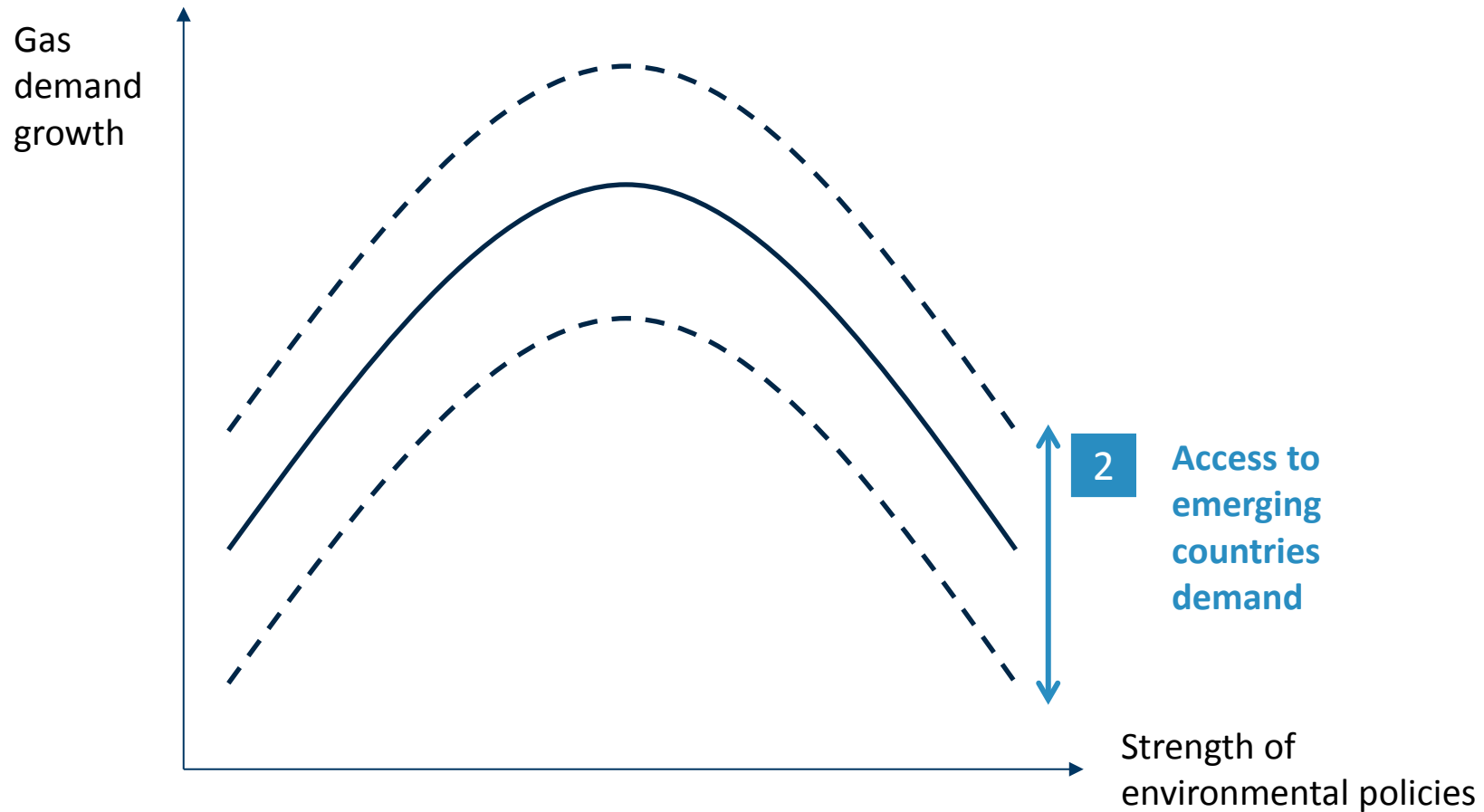
I.

Key uncertainties on gas demand

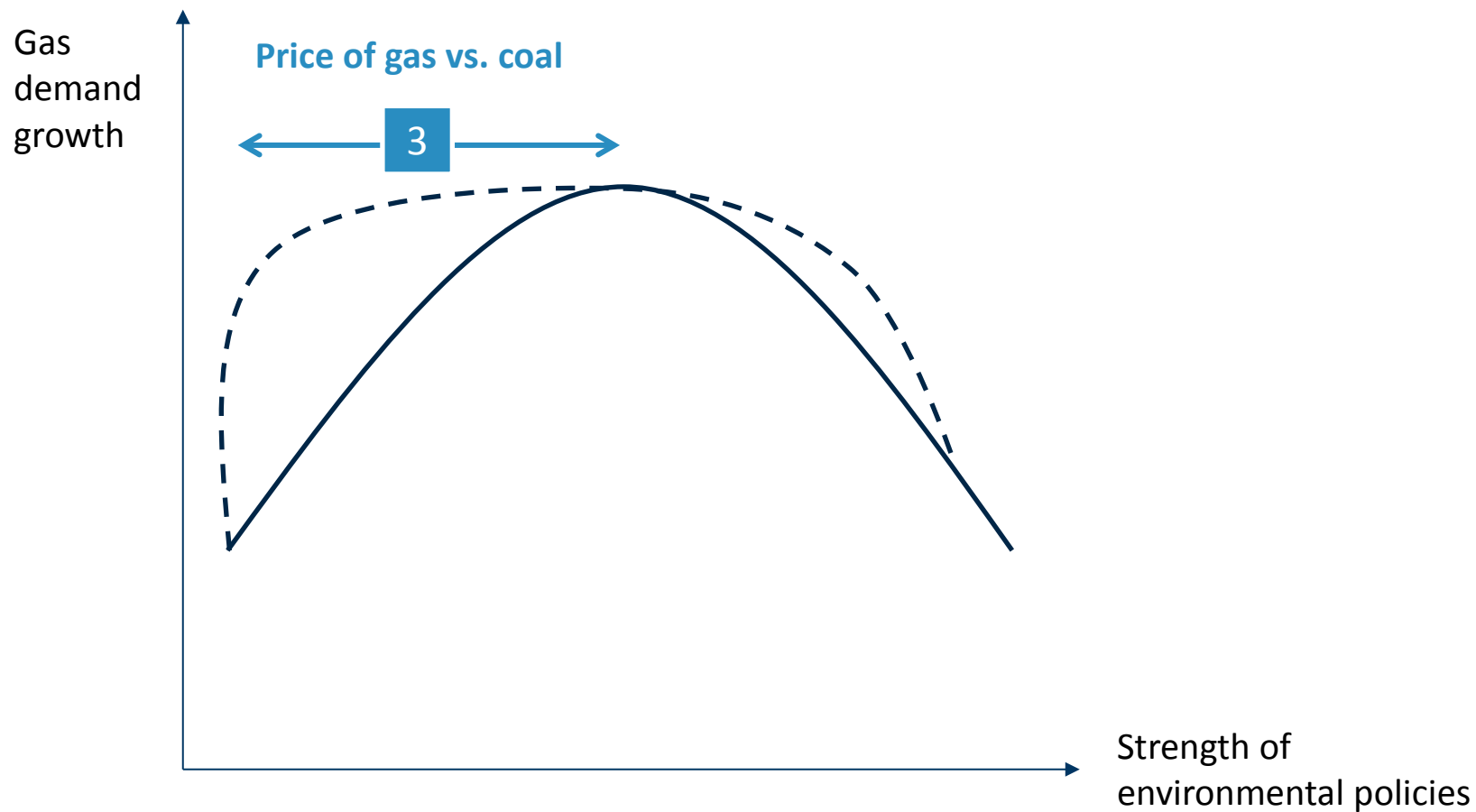
The strength of environmental policies is the #1 uncertainty on gas demand



