



International & European Policies in the Context of a Global Gas Market

11th annual European Gas Conference 2018

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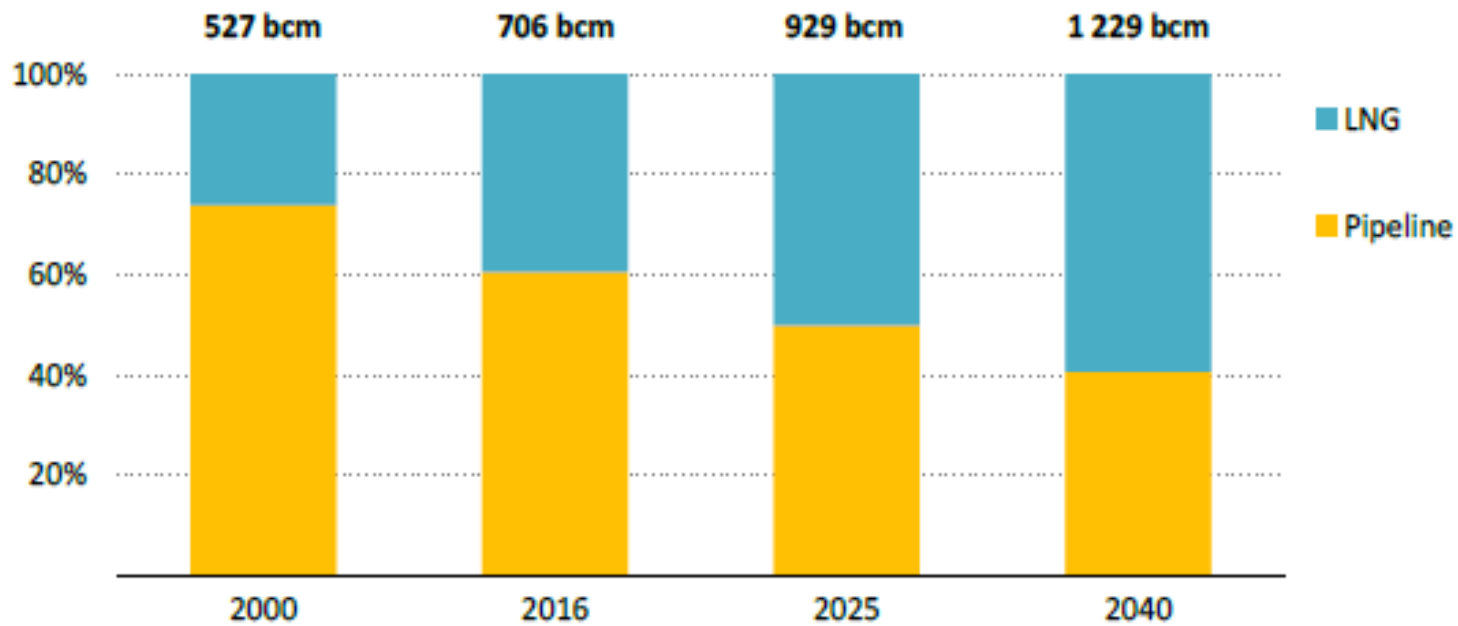
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- ▶ **IEA: Second gas revolution spurs Global Gas Market**
- ▶ **Rapid further development & rising demand**
 - **Slido intervention # 1**
- ▶ **Prices of previously isolated regions now benchmarked by (tradable) ‘spreads’**
- ▶ **Can Europe benefit from global gas market?**
 - **Slido intervention # 2**
- ▶ **Availability of LNG in case of need?**
- ▶ **IEA: Security of supply redefined**
- ▶ **IEA Caveat: ‘unexpected shocks’ possible**
- ▶ **Example Nordstream 2: US sanctions & EC regulatory efforts misplaced**
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IEA: Second gas revolution: LNG revolution

LNG to overtake piped gas in global trade

Figure 2.16 ▶ Global gas trade by mode in the New Policies Scenario



Almost 90% of additional gas trade in the period to 2040 is in the form of LNG

Source: IEA WEO 2017

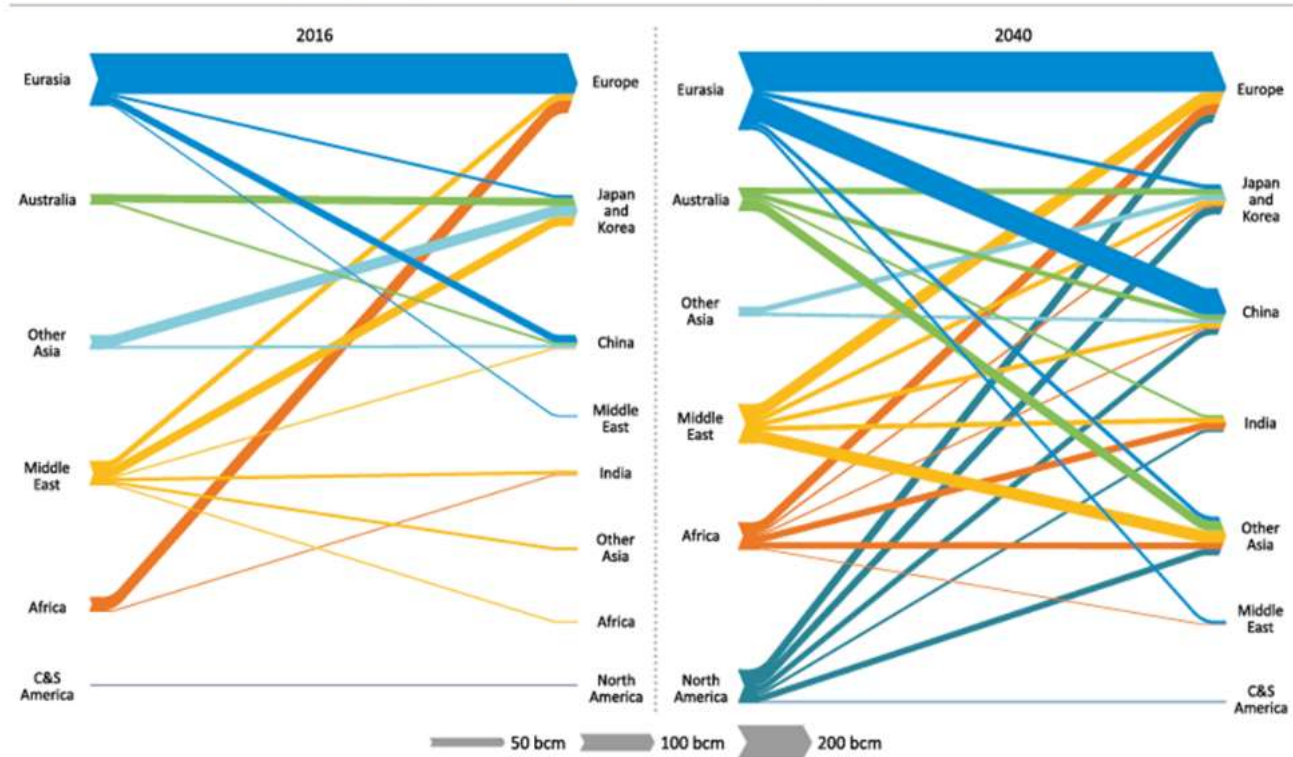
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IEA WEO 2017:

