

Price developments of global LNG in the coming decade

How can US – and other – LNG be competitive with other gas supply sources in Poland?

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Introduction to Baringa



A market-leading consultancy focused on the challenges of tomorrow in the energy, financial services, telecoms & technology sectors

Baringa Partners is a market-leading consulting company with a focus on the challenges of tomorrow, operating in the Utilities, Energy & Resources, Financial Services and Telco sectors.

We help clients using our deep industry insight to:

- ▲ Run more effective businesses
- ▲ Launch new businesses and reach new markets
- ▲ Understand and navigate industry change



Baringa was founded in 2000 and now has:

600 Employees

62 Partners

7 Offices worldwide



UK, Germany, Ireland, UAE, USA (New York, San Francisco), and Australia

We have worked with energy companies across:

- ▲ Strategy and regulation
- ▲ Energy market analysis
- ▲ Operating model design
- ▲ Operational excellence
- ▲ Back office transformation
- ▲ HR and Change
- ▲ Technical and Digital architecture and Solutions

Our clients include:

- ▲ Oil and Gas Companies
- ▲ Mining and Metals Companies
- ▲ Global Investment Banks
- ▲ Power and Water Utilities
- ▲ Insurance Providers
- ▲ Commodities Traders
- ▲ Asset Investors and Private Equity

Our reputation is hard won and we're determined to keep it growing.



Ranked #1 Advisory firm in the UK&I for Energy, utilities & environment sector



Presentation Overview

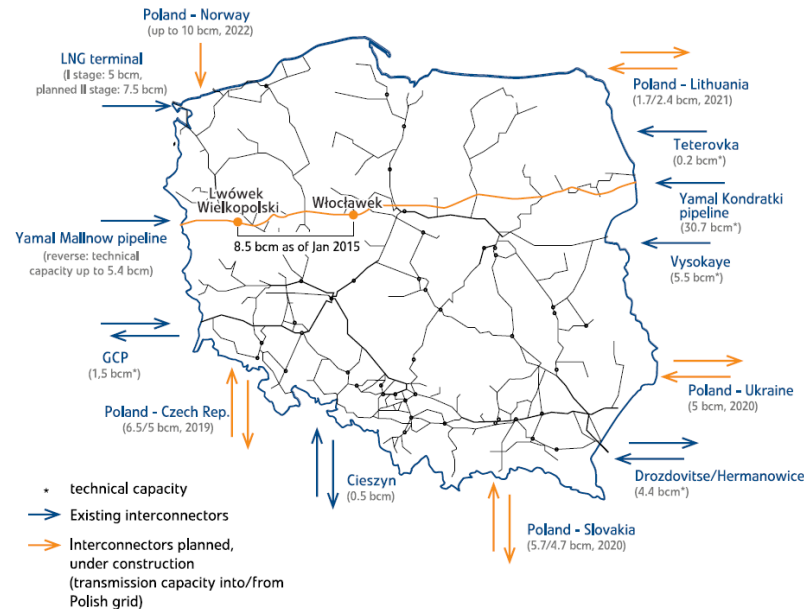


How can US – and other – LNG be competitive with other gas supply sources in Poland?

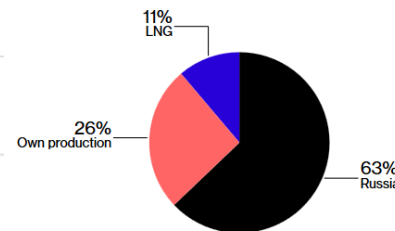
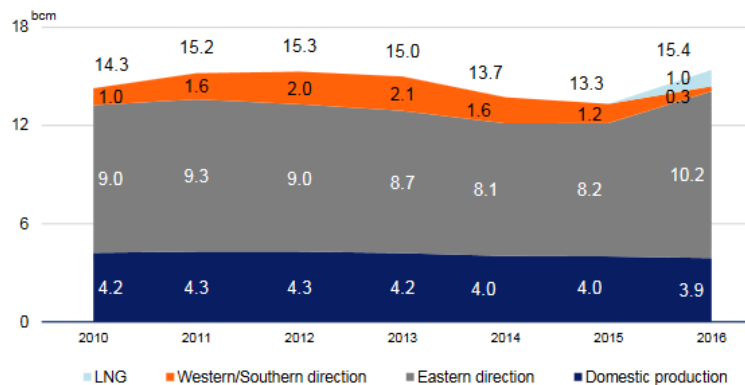
1. Setting the scene: what does the next decade look like?
2. A quantitative and qualitative comparison of LNG and pipeline gas
3. Conclusions