The access to emerging countries demand is the #2 uncertainty on gas demand

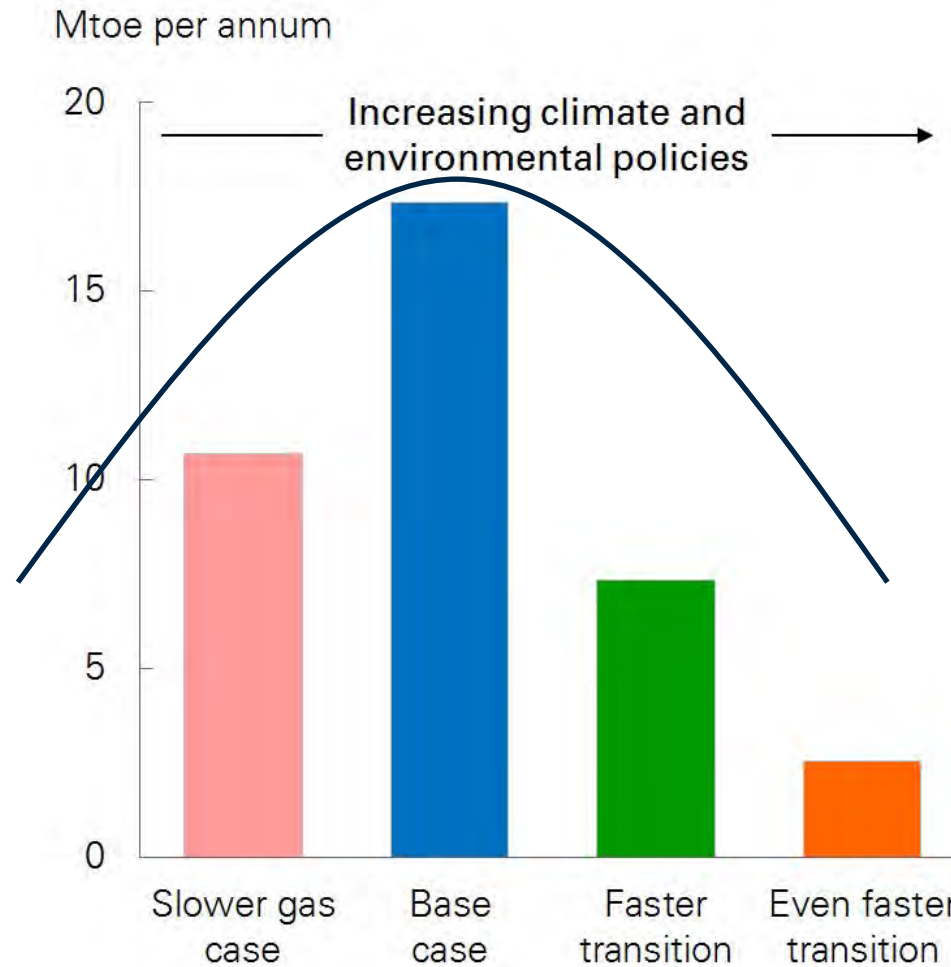


The relative price of gas vs. coal is the #3 uncertainty on gas demand



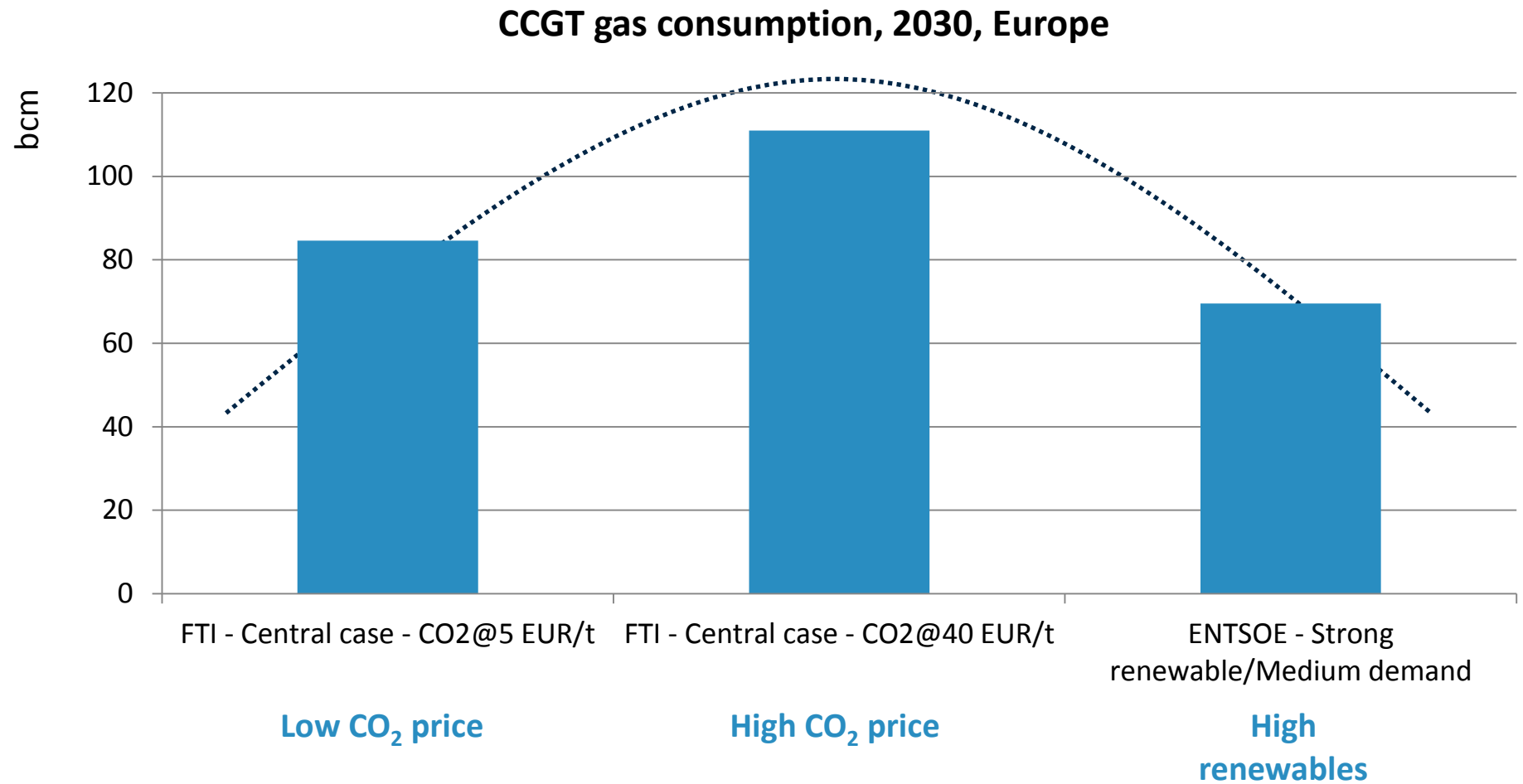
Gas is a regulatory play

Global gas growth 2015-2035



1 Strength of environmental policies

The gas optimum between too soft and too strong environmental policies is also visible in Europe



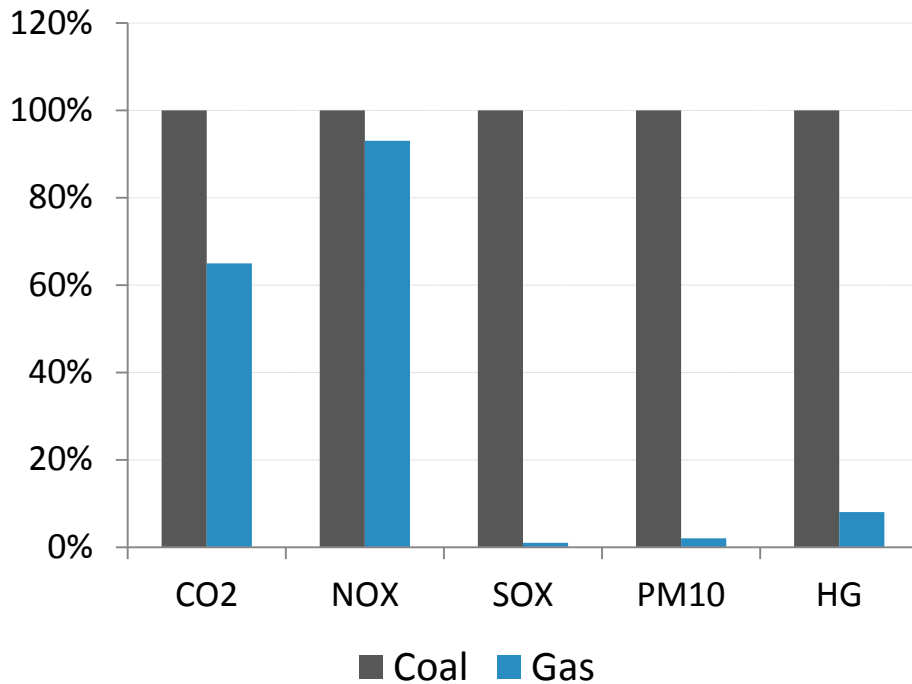
Source: FTI-CL Energy power market model, ENTSOE V3 supply combined with ENTSOE V2 demand

1 Strength of environmental policies

Despite environmental advantages, gas is not well positioned for lobbying in consuming countries

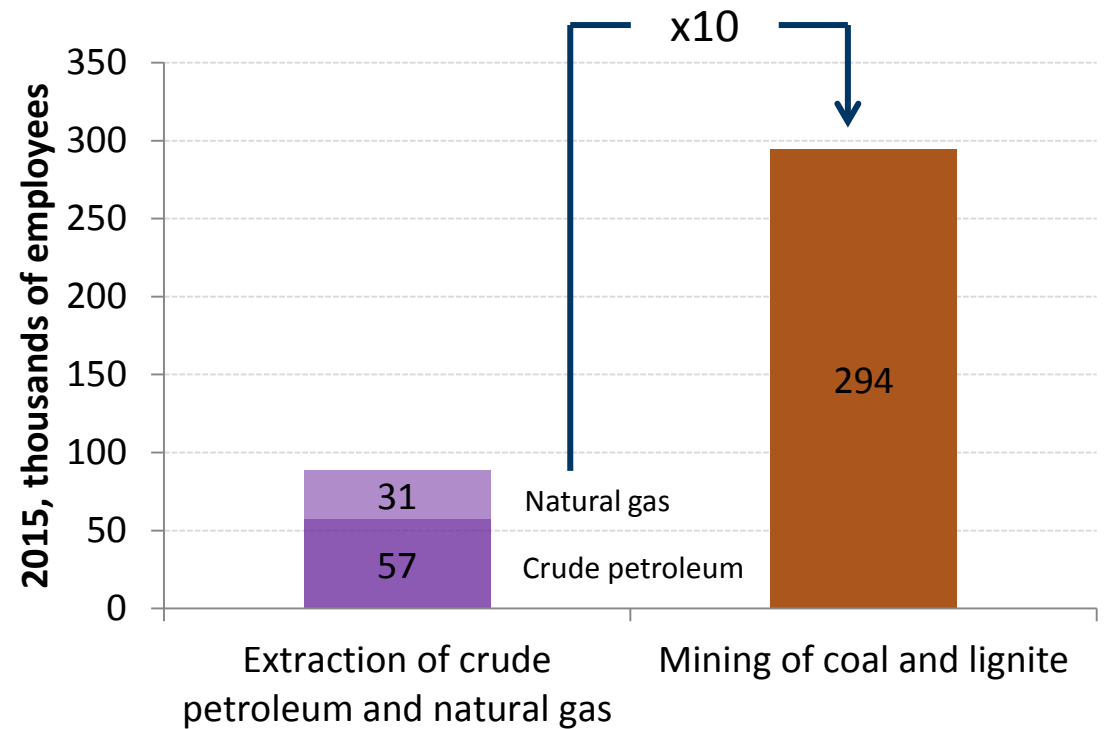
Some technical advantages over coal

Electricity Generation pollutants with gas emissions as a % of coal emissions



Low political footprint vs. other energies in consuming countries

of jobs in energy production, EU28

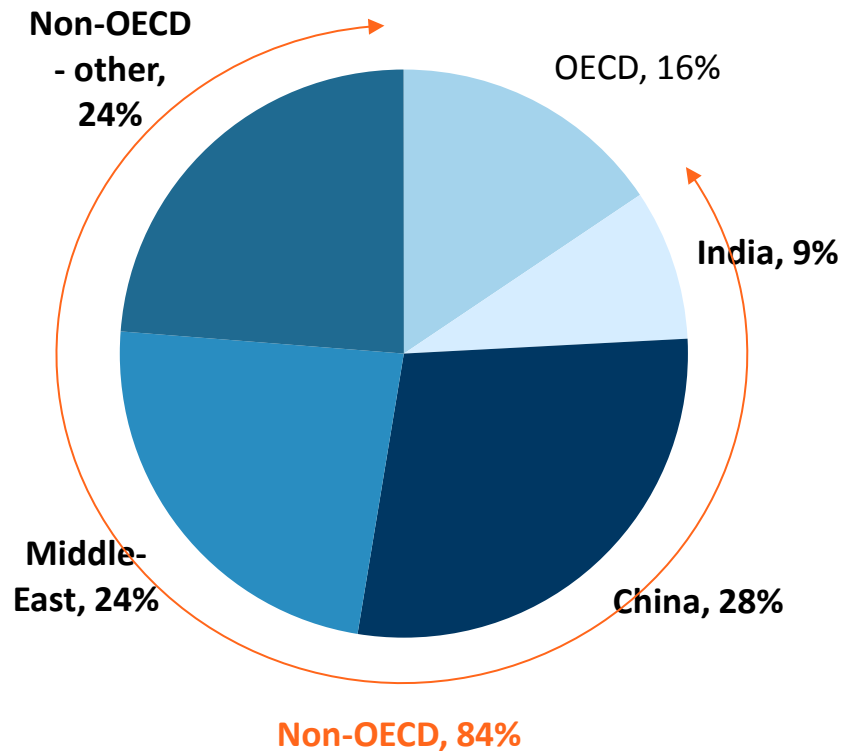


2 Access to emerging countries demand

84% of gas demand increase is expected to come from emerging countries, where political barriers could hinder expected growth

A large demand growth to capture...

