CEPS response to the European Commission's consultation on an EU strategy for liquefied natural gas and gas storage

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The European Commission committed itself in the Energy Union Communication to "explore the full potential of liquefied natural gas (LNG), including as a back-up in crisis situations when insufficient gas is coming into Europe through the existing pipeline system"[1] *and to address the potential of gas storage in Europe by developing a comprehensive LNG and storage strategy by the end of 2015/beginning of 2016.*

This is a comprehensible move in the current context. Geopolitical tensions between the EU and Russia explain the EU's willingness to further diversify its natural gas supply sources to reinforce its long-term energy security on one hand, and to increase its crisis-solving ability on the other hand. Moreover, the current market dynamics could support diversification towards LNG. Increasing flexibility of LNG trade, decreasing LNG prices and LNG charter rates and an apparent price convergence between the European and the Asia-Pacific LNG imports would all reinforce the economic viability of such a strategy.

This contribution to the consultation makes three points:

- *For the LNG and gas storage strategy to work it needs to be embedded in the realities of the natural gas market*
- *The key for success is sufficient infrastructure*
- *The LNG strategy needs an innovation component*

The LNG and gas storage strategy will need to be embedded into the market realities

The LNG and gas storage strategy – to be effective and to avoid any further serious mismatches between investments and market reality – should be part of a broader natural gas strategy. This strategy should not only consider issues related to the security of EU gas supplies but should also take into account potential future developments of European gas demand.

Regarding the supply side, the consultation paper seems to hesitate between a laissez-faire approach ("How much LNG comes to the EU will ultimately depend on global gas prices") and a more pro-active or even interventionist attitude ("The EU will use all its foreign policy instruments … to ensure that the EU has full access to the benefits of the growing global

[1] Energy Union Package. http://eur-lex.europa.eu/resource.html?uri=cellar:1bd46c90-bdd4-11e4-bbe1-01aa75ed71a1.0001.03/DOC_1&format=PDF

market in LNG"). In reality, the supply of natural gas will largely be determined by market forces. LNG will come to the EU market, provided the EU market is attractive and a clear, consistent EU energy policy is in place. Therefore, the LNG strategy should not be too prescriptive on issues related to the LNG supply, both in terms of EU LNG infrastructure and potential future exporting countries, as investments will need to come from private companies and market fundamentals can change quickly. One exception, however, may be for the strategy to find a cost-effective role for LNG in source diversification in eastern European countries (see next section on infrastructure). Related to this, the strategy also needs to address the dichotomy between aspirations to increase security of gas supplies with LNG and the current reality of the EU playing the role of a residual market (i.e. "getting what Asian countries do not need or cannot afford").

Gas demand, on the other hand, will continue to be influenced by European and national policy measures, including in the decarbonisation context. EU gas demand contracted by 12% between 2008 and 2013[2] and the future of the blue fuel in the European energy mix remains uncertain in a context of low economic growth, rising energy efficiency levels, increasing share of renewables and the inability of the EU ETS system to trigger a coal-to-gas switch in the power sector. The LNG strategy should thus seek to define a space for LNG in the overall demand equation – taking into account the whole energy system and interactions between different energy sectors (e.g. between gas and power markets). This is a fundamental issue, which is largely omitted by the consultation paper. The only gas demand-side related issue addressed by consultation paper is "LNG use in transport" which represents a negligible fraction of EU gas demand. Transport accounted for less than 0.5% of overall EU gas demand in 2013.[3]

Focusing only on the LNG and gas storage sectors while not addressing the issues related to the overall EU gas market is likely to result in inefficient investments – as was the case in the near past – or, more likely, in no future investment in either terminals or pipelines. Between 2008 and 2014 the regasification capacity of the EU increased by around 58% from some 124 billion cubic meters per year (bcma) to 196 bcma.[4] At the same time, and as noted in the consultation paper, the volume of LNG imports decreased to 45 bcm in 2013, driving the utilisation rate of EU LNG terminals down to 24%. However, it is important to note that a low utilisation rate does not necessarily mean that an asset is stranded. Stranded assets are those which are not economically viable. Terminals required by the market may still be economically viable even with low utilisation rates, for example when they are used for arbitrage.

