

“Freedom gas” for Europe?

A model-based analysis of the conditions for U.S. LNG exports to Europe

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Overview

U.S. LNG export capacity has grown quickly since the first LNG exports from the lower 48 States started in 2016. This LNG now needs to find its markets. The U.S. administration of President Trump is pushing hard to promote U.S. LNG exports in Europe. The Trump administration even imposed sanctions on the construction of the Nordstream 2 pipeline project to increase the market chances for its LNG exports. Moreover, there has been debate of supporting U.S. LNG exports with measures like tax breaks which would effectively be subsidies.

LNG exports to Europe have been stable at low levels for several years and did not even rise strongly in response to dramatic market movements such as the Dutch production collapse (Holz et al., 2017). At the same time, the Asian market is expected to grow strongly, which will necessarily require a strong growth of LNG imports, given the little availability of long-distance import pipelines (Holz et al., 2015). Under these circumstances, it can be expected that U.S. LNG exports will preferably be directed to the Asian markets. However, in 2019, we have seen a substantial amount of LNG imports to Europe from the U.S.A.

In this paper, we investigate the feasibility conditions that need to be realized in order for U.S. LNG exports to Europe to happen. In two different settings, characterizing high (low) and low (high) climate policy ambition (natural gas demand), we perform scenario runs to check the effects of i) subsidies on U.S. LNG exports, ii) subsidies on U.S. LNG imports, iii) regional variation of willingness to pay (in particular in Asia vs. Europe), and iv) (partial) disruption of Russian exports to Europe.

Methods

We use the Global Gas Model (GGM) to investigate the prospects of U.S. LNG exports to Europe. GGM is a multi-period partial equilibrium model accounting for market power in world natural gas markets. It takes as inputs country level reference projections for production and consumption values and end-user prices; various infrastructure investment and operational costs, capacities and loss rates, seasonal demand loads, sector shares and price-demand elasticities, production costs, and market power assumptions. The model endogenously determines country level seasonal production, consumption and trade patterns and prices, pipeline, liquefaction, regasification and storage infrastructure expansions and utilization (Figure 1).

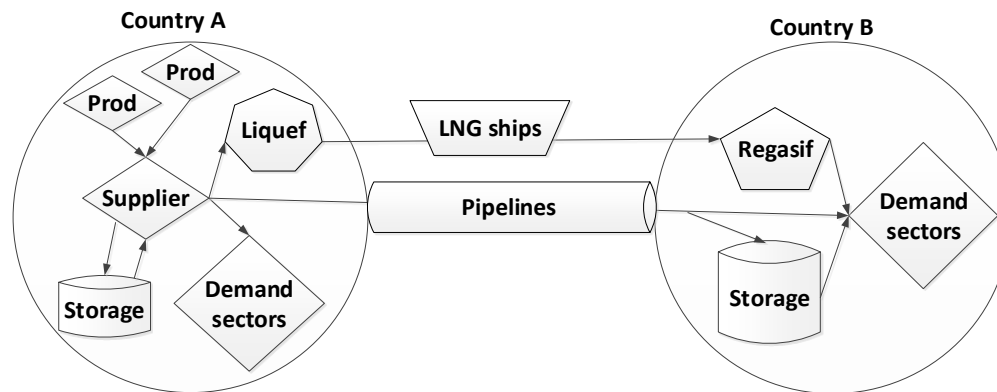


Figure 1: Actors and value chain represented in the Global Gas Model

We develop several scenarios along two dimensions: a) global climate policy and natural gas demand conditions; and b) (policy) conditions to U.S. LNG exports. We run combinations of these two scenario dimensions.

With respect to global climate policy stringency and gas demand, we distinguish:

- Scenario “SDS-Vision”: based on the Sustainable Development Scenario (SDS) by IEA (2018). In this scenario, global supply and demand increase somewhat until the year 2030 and modestly decrease afterwards. EU28 demand decreases by more than half, and import dependency stays relatively stable. To calibrate this scenario the willingness to pay in the EU is assumed to significantly decrease, which can be interpreted as a significant CO₂ tax being imposed on gas usage.
- Scenario “NPS-Ref”: based on the New Policies Scenario (NPS) by IEA (2018). In this scenario, global supply and demand increase significantly until the year 2050. EU28 demand stabilizes at current levels, and import dependency increases significantly. To calibrate this scenario the willingness to pay in the EU is assumed to significantly increase, which is needed to compete against other regions where demand increases much, especially Asia.

We vary the conditions for U.S. LNG exports with the following scenarios:

- Subsidies on (all) U.S. LNG exports, which could be implemented by granting tax breaks for LNG export terminals;
- Subsidies on (all) European LNG imports, which could also be implemented by tax breaks;
- Subsidies on the LNG exports from the U.S. to Europe only, implemented as subsidy on the shipping costs;
- Disruption of Russian supplies to Europe: a) all Russian supplies; b) Nordstream 2 supplies; c) all Nordstream supplies;
- Lower willingness to pay in main Asian consuming nodes (China, Japan, Korea, Taiwan).

Results

Our results show that U.S. LNG exports are more sensitive to policy changes in a world with stringent climate policy and low global natural gas demand, because it is competing with other suppliers for smaller markets than in the NPS-Ref world. We find that Europe is the preferred market for U.S. LNG only when the (relative) willingness to pay is high, which is the case when large supplies (e.g. from Russia) are disrupted or when the willingness to pay is low in competing regions, in particular in Asia. Subsidies on exports and/or on imports will have to be high to obtain shifts in trade flows, and in particular have to be larger than the shipping costs of LNG.

Conclusions

We conclude that the conditions for U.S. LNG exports overall are less favorable in Europe than in Asia. Therefore, it would seem more rational if the U.S. administration directed its political support of LNG exports towards Asia instead of Europe. A trade war with China is counterintuitive and probably counter-productive in this respect.

Selected References

- IEA. 2018. *World Energy Outlook 2018*. Paris, France: International Energy Agency, OECD.
- F. Holz, P.M. Richter, R. Egging (2015): A Global Perspective on the Future of Natural Gas: Resources, Trade, and Climate Constraints. *Review of Environmental Economics and Policy*, 9 (1):85-106.
- F. Holz, H. Brauers, P.M. Richter, T. Roobeek (2017): Shaking Dutch Grounds Won't Shatter the European Gas Market. *Energy Economics*, 64:520-529.