Breakdown of gas demand growth (IEA, 2014-2030)



...with significant political barriers

Security of supply issue

- Main consumers (India, China...) net importers
- Limited appetite for further import dependency

Regulated price issue

- Historic low regulated price a barrier to import
- Hard to reform / High subsidy cost

As an example, Ghana's LNG imports are stuck in political issues



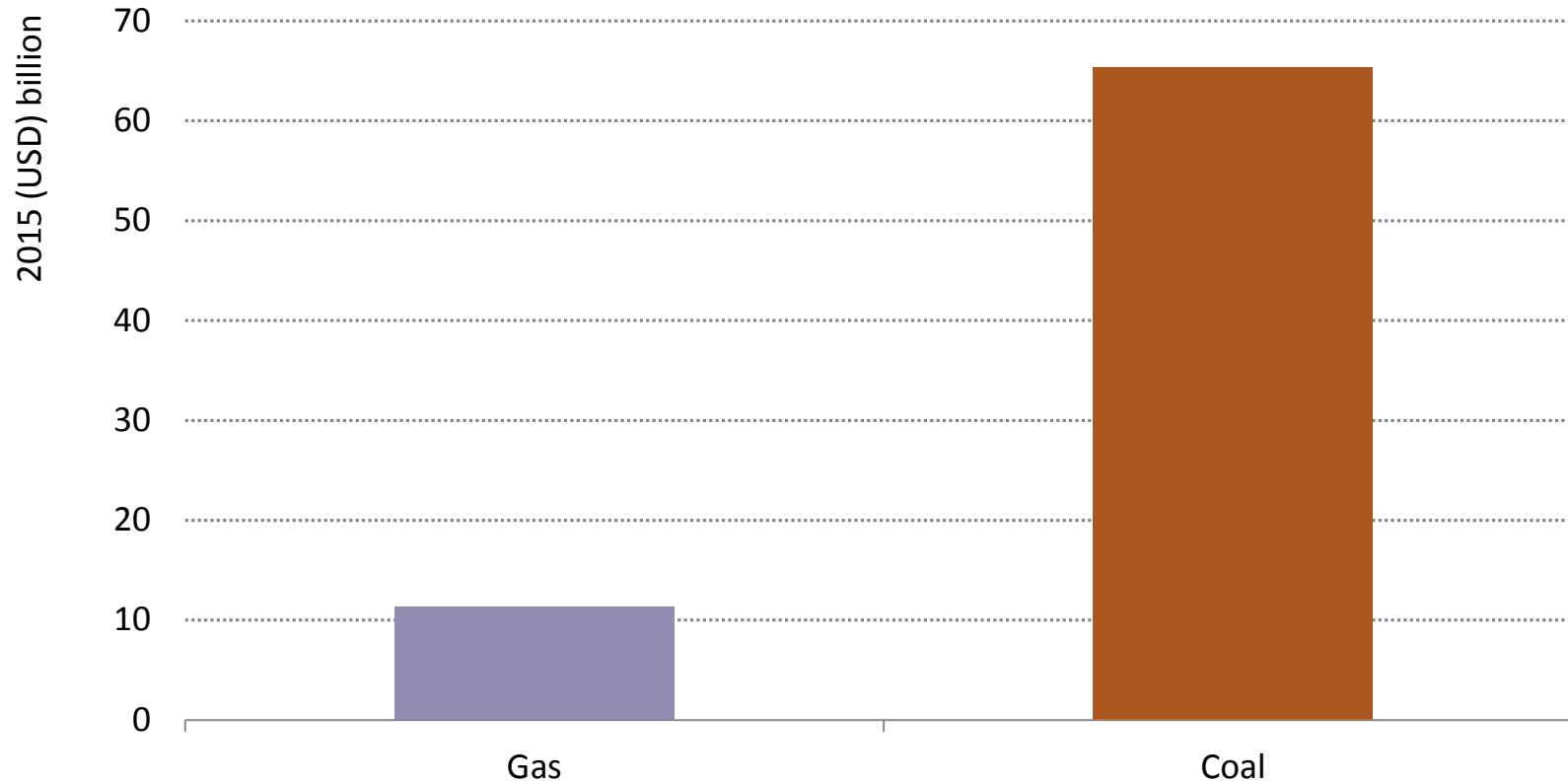
Golar Tundra Case

- **November 2015** GOLAR LNG **signed a 5-year deal** with West African Gas Ltd (local company) to charter 170,000 cbm FSRU from Q2 2016 in Tema
- **May 2016** **FSRU arrival, operational set-up**
- **Since may 2016** Delays to start up because of logistical issues and **political wrangling**
- **October 2016** Parliamentary **delayed approval** to gas sales contract but major onshore construction (connecting pipeline, jetty,..) **not completed**
- **Current situation** GOLAR is awaiting **outsanding charter payments** for the vessel, and started **legal action** against West African Gas Ltd

Source : LNG world news

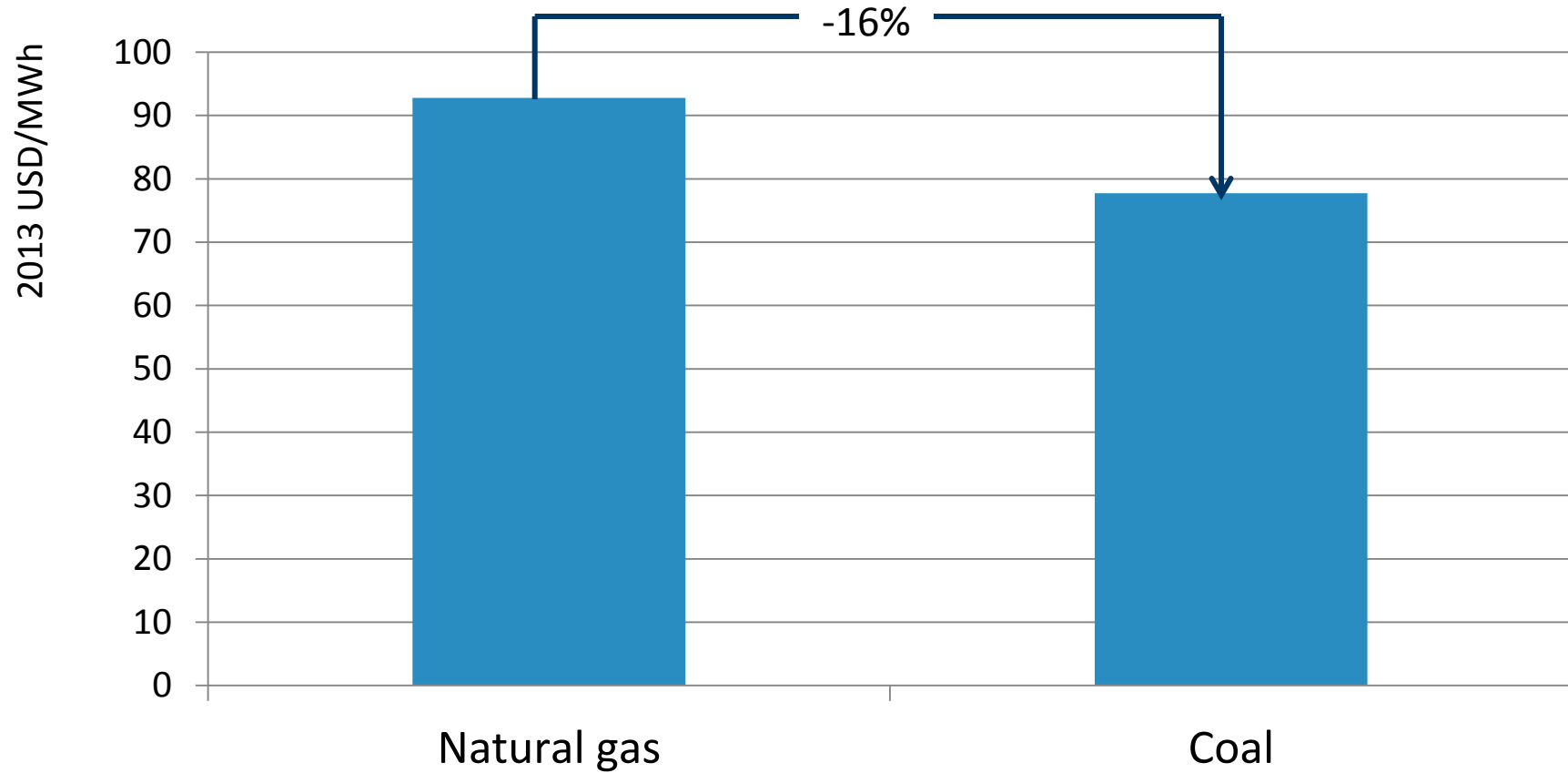
Coal has recently won over gas where it matters: Asia

Coal and gas-fired power investment in Asian markets (2015)



Coal maintains a cost advantage over natural gas in Asia

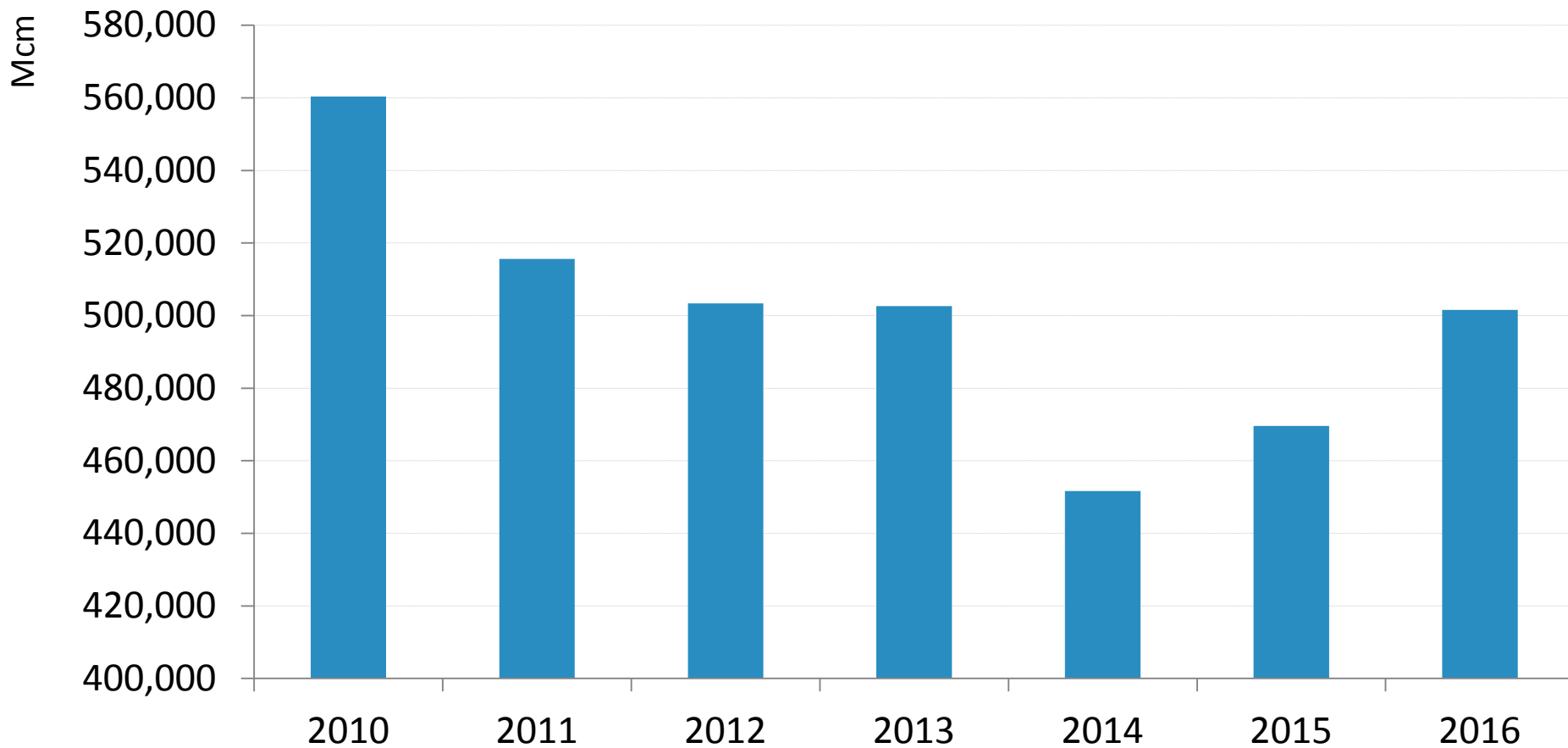
Levelised Cost of Electricity in China



3 Price of gas vs. coal

However this could be reversed if gas becomes sustainably more competitive than coal (1/2)