Rapid further development creates new diversities and interdependencies

Figure 8.12 ▶ Selected global gas trade flows in the New Policies Scenario (bcm)



The rise in LNG trade underpins an increasing diversification and interconnectivity of the global gas market

Note: C&S America = Central and South America.

Source: IEA WEO 2017

Slido intervention # 1

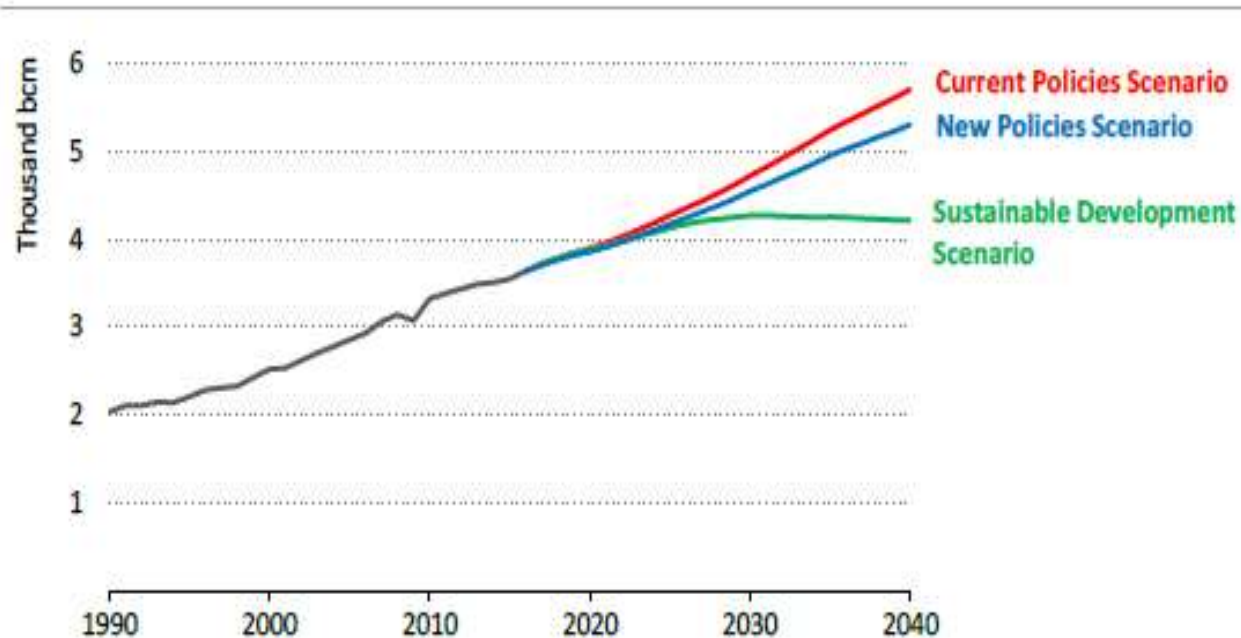
What do you think is the projected 2040 global gas demand in the IEA's WEO 2017 New Policies Scenario (vs. 3,635 bcm/a in 2016)?

- A. 2,500 bcm/a
- B. 4,100 bcm/a
- C. 5,300 bcm/a

IEA WEO 2017:

Gas only fossil fuel with respectable growth

Figure 8.2 ▸ World natural gas demand by scenario



*Gas use is projected to increase by 1.6% per year, on average,
in the New Policies Scenario*

Note: bcm = billion cubic metres.

