Governments' collaborative actions and the globalization of LNG market

Strategic energy partnerships for LNG short-term demand recovery and long-term security of supply

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Introduction

The 21st Conference of Parties (COP) that the U.N. Framework Convention on Climate Change (UNFCCC) held in Paris in December 2015 shed new light on collective environmental responsibility and on the relevance of international commitment to tackle global issues. The COP21 positive outcomes reinvigorated the meaning of global "Climate Governance", and the ratification of the Paris Agreement less than one year later (November 4th 2016) signals countries' serious commitment towards decarbonization. With the conversion of INDCs into NDCs, there is now a window of opportunities to lower the green-house gas (GHG) emissions of global energy systems.[2]

With a reduced content of carbon dioxide (CO2), nitrogen dioxide (NOx), Sulphur oxide (SOx) as well as particulate matter (PM), natural gas is a relatively clean fuel, especially relevant for the power generation, the industrial and the transportation sectors' emissions basket. As gas fired power plants have the shortest start-up time in comparison to other substitutes (i.e. coal or nuclear), gas is a flexible load-follower for power generation, suited to back-up renewables' intermittency. As a less pollutant hydrocarbon, fitting low-carbon requirements for the electric and industrial sectors and, to some extent, also transportation, gas is potentially the "bridge fuel" smoothing the shift toward less carbon intense economies. The portability of liquefied natural gas (LNG) can make gas not only environmentally competitive against other fossil fuels, namely oil and coal, but also economically gifted to outlast further scale up in climate policies against high-carbon assets.[3]

LNG is a challenge and an opportunity to rescue the gas market. After having been the globally fastest growing fossil fuel, natural gas strives now against state subsidized renewables and environmentally irrational –though not economically - lack of a global carbon pricing to hold back coal. Renovated emphasis on climate risk and decarbonized development, thus, did not automatically mean an increase in the global use of gas, and despite the ample reserves left untapped throughout the coal (19th) and oil (20th) centuries, LNG is currently uncompetitive. Part of this economic unviability is

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[2] Countries communicated their Intended Nationally Determined Contributions (INDCs) on post-2020 climate action prior to the COP21 negotiations. To be valid, the Paris Agreement should be ratified by 55 countries, accounting for at least 55% of global GHG, when the submitted INDCs will entry into force and become Nationally Determined Contributions (NDCs). Under the Vienna Convention on the Law of Treaties (1969), States that ratify an international agreement undertake the obligation to be legally bound to the provisions they agreed upon.

[3] LNG suitability to long-distance trade together with its low carbon content make it a valuable substitute to oil in transportation, and potentially prevent it from being converted into stranded asset in case of an intensification of the standards for pollution abatement.

due to the fact that, conventionally, LNG transactions have been priced against crude oil, as they were considered substitutes, preventing a gas market to emerge. notably for power generation. However, now that their uses are distinct, traditional long-term contracts (LTCs), with oil-indexation and destination and take-or-pay (TOP) clauses for both free on board (FOB)[4] and delivered ex-ship (DES)[5] deals, prevent gas trade from being flexible, expose it to the volatility of crude prices and threatens energy security systems.

Additionally, some dramatic changes in the world's economic order reduced the growth rate of energy demand:

- Chinese "New Normal", a slowdown in economic growth and the shift from heavy industry to service-based economy;[6]
- Economic recession of the OECD countries and reduced energy intensity;
- Emergence of smaller, often low creditworthy buyers with precarious energy demand outlooks.[7]

All these transformations have increased the uncertainty over global energy consumption, casting out the relevance of investing in the gas sector. However, if the challenge of price fairness is tackled, LNG could turn into the opportunity to develop an international market for natural gas. Some changes have already occurred within the industry itself, with growing spot and short term deals[8] and price differentials between regional markets being progressively eroded. Gas demand uncertainty coincided with the start-up of U.S. and Australia's massive LNG production, generating a supply glut until the 2020s. Meanwhile, oil-indexed gas prices dropped up to a point where gas production is no more looked as a profitable business, discouraging further final investment decisions (FIDs). On the other hand, over-contracted major buyers have started to trade excessive supply on the spot and short term markets and want to renegotiate existing deals, waiting for supply and demand to rebalance before engaging in new ones. LNG buyers on the Atlantic and Pacific basins are increasingly looking for a globalized hub-based LNG market with ample network capacity and third-party access (TPA) as well as sufficient number of market participants and the financial capacity to reduce counterparty risk and provide long-term price signals for investors.[9] Such a liberalized hub will fundamentally mitigate the shocks of supply (i.e. the US shale revolution) and demand (i.e. Fukushima crisis), increasing market liquidity and creating trustworthy reference prices. Although oil-indexation persists in Europe, the only unique market with two price mechanisms, both the U.S. and the EU currently have reliable gas trading platforms with hub-based prices – the most famous being, respectively, the Henry Hub (HH) and National Balancing Point (NBP). Asian markets

[4] Free on board (FOB) deals transfer LNG cargoes title and risk to the buyer at the loading point. They do not include freight costs.

[5] Delivered Ex-Ship (DES) deals sell LNG, as well as title and risk, to buyers at the port of discharge. They do include freight costs.

[6] The 2016-2020 Five Years Plan sets an annual growth rate of 6.5% against the 7.8% of the past five years.

[7] For instance, Egypt emerged as a new gas buyer in the last two years but its demand could fall by the end of the decade following the development of the Zohr field. Similarly, uncertainty remains over the long-term demand from South America.

[8] Spot and short term deals are intended here as agreements not lasting longer than 4 years, according to the definition of the IEA as it appears in *Developing a Natural Gas Trading Hub in Asia, Obstacles and Opportunities*, Partner Country Series, 2013.

[9] IEA, *Developing a Natural Gas Trading Hub in Asia, Obstacles and Opportunities*, Partner Country Series, Structural Requirements to Create a Wholesale Natural Gas Market, 2013, p. 35

are trying to implement such a mechanism for gas price discovery. The elimination and relaxation of destination clauses in respectively FOB and DES deals, not to mention the upgrade of domestic and cross-regional infrastructures and regulations are among the key issues to the development of one or more gas trading hub(s) in the region.

The new LNG environment involves a plethora of new players: new exporters (U.S.) and importers (Middle East), new supplies (AUS) and technologies (FSRUs) may ask the stakeholders for new forms of engagement. The current gas supply glut is expected be markedly reabsorbed after 2020s, prompting the need for additional supplies. In this scenario, governmental choices in policy design and short-term measures aimed to recover the security of demand for gas and LNG remain outstanding challenges. They would be crucial signals to restore confidence in the gas market and unlock FIDs for new projects, hence guaranteeing long-term supply security. Japan and the EU have both highlighted the potential of internationally coordinated actions and explicitly support the enhancement of a mutual energy dialogue.[10]
The present work tries to assess whether evoked "collaborative actions" between governments can effectively sustain the development of a flexible, global LNG market. The first section reviews some core vectors steering globally the transition to new market conditions of natural gas and LNG industry, resuming some major events from the global scale to the regional contexts of Asia and Europe.[11] The second section investigates the potential of governments' partnerships to recover gas demand and secure supplies in the post 2020s. A final section will look through some recommendations for engaging in cross-regional energy diplomacy.

Global LNG landscape: changing features

The 2016 IEA "World Energy Investment" publication reports investments in renewables to be on track with the Paris commitment to limit world's temperature increase to 2° C, especially in as far as power generation is concerned.[12] Yet, global spending on low-carbon resources and technologies in other sectors has been losing ground. If it is no more possible to ignore a reorientation of market sentiment toward new energy systems, there is still a widespread shortage of financing alternatives to carbon intense fossil fuels, notably in transportation – the key oil consumption's sector – and industry. The report speaks of a "looming collapse in investment in LNG from 2017", threatening the certainty of long term supplies on the post 2020 horizon and driving, together with oil, the general fall in energy investments, down by 8% compared to 2014.[13]
Unquestionably, high costs are the major hurdle besieging gas markets. The transition toward less carbon intense energy systems requires expensive infrastructures conversion, while the capital intensive LNG value chains, that require four to five years to be developed, require long-term financing. Moreover, infrastructures to bring LNG to

[10] See METI, *Strategy for LNG Market Development.Creating flexible LNG Market and Developing an LNG Trading Hub in Japan*, May 2016, and European Commission, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of Regions on an EU Strategy for Liquefied Natural Gas and Gas Storage*, COM(2016) 49 final, Feb. 16 2016.
[11] In the present work, unless differently specified, Europe is intended as the EU-28.
[12] IEA, *World Energy Investments*, 2016.
[13] According to the IEA, *World Energy Investment* (2016), major oil and gas companies cut upstream investments by 25% in 2015.

gas-fired power plants usually have capital costs doubling the costs of a plant itself.[14] Particularly where countries are relying on long-distance imports, such as in the Asian case, this represents a considerable economic burden that makes gas uncompetitive.