Europe OECD gas gross consumption 2010 - 2016

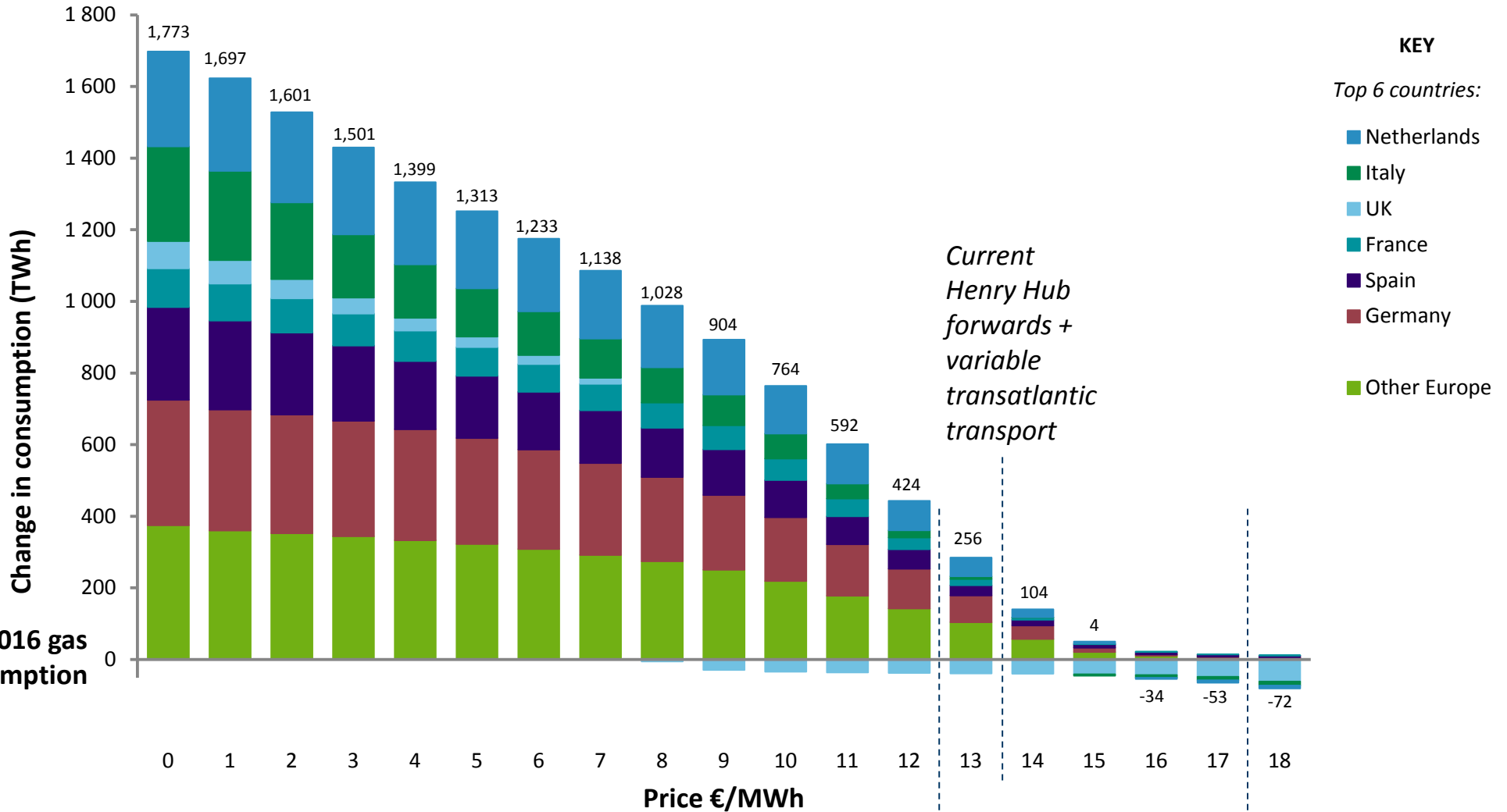


Source : International Energy Agency, monthly gas statistics

3 Price of gas vs. coal

However this could be reversed if gas becomes sustainably more competitive than coal (2/2)

Average annual gas demand from power generation in 2017 – 2020 compared to 2016, according to gas price levels [EU28 + NO + CH]



Current Henry Hub forwards + variable transatlantic transport

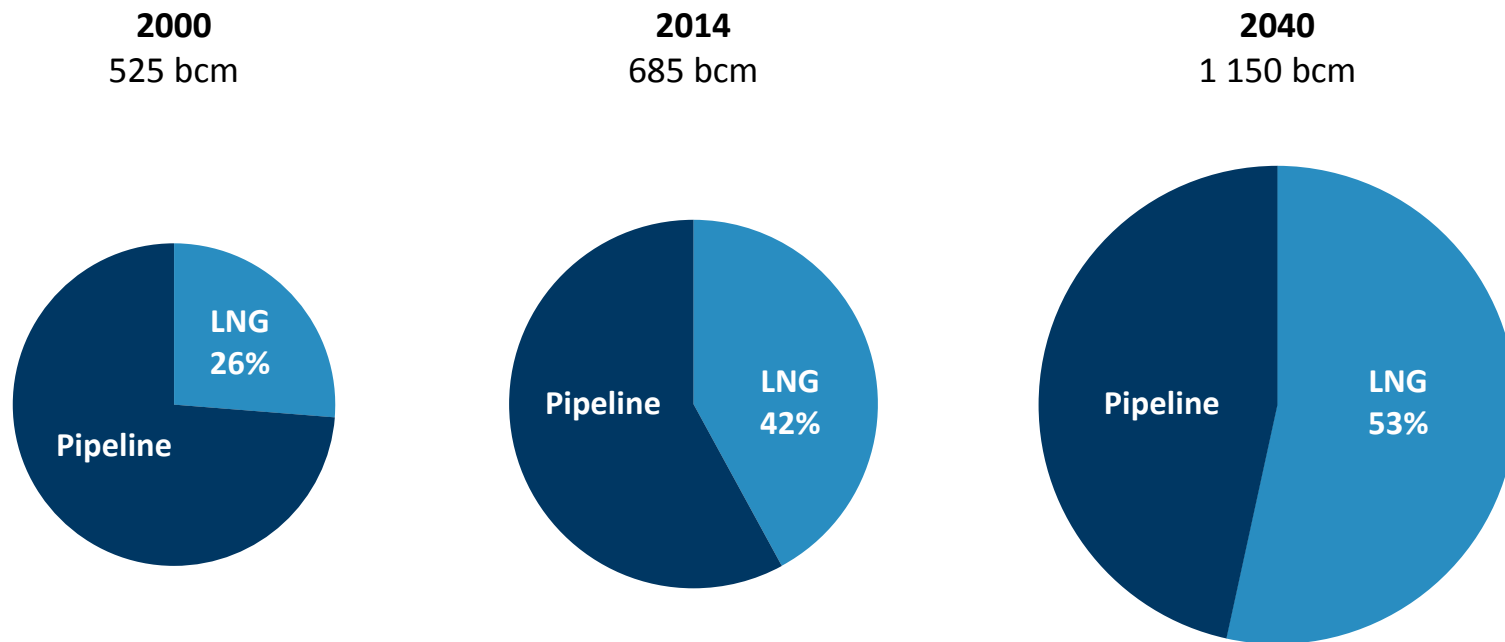
TTF in Winter 2006/2007

Current TTF forwards

Source: FTI-CL Energy analysis. Forwards as of February 2017

The price of gas will be to a large extent defined by the LNG market

Share of LNG in global long-distance gas trade (IEA)



II.

Drivers of global LNG prices

The LNG market is reconfiguring

1 Demand: An increasing volatile world

- After decades of Take-Or-Pay contracts...
- ...An increasingly volatile world

2 Supply: A bust for now

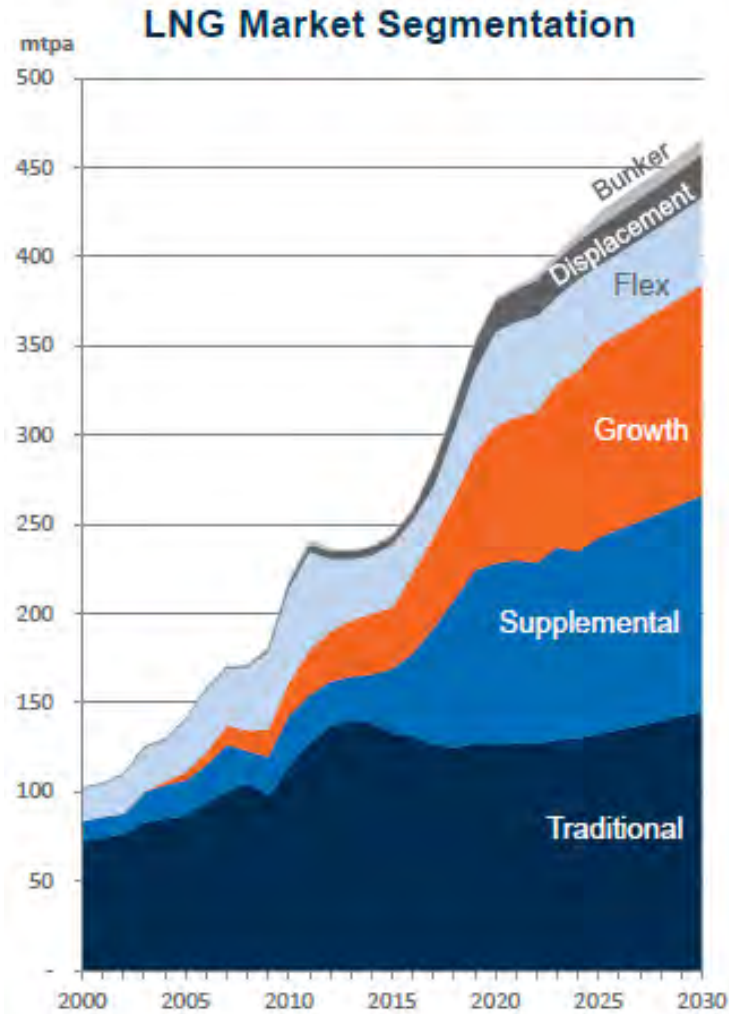
- Oversupply coming to the market
- Collapse of investments, likely to lead to boom and bust cycle

