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LNG TRADE FLOWS IN THE CASE OF OVERSUPPLIED MARKETS AND ITS CONSEQUENT IMPACT ON PRICES AND INVESTMENT

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Overview

This paper reviews "LNG glut" scenario to estimate the impact of new liquefaction capacity coming to the LNG market up to 2025. Between 2012 and 2017, over 200 mtpa of gas liquefaction projects have been announced and most of those are still not shelved and have completion dates before 2025. With latest IEA WEO (IEA, 2018) seeing over 500 mt LNG trade by 2025 compared to 300 mt in 2017, it is plausible to doubt if there is a demand for such a rapid market growth. As the new wave of LNG projects started entering the market from 2016, there has been a long-standing anticipation of the "LNG glut" – oversupply of LNG that would induce the "great reconfiguration" of global LNG trade (Corbeau et al, 2016). So far, 120 extra MTPA of LNG capacity from Qatar, the US, Australia and Russia are widely expected before 2025, and it is unclear how the market will react. Gas consumers in EU and Japan also prepare for the "LNG revolution" (Seko, 2017), a term similar to "shale revolution" of 2009-2011, changing market design, regulation and adding infrastructure.

The effect of this "LNG glut" and corresponding market transformation has long been a focus of market analysts, but did not get enough attention as a research topic in the energy economics. Also, effects of the new market design and trade flow reconfiguration in Asia were reviewed before (Aguilera et al., 2014; Shi et al 2016; Corbeau et al, 2016) but existing studies did not model the LNG capacity oversupply, only the market structure changes.

Method

We build on a vast literature on energy modelling and forecasting, as well as on the body of LNG market research, to run the model with LNG capacities coming on schedule. The main modelling tool is the in-house model of the GECF Secretariat, Global Gas Model, based on the database on network of liquefaction, regas, LNG routes, pipelines and LNG carrier fleets. The infrastructure database of the GGM that is used for the modelling exercise contains: 240 liquefaction plants, 400 regasification plants, more than 5000 gas pipeline and shipping routes, and the trade gas contracts database contains annual contracted and delivered volumes, including 600 contracts (country-to-country and non-dedicated), based on more than 1000 company-to-company contracts.

We use a global modelling tool GGM to see how the LNG trade flows change based on the timing of the project schedules and capacity going as planned. We implement the project schedules announced, assume no bottlenecks in feedgas or upstream production and natural gas transportation, and solve the trade flows model to get the market distribution of flows and the market-specific LNG prices for Asian, European, and Latin American markets. We benchmark the results to the Reference case of 2018 edition of GECF Global Gas Outlook 2040.

Results

The results confirm that the market design is central to the structure of LNG flows. As Asian and Latin American contracts are currently largely oil-indexed, the supply and demand fluctuations in the oil and gas markets create frictions that are removed via renegotiations only after some time (Agerton, 2016). While those contracts are necessary to make LNG and upstream projects bankable, there is a strong policy-directed trend towards greater flexibility of the gas market, especially in Asia (Stern, 2016; Niyazmuradov and Heo, 2018).

The assumptions for supply overcapacity allow us to reduce the price to the new level of the marginal costs, as there is a certain level of required capacity utilization for liquefaction facilities. The demand reaction is characteristic depending on the flexibility of the market. While there is projected extra market of around 115 bcm globally given somewhat lower LNG prices, without price flexibility there is extra 14% global LNG demand as the price is rigid. Given the price flexibility, the figure for additional trade tops 250 bcm compared to the Reference case scenario, including additional demand for 160 mtpa of LNG (+15%), including 120 mtpa in Asia. The effect is much less pronounced in Europe, as the market price is already mostly discovered via gas-to-gas competition, and cheap piped gas is abundant to compete with LNG.

Table 1. Natural gas demand and trade, total and by region, bcm

	Bcm	2017	2040 - Ref. case	2040 - High LNG case	2040 - High LNG case + full gas-to-gas competititon
World	Demand	3709	5427	5618	5851
	Imports	1094	1595	1709	1849
	Pipeline	706	876	893	914
	LNG	388	719	817	936
Europe	Demand	538	573	609	615
	Imports	499	502	538	544
	Pipeline	436	383	376	381
	LNG	63	119	161	163
Asia	Demand	794	1422	1541	1761
	Imports	369	756	847	969
	Pipeline	89	205	224	345
	LNG	280	551	624	624
Latin America	Demand	178	291	309	343
	Imports	29	48	62	69
	Pipeline	15	15	18	18
	LNG	14	33	44	51

The effect of full price liberalization is twofold – it increases traded volumes, expanding the markets by estimated 15% relative to case with simple LNG oversupply, but the price levels in this scenario guarantee almost no new investment coming in the gas supply infrastructure after announced projects are fulfilled (according to the schedule). The NPV for the new projects stays negative under any plausible assumptions from 2025 to 2040. The net global effect for the LNG exporters is close to zero for LNG oversupply case, and negative in case both price liberalization and LNG oversupply take the effect. However, the regional structure of exports matters: exporting LNG to Asian and Latin American markets stays marginally profitable even after full price liberalization, while European LNG supplies do not, that is probably why volumes almost do not change.

Conclusions and policy implications

There are three main outtakes from the modelling. First, gas market design and pricing mechanisms matter, especially in how the Asian customers behave. By 2025, some of them will have access to the piped gas from Russia, as well as to an increasing indigenous production of natural gas. Secondly, the impact of "LNG glut" for Latin American and European markets is often overlooked, as those markets are price-sensitive and could absorb up to extra 40 MT LNG annually, even as the pipeline gas consumption is flat or growing. Thirdly, the policy drivers of natural gas demand should not be overlooked. The gas use in China as per Chinese 13th Five-year plan was undercut in 2017-2018 by the lack of infrastructure and affordability challenges vis-à-vis coal, but the demand is also price-elastic and might ramp up quickly (Wanga and Xue, 2017).

The paper also contests that the "LNG glut" and "LNG revolution" would be absorbed by the growing markets in full with no effect, as the LNG price effect of such competition is drestic. While there is a significant increase in volumes, it is not beneficial for the exporters, as it challenges the business model they use. The latest IEA Outlook features the special topic on gas exporter strategies in case of oversupply, and the main outtake is in line with the modelling results. As it is, the LNG (and natural gas) oversupply is not beneficial for exporters, but natural gas emerges as a market for term supplies, where short-term and long-term, firm and flexible supply forms of the same commodity coexist. If such changes in market structure would allow the equitable risk sharing between exporters and importers, there is enough gas demand to support it.

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