Indeed, increasing contractual flexibility[5] made it possible to redirect LNG from the depressed EU gas market to Japan and South-Korea, who were seeking to replace nuclear power

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[2] BP, Statistical Review 2014.

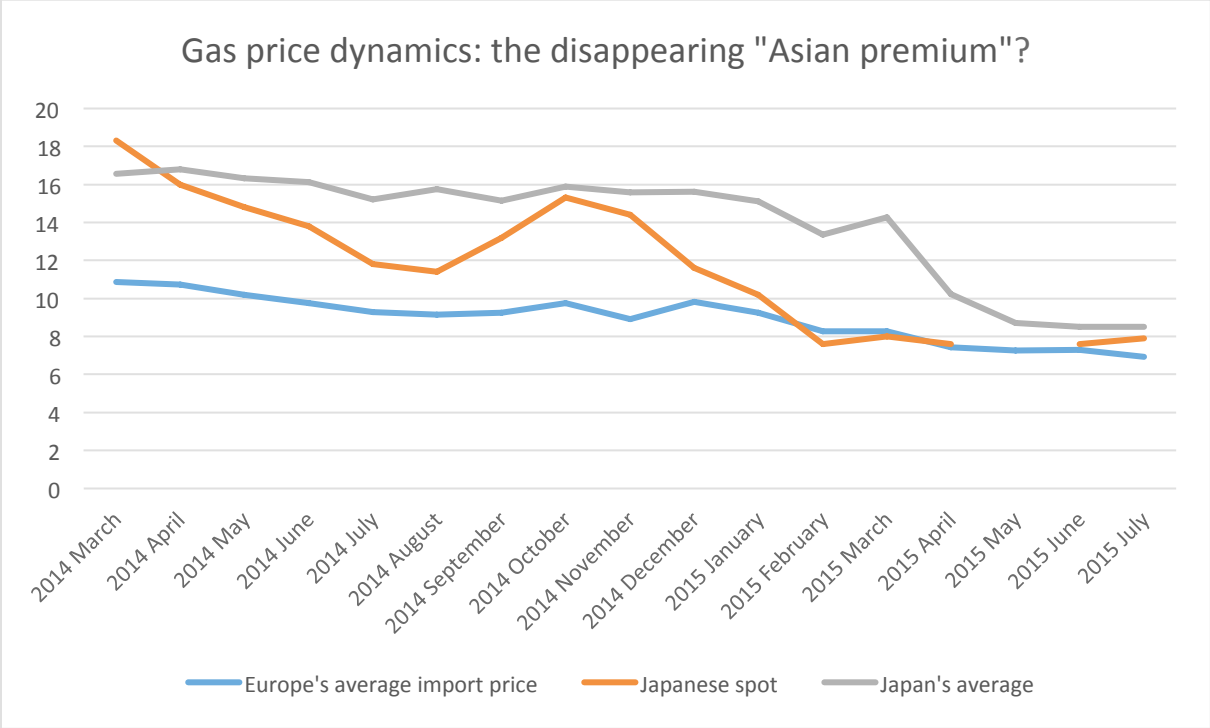
[3] Eurogas, Statistical Report 2014.
http://www.eurogas.org/uploads/media/Eurogas_Statistical_Report_2014.pdf

[4] GIE, LNG Map Dataset.
http://www.gie.eu/download/maps/2015/2015%20GLE%20LNG%20Map%20database.xlsxa

[5] LNG trade became more flexible as a result of the European Commission's efforts to eliminate territorial restrictions from long-term LNG contracts and the willingness of certain suppliers (mainly Qatar) to negotiate flexible contracts with diversion rights.
For instance see: European Commission (2007), Commission and Algeria reach agreement on territorial restrictions and alternative clauses in gas supply contracts.
http://europa.eu/rapid/press-release_IP-07-1074_en.htm

generation with natural gas after the Fukushima nuclear disaster and were willing to pay the "Asian premium" (up to twice EU hub prices). Since mid-2014 a combination of factors (mild weather, nuclear restarts in South-Korea, additional supply from PNG LNG and Australia, increasing energy efficiency and China's "new normal") resulted in an oversupplied LNG market in the Asia-Pacific region and lower spot LNG prices to the levels of averaged European gas imports. Moreover, the falling oil price is filtering through the JCC-linked long-term contracts, resulting in an average price of $8.5/MMbtu for Japan. The disappearing "Asian premium" resulted in the collapse of LNG re-exports from Europe to Asia (viable when the spread is over $1.75/MMbtu)[6] and an increase of EU LNG imports by 24% year-on year in the first quarter of 2015.[7]

Figure 1: Gas price dynamics – the disappearing "Asian premium"?