3 Industry structure: Taming the explosion of risks

- Shorter commitments and more flexible assets
- New risk bearing intermediaries

1 Demand

The level of LNG demand will be determined by emerging countries' credit risk and demand uncertainty, and its relative price vs. coal



Type	Characteristics	Locations	Demand Growth (mtpa)
Supplemental	Countries with maturing indigenous resource bases require new sources of gas	Indonesia Malaysia Egypt Pakistan Thailand Bahrain Southeast Europe...	+85
Growth	Growing economies seeking cleaner and more diverse fuel mix	China India	+84
Flex	Seasonal / weather influenced and price sensitive demand	Northwest Europe Brazil Argentina...	+13
Displacement	Diversifying energy mix away from oil / coal	Caribbean countries Kuwait South Africa	+20
Bunkering	Adopting cleaner ship fuels due to stricter emission standards	Singapore Gibraltar Tenerife...	+8
Traditional	Legacy importers with flat to declining demand	Japan Korea Taiwan	+12

A

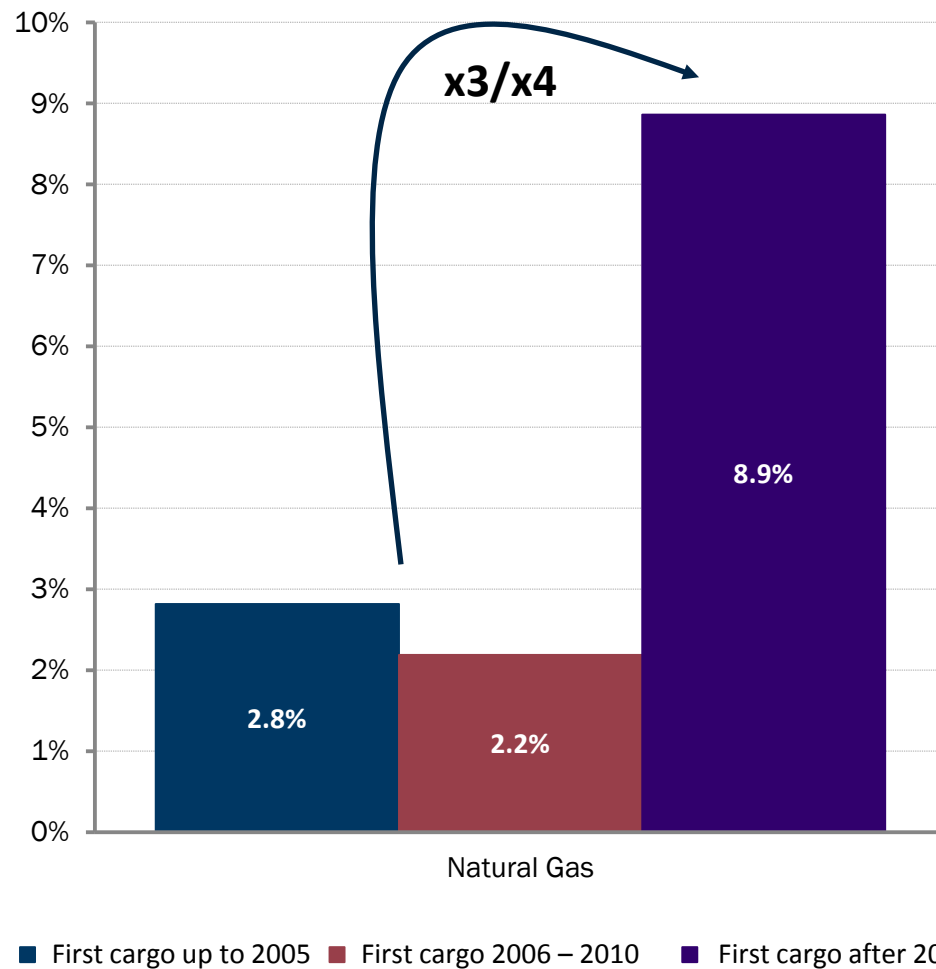
Emerging countries:
Credit risk issues and demand uncertainty

B

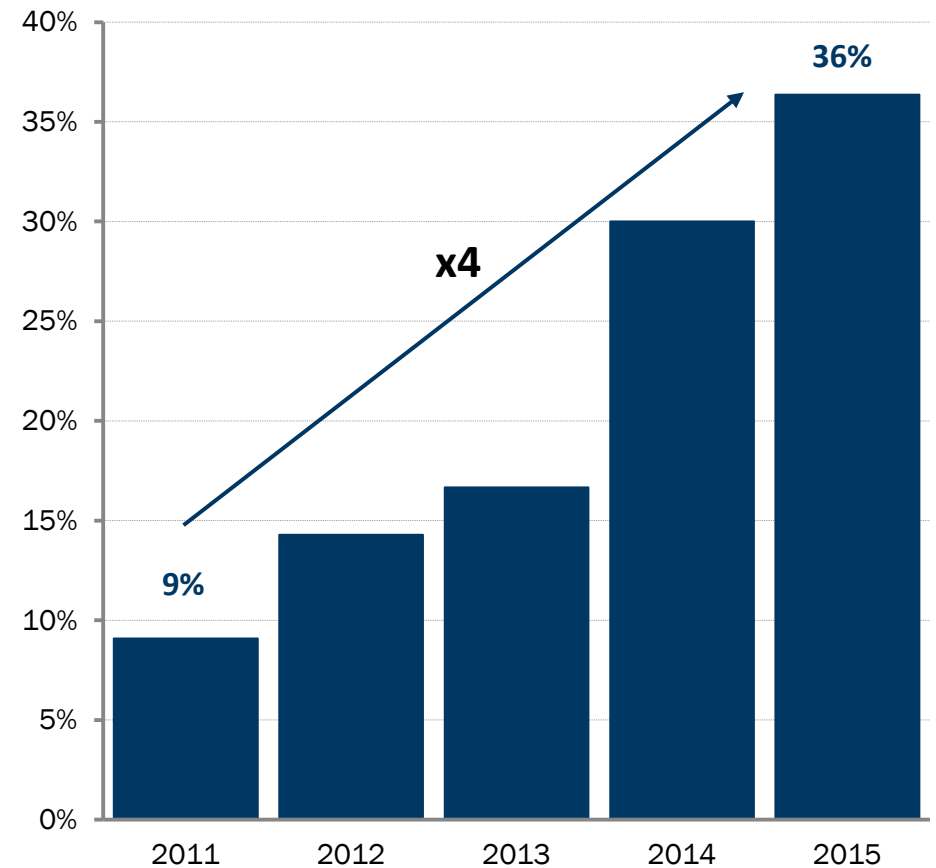
Switching countries:
Relative price issues

New LNG demand from emerging countries carries demand volatility and higher credit risk

Standard deviation of YoY change in gas consumption, 2005 – 2014 ^[1]



Non credit rated companies as % of buyers in new LNG contracts ^[2]

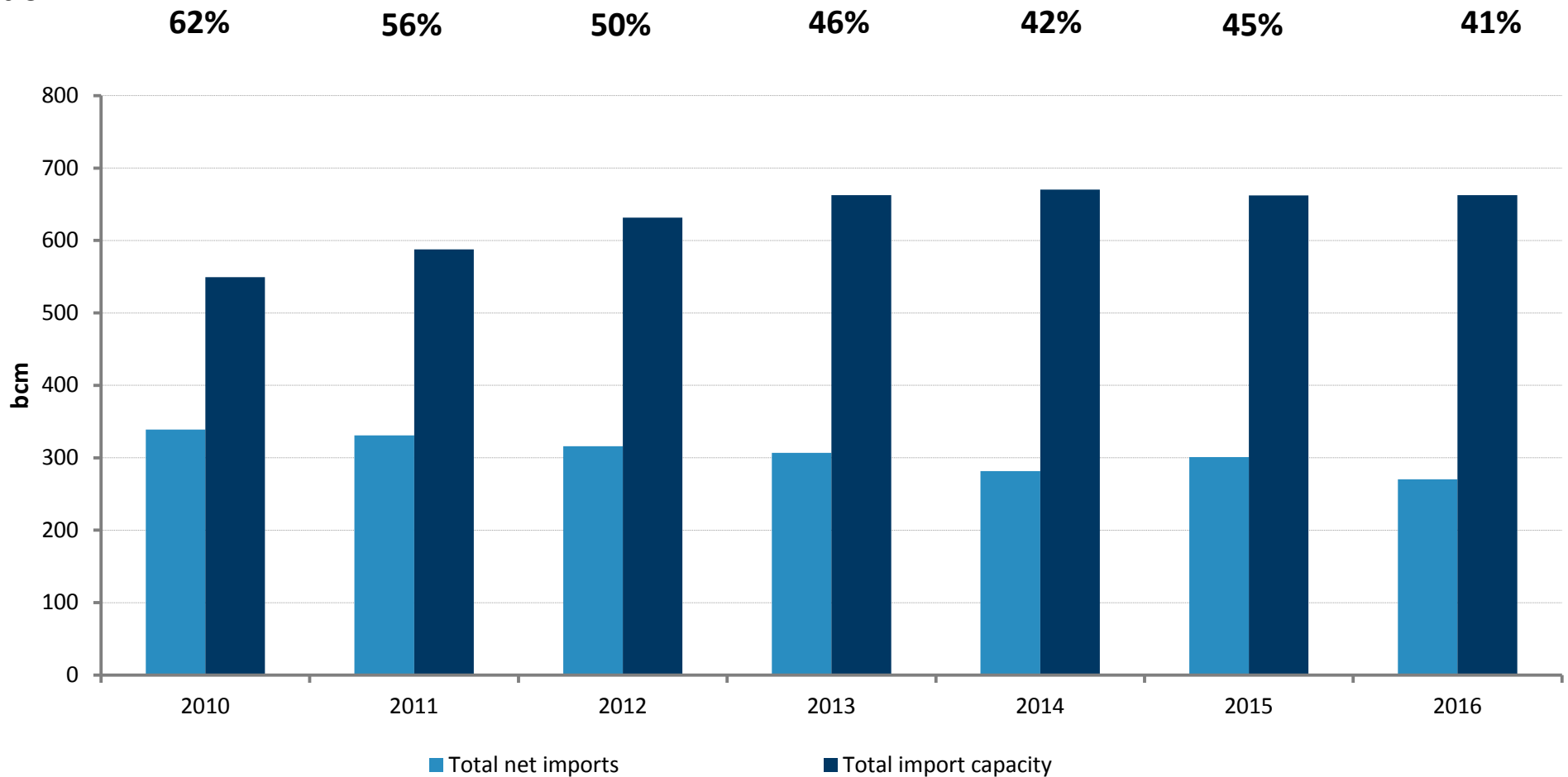


1 B Demand – Switching countries

Europe has a large switching potential supported by import overcapacity – Utilisation dropped from 60% to 40% since 2010