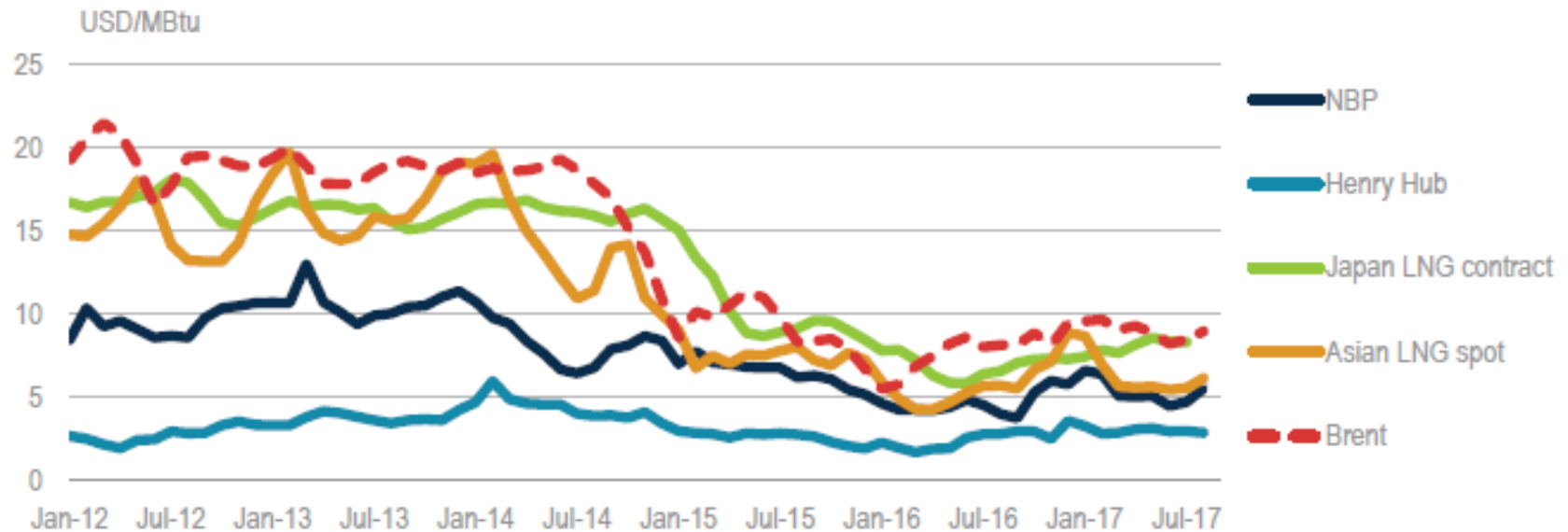
Source: IEA WEO 2017

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Prices of previously isolated regions now benchmarked by (tradable) spreads LNG driven spread arbitrage causes price convergence

Figure 1.2 • Gas price development, 2012-17



Note: NBP = National Balancing Point (United Kingdom).

Sources: NBP, Henry Hub, Japan LNG contract and Brent data: Bloomberg Finance LP; Asian LNG spot data: ICIS (2017a), *ICIS LNG Edge*, www.icis.com/energy/liquefied-natural-gas/lng-edge (subscription required).

Source: IEA Global Gas Security Review 2017

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Slido intervention # 2

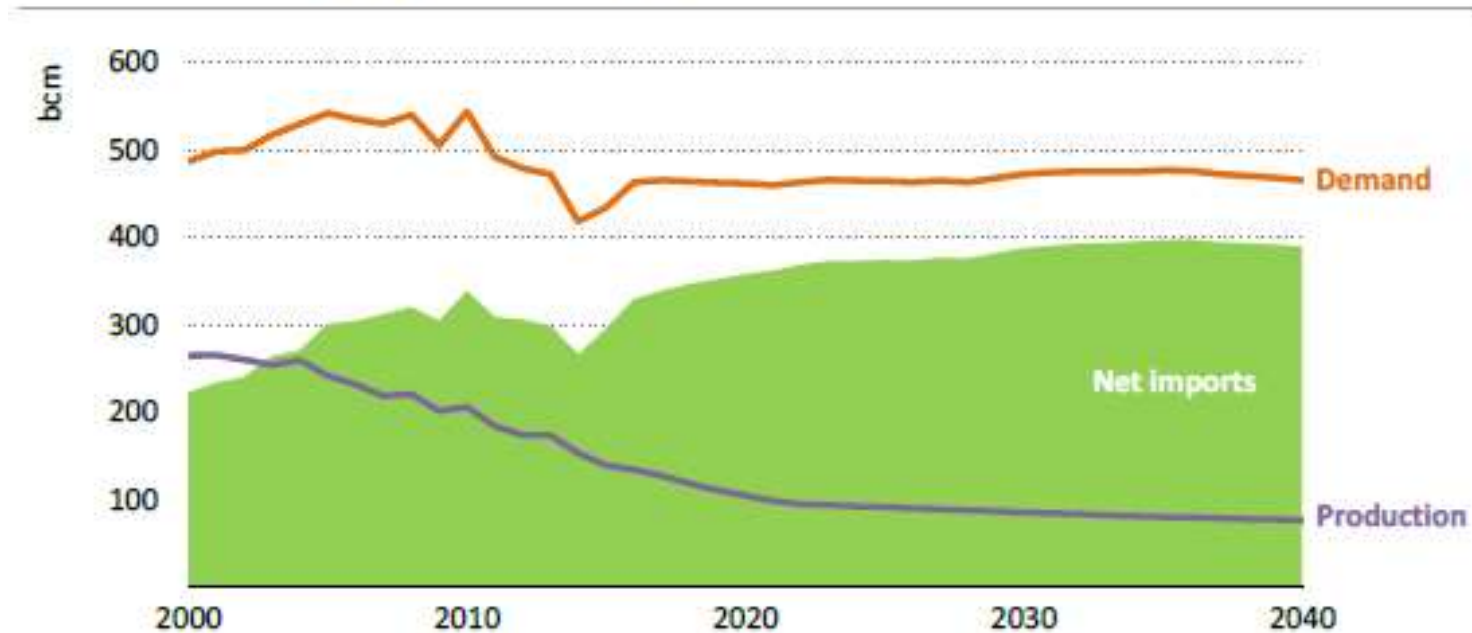
What is the EU's projected import requirement in 2040 conform the IEA's WEO 2017 New Policies Scenario?

- A. 60 bcm/a**
- B. 150 bcm/a**
- C. 390 bcm/a**

Can Europe benefit from global gas market?

IEA WEO 2017: Europe's import needs rise to 390 bcm/a in 2040

Figure 8.9 ▶ Natural gas balance of the European Union in the New Policies Scenario



