



US exports & European hub prices

Flame 2018

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www.timera-energy.com



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Focus on LNG and European gas & power assets

Extensive industry expertise

Practical knowledge from senior industry roles

Pragmatic commercial focus

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Strong client base

leading energy companies (producers, utilities, funds)

Leading industry blog

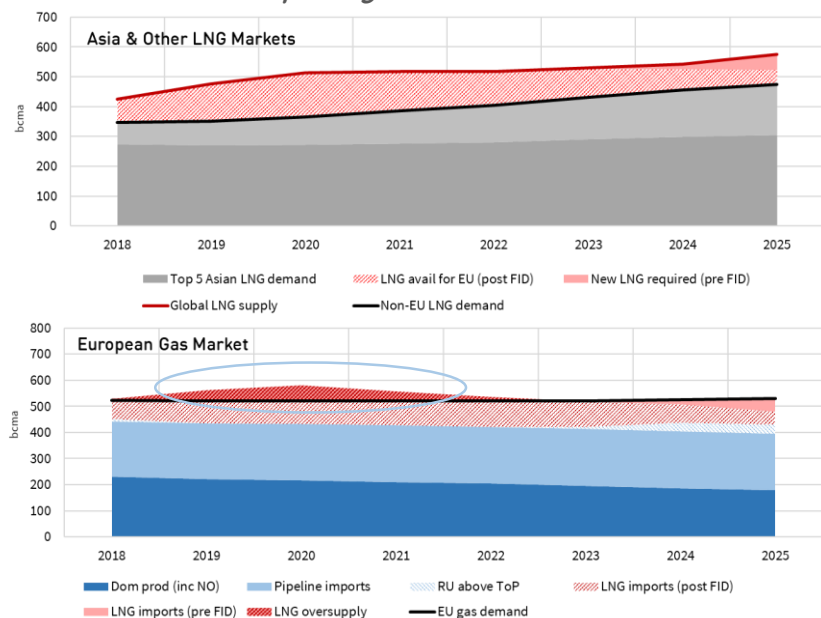
15,000+ regular readers, publications, conferences

Our clients include

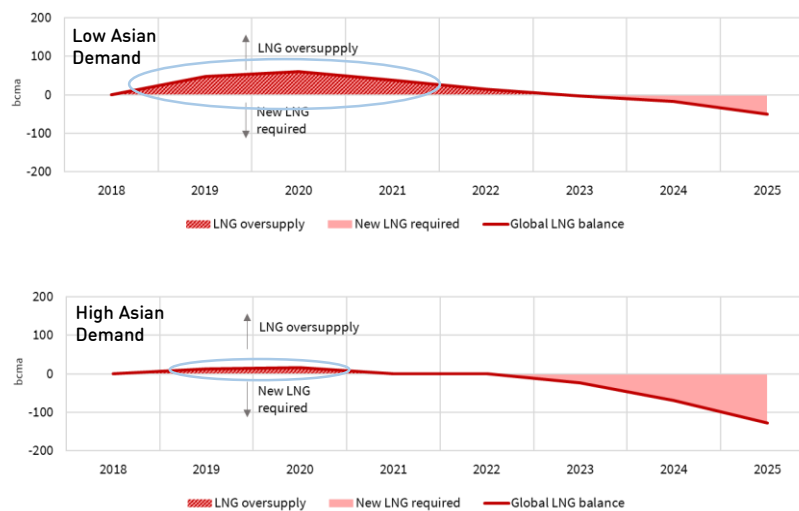


Global balance & the European sink

Global LNG & European gas balance*



LNG market balance



Source: Timera Energy

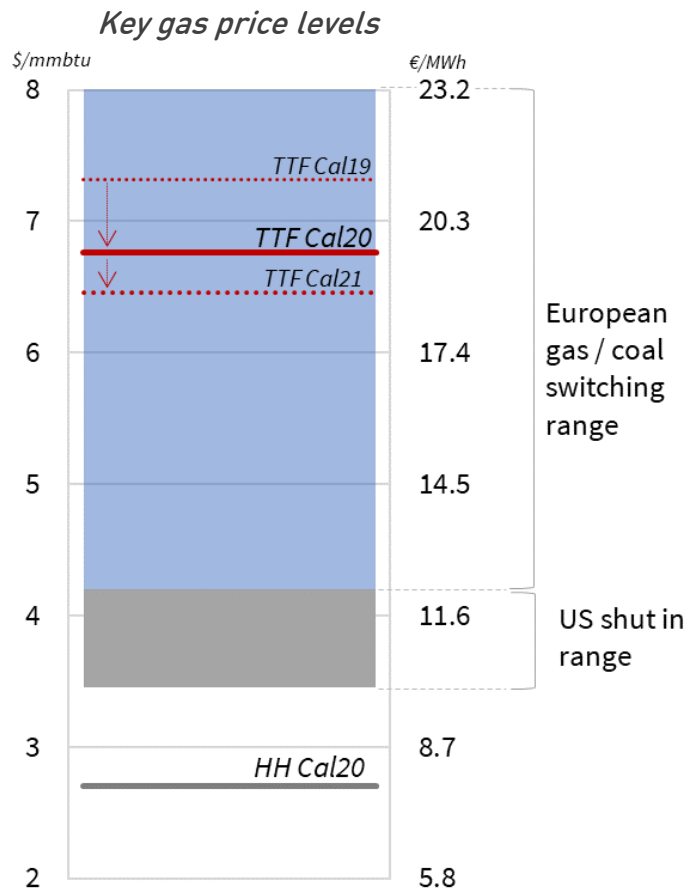
- Uncertainty of depth & level of oversupply
- Europe will absorb LNG “spill”