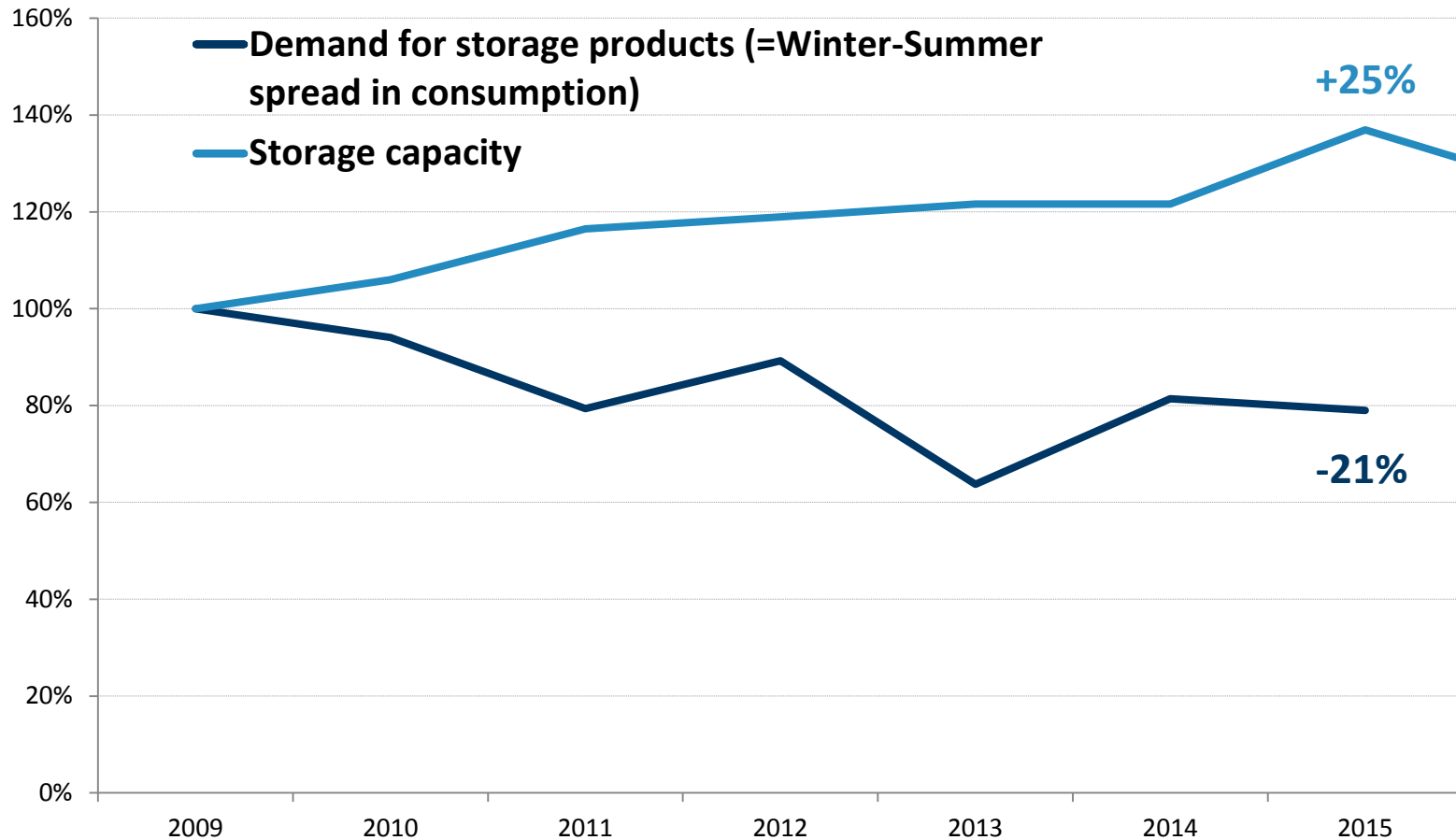
EU import capacity and net imports

Utilisation factor



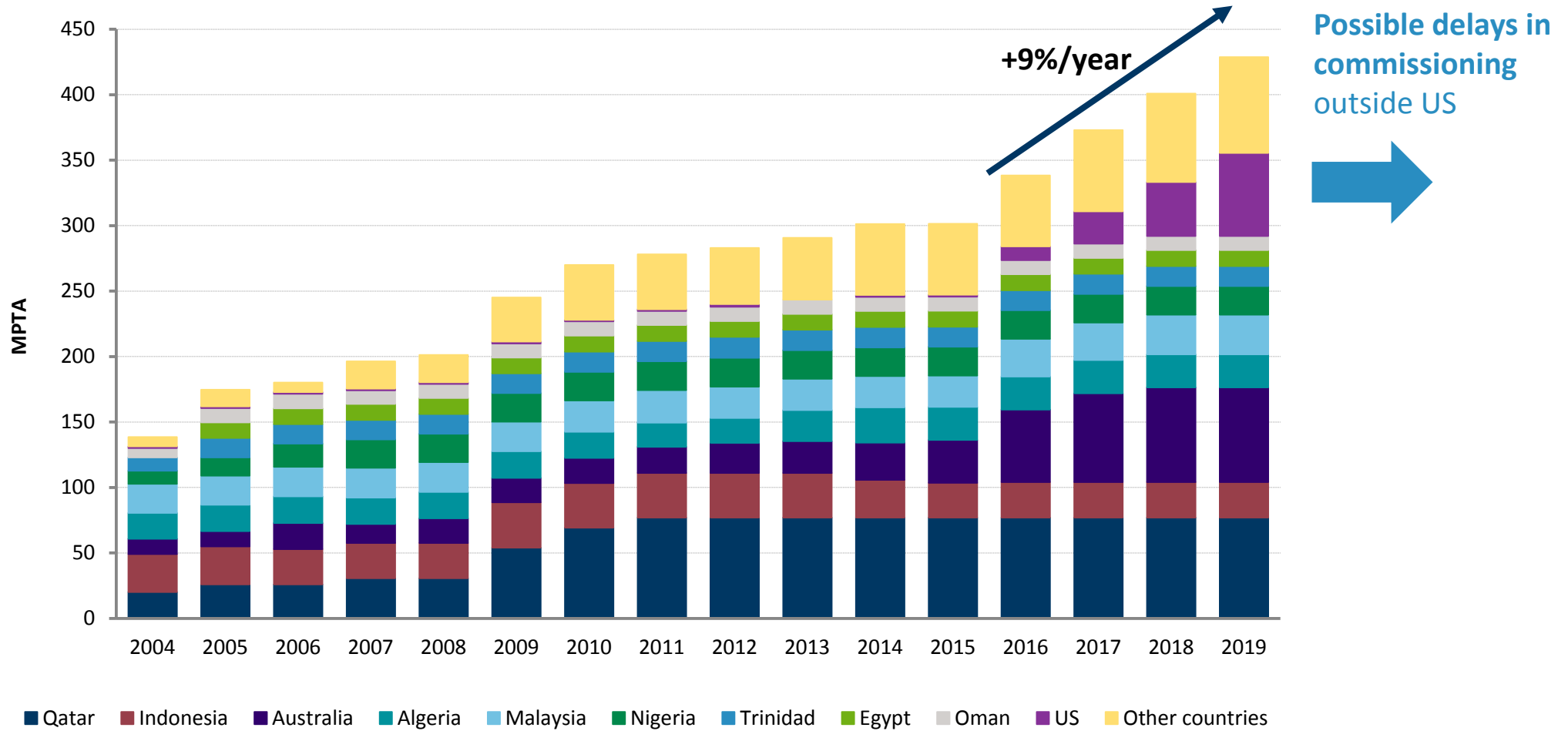
European storage overcapacity further supports the region’s global LNG balancing role

Storage capacity and demand for storage products (Base 100% in 2009)