Globally, governments have hitherto failed to implement transparent regulations consistent with a "well below 2° C" trajectory and still able to attract additional investors in gas, which is now exposed to a twofold competition from cheap coal and subsidized renewables. Frequently, governments are concerned about gas overreliance because, differently from oil, it is not yet freely traded on the global market. This inflexibility, also due to physical impediments linked to its gaseous nature, makes gas being perceived as a politically sensitive commodity, overexposed to the hazard of discretionary disruptions. Governments often fear other countries' anti-competitive free-riding over carbon policies, a highly threatening prospect in the current economic downturn which may discourage the adoption of tightened policies. If in developing countries environmentally responsible norm codes have to fight off obligations of modern, universal energy access, let alone budget constraints,[15] OECD countries do not make exception, whereby the back-up fuel option for renewables is often coal.[16] Finally, in places where coal reserves abound, gas switching is much questioned by (coal) industries lobbying and by issues of resources national sovereignty and macroeconomic impact.[17]

Yet, the recent turmoil in the LNG market fundamentals has substantially changed the features of gas business, suggesting how the future of this last may depend on the path of LNG itself. New players appeared either in the form of buyers or sellers, downstream and upstream players. In 2015, the market was awash by a huge wave of gas supply, the first to come on stream from the total estimated 150 mtpa that received FIDs between 2010 and 2014. These are, notably, the supplies from the U.S.[18] and Australia that received FIDs even without 100% offtake commitment from buyers. However, this abundant capacity has not been met by a comparable hoist in demand.[19] A slower than expected demand in Asia and unclear scenarios for Europe coupled with globally lower energy intensity (the energy needed to produce one unit of GDP) and left some major buyers with unnecessary quantity of contracted gas. Consequently, over-supplied markets responded with a weaker demand, creating an overwhelming LNG supply glut deemed to last at least until 2020, when supply is still accounted to be

[14] IEA, *World Energy Investment*, cit.
[15] IEA, "The growth in coal-fired capacity remained strong in developing Asia, with over 75 GW starting operating in 2015", *World Energy Investment*, cit.
[16] Especially from 2009, the combination of economic recession and non-market-based adoption of renewables made gas to compete with coal for the tiny share of baseload generation available for fossil fuels plants, usually dispatched after nuclear, hydro and renewables. Coal power plants were also sustained by low carbon prices on the EU ETS market. See Anouk Honoré, *The Outlook for Natural Gas Demand in Europe*, The Oxford Institute for Energy Studies (OEIS), 2014.
[17] Luca Franza, Dick de Jong and Coby van der Linde, The Future of Gas: The Transition Fuel?, in Silvia Colombo, Mohamed El Harrak and Niccolò Sartori (ed.), *The Future of Natural Gas, Markets and Geopolitics*, Istituto di Affari Internazionali (IAI), 2016.
[18] Four LNG export terminals are under construction in addition to the Cheniere Energy's Sabine Pass, which started shipping cargoes in February. Three have been approved but are not under construction, and a dozen are under regulatory process.
[19] Timera Energy, *Global Gas Market, The Path to Market Recovery*, Oct. 2016.

426 mtpa against 372.7 mtpa of global demand.[20]

On the whole, the present situation of over-supply and weak demand, with plunging commodity prices lying on the background, has changed the balance of power in the gas market. The 2014 OPEC strategy not to restrict output and rebound the market has resulted in lower oil-indexed gas prices.[21] Though spurring some optimism - especially in as far as consumption in China and India concerns -, the comparative advantage of gas has been eroded by cheap oil. Moreover, with prices barely recovering short-term marginal costs, the reduced returns on investments (ROI) have been undermining the economic viability of new gas projects (as in the case for Canada and East Africa). Indeed, after the prolific timeframe between 2010 and 2014, gas projects' FIDs suffered a setback from mid-2014 which could seriously threaten the security of gas supply in post 2020s.

Traditionally predominant sellers, demanding average 20-years LTCs with restrictions such as the (in)famous destination or TOP clauses, are now faced with the new buyers' bargaining power and their aim to not only eliminate (in FOB) or relax (in DES) unnecessary contractual rigidities, but also to actively engage in the upstream sector to secure positions in gas fields and liquefaction plants.[22] Consumers are now given the choice between different competing producers, and the new need for flexibility has been matched by the revolutionary tolling model of U.S. LNG contracts, where offtakers pay for the right to use a train's liquefaction capacity rather than gas itself. Being them "pure"[23] or "modified"[24], the flexibility introduced by U.S. innovative contract structures paved the way for intensified short term and spot gas trade, that accounted for 28% of the global LNG supply (68.4 mt) in 2015.[25] Increased volumes of flexible, destination-free LNG allowed so-called aggregators not only to maximize profits by sending LNG to the most convenient markets,[26] but also to take stakes in regasification terminals (including FSRUs) in order to secure access and share risks.
With one third of the 135 mtpa of expiring LTCs (2015-25) owned by aggregators, the buyers' trend of sourcing from the market instead of engaging in new LTCs and the downstream participation to equity investments are likely to persevere.[27]

The abundance of gas traded in short term and spot markets also tightened the

[20] Platts, *Japan's Oil and LNG Price Evolution*, Special Report, S&P Global, Sep. 2016.
[21] Andy Flower, *LNG Supply Outlook 2016 to 2030*, CEE, University of Texas, Jul. 2016.
[22] David Ledesma, The Changing Commercial Structure of the Upstream and Midstream LNG Business, in Anne-Sophie Corbeau and David Ledesma (ed.), *LNG Markets in Transition: the Great Reconfiguration*, Oxford University Press, 2016.
[23] Under the "pure" tolling structure (Sempra's Cameron), upstream producers pay a fee ("tolling fee") to liquefaction sites for the right to use the plants and liquefy gas to source and "toll" their own gas through the terminal. Then, through flexible contracts they sell LNG to buyers, often aggregators or portfolio players wanting to sell cargos directly on the market on a flexible basis to exploit profits.
[24] Under the "modified" tolling model (Cheniere), arrangements are delivered on a FOB basis and offtakers pay a constant tolling fee (not subject to price review) even though the LNG is not taken. This is the basis to recover the liquefaction plant's CAPEX and OPEX.
[25] International Group of LNG Importers (GIIGNL), *The LNG Industry in 2015*, GIIGNL Annual Report, 2016.
[26] Anne-Sophie Corbeau, LNG contracts and Flexibility, in Anne-Sophie Corbeau and David Ledesma (ed.), *LNG Markets in Transition: the Great Reconfiguration*, 2016, cit., pp. 511-14.
[27] Anne-Sophie Corbeau, David Ledesma, *LNG Market in Transition: The Great Reconfiguration*, Perth, Australia, Apr. 11-15, 2016.

regional price differentials typical of the gas market. Likely, the glut will drive price alignment between the Atlantic and Pacific basins, with price differences based exclusively on shipping costs. With limited transmission capacity and price gaps, gas markets have been indeed typically regional rather than global. In particular, regional differentials expanded between 2010-14 as a consequence of mainly unpredictable events: shale boom in the U.S., which became an exporting country and left Qatar with over-capacity; the impact of economic recession that reduced both end-users demand in developed countries and the price of coal; the rise in oil prices, with consequent market liberalization and shift to hub-based gas pricing in Europe;[28] the huge amount of additional LNG to offset the nuclear shortage of Fukushima crisis in Japan, with transactions based on (high) oil-indexed prices prompting a massive diversion of LNG supplies to Asian gas markets.[29]

Increasing liquidity is the first step towards first physical, and then virtual LNG Asian hubs.[30] Limited LNG availability on the spot market led to the reliance on rigid LTCs (with TOP and destination clauses) and irrational price mechanisms (such as oil-indexation and "Asian Premium"), undermining the overall flexibility and commoditization of gas. The progressive alignment of regional benchmarks towards a global, internationally linked gas market – with the JKM (Platts' "Japan-Korea Marker" assessment price) and NBP closed to parity in early 2016 - is likely to spur a shift to gas-on-gas pricing and to the upsurge of flexible portfolio traders in liberalized gas markets, acting as price setters. Still, a shift towards contracts reflecting the new conditions won't necessarily imply a move away from LTCs *tout court*, but rather a step in the direction of improving contracts flexibility. The gas security is not a matter to take for granted, and the LNG business needs to be backed by liquid and trustworthy trading hubs to offset the risks of price volatility while maintaining the stability of long-term supply/demand security.