Source: World Bank, METI

This raises a number of issues.

(1) With oil price remaining below $60/barrel, oil-linked long-term contracts are likely to out-compete LNG.

On Qatar gas monetisation strategy, see: Bassam Fattouh, Howard V. Rogers, and Peter Stewart (2015), The US Shale Gas Revolution and its Impact on Qatar's Position in Gas Markets. https://gallery.mailchimp.com/20fec43d5e4f6bc717201530a/files/The_US_Shale_Gas_Revolution_and_Its_Impact_on_Qatar_s_Position_in_Gas_Markets_March_2015.pdf

[6] Platts, Minimum Japan Korea Marker winter netforward price to pull European LNG seen at $9.20/MMBtu, 15 July 2015. http://www.platts.com/latest-news/natural-gas/london/minimum-japan-korea-marker-winter-netforward-26149124

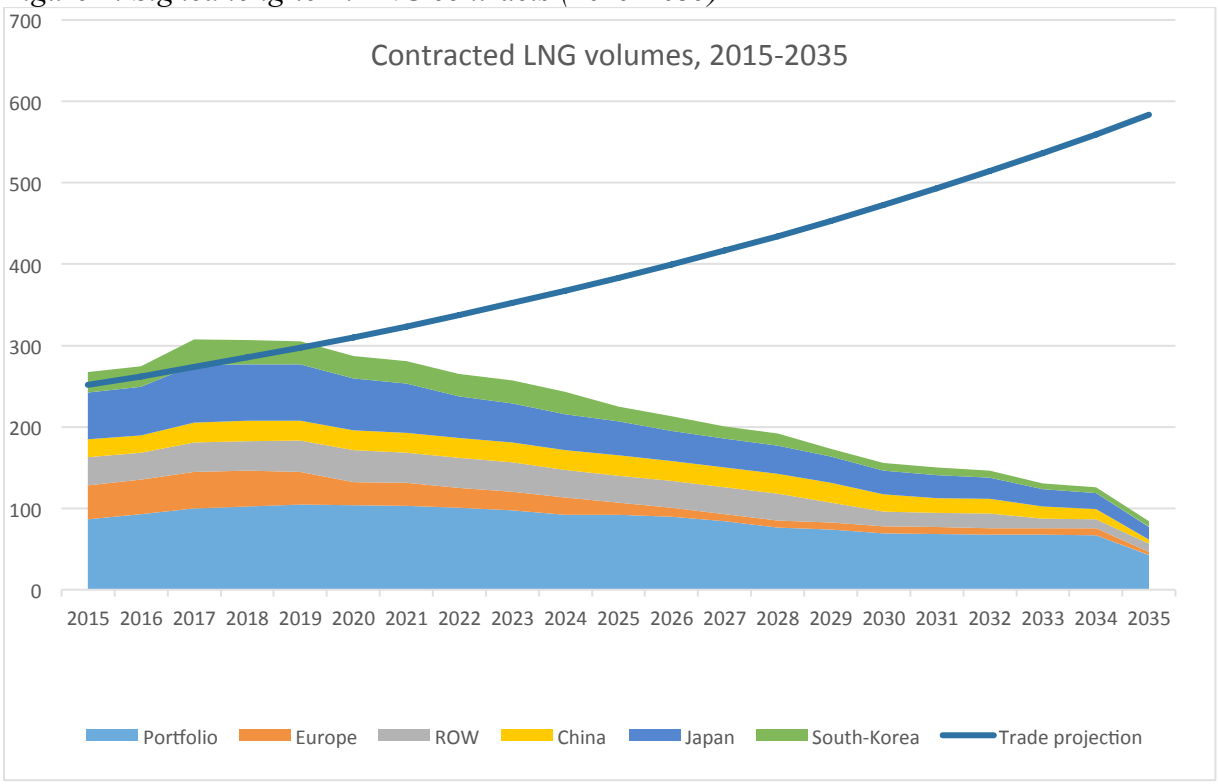
[7] European Commission, Quarterly Report Energy on European Gas Markets, Volume 8, Issue 1, first quarter of 2015. https://ec.europa.eu/energy/sites/ener/files/documents/quarterly_report_on_european_gas_markets_q1_2015.pdf