*Shown for Low Asian demand scenario

- Peak oversupply ~2020. Surplus of 15–70 bcma (10-50 mpta). Asian demand growth key driver.
- Gas / coal switching key mechanism that allows European hubs to absorb surplus gas

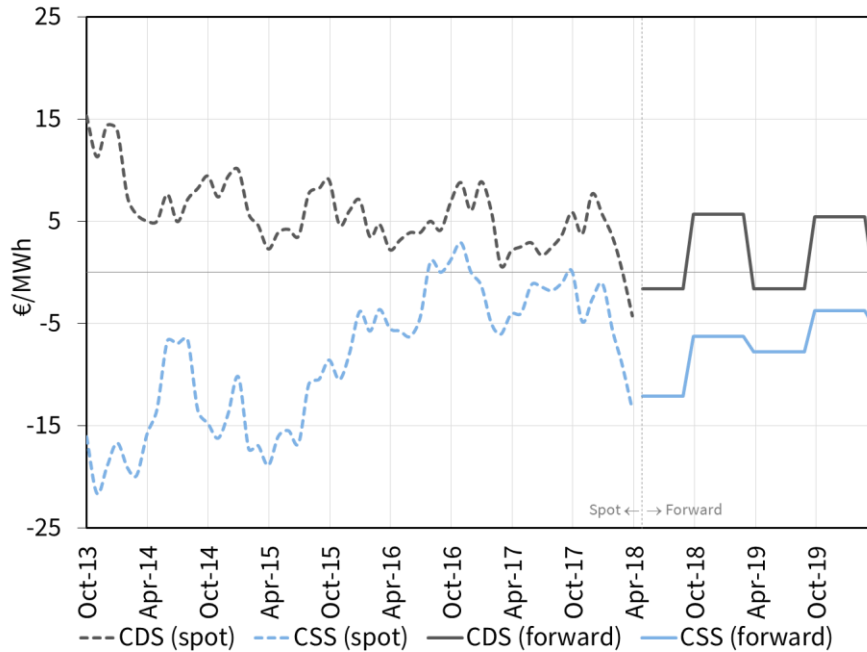
Global gas price levels

- European gas curve in backwardation
- US exports likely to be shut in if European hub prices fall below 0.7-1.5 \$/mmbtu spread to HH (variable cost not covered)
- Switching drives hub price behaviour in range between:
 - Current hub prices (6.5-7.5 \$/mmbtu)
 - US shut in floor (3.4-4.3 \$/mmbtu)