The U.S. and Europe successfully implemented regional gas trading hubs, spurring a price for gas independent from oil and reflecting their own regional market fundamentals. On the whole Asia, the lack of an integrated infrastructure for both piped and liquefied natural gas is still a major hurdle, while in many countries oil is the only substitute of LNG, jeopardizing the shift from oil price benchmark to gas-to-gas competition. This shift would be crucial to develop a pricing rationale reflecting the Asian markets own gas dynamics. The current supply glut is supposed to create more competitiveness, facilitating liquid markets and the use of short-term and spot indices in LTCs' prices. The further development of one or more trading hub(s) in Asia will unleash the discovery of a transparent price mechanism, leading to regional price convergence and to the development of a global gas market.[31]

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[28] Economic recession costed Europe 40 Bcm in only one year, some 60% of total gas consumption. See Anouk Honoré, *The Outlook for Natural Gas Demand in Europe*, The Oxford Institute for Energy Studies (OIES), 2014, cit.

[29] Reloads from EU to Asia climbed from 0.1 million mt in 2010 to 6.4 million mt in 2014. See GIIGNL Annual Report 2016, cit.

[30] According to the IEA's definition, a *physical* hub is a geographical point, sufficiently interconnected and centrally located in the network, where a price is set for the natural gas delivered on that specific location; a *virtual* hub is built on the existing pipeline system as a virtual, balancing point. See IEA, *Developing a Natural Gas Trading Hub in Asia, Obstacles and Opportunities*, 2013, cit.

[31] The alignment of prices still implies the existence of price differences between regions, as linked to the different freight and ancillary costs peculiar of each market. What tightens is the spread between offers and bids, as the more

Gas Asian "Pivot"

Traditionally, limited infrastructures and poor gas transit capacity across Asian markets, with only 10% of gas traded via pipelines, have constrained the availability of alternatives to LNG.[32] Three regional gas centers have emerged:

- Japan, Korea, Taiwan, mature markets solely relying on LNG supplies;
- China and India, young gigantic markets endowed with pipelines and LNG networks;
- Southeast Asia, historical gas producer with growing demand but weak facilities.[33]

Due to geographic conditions, Asian countries have been predominantly depending on LNG imports. Combined with poor physical interconnections, this translated into a stumbling inflexibility in both transportation and resources choice. As a means of energy security, the reliability of gas supplies has started to be prioritized over the economic rationale of price formation. This approach favored LNG LTCs priced against oil benchmarks, usually the Japan Crude Cocktail (JCC), within a time lag of some five months, with a price slope traditionally close to 14% and spot transitions priced above or below the slope calculated for LTCs.[34] Linking the LNG price level to global oil rather than gas fluctuations yielded illiquid, rigid markets, unable to reflect gas trade's own features. Becoming a *de facto* gas premium market, ready to pay a price higher than in U.S. and Europe (the "Asian premium") for the security of gas supplies, Asian countries have been missing the benefits of the developing spot and short-term market. When the Asian premium peaked, in 2013, the idea of an Asian hub emerged as a tool to correct price distortions.

In the Asian century, also the energy landscape is experiencing an "Easternisation" of trends and the behavior of Asian markets is expected to determine energy demand. Asian trends in thermal coal supply and demand, in many senses hold the key to meet the 2° C targets. Among the reasons dimming further an already unclear LNG picture, Japanese and Korean nuclear policies rank first in shrouding in uncertainty future forecasts, followed by Chinese timeliness and path for a coal-to-gas switch.[35] On the other hand, India's capability to deliver adequate infrastructures in time to increase gas shares[36] and additional gas demand from Southeast Asia are all price sensitive issues. The recent IEA Medium-term gas outlook assumes Asia to account for the 23% of the global gas demand, growing by 26% from the 711 billion

liquid a traded market is, the more it attracts participants to transact and it creates competition. Where competition is limited, the gap between bids and offers might widen. Liquid markets instead create the confidence that the price of a particular trade will be close to the price initially envisaged, encouraging further trading.

[32] IEA, *Developing a Natural Gas Trading Hub in Asia*, 2013, cit.

[33] Howard V. Rogers, *Asian LNG Demand: Key Drivers and Outlook*, OIES, Apr. 2016.

[34] IEA, *The Asian Quest for LNG in a Globalizing Market*, Partner Country Series, 2014.

[35] China plans to switch 115 bcm of coal consumption to gas over 5 years. See Oxford Energy Forum (OEF), *LNG Markets: the Great Reconfiguration*, OIES, Issue 106, Aug. 2016.

[36] India aims to shift gas shares from 6.5% to 15% of the energy mix in three to four years. Since domestic production fell significantly (from 5 to 3.1 Bcf/d, 2011-16), this means an increase in imports from current 21 million mt to 50 million mt and will require tremendous infrastructure's improvements, especially in the eastern cost, to ensure LNG terminals and gas distribution. India boosted the use of LNG through subsidies schemes provided for power generators plants - having the market high price elasticity here. On September 2016, the Indian government presented the "Vision 2030 – Natural Gas Infrastructure in India" foreseeing a rise in domestic production of gas and a dramatic expansion in gas demand for power generation by the end of 2020s. Similarly, Platts Analytics sees demand for LNG in India to double to 30 million mt/year in 2021 from the 2015 levels, sustained by revised contract prices between RasGas and Petronet.

cubic meters (Bcm) of 2015 to the 895 Bcm of 2021.[37] While demand in the premium markets of Japan and Korea will decline and marginally grow respectively, new consumption is supposed to come from other gas poor Asian countries (India, Pakistan, Bangladesh, Philippines). Elsewhere in the world, Middle East and Latin America are also regarded as potential pockets of growth. However, even assuming low prices to last and FSRUs to increase and facilitate access to gas market,[38] they only have limited potential to absorb the LNG supply glut at present. On the whole, it is the Asian behavior that will transform gas demand growth, with the Chinese performance dominating the outlook. Bullish figures on Chinese demand growth came from the IEA and Wood Mackenzie,[39] and both identified China as the key player of gas expansion. Yet, assumptions on China are hazardous. It already leapfrogged traditional Western steps of development, including in the energy sector, and might now be the first country to cap energy consumption.[40]

World's larger LNG consumer and main marginal gas price driver, Japan is likely to remain over-contracted up to the next decade, with committed LNG forecasted to peak in 2017 (90 mtpa) and fall down to 35 mtpa by 2030, with imports to decrease accordingly by the same year (to 62 mtpa).[41] Overall, about 20 million mt of contracted LNG will be left in excess in 2020.[42] The ability of Japanese buyers to lift destination clauses in FOB and DES contracts and resell unutilized LNG capacity can boost a transformation in the regional market, with other Asian players to follow the path. The deal that JERA Co.[43] struck with the French EDF to sell over-contracted gas to Europe,[44] together with its declaration not to sign contracts containing destination clauses, aim to challenge the established "one-way" direction of the gas market, and show how the glut can be the chance for a trading hub to offset future supply-demand imbalances. In this sense, METI's recent strategy on LNG and explicit call for a halt to oil indexation ("linking the price of LNG to crude oil is no longer necessarily justifiable")[45] is a strong political commitment. On the other hand, the effectiveness of power and gas liberalization - scheduled in 2016 and 2017 respectively - is questioned by insufficient pipeline networks,[46] which postpone hub's achievements to 2020s.

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[37] IEA, *Mid-Term Gas Outlook*, Jun. 2016.

[38] Floating Storage and Regasification Units (FSRUs) are a cost-effective way to ensure affordable supply. They do not require upfront investments when provided through lease arrangements, and can be used on a seasonal basis. Their development has been impressively successful, increasing from 1 to 19 vessels between 2005 and 2016. See, Brian Songhurst, *Floating Liquefaction (FLNG): Potential for Wider Deployment*, OIES, Nov. 2016.