(2) The break-even price of LNG projects for the potential suppliers (US, Canada, Australia, East Africa) enumerated by the consultation paper ($9-12/MMbtu)[8] are higher than the above presented LNG prices.

(3) The development of natural gas demand remains unclear explaining the unwillingness of EU midstream utilities to contract high amounts of LNG with destination to the EU.

As shown in Figure 2, LNG volumes contracted for the period 2015-2020 seem to exceed projected demand. This suggests that a loose, over-contracted market will last until the end of this decade and would support the currently experienced low LNG prices. While the consultation paper notes that "capital investment costs nevertheless remain substantial, particularly for liquefaction plant", one should not forget, that LNG export project costs almost quadrupled over the last decade (from $300/tpa in 2000 to $1200/tpa in 2013).[9] In today's buyer's market, this means that some projects will not go ahead. Hence, in the long-term the market is likely to tighten as projects and final investment decisions (FIDs) are delayed waiting for more favourable market environment where demand or the willingness to pay a risk premium generates prices above breakeven. The consultation paper does not address the questions either of demand or the willingness to pay a risk premium.

Figure 2: Signed long-term LNG contracts (2015-2035)



Source: GIIGNL, Companies' websites

[8] Various estimates (OIES, CEDIGAZ).

[9] Tpa refers to tonne per annum. For an analysis of this issue, see Brian Songhurts, LNG Plant Cost Escalation, 17 February 2014.
http://www.oxfordenergy.org/wpcms/wp-content/uploads/2014/02/NG-83.pdf

Similarly to LNG, the increase of gas storage volumes (by almost 27% between 2009 and 2015, from 85 bcm to 108 bcm)[10] occurred in a market environment, where storage has a low value. As noted by the consultation paper "the current willingness to pay for gas storage is in some cases barely sufficient to cover the marginal cost of storage operations." For instance Centrica's SBU[11] decreased by 57% between the 2008/2009 and 2015/2016 storage years.[12] This is partly because of the decreasing demand, but also because the overall gas system is becoming more flexible (increasing interconnectivity and LNG regasification capacities, spot trading, declining price spread between seasons).[13]

These issues related to LNG and gas storage can be addressed if there is a shared view on the natural gas market, which also includes an understanding of the role of natural gas in the EU electricity market.[14]

The need for sufficient infrastructure

Given that some 95% of existing EU LNG import capacity is in Western Europe (ES, UK, IT, FR, NL, BE, PT, SE)[15] the LNG and storage strategy should explicitly aim at improving access to LNG particularly in Eastern European countries currently dependent on only one import source. Indeed, to fully exploit the benefits which could arise from LNG in this region, the EU needs a system of interconnectivity, meaning: (1) additional infrastructure, either in the form of interconnectors or additional LNG terminals, including flexible LNG Floating Storage and Regasification Units (FSRU); (2) a clear regulatory framework avoiding contractual congestion at the interconnection points and (3) properly functioning gas hubs facilitating trade.

The need for better gas interconnections is most evident in the Baltic region, where currently Lithuania (with 4 bcma of LNG importing capacity) has an interconnection of 2 bcma only with Latvia, while Estonia (planning 6.5 bcma of LNG importing capacity) has currently no gas interconnectors with its Baltics neighbours.[16] Similarly, while presenting its future Swinoujscie LNG import plant (5 bcma capacity)[17] Poland has no major interconnectors with

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[10] Geoffroy Hureau, Gas Storage in Europe, recent developments and outlook to 2035, European Gas Conference, 27-29 January 2015, Vienna.
http://www.cedigaz.org/documents/2015/Gas%20Storage%20in%20Europe,%20recent.pdf
GIE Storage Map Dataset in Excel-format (2015).
http://www.gie.eu/download/maps/2015/20150507%20-%20GSE%20map%20database%20-%20EXTERNAL%20final.xlsx

[11] Standard Bundled Units, the price of storage.

