



Are European hubs driving global gas prices?

Flame 2017

Olly Spinks olly.spinks@timera-energy.com

www.timera-energy.com



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LNG glut puts European Hubs on the margin

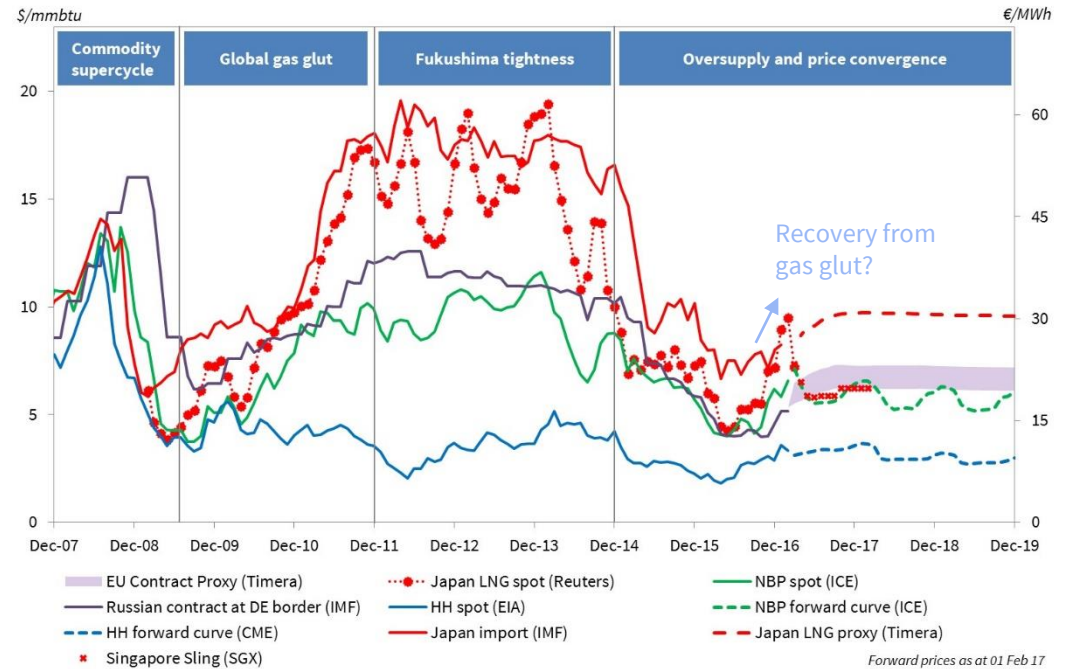
Global supply glut reasserting itself in 2017

Europe hubs:

- Providing marginal price signal for global LNG spot market
- Significant influence over ST LNG pricing

5 factors driving European & global LNG prices:

1. Asian demand recovery
2. Timing & volume of new supply
3. Coal prices
4. Role of the US gas market & exports
5. Russian market share response



Evolution of global gas price benchmarks

Source: Timera Energy

Is Asian LNG demand making a recovery?

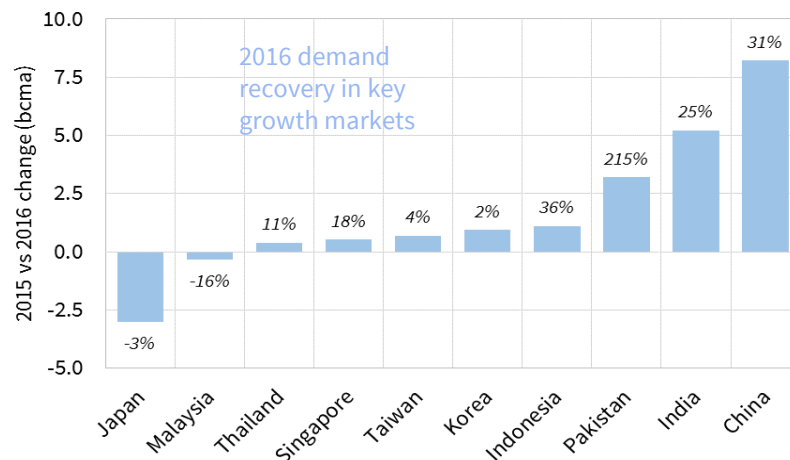
Asian LNG demand increased by 17 bcma in 2016