[39] IEA forecasts Chinese gas demand to grow from 190 Bcm in 2015 to 320 Bcm in 2021; Wood Mackenzie estimates demand to expand to 250 Bcm in 2019 and 300 Bcm in 2021. See Clara Tan, *Asia's Gas "Bridge" Starts to Wobble*, Energy Intelligence, World Energy Opinion, Aug. 2016.

[40] Along with a national carbon market plan scheduled for 2017, Beijing plans to adopt a scheme in four provinces (Zhejiang, Fujian, Sichuan, and Henan) to limit national energy use to 5 billion tons of standard coal equivalent in 2020.

[41] Anne-Sophie Corbeau, David Ledesma, *LNG Market in Transition: The Great Reconfiguration*, Paper, Apr 2016, cit.

[42] Platts, *Japan's Oil and LNG Price Evolution*, Special Report, S&P Global, Sep. 2016, p. 9.

[43] JERA Co. is a fuel procurement joint venture of Tokyo Electric Power Co. and Chubu Electric Power Co. It is one of the consortia between buyers aiming to optimize supply logistics.

[44] Stephen Stapczynski, Emi Urabe, Dan Murtaugh, *World's Biggest LNG Buyer Becomes Seller As Gas Glut Builds*, Bloomberg, May 26, 2016.

[45] METI, *Strategy for LNG Market Development. Creating flexible LNG Market and Developing an LNG Trading Hub in Japan*, p. 7.

[46] Sufficiently open and developed infrastructures are essential to ease physical transaction, which in turn improves trade and mobility, helping the shift toward the relax/elimination of destination clauses.

A flexible trading hub will be pivotal to remove Asian premium and ensure the global stability and long-term affordability of supplies.[47] The discovery of hub-based gas price indices is fundamental for future supply and demand balance, and to create a transparent and liquid market. Among the measures deemed necessary to develop a competitive regional hub, the IEA recommend governments to adopt a hands-off approach (i.e. shifting their role from policy makers to regulators, and arbitrators), to separate the transport from the commercial sector, and to deregulate wholesale prices.[48] Transformation, in Asia, requires at first the establishment of physically integrated connections and TPA, then the participation of a sufficient number of players and finally the involvement of financial parties, to ensure risk mitigation and a futures market development.[49] Furthermore, Asian market players still need to develop two characteristics that contracts have been lacked of late: standardization and transparency.[50] Particularly, limitations on contracts information disclosure have generated an overall opaque and unclear Asian market. In this sense, Japanese and Singapore's initiatives of, respectively, Japan Over-the-counter Exchange (JOE) and Singapore Exchange LNG Index Group (SLInG) are important steps forwards to correct these system's inefficiencies.[51]

Creating a regional hub requires governments to engage in competitiveness, security and sustainability of energy markets. Wholesale gas markets open to new entrants, with equal treatment and liquid trade, improve competition and make consumers and producers confident in the price signals set by the market itself. Looking at the previous experience of Europe, the situation of Asian markets at present shows some similarities. In 2008 gas demand collapsed with the U.S. no more in need for LNG, additional supplies coming from new projects – i.e. expanding wholesale choices for consumers -, and utilities suffering the oil indexation financial burdens, with increasing tensions among end-users.
These pressures encouraged the adoption of legislations directed at improving market competitiveness and access to low cost energy. Of course similarities do not mean automatic repetition, and a transition to hubs in Asia still requires time to develop. Yet, a comparative exercise is helpful to understand the changes (notably, deregulation and unbundling) making inroads in Asian markets.[52] Perhaps more important to remark, however, is that hub-based gas prices will not automatically be cheaper than the

[47] Discussions around the move away from JCC indexed prices started in the Fukushima aftermath, when the demand spike in Japan generated a surge in the Asian premium ($14-18 in JKT and $9-14 in China and India) and Japanese utilities made record losses.
[48] IEA, *Developing a Natural Gas Trading Hub in Asia, Obstacles and Opportunities*, 2013, cit.
[49] "Financial parties create their margins by carrying on risk exposure". See IEA, *Developing a Natural Gas Trading Hub in Asia, Obstacles and Opportunities*, 2013, cit.
[50] In particular, different legacy contract terms make it difficult the standardization of cargo term sheets and of Master Sales Agreement (MSA). See Edwin Loh, *Life to get harder for LNG traders*, World Gas Intelligence, Vol. 27, No. 39, Sep. 28, 2016.
[51] Singapore further launched a second pricing index, the North Asia Sling (with DES prices similar to FOB of the Singapore Sling) probably to overcome the limits of remoteness ascribed to its ambition of becoming the hub setting an East Asian price. See Jonathan Stern, LNG Pricing: Challenges in the Late 2010s, in *LNG Markets in Transition: the Great Reconfiguration*, 2016, cit.
[52] Japan has liberalized the electricity market in 2016 and will open up the gas sector in 2017. Other Asian countries envisaging unbundling reforms include chiefly China, Thailand, Vietnam and Indonesia, with South Korea, India and Malaysia expected to follow. See Nick Fulford, Ryan Pereira, *Gas Market Reform – Death of Oil Indexation and Resulting Impact on Asian and Global LNG Prices*, Gaffney Cline and Associates.

oil-indexed ones. The difference between price formation and price level is essential here: the adoption of a transparent, hub-based gas pricing mechanism can avoid imbalances in the price formation of upstream contracts versus downstream, but can also potentially yield higher prices to be paid by traders. Beyond low oil prices, the 2016 higher gas-to-gas price resulted from referencing the cost of Asian gas to that of HH, which benchmarks U.S. gas market fundamentals. If this link was appealing in times of high JCC and low HH prices, when the situation reversed oil-linked prices became lower than gas-to-gas prices.[53] Conversely, a properly functioning price mechanism in Asia should reflect first of all the Asian own demand/supply fundamentals. Before this transparent price is found - what could still require up to ten years -, a hybrid formula of oil- and gas- indices can be adopted in Asia, to correct high price on the HH-portion through the oil-portion, and spread the risk of oil index exposure.[54] The current gas oversupply is a unique opportunity to increase flexibility and traders' participation, to develop transparent price mechanisms and spot market, and ultimately to enhance short-term security of *demand*. Depending on the ability to create a profitable market, new supplies will be guaranteed for the post 2020, when 45% increase in global LNG demand, driven by Asia and Europe will have absorbed the glut.[55]

The EU hubs and Energy Union diplomatic commitment to LNG

The idea of energy supply security in Europe changed after that the geopolitical crisis of 2006, 2009, and 2014 unveiled a Union exceptionally vulnerable to gas flow disruptions and the threat of the overreliance on Russia. A new framework, the Energy Union, was institutionalized in 2015 to provide concerted response to energy issues and safeguard the whole EU self-reliance on energy requirements and security standards.[56] The Energy Union aims for a single market where energy flows freely, and competitiveness and bargaining power of consumers improve through the comprehensive diversification of sources, suppliers and routes across Member States (MS). If the 2015 Action Plan on energy policy coordination included LNG among the key priorities for "new energy source" diversification,[57] a dedicated strategy in 2016 definitively confirmed the will to enhance the EU resilience through LNG inclusion in energy portfolios and the construction of new regasification terminals (significantly labelled as Projects of Common Interest, PCI).[58] Although not optimally allocated, Europe has an important regasification capacity of total 154 mtpa, with terminals situated in the Western, Mediterranean and Atlantic areas.[59] Insufficient transmission

[53] Jonathan Stern, LNG Pricing: Challenges in the Late 2010s, in *LNG Markets in Transition: the Great Reconfiguration*, 2016, cit.
[54] Howard V. Rogers, *The Impact of Lower Gas and Oil Prices on Global Gas and LNG Markets*, OIES, Jul. 2015.
[55] METI, *Japan's Energy White Paper 2016*. Long-term Energy Supply and Demand Outlook for FY2030, 2016.
[56] On the Energy Union see European Commission, *Energy 2020 – A Strategy for Competitive, Sustainable and Secure Energy*, (COM (2010) 0639 final, Nov. 10, 2010, and European Council, *Conclusions* (EUCO 11/15), Mar. 19 and 20, 2015.
[57] Council of the European Union, *Council Conclusions on Energy Diplomacy* (10995/15), 20 Jul., 2015.
[58] The regulation of 2013 on the Trans-European Energy Infrastructure (TEN-E) and the Connecting Europe Facility (CEF) established a common policy framework in support of EU gas infrastructure (transmission, LNG terminals and storage) and has identified to this end key projects of common interest (PCIs) to be prioritized. For information on the TEN-E and PCIs see European Commission, *Commission Delegated Regulation (EU) 2016/89 of Nov. 18, 2015 amending Regulation (EU) No 347/2013 of the European Parliament and of the Council as regards the Union list of projects of common interest.*
[59] The LNG regasification facilities in the European Union are 23, representing some 20% of worldwide

capacity, however, is responsible for MS imbalances regarding access to and benefits from the international LNG markets, warning the overall EU market attractiveness and security of supply.[60] The additional 126 mtpa planned capacity and 13 mtpa under construction[61] are intended to correct the non-homogeneous LNG liquid trade of the European hub system, indeed highly diversified.