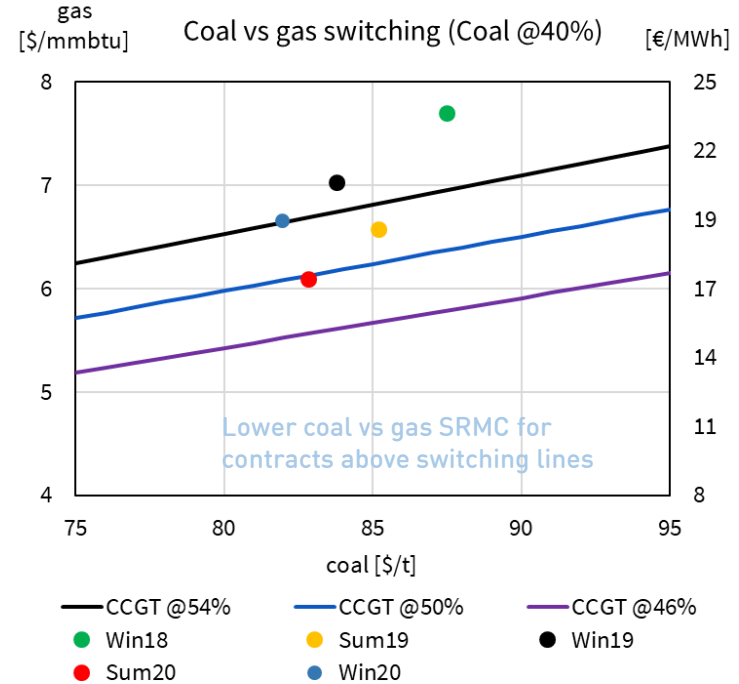


Source: Timera Energy

Gas plant economics have improved on the continent



DE baseload clean spark & darks spreads

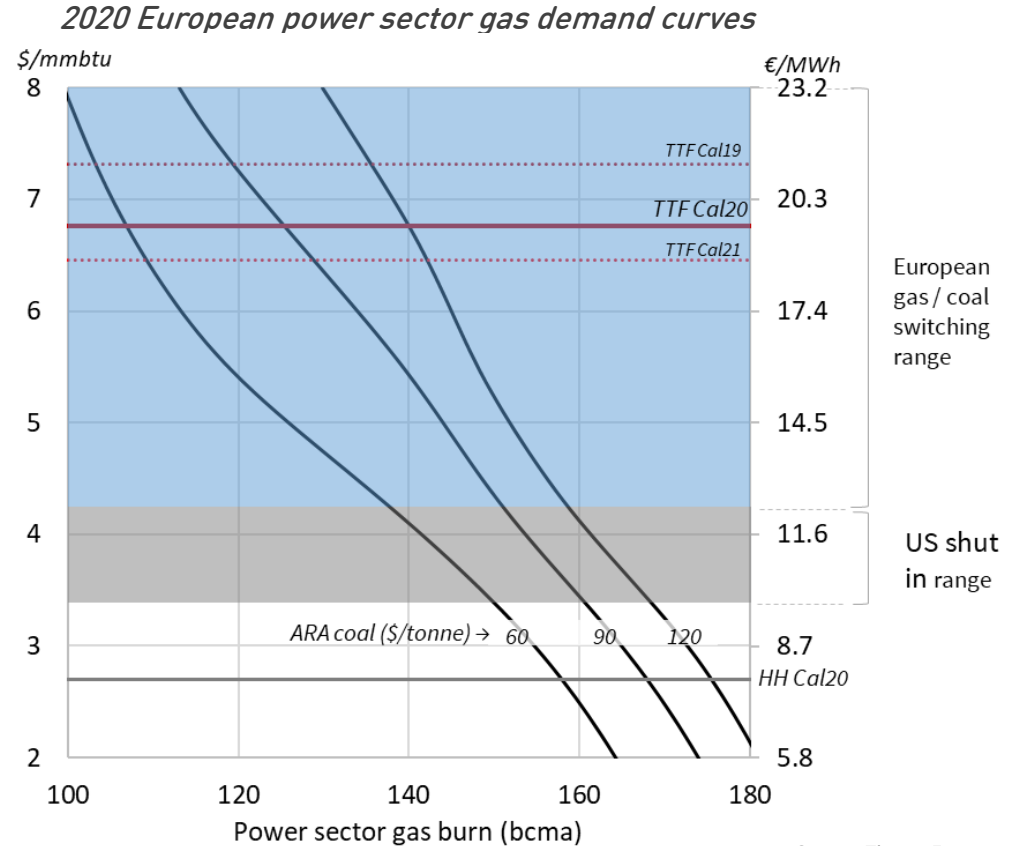


DE gas / coal switching boundaries

European gas / coal switching benchmarks

- Coal prices key determinant of gas hub prices
- 20-30 bcma (15-23 mpta) switching potential in Europe as gas prices fall, before US shut ins required*
- Hard to construct a scenario where US shut ins are not required for LNG surplus > 40-50 bcma (30-38 mpta)
- If US shut ins are required then European hub prices likely to be <4.5 \$/mmbtu (~12.5 €/MWh)

*Additional oversupply absorbed by Asian demand response (10-15 bcma?)