Recovery in key markets was positive (e.g. China & India)

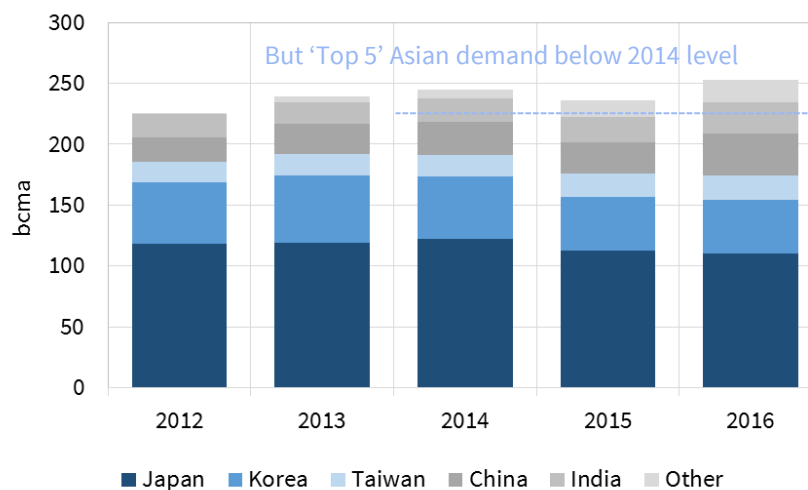
But aggregate 2016 demand from the 'top 5' Asian buyers still below 2014 levels

Watch for:

- Evidence 2016 was a turning point for Asian LNG demand especially structural displacement of coal
- Asian LNG spot / European hub price spread as LNG "glut barometer 1"



Asian LNG demand in key markets (2015 vs 2016)



Evolution of Asian LNG demand

Source: Timera Energy

Progress up the mountain of new LNG supply

19 bcma of new liquefaction capacity came online in 2016

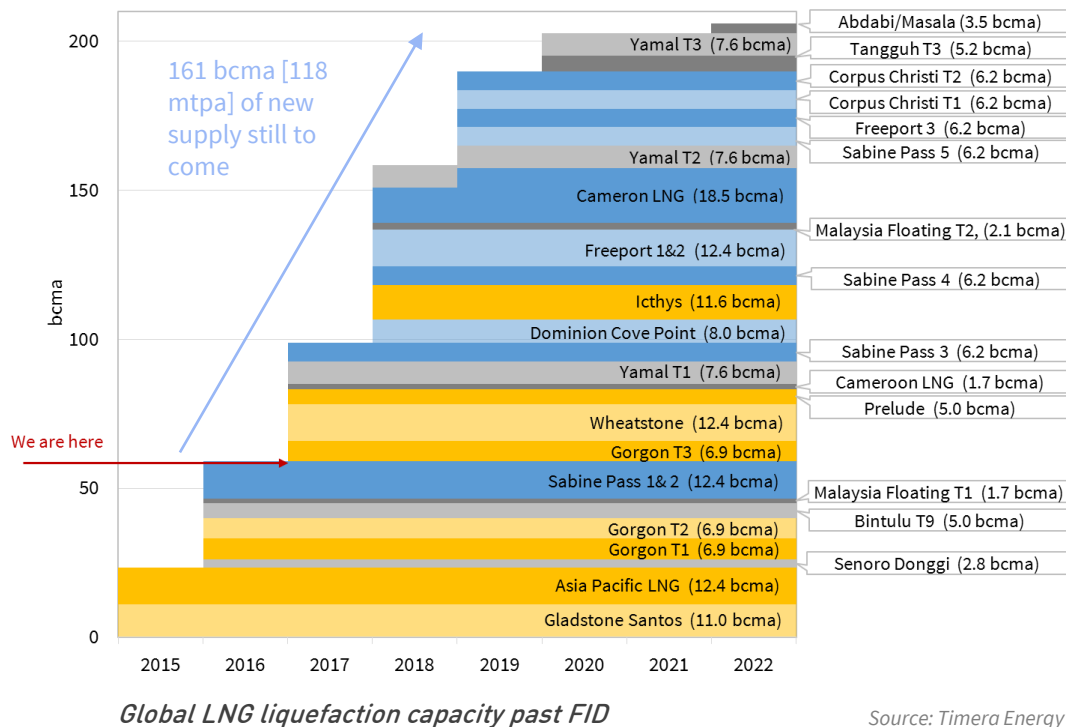
Outages, delays and normal 6-9 month ramp-up time, dulled impact of new supply