An oversupply is coming to the market

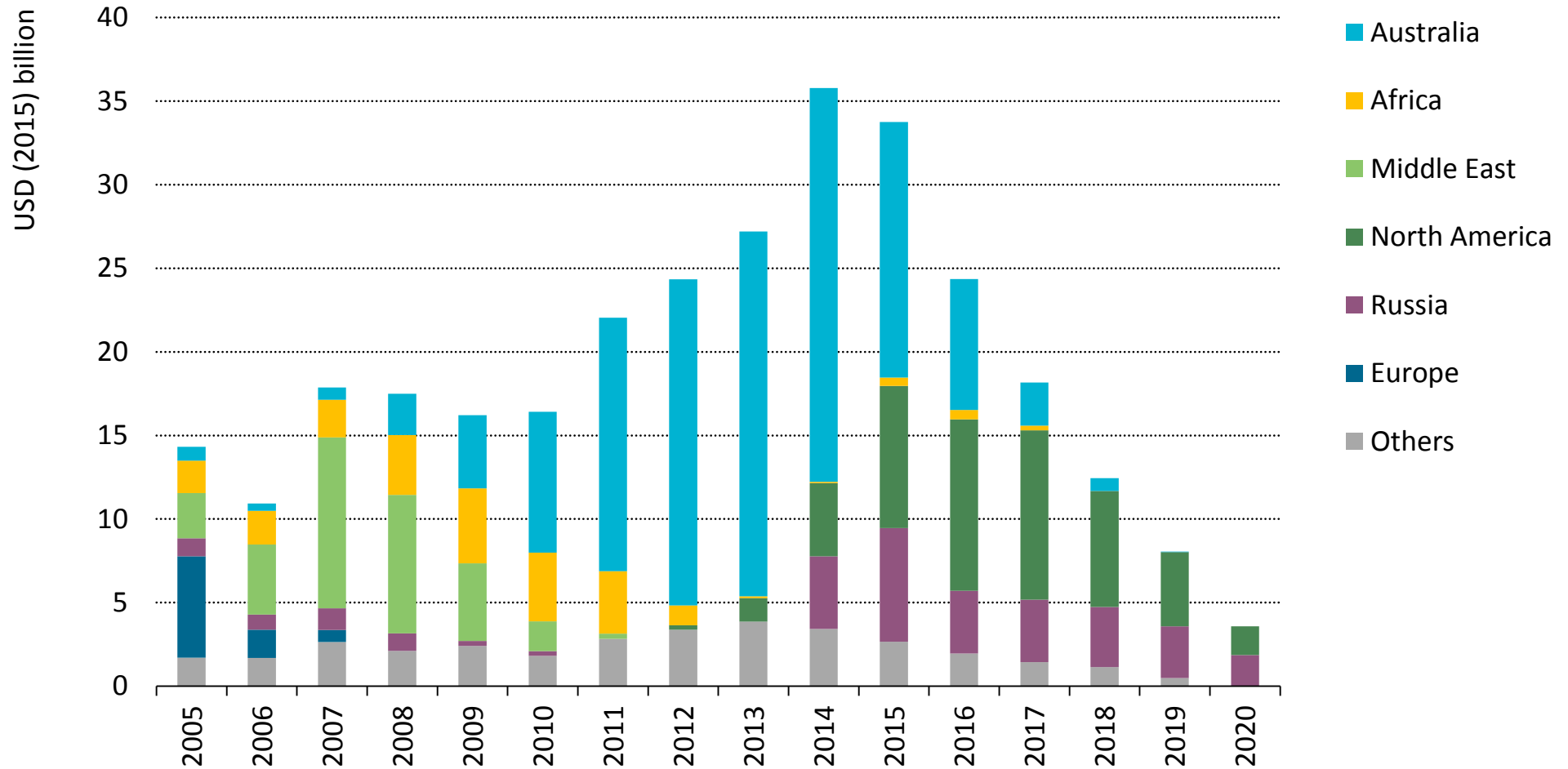
LNG liquefaction capacities



2 Supply

Supply investments have collapsed, leading to likely boom and bust cycle

LNG liquefaction terminals investment, according to IEA



The industry is adapting to higher risks

A Shorter commitments and more flexible assets

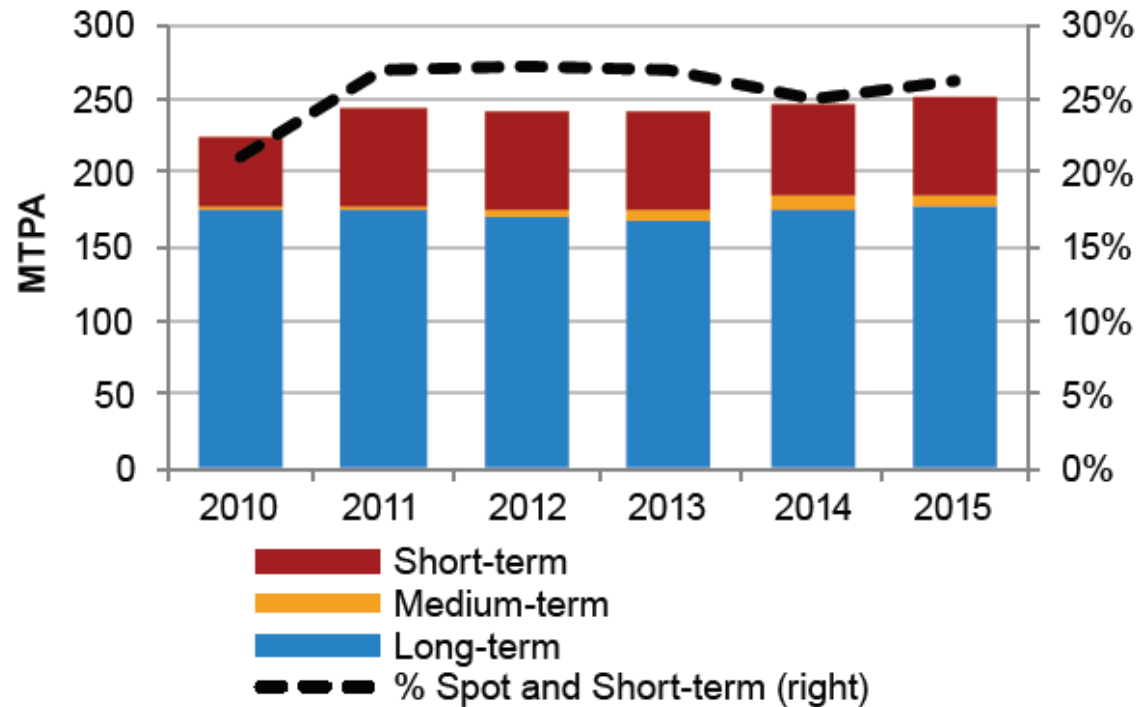
- Significant share of short-term deals, Reliance on tendering
- Putting assets on boats to increase flexibility

B New risk bearing intermediaries

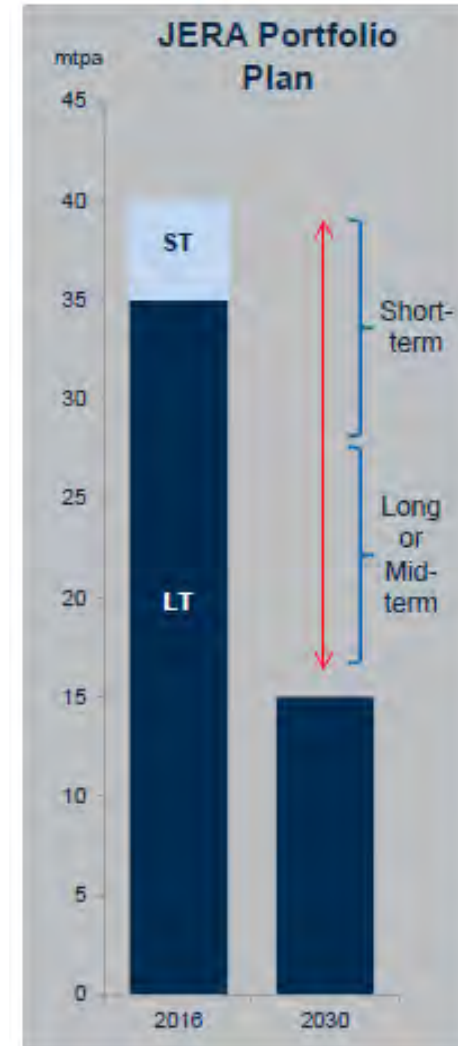
- Trading houses entering the LNG market, offering risk intermediation

Short-term deals have become significant and can be relied upon

Significant share of short-term volumes



Increasing reliance on short-term supplies/sales



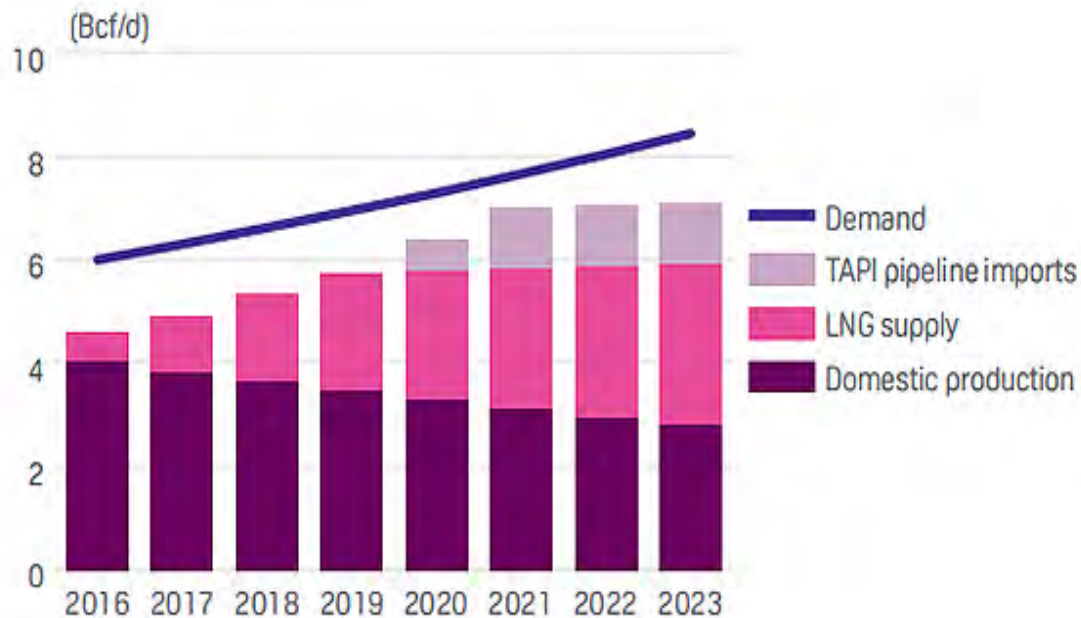
Development of tenders, 2016-2017:

- ~500 cargos bought via tender
- ~200 cargos sold via tender

3 A Industry – Shorter commitments and more flexible assets

As an example, Pakistan has secured a significant LNG supply through straight tendering

Pakistan gas market forecast



Pakistan tender

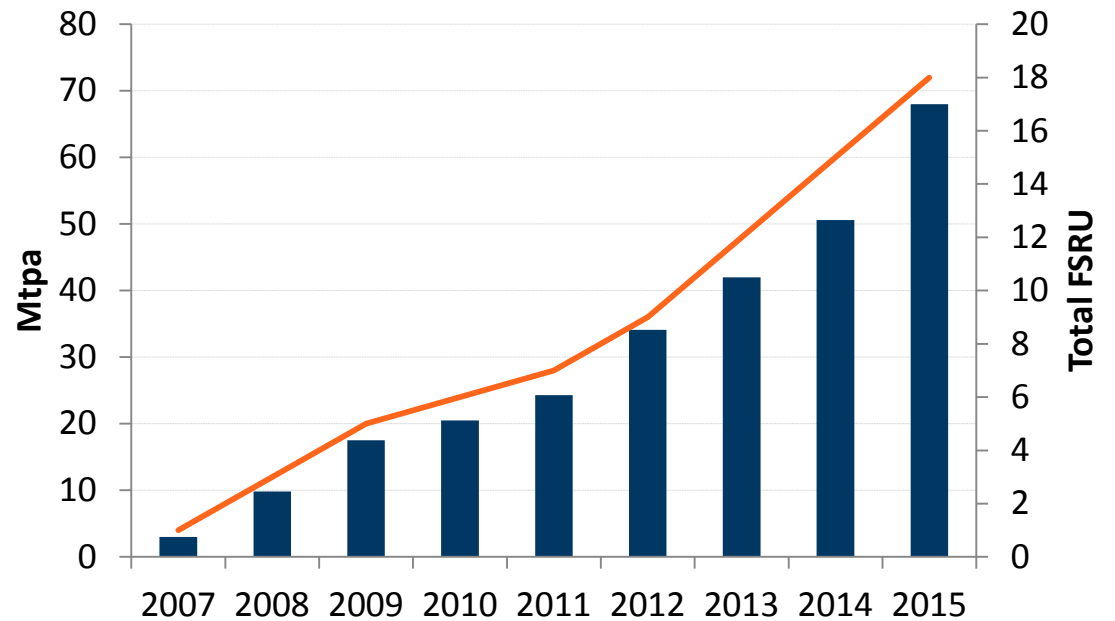
- January 2017, 240 LNG cargoes tender secured, totalling 48 Bcf of gas (1.4 Bcm)
- Five-years tender of 60 cargoes
- 15-years tender of 180 cargoes
- Offers submitted on a DES basis
- Bank bond of \$100,000 required for each bid
- Pricing : indexation to the 90-day average price of the Brent crude benchmark