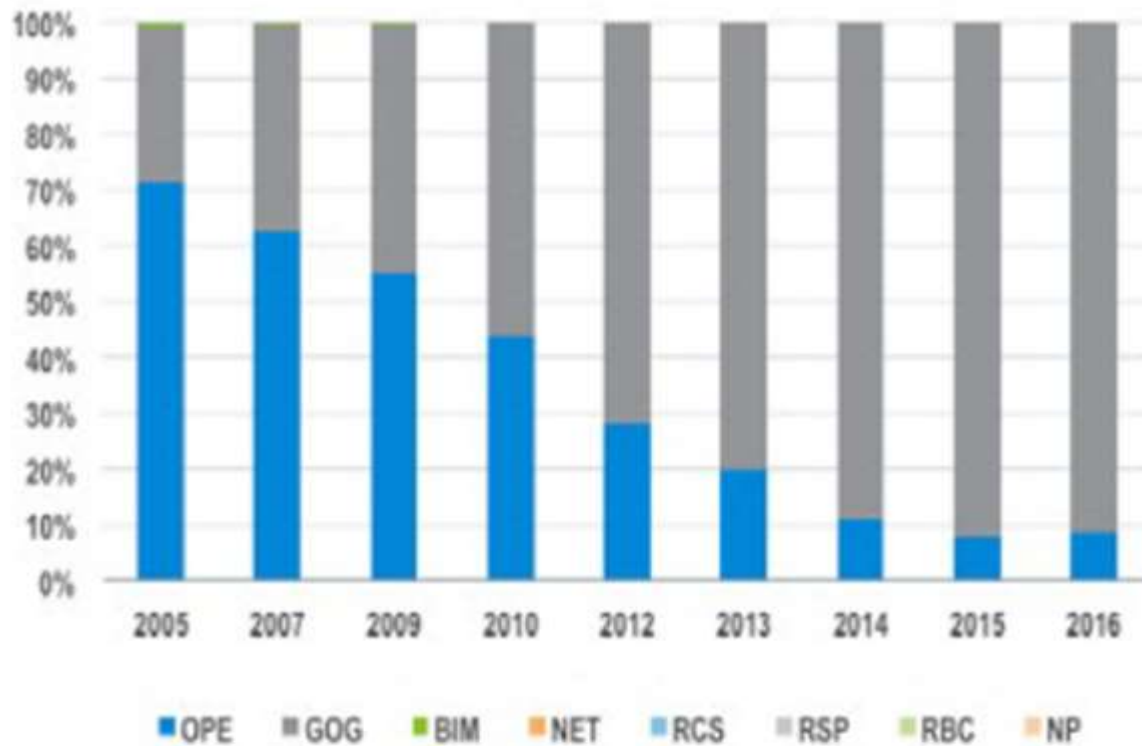
Even with a flat demand outlook, the European Union's gas imports increase to 2040 as domestic output continues to decline

Source: IEA WEO 2017

Can Europe benefit from global gas market?

Europe capable of sending price signals by traded markets

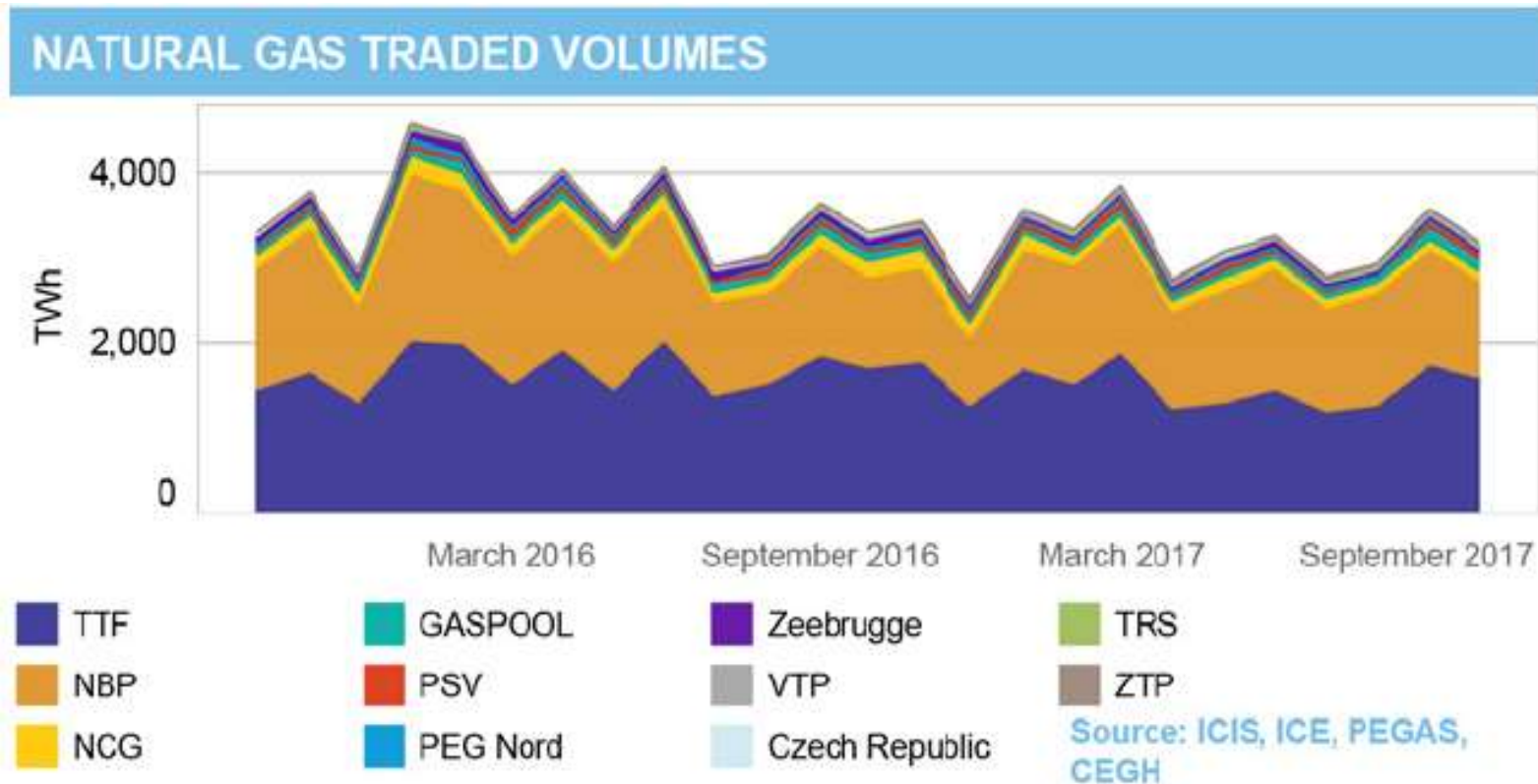
Figure 5.5 Northwest Europe Price Formation 2005 to 2016



Source: IGU Wholesale Gas Price Survey 2017 Edition

Can Europe benefit from global gas market?