[12] Centrica Storage, Storage Year 2014/15 Weighted Average SBU Price and 2015/16 Sales Announcement.
http://www.centrica-sl.co.uk/index.asp?PageID=22&NewsID=175

[13] Natural Gas Europe, Underground Gas Storage: Beyond the Tip of the Iceberg, 26 Ferbruary 2015.
http://www.naturalgaseurope.com/european-gas-conference-underground-gas-storage-22330

[14] See: Genoese, F. and C. Egenhofer, Reforming the market design of EU electricity markets : Addressing the challenges of a low-carbon power sector, CEPS Task Force Report, July 2015.

[15] GIE, LNG Map, May 2015. http://www.gie.eu/index.php/maps-data/lng-map

[16] GIE, ENTSOG.

[17] See for instance: LNG Terminal in Swinoujscie – an important investment for Poland's and regional energy security, 31 March 2014.
http://www.msp.gov.pl/en/polish-economy/economic-news/5297,LNG-Terminal-in-Swinoujscie-an-important-investment-for-Polands-and-regional-ene.html

most of its neighbours and no transmission capacity will be added under ENTSOG's Capacity Low Firm Scenario (based on the FIDs already taken).[18]

Despite the importance of the interconnectors, investors do not seem to be queuing up for new projects[19] due to various well-known barriers. The issue of the regulatory and political framework plays a major role, as does the question about future gas demand. The rate of return set by national regulatory regimes, the market environment and economic growth, the clarity of signals from EU energy policy and impacts from the energy transition matter significantly.[20]

Interconnections certainly are important for the LNG strategy but they should not be the sole focus. While increasing gas interconnections, for example, between Spain and France could increase EU security of supply, there may be lower-cost solutions to achieve the same objective. For example, it may be more cost-effective to build a LNG terminal close to a vulnerable zone (e.g. South-Eastern Europe) rather than deploying large interconnection or reverse flow capacities. Also, LNG Floating Storage and Regasification Units (FSRU) may turn out to be more cost-effective than new pipelines. While a pipeline built mainly for security of supply reasons will remain unused most of the time, a FSRU that is not used can be disconnected and used for trading. Another alternative is to reload[21] the gas. Many LNG terminals allow for this. The type of infrastructure to be built should depend on a cost-benefit analysis which properly values security of supply.

Apart from cost-effective additional infrastructure, another major issue is contractual congestion.[22] According to ACER's annual report around 15% of interconnection points still suffered from contractual congestion in 2014, resulting in sub-optimal capacity utilisation.[23]

A third issue is the absence of well-functioning natural gas hubs in the CEE region and the Iberian Peninsula. According to the EFET's Gas Hub Assessments in 2015 most of the regional hubs are lacking basic characteristics such as a consultation mechanism in English, cash-out rules, standardised contracts or accessibility to non-physical traders. The Romanian, the Bulgarian and the Mibgas hubs are still their nascent phase with the appropriate legislative and regulatory framework yet to be set.[24] While it is a debatable question if there is a need for more benchmark hubs (serving as reference markets "that people can price their contracts

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[18] ENTSOG.

[19] ENTSOG's data shows that for only 15% of the total proposed transmission capacity by 2020 (20,793 GWh/day) final investment decisions (FIDs) have been taken. This would add 3,177 GWh/day (approximately 100 bcma) of (full) interconnection capacity to the EU gas system.

[20] ENTSOG, TYNDP 2015, Main Report.
http://www.entsog.eu/public/uploads/files/publications/TYNDP/2015/entsog_TYNDP2015_main_report_lowres.pdf

[21] "Reloading" refers to the transfer of LNG from the LNG reservoirs of the terminal into a vessel (GIE, 2015).

[22] "'Contractual congestion' means a situation where the level of firm capacity demand exceeds the technical capacity"as defined in Articles 2(21) and 2(23) of Regulation (EC) No 715/2009.