Setting the scene: Poland's gas supply

Historic reliance on Russian imports increasingly challenged



- ▲ c. 17 Bcm market in 2016
- ▲ Reliant on Russian gas imports since 1944
- ▲ Oil price linkage
- ▲ Increased market liberalisation in Europe, new infrastructure projects create supply alternatives
- ▲ Advent of LNG has increased diversification of gas supply
- ▲ LT contract with Qatargas, other shorter deals
- ▲ Long-term supply contract with Gazpromexport expires in 2022



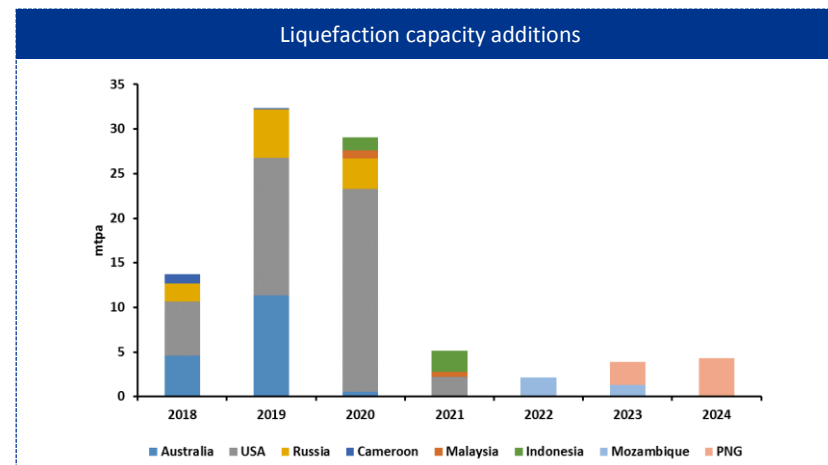
Source: PGNiG

Setting the scene: global LNG

US LNG – both existing and new – will be a key part of the next decade

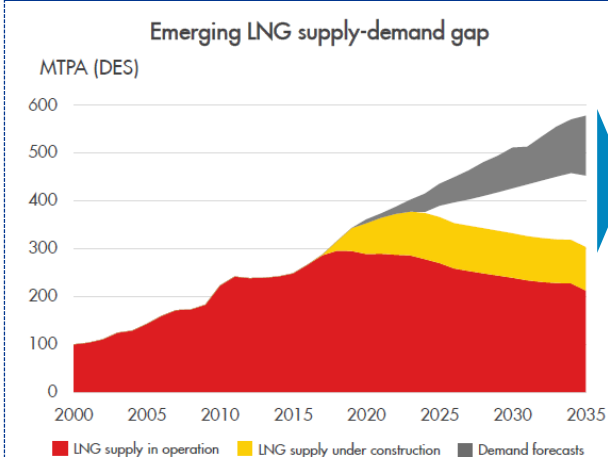
Global LNG in the next decade

- ▲ Demand growth driven by Asian and emerging LNG markets
- ▲ Supply growth continues for next three years before slowdown – US >50% of capacity under construction
- ▲ US LNG available in coming years on spot/short-term basis
- ▲ New FIDs needed as demand outstrips supply in 2020s
- ▲ Non-US LNG projects of low-enough cost will use TTF as price benchmark to secure FID
- ▲ May trigger higher spot prices



Source: Baringa

US projects well-placed to meet supply / demand gap



Source: Shell

| Project Stage | Projects | mtpa | Bcm/yr |
|----------------------------------|-----------|--------------|--------------|
| Operating / Under Construction | 6 | 70.9 | 97.7 |
| Fully Permitted (Major Projects) | 4 | 68.9 | 95.0 |
| Fully Permitted (Small Projects) | N/A | 9.0 | 12.4 |
| Formal FERC Review | 11 | 146.9 | 202.6 |
| FERC Pre-Filing | 2 | 24.0 | 33.1 |
| Total | 23 | 310.7 | 428.5 |