The industry is moving its assets on boats

Floating Regasification Capacity by Status and Number of Terminals, 2005-2021



Golar Spirit FSRU



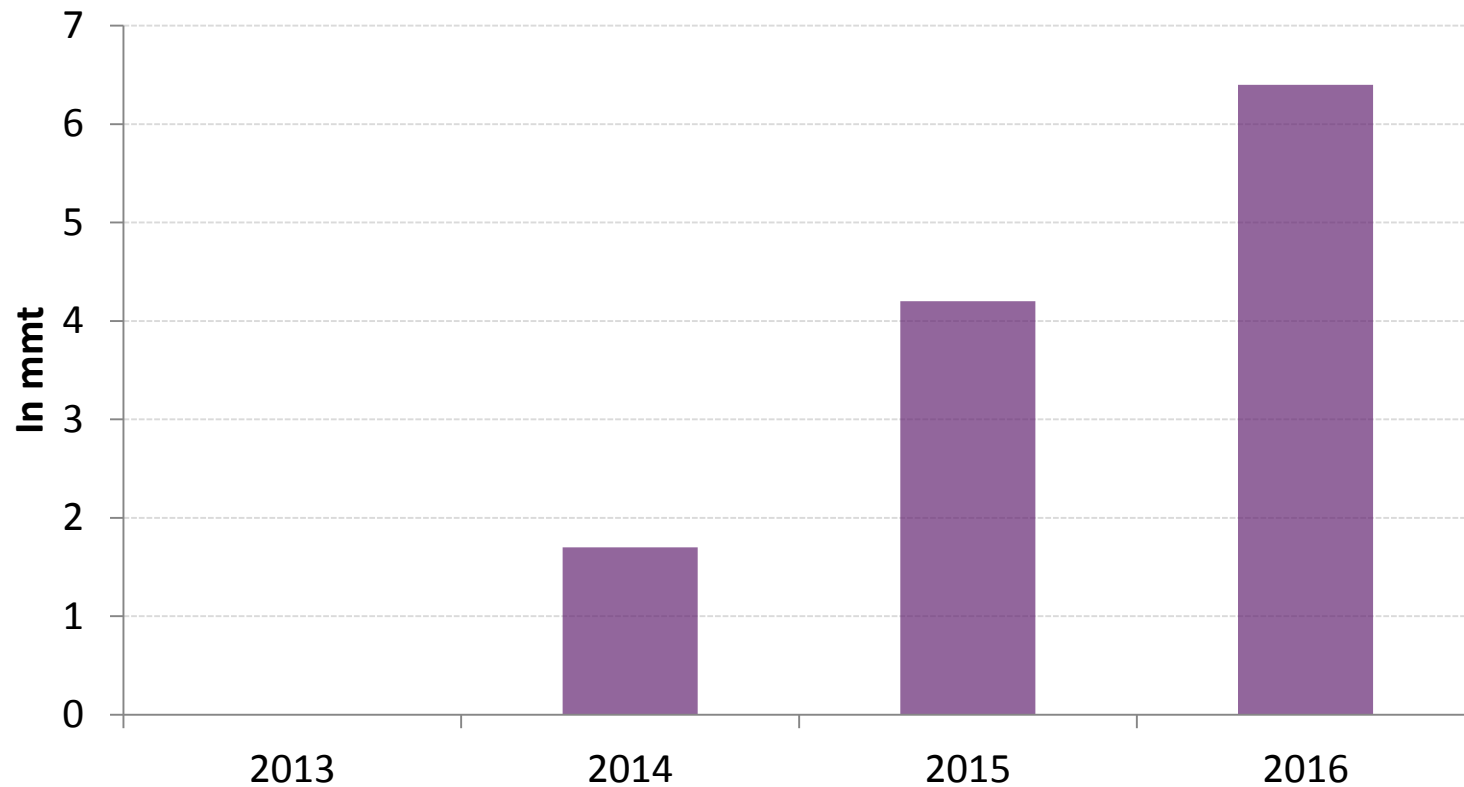
■ Cumulated receiving capacity in Mtpa — Existing FSRU

3 B Industry – New risk bearing intermediaries

Trading houses have entered the LNG market, offering intermediation between producers and risky buyers



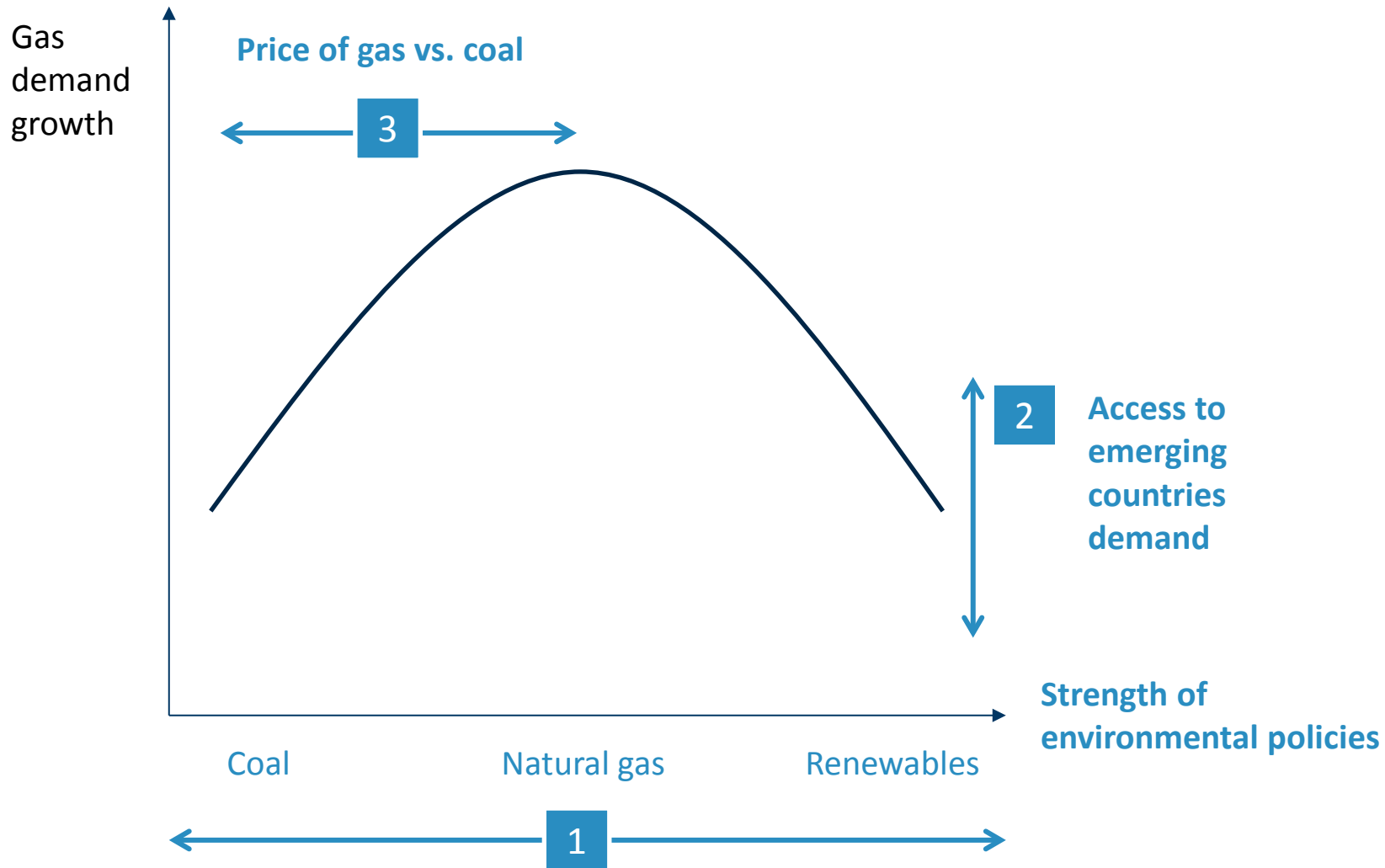
Trafigura volumes of trading of LNG



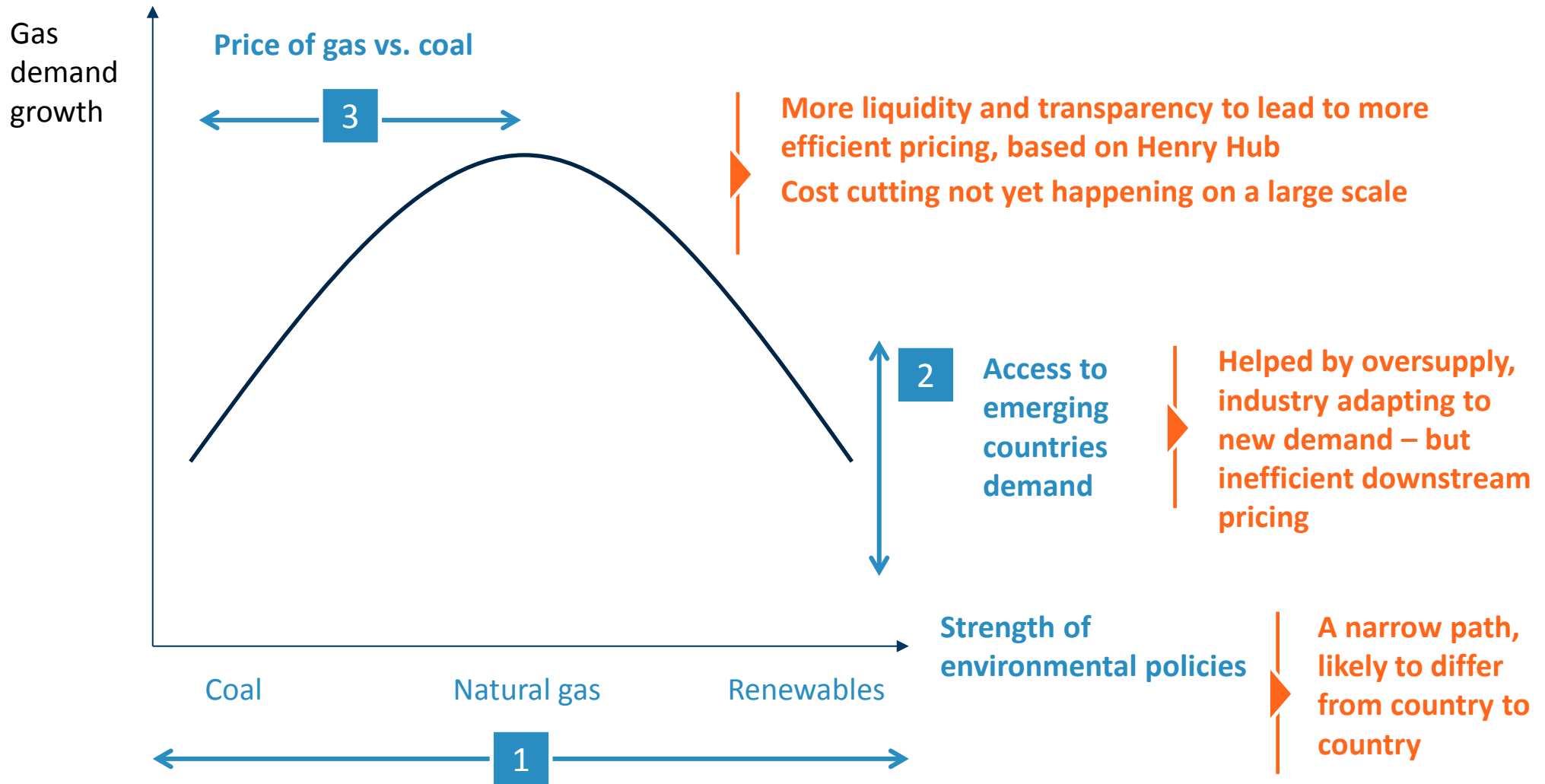
III.

Conclusion

Gas demand growth will remain dependent on coal prices and national fuels policies



Gas demand growth will remain dependent on coal prices and national fuels policies



Experts with Impact

Emmanuel Grand

emmanuel.grand@fticonsulting.com

+33 1 53 05 36 13