[23] ACER, ACER 2015 Report on Congestion at IPs in 2014, 10 February 2015.
http://www.acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/20150529_ACER%202015%20Report%20on%20Congestion%20at%20IPs%20in%202014.pdf

[24] See in more detail:
EFET, 2015 Review of Gas Hub Assessments.
http://www.efet.org/Cms_Data/Contents/EFET/Folders/Documents/EnergyMarkets/VTP_Assessment/~contents/SBX28G3U3L2PNND5/2015-Review-of-Hub-Scores_final.xlsx

on")[25] there is certainly a need for hubs serving as platform for physical balancing in the CEE and the Iberian Peninsula.

Cost-effective investment in gas infrastructure, improving the procedures coping with contractual congestion and developing gas hubs in the CEE region and the Iberian Peninsula are crucial to achieve a better level of system efficiency of the EU gas market.

This would also "enable all Member States to benefit from access to the international LNG market", as proclaimed in the consultation paper. However, to achieve this, it seems more appropriate to develop an overall gas strategy in order to approach the issue of LNG and gas storage in a comprehensive manner. Such a strategy needs to focus on the market realities.

The need for an innovation-driven strategy

Although "research and innovation" is a separate dimension of the EU's Energy Union strategy, the LNG and storage strategy should mention the considerable innovation potential of natural gas in order to give a perspective on the potential long-term role of gas in the decarbonisation process of the EU energy system.

There is considerable prospect for numerous emerging technologies related to natural gas, among them in particular the following:

(1) **Production and use of biomethane:** in 2013 around 1.3 bcm of biomethane (cleaned biogas) have been produced in the EU and Switzerland.[26] The industry's main concerns are the uncertainties regarding the EU energy and climate change policies post-2020 and the difficulty to form a European biomethane market. Indeed, the slow process of elaborating EU standards for biomethane hinders its trade and its use as a vehicle fuel. The European Committee for Standardisation (CEN) is drafting the specifications of biomethane for the injection into natural gas grids and the use as vehicle fuel since 2010.[27]

(2) Natural gas in transport: besides LNG, Compressed Natural Gas (CNG) and Adsorbed Natural Gas (ANG) should be considered as part of the solution to decarbonise the EU transport system. While the CNG and LNG-fuelled combustion engines are mature technologies requiring support at the deployment phase, ANG is currently in the "valley of death" between R&D and the demonstration stage. ANG stores natural gas at 35 bar enabling a volumetric efficiency increase of more than 25% compared with traditional CNG storage cylinders.[28] Hence, this technology

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[25] See: Natural Gas Europe, Reaching a Fully Liberalised and Single EU Gas Market – Interview with Patrick Heather, 10 February 2015.
http://www.naturalgaseurope.com/liberalised-single-gas-market-interview-patrick-heather-oies

[26] European Biogas Association, Biomethane Statistics.
http://european-biogas.eu/wp-content/uploads/2014/12/Biomethane-graph-20131.png

[27] CEN/TC 408 - Project Committee - Natural gas and biomethane for use in transport and biomethane for injection in the natural gas grid.
http://standards.cen.eu/dyn/www/f?p=204:22:0::::FSP_ORG_ID,FSP_LANG_ID:853454,25&cs=1A6E2885FFA69ED2A8C4FA137A6CEF3DA

[28] See more on ANG: Y. Ginzburg, ANG Storage as a Technological Solution for the "Chicken-and-Egg" Problem of NGV Refueling Infrastructure Development, 23rd World Gas Conference, Amsterdam 2006.
http://apvgn.pt/wp-content/uploads/adsorbed_ng.pdf

would be more suitable for the use in light-duty vehicles (responsible for 15% of EU CO_2 emissions).[29]

(3) Power-to-gas: The transport and heating sector can also be decarbonised by creating synthetic methane from renewable electricity (so-called power-to-gas). This technology branch should be further explored, especially because existing gas infrastructure could be used to transport and distribute this synthetic methane. Moreover, power-to-gas stations could provide demand-side flexibility to the electricity sector, i.e. produce when there is a surplus of renewable electricity.

[29] European Commission, Road transport: Reducing CO2 emissions from vehicles. http://ec.europa.eu/clima/policies/transport/vehicles/index_en.htm