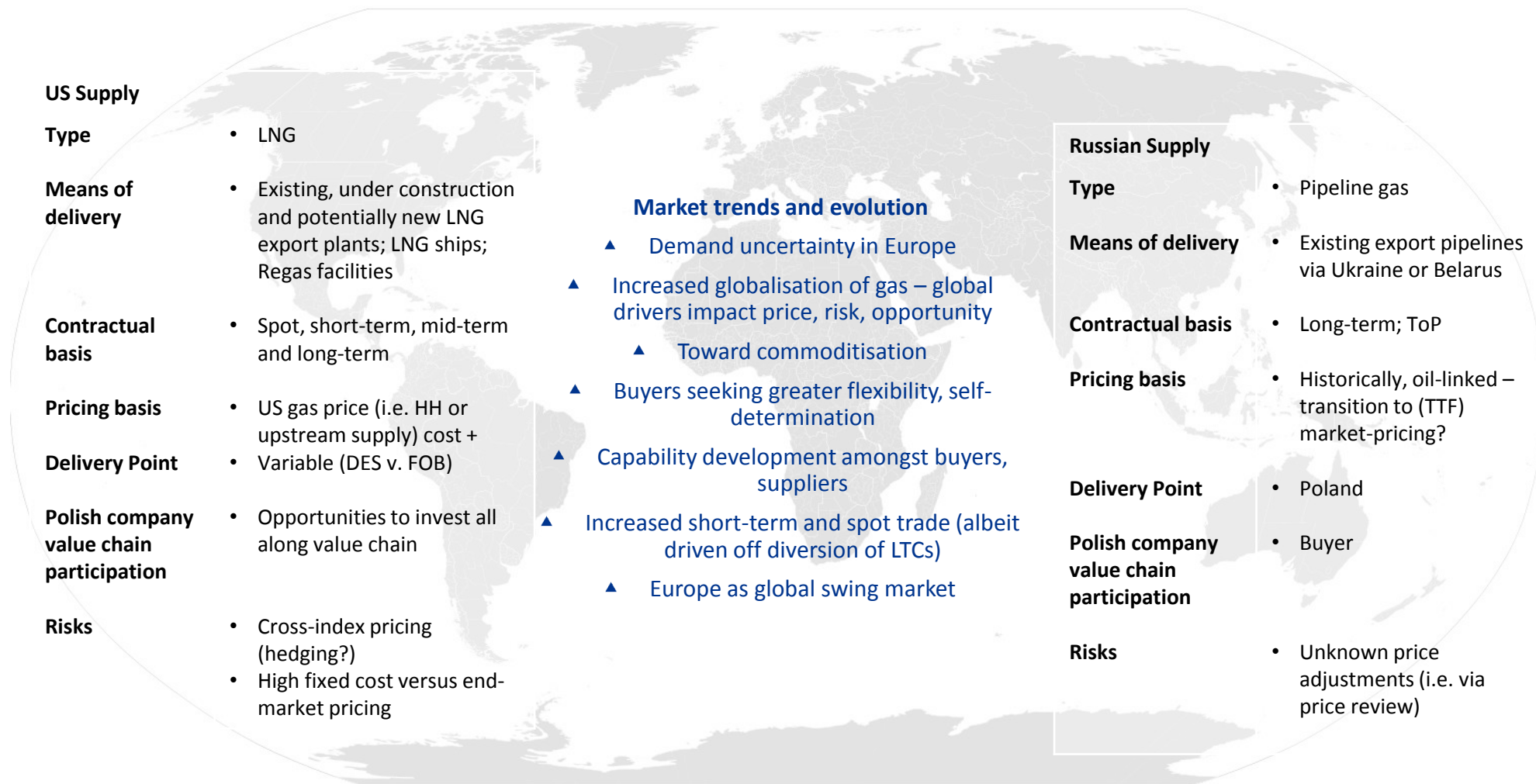
Source: FERC

New LNG projects

- ▲ US LNG projects well-placed to contribute
- ▲ Also other proximate projects likely to supply Europe (Mozambique, West Africa)
- ▲ Timing uncertain
- ▲ Downward pressure on costs
- ▲ New commercial models emerging