Currently, the Union presents a variety of gas hubs, ranging from Trading Hubs (NBP, 1996; TTF, Title Transfer Facility in the Netherlands, 2003), to Transit Hubs (ZEE, Zeebrugge hub, 2000; CEGH, Central European Gas Hub, 2005) and Transition Hubs (GPL, Gaspool Balancing Services hub, 2009; NCG, NetConnect Germany, 2009; PEGs, Points d'Echange de Gaz, 2004; PSV, Punto di Scambio Virtuale, 2003).[62] With a low rate of utilization (24% on average), excess regasification capacity makes Europe a market of "last resort" for distressed cargoes, increasingly seen as the main recipient of glutted LNG, although nearly six months after the start-up of LNG production at Sabine Pass trains in the U.S., only two cargoes headed to Spain and Portugal, limitedly connected with the rest of Europe, and one to Turkey.[63] With the end of winter in South America - preferred destination of U.S. volumes so far - and tightening Asian and Japanese markets, wide is the consensus that the proliferation of gas hubs, combined with the huge wave of new flexible supplies, will promote additional LNG imports in Europe in 2016-20, being the best-price alternative at least until the market rebounds.[64] Rather than on demand raise, assumptions are based on falling domestic production (supplying 50% of total needs in 2014)[65], and on the available infrastructures and political will to diversify gas sources (namely from Russian piped gas, retaining alone some 30% of market share)[66] and shipping fuels. Yet, the gas sector strives to find stability among energy efficiency policies,[67] subsidized renewables and low-priced coal. In Europe, low gas prices did not push a U.S. alike significant shift from coal to gas-fired power generation. Ironically, heavily subsidized renewables have incremented the use of coal as cheap backup complement, eroding the regional energy security of supply.[68]

Trade is an unquestionable priority to mitigate supply risks and sustain the

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regasification capacity.

[60] Four MS in the Baltic, central-eastern and south-eastern regions are exclusively relying on Russia and have poorly connected infrastructure that stir up EU vulnerability to disruptions on a regional scale. See COM(2016) 49 final, cit., p. 2.

[61] Oxford Energy Forum (OEF), *LNG Markets: the Great Reconfiguration*, OIES, cit., p. 11.

[62] Classification taken from Patrick Heather, *Continental European Gas Hubs: Are They Fit for Purpose?*, OIES, Jun. 2012.

[63] The perspective of US LNG imports into Europe is strategical for geopolitical purposes, though it has significant practical shortcomings when it comes to prices, suppliers' and inter-fuel competition, especially in comparison with Russian gas.

[64] Jaime Concha, Chapman Alexandra, *US LNG Seen Hitting Europe Next Year*, Natural Gas Week , Oct. 24, 2016.

[65] With the exception of Norway, indigenous gas production started to decline almost everywhere in 2000s, and sharpened recently with cap on the Groningen gas field production the Netherlands. See *LNG Markets in Transition: the Great Reconfiguration*, LNG Demand Potential, cit., p. 311.

[66] Pipeline imports from North Africa are not likely to increase unless Egyptian Zohr field is developed quickly, while the development of the Mediterranean fields of Israel and Cyprus as well as of the Southern Gas Corridor are facing political complications.

[67] The 23rd WEC on Oct. 2016 (Istanbul) envisaged "A new world for energy industry" and global per capita energy demand to peak by 2030 thanks to new technologies and efficiency policies.

[68] Giacomo Luciani, The EU and LNG as a Flexible Tool for Energy Security: Constraints and Opportunities, in *The Future of Natural Gas, Markets and Geopolitics*, Istituto di Affari Internazionali (IAI), 2016, cit.

business. In this sense, the path towards gas market liberalization of the EU has enabled the discovery of hub-based price mechanisms, with following developments in market competition and consumers' choice. But unlike North America - the only market to price gas on a purely supply and demand base -, the EU has to cope with the internal differences persisting in the unique market that impose a reliance on a two-price mechanism. Since 2010 hub-based (50% of transactions in 2014)[69] and oil-indexed (in particular for Russian and North African gas) prices have coexisted. The double pricing mechanism is owed to the market's regulatory changes emerged in 2006, when Europe evoked the implementation of a more "coherent external energy policy".[70] The revision of the EU Security Strategy in 2008 and the Treaty of Lisbon adoption in 2009 established a new energy policy approach towards competitiveness, supply security and environmental sustainability which then found realization in the Energy Union.[71] In the same 2009 the "Third Energy Package"[72] set the legislation to create a single, competitive market by providing codes to split the generation and marketing sectors from the transmission and distribution of electricity and gas.[73] By virtue of the 1994 Energy Charter Treaty, these policy commitments were rules based, and legally bound MS to cross-border cooperation towards production, trade and transit, on the model of WTO. No more able to pass costs on consumers, like former large wholesale "intermediaries" between producers and end-users, the new trading companies were required, by regulation, prices reflecting the value of gas as signaled through hubs.[74]

The proliferation of European hubs in the 2000s is attributable to a move away from monopolistic structures - where vertical integration allows for artificial adjustment of supply and demand imbalances *within* companies' portfolios - to a more variegated landscape of different agents in need to balance the physical flows in the transmission systems (TS) - i.e. the aggregate injections and withdrawals of gas -, and to adjust volumes to shocks by clearing positions through wholesale trade.[75] Wholesale marketplaces offered buyers an alternative source of gas provision to lower the cost – so-called option value of second sourcing – and to resell unneeded shares of contracts, required under TOP clauses. Progressively, sufficient liquidity enabled sellers to exploit price differences and arbitrage opportunities, thanks to price differentials reflecting transportation and ancillary services (i.e. bank or insurance costs).

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[69] Chi-Kong Chyong, On the Future of Global LNG Trade and Geopolitics, in *The Future of Natural Gas, Markets and Geopolitics*, Istituto di Affari Internazionali (IAI), 2016, cit., p. 43.

[70] European Commission, *A European Strategy for Sustainable, Competitive and Secure Energy,* COM(2006) 105 final, 8 Mar 2006.

[71] Determinant for the Energy Union ware changes in European Security Strategy (ESS). When first implemented in 2003, ESS did not include energy security among its top five priorities (Terrorism, Proliferation of Weapons of Mass Destruction, Regional Conflicts, State Failure, and Organized Crime). After the burnt out of the first Ukrainian crisis with Russia (2006), the ESS strategy was revised in 2008 to include also energy security, cyber security, and climate change as key threats to the stability of the EU as a whole.

[72] For internal gas market common rules see *Directive 2009/73/EC of the European Parliament and of the Council*, Jul. 13 2009.

[73] Because the details of the new market were to be provided by national regulators, the common "Gas Target Model" (GTM) was created to harmonize visions. CEER, ACER and ENTSOG are the authorities in charge of implementing and enforcing the legislation.

[74] Patrick Heather, *Continental European Gas Hubs: Are They Fit for Purpose?*, OIES, 2012, cit., p. 27.

[75] This is the case for, particularly, shippers with opposite net positions. See Caterina Miriello and Michele Polo, *The Development of Gas Hubs in Europe*, The Center for Research on Energy and Environmental Economics and Policy, Bocconi, 2015.