Also supply disruptions from existing producers

A total of 161 bcma of new supply is still to come by 2021

Watch for:

- Further start-up issues to delaying glut condition projections



Source: Timera Energy

European gas/coal switching now a reality

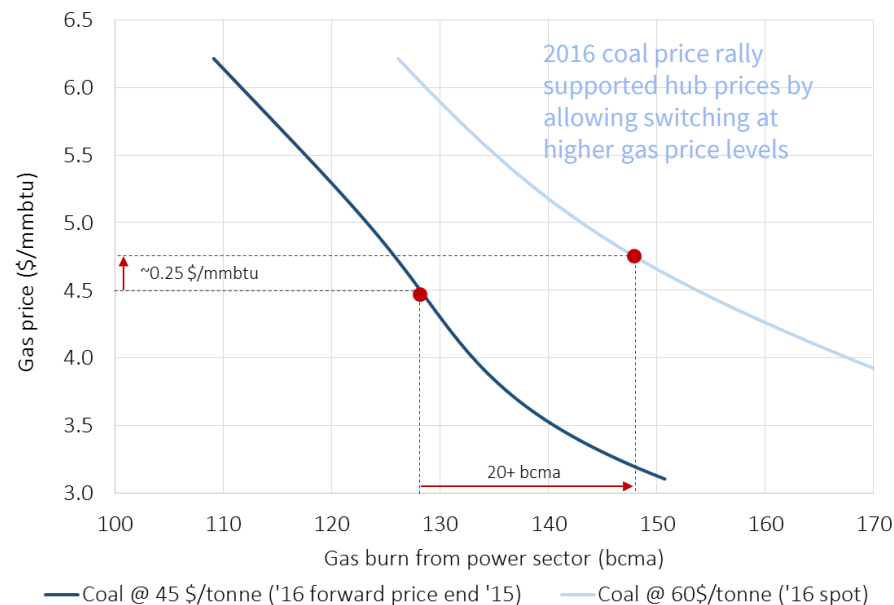
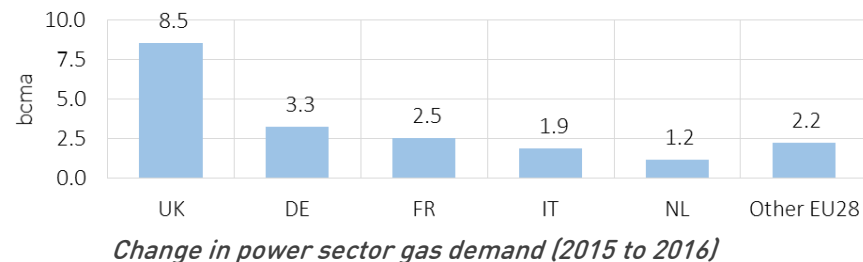
European gas demand rose by 27 bcma in 2016. Gas / coal switching was the key driver behind recovery

Coal prices doubled between Q1 & Q4 2016 raising gas price switching levels, which supported for hub prices

European switching is currently the primary mechanism for absorbing surplus global LNG

Watch for:

- Coal prices & power sector demand closely in 2017 as a driver of European hub prices & spot LNG prices