North-West European markets deeply liquid



Source: ICIS Heren, European Gas Markets 15-11-2017

Can Europe benefit from global gas market?

Redundant import capacities: ~210 bcm/a of LNG regas terminals (~75% idle)

KEY DATA			
Annual regasification capacity of large-scale LNG import terminals per country			
	billion m ³ (N)/year		
	operational	under constr.	planned
BELGIUM	9		
CROATIA			6
ESTONIA			5
FINLAND			
FRANCE	34		11
GERMANY			4
GREECE	5	2	6
IRELAND			3
ITALY	15		8
LATVIA			5
LITHUANIA	4		
MALTA	1		2
NETHERLANDS	12		4
POLAND	5		11
PORTUGAL	8		
SPAIN	69	3	5
SWEDEN	1		1
UK	48		17
TOTAL EU-28	210	5	87
ALBANIA			8
NORWAY			
RUSSIA			3
TURKEY	17		21
UKRAINE			10
TOTAL EUROPE	227	5	129

Number of LNG import terminals per type			
	operational	under constr.	planned
LARGE-SCALE	23	2	7
└ FSRU & OTHERS	4	0	13
SMALL-SCALE	5	4	4
TOTAL EUROPE	28	6	11

Source: GIE LNG Map 2018

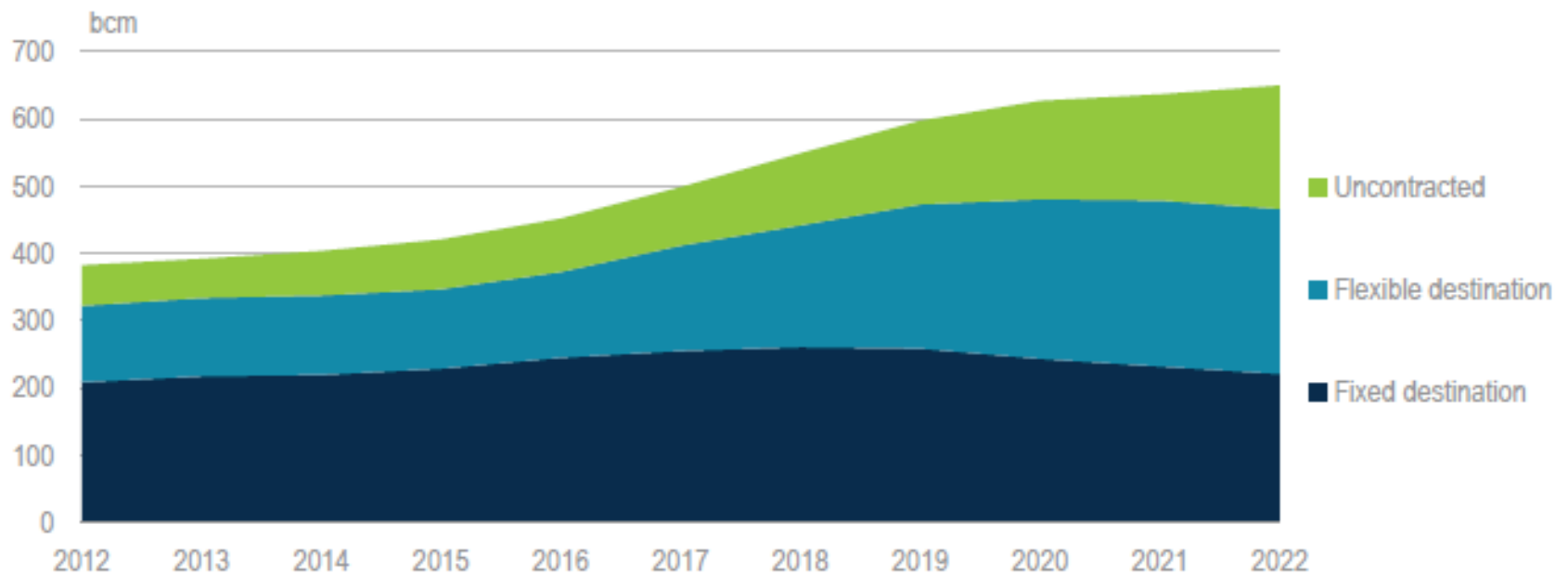
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Availability of LNG in case of need?