As long as a wholesale trade develops liquidity increases, clearing the market from the confidentiality of LTCs, creating reliable (wholesale) price signals. Since price volatility remains, in order to protect their exposure, the new energy companies need to use the market not only for physical balance and adjustment purposes but also for financial risk management, increasing the hubs liquidity.[76] Hence, following a first entry/exit balancing phase and a rule-based second sourcing phase, both strictly physical, the hub develops so as to provide deals to manage price risks, such as futures and forwards. According to this process, before well-functioning LNG trading hubs develop in Asia the region has to first and foremost enhance integrated gas infrastructures at a domestic and transregional level, as well as TPA access. Unlike physical phases that generally develop within each national gas systems, financial wholesale markets can also emerge in places other than those of physical trade, and are usually smaller in number.[77] Albeit the likelihood of a thriving number of hubs to develop in both European Union and Asia, therefore, they will not be necessarily all price markers. As short term transactions increase, indeed, the liquid hubs supposed to be used for benchmarking and risk management will only be few, whereas several national hubs with spot traded volumes and tight price correlation to the regional hub will emerge for physical balance and portfolio's adjustment purposes.[78]

On the whole, the willingness of both utilities to adopt contracts based on hub prices and market players to grab opportunities for portfolios trade and management will be key to settle gas hubs. Governments, however, can stimulate the process from a physical and an institutional point of view, through the realization of the needed infrastructures and regulatory frameworks against anti-competitive behaviors. In times of disruptions and scarcity, the price of LNG will rise, and spot cargoes can be costly in terms of budget and time.[79] Trading hubs are flexible tools to respond to urgent needs and immediate actions, thanks to mechanisms of transparent and timely reported prices allowing for comparison. As hubs facilitate the trade of LNG, an effective geopolitical "game changer" insofar as it expands consumers' choice and bargaining power, they fundamentally deliver requirements of national energy security. However, they also demand accelerated reactions and fully information to be available at any time and place. They might thus sometimes require the establishment of dedicated teams or departments, and often the implementation of targeted policy measures.

Collaborative actions: going beyond conventional borders

The imbalance of the global gas market, where the LNG supply glut is expected to last at least until 2020s, together with low gas prices have contributed to the defer of new projects' FIDs from 2014 onwards, a fact which now questions the availability of future provisions. As long as upstream players' capability to invest is

[76] In this phase of hub development companies need gas, power and coal as well as contracts portfolios, with different maturity and structures, in order to manage and hedge risks.

[77] For instance, although the TTF became the Continental Europe reference hub, it has not yet developed a range of hedging financial instruments compared to the NBP, and the two hubs cannot compete in terms of financial capacity. See Caterina Miriello and Michele Polo, *The Development of Gas Hubs in Europe*, cit., p. 23.

[78] Jonathan Stern and Howard Rogers, *The Transition to Hub-Based Gas Pricing in Continental Europe*, OIES, Mar. 2011, p.44.

[79] "It may require at least one week for a shipment to arrive in the crisis area". See the European Commission, *Communication on the short term resilience of the European gas system. Preparedness for a possible disruption of supplies from the East during the fall and winter of 2014/15*, COM(2014) 654 final, Oct. 16 2014.

deteriorating alongside plunging oil prices, the LNG industry needs a shared commitment from stakeholders' towards market principles - involving in equal measure supply and demand security, but also that of capital, returns and risk allocation -, since well-functioning markets mitigate investments uncertainty.

"The pressure on budgets at oil production companies is driving consolidation in the oilfield services industry",[80] and to manage current gas market uncertainties, pooling together volume and price risks, new consortium initiatives are intensifying on both a producer-consumer and consumer-consumer basis, with the most relevant example being the JERA Co., the joint venture that became the world's biggest buyer of LNG.[81] On the demand side the attractiveness of LNG depends on financial and environmental advantages against other fuels.[82] If confidence has to be restored, the engagement in intraregional coherent policies is needed to establish flexible, innovative and cost-reflective incentives to support spot market activities and the global recovery of demand.

Global Public Goods and Peer Pressure

The notion of collaborative actions may recall by itself a variety of players sharing common interests. Global public goods, being goods that everyone can equally benefit from on a global scale, require concerted measures to preserve conditions and ensure fairly distributed costs – that is to say, marginalize free-riding practices. Expression of cooperative initiatives targeting global public goods, the idea of environmental governance entails a plethora of members of the national and international scene, both state and non-state actors. The big question remains how to hold the accountability of national participants, representing peculiar interests, in the broader and mainly unelected contest of global governance. Globalization and the most global of its challenges, climate change - at the heart of environmental policies - call upon governance models that question the traditional conception of politics, which now needs to be accountable not only for national bureaucracies, but also those of international organizations such as the UNFCCC.

The Paris Agreement provided a framework, not a method, and indeed a breakthrough in decarbonization paths has not materialized yet. Keeping the global temperatures under the 2° C is an ambitious target that would practically mean zero or below zero emissions. If energy efficiency is the more effective tool in the short-term, a long-term paradigm shift of energy systems will have the paramount impact. LNG comes under this strategy inasmuch as it represents a flexible low-carbon alternative, notably in the power generation and, to a lesser extent, the mobility sectors. Because the stakes of globalized markets – including LNG - structurally transcend physical and territorial limitations, the promotion of shared views rather than geographic proximity can effectively provide stakeholders with global coherence and problems orientated policies. Reliability - and thus predictability - is a key element for workable policy-making. In the perspective of policies in favor of LNG, envisaging collaborative actions between peers has the potential to deliver political and economic robust

[80] Ed Crooks, *Hold the Champagne*, Financial Times, FT Energy Source, Nov. 4 2016.
[81] JERA Co. is a joint venture created in 2015 by the Tokyo Electric Power Co. Inc. (TEPCO) and the Chubu Electric Power Co. Inc.
[82] Chris Le Fevre, LNG as a Transport Fuel, in Anne-Sophie Corbeau and David Ledesma (ed.), *LNG Markets in Transition: the Great Reconfiguration*, 2016, cit., p.443.

relationships, and hence to facilitate concrete climate policy achievements.

Peer pressure has been an instrument widely used in soft power organizations (OECD, G20) to shape performances and promote a sense of affiliation by means of mutual assessment and peer reviews built on a perceived sense of common identity and expertise. The "best practices" become here an instrument of policy making that provide the standards against which review States' national policies.[83] These incentive mechanisms of mutual influence are productive processes not only for views exchange and international high-level dialogues, but also for concrete reforms, particularly in case of "clubs" like arrangements. The effectiveness of clubs mechanisms in climate deals has been explored by Nordhaus (2015), who concludes that a Climate Club with penalties for nonmembers is the more effective way to marginalize free-riding practices and promote participation to agreements involving global public goods.[84] The rationale is the voluntary sharing of the costs of producing a public-good-type resource to mutually enjoy the benefits of membership at penalizing costs for nonmembers.[85] Although sanctions on international trade are recognized as the most powerful instrument of penalty, benefits from climate deals include also technologic transfer and R&D cooperation, and penalties can be therefore intended as an exclusion from such schemes of knowledge sharing: not direct injunction but indirect incentive to participate instead. With a minor but still consistent part of abatement costs depending upon regions' technological and sectorial differences, weakened technologic and knowledge transfer makes resources indeed more expensive, which explains why very high value is placed on promoting R&D as a tool to deal with climate change by many industry leaders, chiefly in Japan.[86]

International energy partnerships, with ancillary initiatives of technological and intellectual capacity building, are a genuinely fertile environment to exchange knowledge and improve competitiveness, especially in a context of homogeneous membership. Identity-defining international organizations make a wide use of peer pressure mechanisms to influence policy-making.[87] Although in some specific cases the involvement brought about by membership does not translate into practical and operational activities (such as OECD, where it however translates in accession

[83] It is noteworthy that much of this identity sentiment is fostered by these institutions' perceived unbiased advices and expertise. See Tony Porter and Michael Webb, *The Role of the OECD in the Orchestration of Global Knowledge Networks*, May 2007, Canadian Political Association Annual Meeting, Saskatoon, Saskatchewan, Canada.

[84] William Nordhaus (2015), Climate Clubs: Overcoming Free-riding in International Climate Policy, American Economic Review 2015, 105(4): 1339-1370. An admittedly idealized solution, not existing in its pure form, the Climate Club is a top-down approach to understand the forces underlying the international agreements working processes and find mechanisms to limit free-riding. The analyzed sanctions consist on imports tariffs uniformly levied by members to nonmember countries as either carbon duties or uniform tariffs. Shortcomings persist, however, inasmuch as carbon duties are complicated to compute, while all-imports tariffs would represent a major departure from international trade law, as pointed out by Nordhaus himself.