2016 European power sector gas demand curves Source: Timera Energy

US gas market reconnects

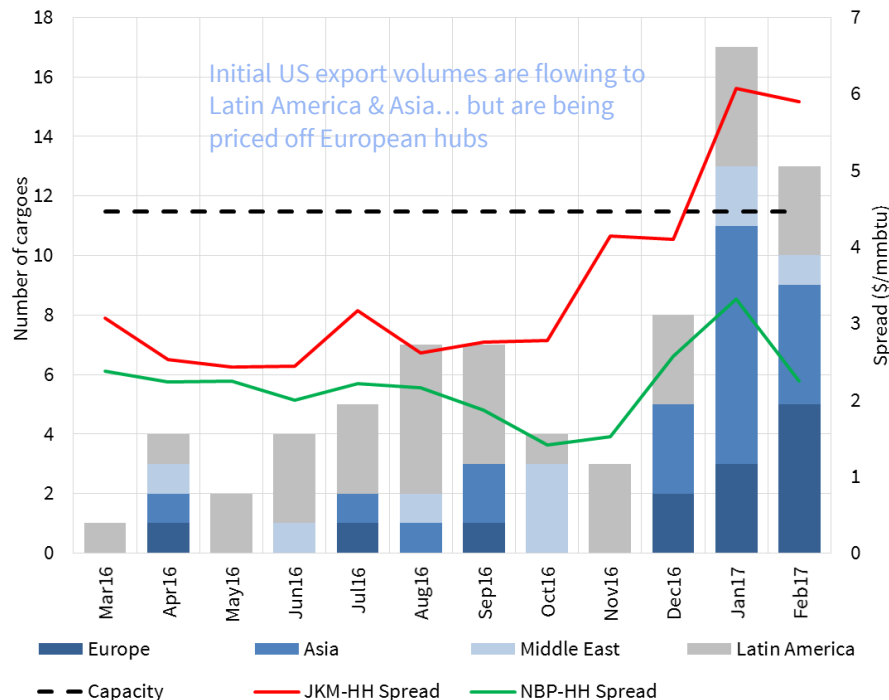
89 bcma of new US export supply is due online by 2021

Lack of US export flows to Europe to date not evidence of limited influence of Europe Hubs on global pricing...

- US export & other LNG flex volumes are priced & hedged based on European hub price signals
- NBP /TTF currently significant influence ST LNG contract pricing terms

Watch for:

- Contraction of Atlantic spread to true variable cost (shipping, liquefaction, regas). LNG “glut barometer 2”
- Increasing influence of Henry Hub price signal on global gas prices as US exports rise



US export cargoes by destination

Source: Timera Energy

European supply sources: LNG vs Russian imports

Lower 2016 European LNG imports than expected. Russia & North Africa filled the gap

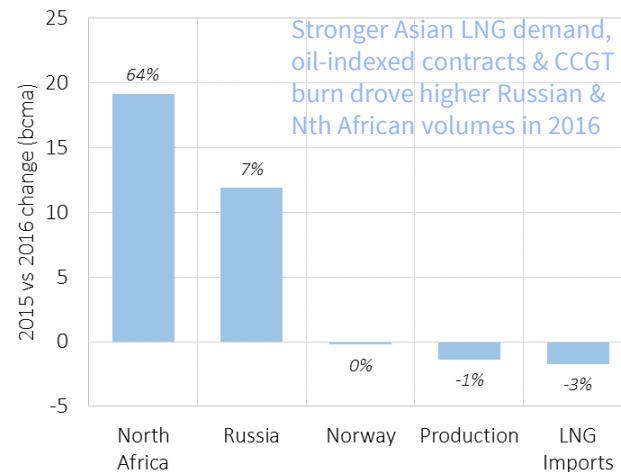
Increase in Russian flows not 100% driven by Gazprom decisions:

- (1) higher buyer contract noms (contract prices < hub prices in Q4)
- (2) Ukraine re-exported volumes

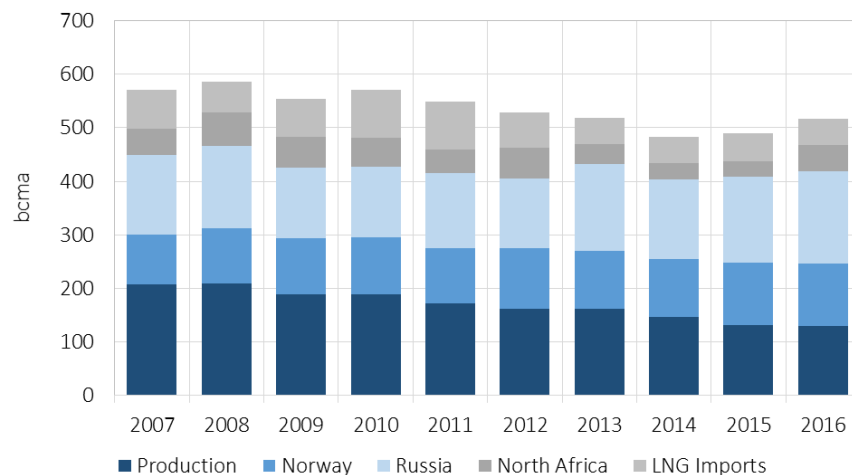
Reported increase in volumes sold at hubs but unclear how much is incremental physical flow vs. churn