Increasing share of flexible global LNG supply volumes

Figure 2.10 • LNG export contract volumes by destination flexibility, 2012-22

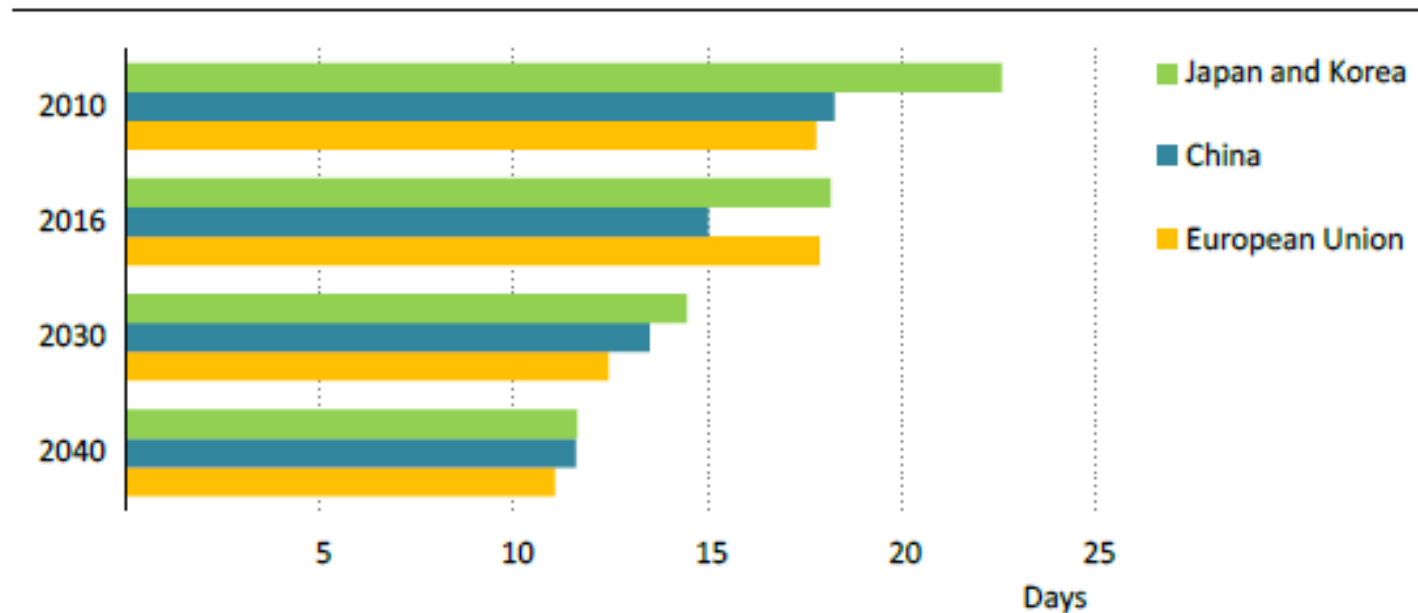


Source: IEA Global Gas Security Review 2017

Availability of LNG in case of need?

Global LNG supply response time reduces significantly

Figure 9.14 ▶ Estimated average time to procure an extra 10% of LNG import volumes by selected importer in the New Policies Scenario



As LNG trade expands and becomes more diversified, major LNG importers are able to meet an unforeseen 10%-spike in their LNG import demand in much less time than today

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First edition IEA Global Gas Security Review 2016:

Security of supply to be redefined: regional approach no longer appropriate

“As the role of gas ... evolves, a narrow approach to gas security focussing on gas as a stand-alone fuel in an individual region is no longer appropriate.”

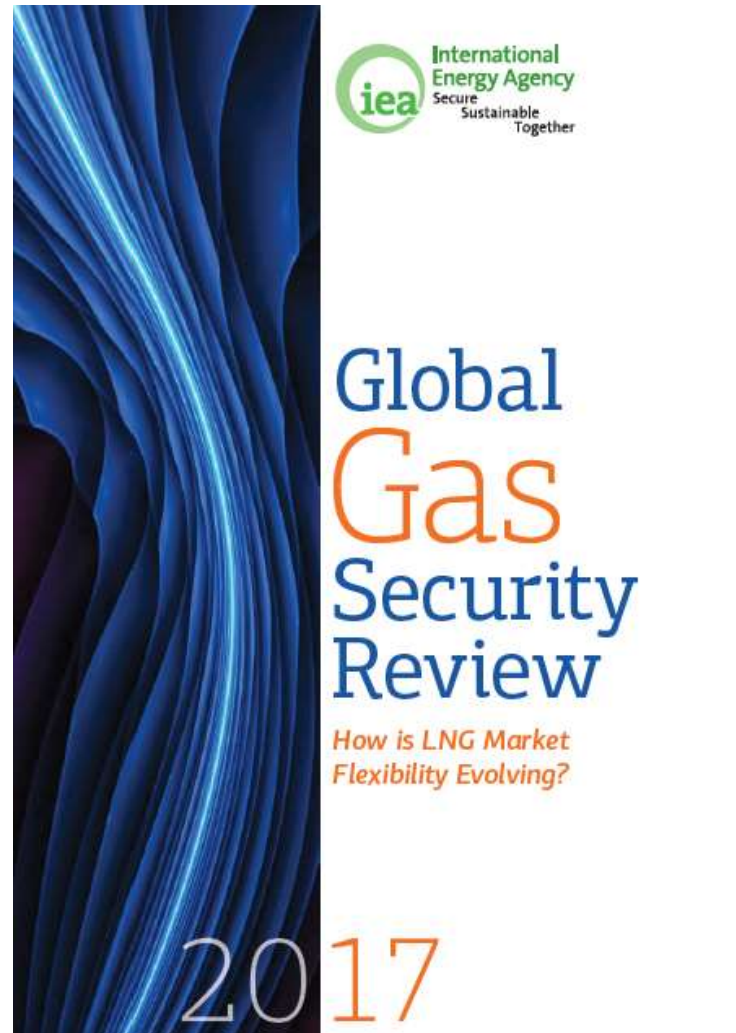


Source: IEA Global Gas Security Review 2016

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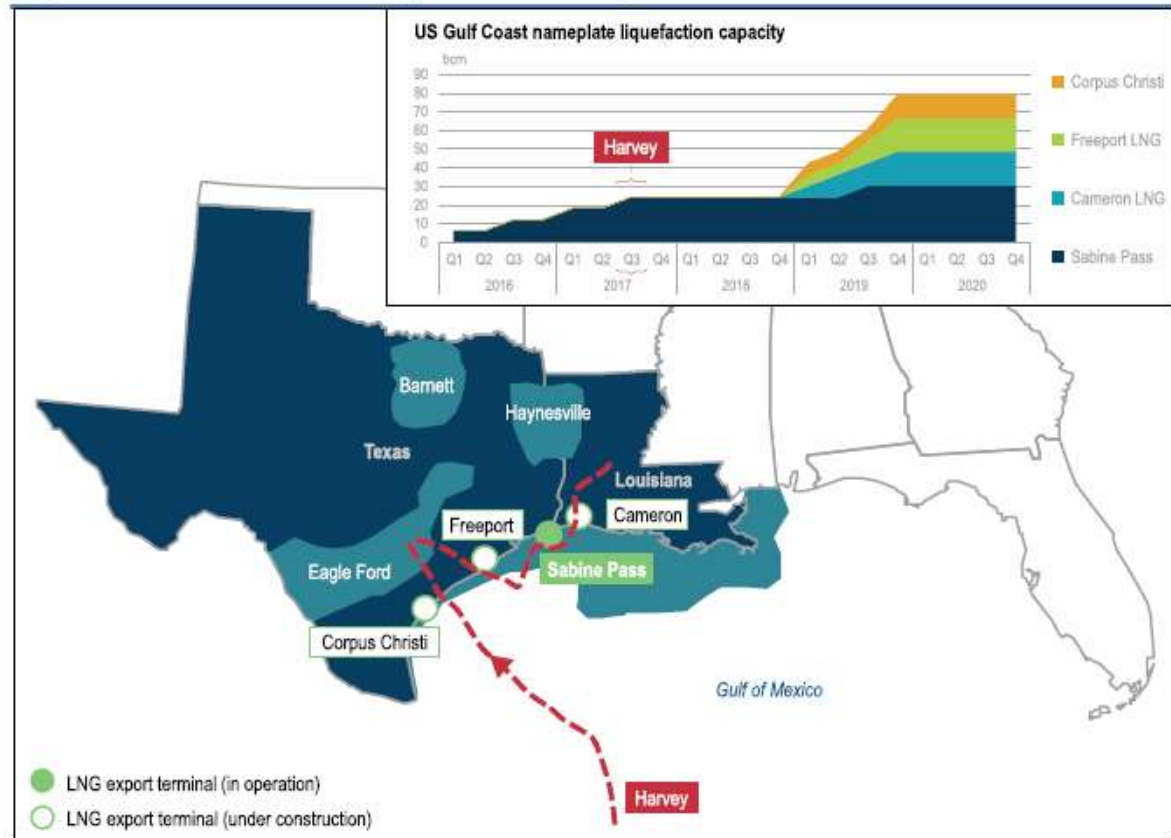
Second edition IEA Global Gas Security Review 2017: Caveat: Unexpected 'shocks' nonetheless possible