[85] For the theory of "Clubs" see James M. Buchanan, *An Economic Theory of Clubs*, Economica, New Series, Vol. 32, No. 125 (Feb., 1965), pp. 1-14, Wiley, The London School of Economics and Political Science and The Suntory and Toyota International Center for Economics and Related Disciplines.

[86] Mitsutsune Yamaguchi and Keigo Akimoto, The view from different parts of the world: A view from Japan, in Scott Barrett, Carlo Carraro and Jaime de Melo (ed.), *Towards a Workable and Effective Climate Regime*, CEPR Press and Ferdi, 2015.

[87] In their constructivist analysis of the OECD, Porter and Webb (2007) argue that the explanation of OECD's existence and effectiveness owes more to the mechanisms of organization's identity and values than rational calculations.

mechanisms, where non liberal-democracies are prevented to adhere), in other like-minded fora such as the G7 or G20 the concept of "peers" fosters the alignment of states behaviors and domestic policy design. Similar conforming power have also the three clusters of parties' parallelisms, cross-border imitation and learning process, the features supposed to traditionally shape global trends towards policy convergence.[88] Finally, the engagement in "soft law" frameworks, together with the mobilization of international expertise, has a huge potential to preserve over the long run commonly designed policies from the interference of narrower national political.[89]

International climate deals are aimed to address the shortcomings of global environmental governance, where diplomatic tools eventually turn out to be an essential connector between the internal and external dimensions of policymaking. Though environmental outcomes still have to prove successful, the COP21 political success owes much to the exceptional efforts of French diplomatic body. Assuming alignment of views and policy orientation, it follows that the same mechanisms could also influence policy implementation of other relevant areas of global governance, such as those involving energy collaborative actions. Given the structural features of sense of membership and identity among participants, certainly enforced by the sense of world's leadership among members, the G7 and its Energy Ministerial Meeting (EMM) can be legitimately assumed to follow the same mechanisms. Established in 1979 as a side event of G7/G8 conceived to harmonize energy policies and discuss the financing of energy security and sustainability, the EMM has shown in recent times a significant escalation of the scheduled agenda. After a leap of nearly 20 years, from 1998 it gathered almost every three years. The speeding up of the energy ministries' meetings, which started to meet each year since 2014, may suggest an aspiration of this international "club" to undertake the creation of a cross-national platform for energy policy coordination.

The EMM potential further consolidates in moments when converging visions coexist with converging interests, as it is the current case of LNG momentum. If the accelerated frequency of meetings is a signal *per se* of the increased concerns over gas supplies' stability unleashed by the Ukrainian crisis, there is an explicit commitment to start an enduring and systematic action towards the consolidation of the security of the global energy architecture. Such a commitment ended up in the agreed promotion of a more integrated strategy towards the promotion of diversified energy systems, notably through a widespread use of LNG that was regularly reiterated in the EMM of Rome (2014), Hamburg (2015), and Kitakyushu (2016).

Governments to boost LNG demand

Markets always clear, and market forces are likely to reabsorb the supply surplus through clearing mechanisms that involves both the supply and demand sides. Inasmuch as demand concerns, gas still lacks a dominant sector of consumption, and only a governments' clear signal in support of gas will restore the confidence in the market, driving on the necessary further investments. Thus far, though on the rise in

[88] Kerstin Sahlin-Andersson, *National, International and Transnatioanl Constructions of New Public Management*, Stockholm Center for Organizational Research (SCORE), 2000.

[89] Marcussen (2004) sees the soft law produced by international organizations as more powerful than usually thought, especially in comparison with the hard power of international treaties. See Martin Marcussen, OECD Governance Through Soft Law, in U Mörth (ed.), *Soft Law in Governance and Regulation: an Interdisciplinary Analysis*, Cheltenham, 2004.

companies' agendas, the adoption of responsible business conducts (RBC) and corporate social responsibility (CSR) approaches have been subjected to voluntary inclusion of environmental, social and/or governance issues in strategies and management practices. If the market fails to deliver responsible behaviors by itself, then the governments' involvement will be advantageous to coordinate policies that, far from being purely voluntarily, head towards sustainability. The use of energy as a diplomatic tool may give rise to new platforms of policy coordination and, with regards to LNG, of concrete engagement in relevant actions to boost demand, such as in the coherent monitoring and evaluation of global markets and policy implementation. The reliability of the LNG business can be ensured through governments' provision of sound regulatory, financial and institutional frameworks aiming to boost short term demand of low-carbon resources and support cost-effective solutions for investments that ensure to suppliers the long-term consumption.

On the policy side, governments can stimulate demand for gas by pricing carbon, either in the form of direct taxes, indirect cap-and-trade emissions schemes or hybrid mechanisms. Command-and-control measures can also be included (such as rules to expand moratoria on new coal plant permits and constructions, to accelerate the retirement of old plants, to promote electricity market reforms to prioritize low carbon dispatch on the merit order), though carbon pricing is seen as the game changer for investments recovery in the gas sector. Many of the biggest Oil & Gas (O&G) industry players have already started to back an internal, hidden price on carbon into calculations, to limit the impacts of an eventual scaling up of environmental regulations in the future. The cost of adding a carbon price on investment calculations seems to be lower than the costs embedded in the current environment of policies uncertainty, lacking coherence and clarity.[90] A *de facto* price, with more predictable cash flows, helps shareholders to have clearer expectations on the returns of investing on certain fuels rather than others, lowering the risks of exposure. Not only O&G companies, but also assets management firms warn against the risk of ignoring climate-related regulations and technological disruptions in investments portfolios.[91] Risks that are furthered by the environmentally-conscious tomorrow's ruling class of "millennials": the disruptive potential of their different transportation and energy choices as well as careers objectives may impact the O&G companies all along its value chain. On the whole, signaling a long-term commitment to decarbonization through regulatory responses is likely to spur demand for less carbon-intense natural gas. Bolstered climate regulations are widely expected by the industry, a thing that would make explicit political engagement in this direction less impacting than expected and even advantageous in improving market clarity.

On the financial side, LNG infrastructures development is capital intensive and can exceed the private sector willingness to risk, especially when uncertainties persist on future demand. Subsidies would be clearly the most straightforward form of financing, though in the current economic slowdown do not seem workable. Governments can ease the availability of public funds to develop facilities and

[90] Amy Myers Jaffe, *A Price on Carbon May Be Coming Soon to the U.S.*, The Wall Street Journal, Sep. 13, 2016
[91] See Black Rock Investment Institute, *Adapting Portfolios to Climate Change. Implications and Strategies for all Investors*, Global Insights, Sep. 2016.

technologies, improving investments recovery. Financing options range from the support to private-public partnerships (PPP) to solutions involving investments from national Export Credit Agencies (ECAs), commercial banks or national development banks (NDBs). For instance, among the schemes envisaged by the European Investment Bank (EIB) to finance the Connecting Europe Facility (CEF) programme - which established the mentioned PCIs to support EU gas infrastructures -, the Shipping Financing Tool (SFT) has been proposed as a tool to develop a competitive LNG fleet. It would fund different operators by pooling proposals and loans together rather than finance projects one by one, allowing for economies of scale. In case of non-payment from corporate, international financial institutions (such as the EIB, in the case of the European Union) play the role of a "first loss" guarantor, while a potential "second loss" guarantor will be played by MS funds. Finally, SFT identifies an additional source to finance "pooled" projects in tax programs or port fees reduction for compliant ships. Portfolio approaches aiming to restore investors' confidence, such as through "first loss" and "second loss" guarantees' schemes, have a huge potential to rump up consumption of LNG. [92]

Public-private cooperation is meant to balance financial risk by involving public money and ensure production even when banks are reluctant to lend, as in periods of overcapacity. But financial instruments cannot solve market imbalances by themselves. If the LNG industry needs to pursue new, competitive business models – i.e. by lowering costs all along the value chain, keeping prices affordable also to new markets through innovation and modularization -, the establishment of regional open markets calls for an inclusion of public authorities to institutionalize the energy liberalization. [93] Governments can provide mechanisms to identify possible uncompetitive behaviors (such as the destination clauses) and the institutions deputed to market control, becoming arbitrators rather than purely policy-makers. Despite the profusion of EU hubs, the supervision pertains to only one regulatory entity, with the movement towards the institutionalization of a unique market with uniform regulation starting from the initiative of one most liberalized country to open up its own energy market. The UK NBP has evolved rapidly, shifting from a physical balancing platform to a gas trading point in only few years.[94] This first step led other European countries to emulate, then new Transmission System Operators (TSO) to emerge and the following extensive need to balance positions and create hubs.[95] This spreading engagement created a concrete interest in joint regulations to ensure fair trade, competitiveness and equal opportunities for all players. The interest towards a steering transnational body - such as the Energy Union - to speak a common voice can be seen as inherently tied to such bottom-up initiatives to share and ensure competitiveness.