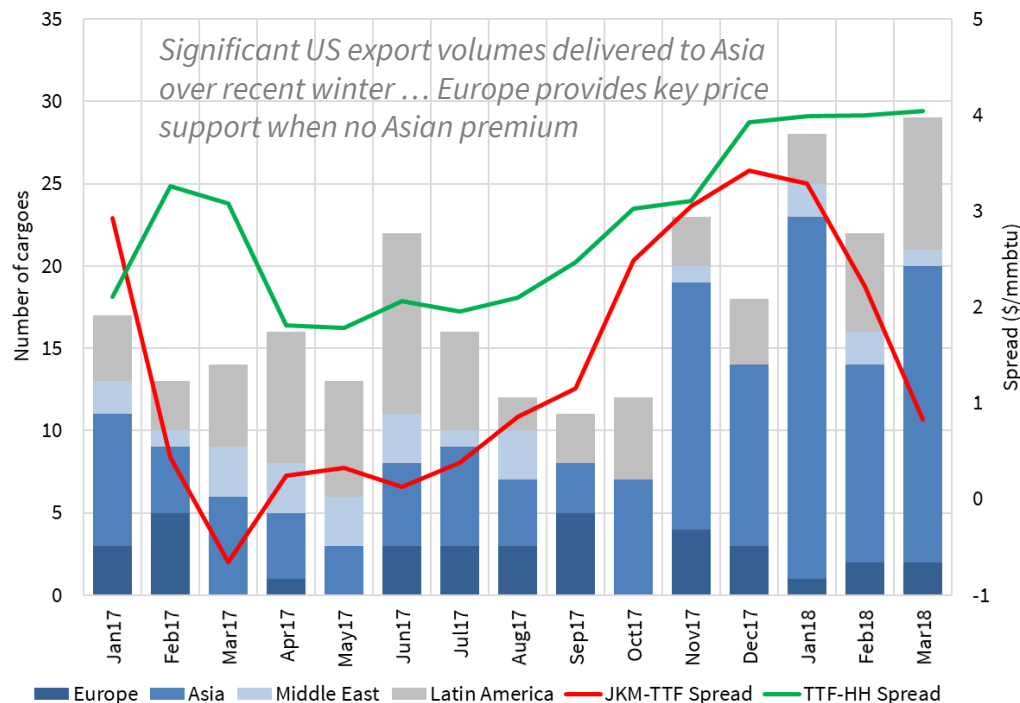
Market oversupply barometers

- Low volumes of US exports landing in Europe to date

3 barometers of oversupply

1. Asian LNG spot / TTF spread
2. HH / TTF spread (Atlantic arb)
3. US exports landing in Europe

US export cargoes by destination



Source: Timera Energy

Commercial perspectives

US export flex managed against Hubs

- Spread exposure managed by forward hedging at TTF / HH (given liquidity)
- Significant LNG price volatility creates prompt optimisation opportunities
- Implied coal price exposure (from switching)

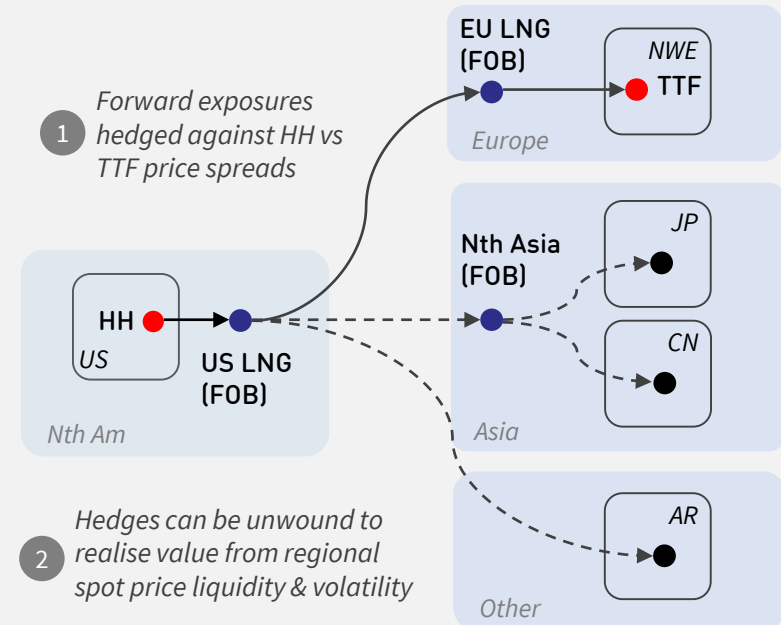
Commercial evolution

- LNG players expanding commercial & risk management capabilities to support portfolio management (particularly in Asia)
- Commodity traders are acting as a catalyst
- US export ramp up to rapidly boost shorter term trading & optimisation (and liquidity) of LNG supply

Case study: US export value management

$$\text{MAX} \begin{pmatrix} 0 \\ P_{\text{EU Hub}} - P_{\text{HH}} - (P_{\text{HH}} \times 0.15 - \text{shipping} - \text{regas}) \\ P_{\text{Asia (FOB)}} - P_{\text{HH}} - (P_{\text{HH}} \times 0.15 - \text{shipping}) \end{pmatrix}$$

US export contract "spread" option pay off (simplified)



US export contract hedging and optimisation

Source: Timera Energy

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