Source: IEA Global Gas Security Review 2017

IEA Caveat: ‘Shocks’ nonetheless possible: U.S.A. E.g. Hurricane Harvey reminds of concentration risk Gulf Coast

Map 1.2 • US Gulf Coast increasingly connected to the global LNG market



This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

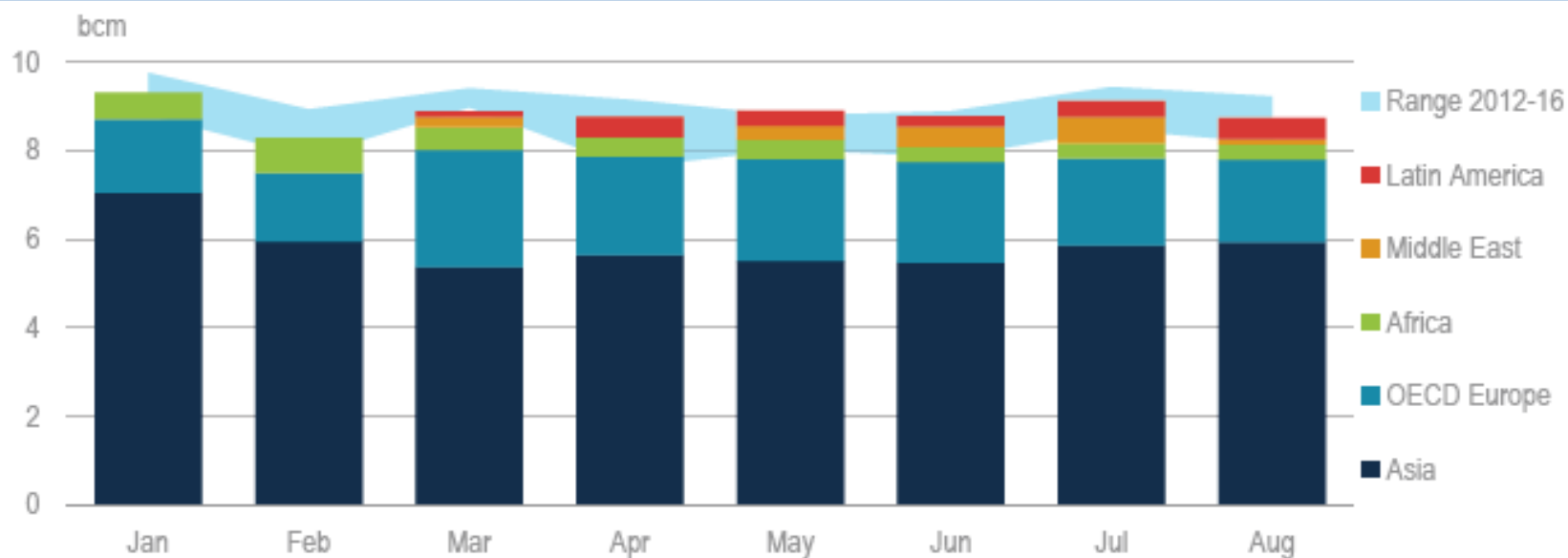
Sources: EIA (2017a), *Natural Gas Consumption by End Use* (database), www.eia.gov/dnav/ng/ng_cons_sum_dcu_SLA_a.htm; EIA (2017b), *Natural Dry Gas Production* (database), www.eia.gov/energyexplained/data/U.S.%20dry%20shale%20gas%20production.xlsx; ICIS (2017a), *ICIS LNG Edge*, www.icis.com/energy/liquefied-natural-gas/lng-edge (subscription required).

Source: IEA Global Gas Security Review 2017

IEA Caveat: ‘Shocks’ nonetheless possible: Qatar

Geopolitical strife did not cause supply disruptions, supplies within 5 year range