Watch for:

- Dilution of oil influence due to contract price formula corridors (TTF cap / collar around oil index)
- DG Comp requirement to move contract delivery point to hubs hands control to Russia over physical flow



Change in supply (2015 vs 2016)

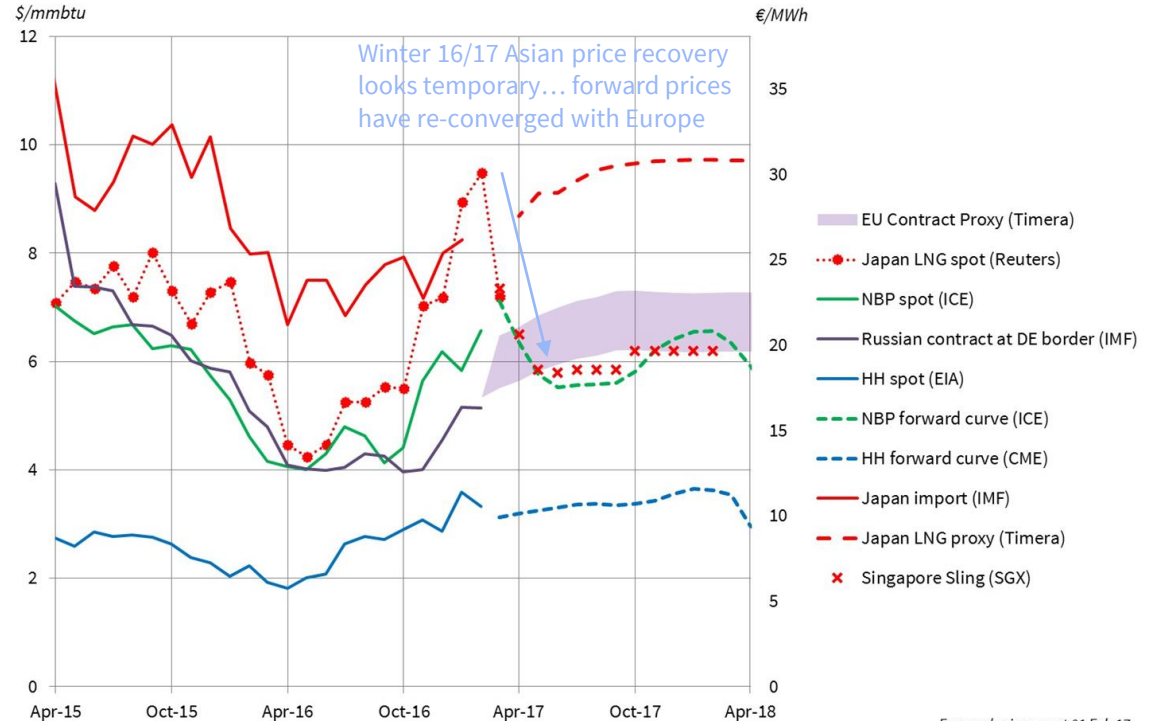


Evolution of European supply

Source: Timera Energy

Key factors to watch going forward

1. **Asian demand:** ongoing recovery & displacement of coal? Watch Europe vs Asia spot price spread as 'glut barometer 1'
 2. **New supply:** further slippage/outages?
 3. **Coal prices:** European hub price levels linked to coal prices via switching
 4. **US market:** Watch US vs European hub price spread as a 'glut barometer 2'
 5. **Russia:** Evidence of grab for market share? Likely to depend on LNG surplus
- Winter 16/17 price jump is consistent with inherent volatility from LNG supply chain
 - Forward market pricing points to glut conditions reasserting in 2017



Evolution of global gas price benchmarks

Forward prices as at 01 Feb 17

Source: Timera Energy

Olly Spinks

olly.spinks@timera-energy.com
+44 (0) 7525 724 461

David Stokes

david.stokes@timera-energy.com
+44 (0) 7957 656 337

Address:
Tel:

110 Bishopsgate, London, EC2N 4AY, UK
+44 (0) 207 961 0805

www.timera-energy.com