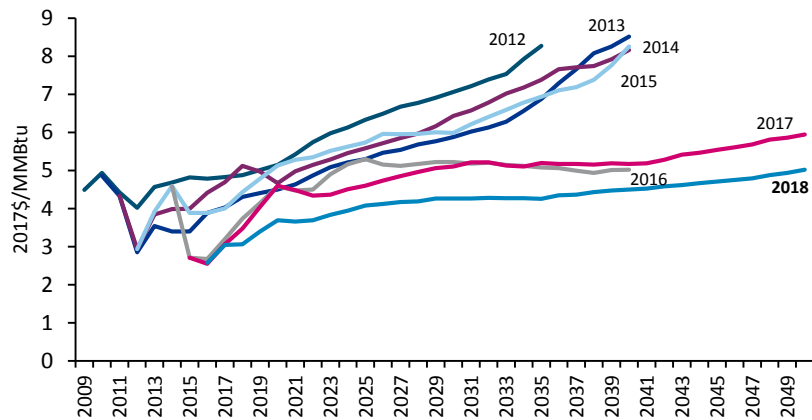
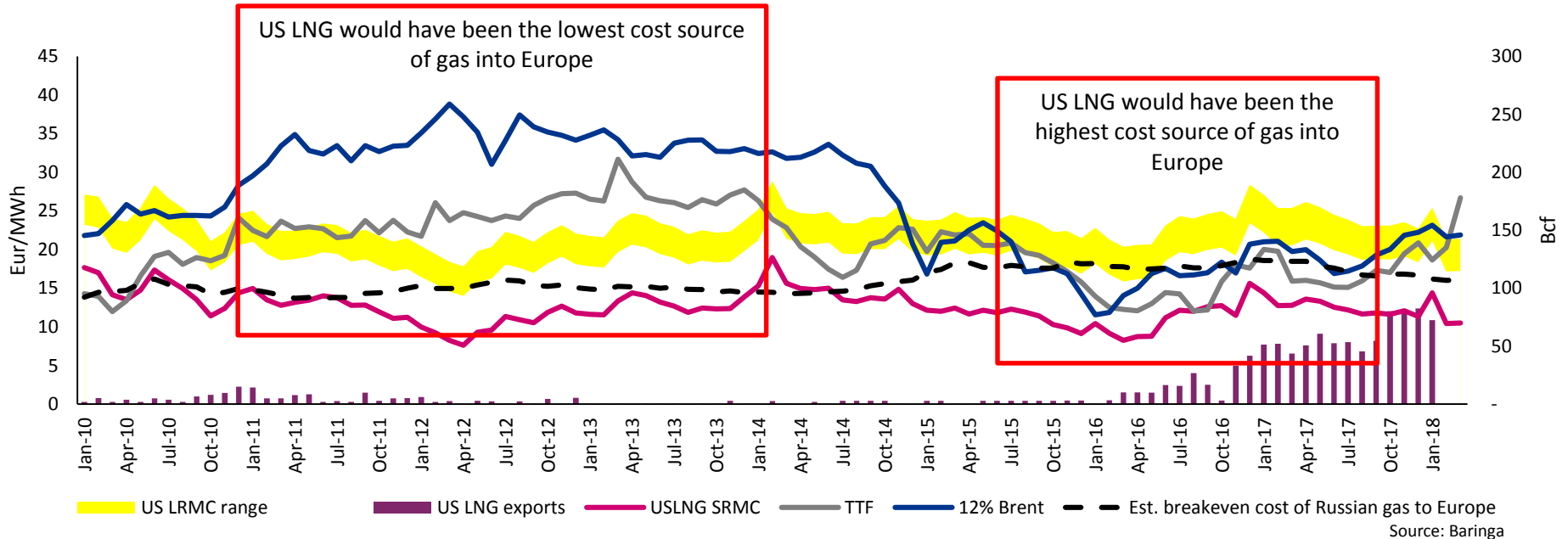
For example: comparing US LNG and Russian pipeline gas

Apples and apples?



Can US LNG compete with pipeline gas on cost?

Competitiveness of US gas on cost-basis is dependent on a range of market drivers



Source: EIA

- ▲ EIA Henry Hub price projections demonstrate downward trend
- ▲ Liquefaction costs being aggressively challenged in second wave of US LNG – historic median of \$3.00/MMBtu (and high of \$3.50/MMBtu) v. new projects looking for closer to \$2.00-\$2.50/MMBtu
- ▲ As new gas supply needed globally to meet demand, market prices will need to rise to support investment decisions

Conclusions

US LNG will be in the money, and sometimes it will be out. Commercial contracting strategy must be flexibly designed to address this

- ▲ **US LNG cost competitiveness into Poland is driven by a number of external factors, for example:**
 - Gas cost: LT US cost of production continue to decline
 - Liquefaction cost: new wave of supply projects are aiming to be significantly cheaper than first wave
 - Pricing of Russian gas (i.e. Brent and / or TTF or towards cost of production...). Settlement with DG Comp may affect this.
 - Value of inherent flexibility via access to higher value markets.
 - US LNG's inherent flexibility allows for value to be added when global LNG markets are short and greater value can be achieved elsewhere (likely in the next 10 years)

- ▲ **Key for Polish buyers to engage actively in identifying and executing appropriate type of contracting**
- ▲ An initial list of considerations:
 - A long-term deal reflective of fully-built-up costs is going to look different to a deal to buy existing LNG which will be priced according to global conditions (down to SRMC)
 - Drive to FID and intense supply project competition provides buyers with opportunity
 - Business model choices/commercial approach (including pricing) need to reflect risk appetite and view of the external factors
 - Key determinant of competitiveness of US LNG is:
 - Cost management
 - Organisational development to maximise inherent value of LNG supplies



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