Figure 1.20 • Monthly Qatari LNG export volumes by region, 2012-17



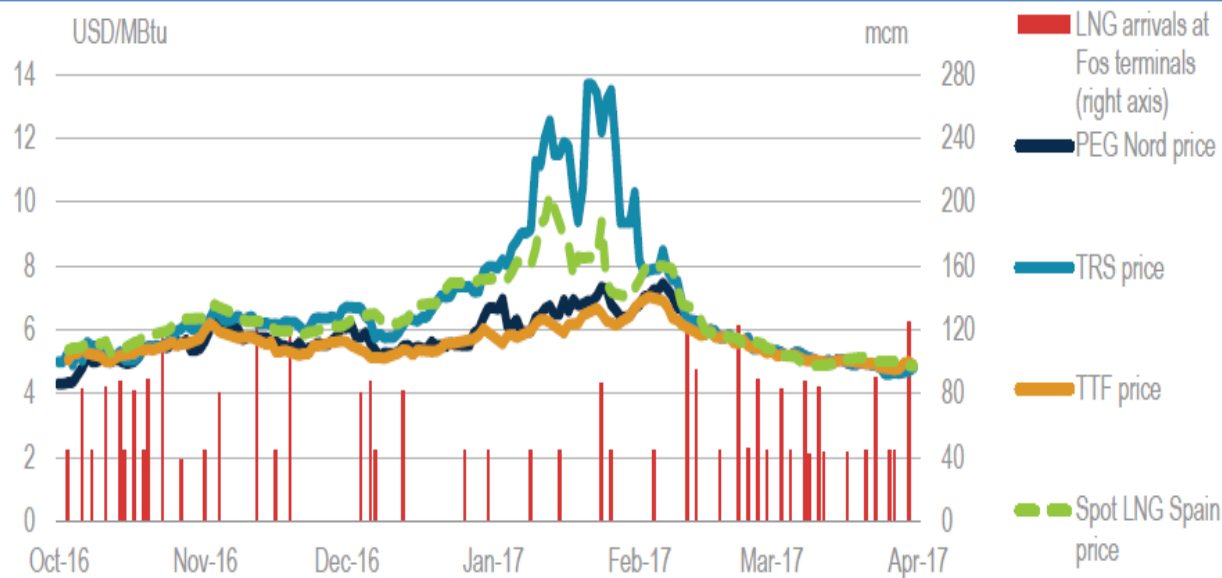
Source: ICIS (2017a), *ICIS LNG Edge*, www.icis.com/energy/liquefied-natural-gas/lng-edge (subscription required).

Source: IEA Global Gas Security Review 2017

IEA Caveat: ‘Shocks’ nonetheless possible: France

Neglect of interconnectivity TRS Southern France

Figure 1.5 • Natural gas spot prices in France versus TTF and LNG spot price in Spain, winter 2016/17



Sources: Natural gas prices in France: Bloomberg Finance LP; other prices: ICIS (2017a), *ICIS LNG Edge*, www.icis.com/energy/liquefied-natural-gas/lng-edge (subscription required).

Source: IEA Global Gas Security Review 2017

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Misplaced US sanctions: ‘Money talks ...’ – not sanctions

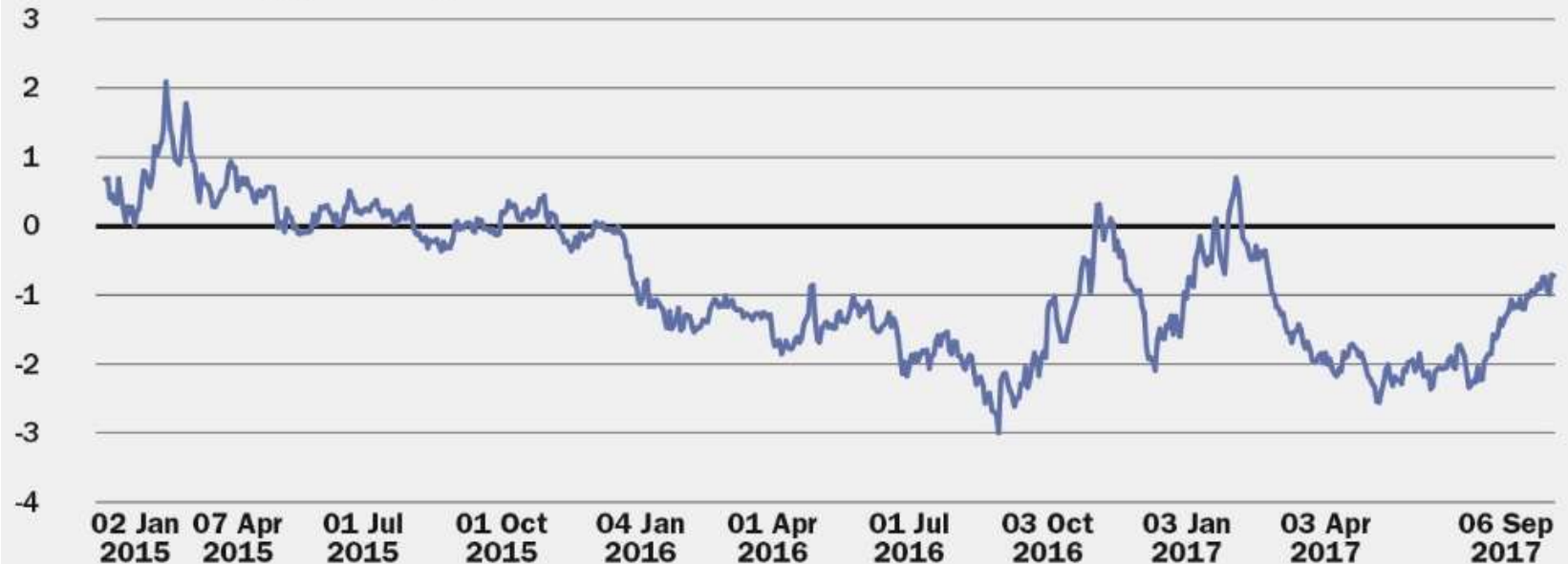
Premium NBP over HH required

Full cost: 15% HH + ~\$2.25 liquefaction + 0.50 shipping + \$ 0.50 regas = ~\$3.70/MMBtu

Marginal cost (liquefaction sunk): ~\$1.45/MMBtu

NBP PREMIUM TO FULL COST OF US LNG EXPORTS TO EUROPE

NBP PREMIUM (\$/MMBtu)



SOURCE: ICIS, NYMEX

Source: ICIS Heren

Misplaced EC efforts to derail Nordstream 2: SoS has transformed from bi-lateral physical dependency to a functionality of price signals in an integrated traded market



Ukrainian Crisis 2009: Andrej Budajew, “Putin’s recalcitrant bride”

Thank you for your attention