A diversification of gas procurements at equitable and reasonable prices might imply a connection between internal and external policies, to provide aligned visions

[92] Italian Ministry of Economic Development (MISE), *Documento di Consultazione per una Strategia Nazionale sul GNL* (Consultation Paper on a National LNG Strategy), Jun. 2015.
[93] Liberalization, in turn, is expected to further push producers to find new solutions to lower the costs of production and compete against new entrants and is likely to reduce the cost of infrastructures.
[94] Caterina Miriello and Michele Polo, *The Development of Gas Hubs in Europe*, cit, p. 23
[95] The TSO ensure the physical operation of the system. For balancing purposes, it can engage in trading on the wholesale market (balancing actions) or recur to third parties to supply natural gas (balancing services).

amid consumers and boost the global competitiveness of LNG. In the age of buyers' bargaining power, a purely national approach may fail to fully exploit importing countries' synergies and, hence to catch the multiple benefits of the buyers' advantage. Proactive actions to smooth the transition towards low-carbon energy systems are likely to require governments and policy-makers of the most exposed LNG importing countries to engage together in "energy partnerships". The external dimension of energy policy has been already integrated in the recent EU and Japanese agendas on demand security, both openly welcoming collaborative approaches to expand LNG use at contained costs, with the EU adoption of an explicitly diplomatic energy strategy.

Energy diplomacy and Diplomacy of Resources: the case for EU-Japan partnership

The 2014 "2030 Climate and Energy Framework" and the European Energy Security Strategy (EESS) recognize energy as a matter of foreign and security policy, insisting on its consistent inclusion in political dialogues and Summits with strategic partners.[96] The following "Energy Diplomacy Action Plan", approved by the Council in 2015, has institutionalized the mutual enforcement between external and internal dimensions of energy and climate policy.[97] Launched by the European External Action Service (EEAS), the appointed body for EU foreign policy, as a cornerstone in the Energy Union, the new strategy promotes common responses across MS as well as the enhancement of existing cooperation and the establishment of a new one with key global partners. The Energy Diplomacy tool requires the Commission and the Council regular commitment towards the "external" dimension of energy policy. By creating new partnerships, it aims at ensuring diversified and sustainable energy markets in the respect of MS sovereign rights to explore and develop their natural resources.[98] Insisting on consistency between energy dialogues and foreign policy goals with a view for private business opportunities, the Plan envisages deeper cooperation on LNG as part of the efforts to promote safe and sustainable low-carbon and efficient energy systems while ensuring international competitiveness. Multilateral initiatives can fundamentally balance internal and external dimensions of global energy architecture, expanding the geography of the Energy Union goals.[99]

Strictly speaking, the EESS envisages further cooperation on LNG with gas suppliers "to identify possible sources for short-term additional *supplies*".[100] However, since 2014 market conditions have changed, and in fact pledges at the G7 Energy Ministerial Meeting in Kitakyushu (Japan, 1-2 May 2016), including those of the annexed bilateral meeting between Motoo Hayashi (Minister of Economy, Trade and Industry of Japan) and Miguel Arias Cañete (EU Commissioner for Climate Action and Energy), seem to confirm a tendency toward schemes of collaborative endeavors to secure the demand for LNG, and hence the future supply. On the other hand, the Ministry of Economy, Trade and Industry (METI) of Japan compiled in 2015 the "Long-term Energy Supply and Demand Outlook" for FY2030 (the "Energy Mix") to

[96] European Commission, *Communication from the Commission to the European Parliament and the Council, Europe and Energy Security Strategy*, 2014, COM(2014)330 final, Brussels, May 28, 2014
[97] Council of the European Union, *Council Conclusions on Energy Diplomacy*, 10995/15, Jul. 20, 2015.
[98] *Ibid.*
[99] *Ibid.*
[100] European Commission, *Communication from the Commission to the European Parliament and the Council, Europe and Energy Security Strategy*, 2014, COM(2014)330 final, cit.

combine targets of energy sustainability and economic growth to the 2030 horizon. The plan revises the goals of fossil fuel and nuclear dependency, but still projects hydrocarbons to account for the 77% of primary energy sources and thermal power generation for 56%.[101] In particular, three are the policy goals standing at the heart of the strategy to secure stable energy supply at low cost:

- Facilitating global investment in upstream development;
- Establishing LNG markets in readiness for crude oil price volatility;
- Exporting Japan's energy-saving technologies to reduce worldwide dependence on crude oil.[102]

The second target calls upon taking advantage of a buyers' market to develop domestic integrated infrastructures and to correct destination clauses, both critical elements for the development of liquid trading hubs in Asia. As acknowledged at international level discussions (G7), this would significantly scale up the globalization of LNG markets. Although the METI's Plan does not have a legally binding power, working more as an *Agenda* for guidelines procurement to stakeholders, this government intervention did help limiting targets of cheap coal use to 26% (against 27% of gas use), showing how open governments commitments can effectively represent an important game changer.

The METI's strategy renews emphasis on the engagement of national energy companies abroad, State financial support and energy efficiency improvements, set to reach targets equivalent to those achieved in the 1970s. Meaningful is the echo of the *Shigen Gaikou*, or "diplomacy of resources", the well-conscious strategy of foreign policy and energy security implemented in the aftermath of 1973 oil shock to promote independent access to supplies and redefine the government's function in the global balance of powers. This correspondence highlights the enormous significance that a changing LNG market has for the Japanese economy. On the other hand, it engages with the diplomatic efforts of the other stable LNG buyer, the EU, becoming a natural partner in the promotion of a globally competitive market. In March 2016, the Japan Institute of International Affairs (JIIA) in an issue significantly entitled Energy Cooperation and Resource Diplomacy of Japan（日本の資源外交とエネルギー協力）[103] listed some clue recommendations to realize the *paradigm shift* that changing global conditions require. Poorly endowed with domestic natural resources, Japan is forced to rely on imports from outside a fact that naturally boosts the value of the external dimension of national energy policies, with inherent economic and political security consequences that won't be addressed in the present analysis. Under the broader notion of "comprehensive security guarantee"（総合安全保障）energy security is the first ranking item in the Japan's security strategy. In the national policy making, recommendations insist, it is crucial to take into account sufficiently coordinated energy cooperation and resource diplomacy.

Accounting for more than a third of global GDP, the scope of EU-Japan partnership in support of LNG markets is ample. Coherent energy and carbon policies between these two parties can still represent the signal of an aligned global vision on

[101] METI, Long-term Energy Supply and Demand Outlook, Tokyo, Jul. 16, 2015
[102] *Ibid.*
[103] JIIA, 日本の資源外交とエネルギー協力 (Energy Cooperation and Resource Diplomacy of Japan), Tokyo, Mar. 2016

carbon price that investors await. Their ambitious NDCs require the design of domestically and internationally integrated policies to clearly communicate the role of low-carbon energy to the market, which would not probably deliver expected environmental achievements without a strong political stance.[104] Negotiations on a Strategic Partnership Agreement are currently ongoing between Japan and the European Union, and could lead to a Free Trade Agreement easing the investments in clean energy. Meanwhile, the EU-Japan 5th Energy Dialogue that took place in Tokyo in September 2015 reaffirmed the will to further cooperate on gas security. On May 2016, at the G7 EMM of Kitakyushu, the two parties agreed to improve bilateral cooperation towards the development of a "well-functioning international LNG market", which was also collectively endorsed by the other participants.[105]

Especially when it comes to strengthen positions with regards to both cost of supplies and pricing formula, a certain degree of cross-countries policy coordination provides common visions that, if coherent across different sectors and respectful of national economic and energy peculiarities, can revitalize the LNG business. Up to now, illiquid Asian markets represented a major obstacle to the fair development of a well-functioning LNG market. If Japanese gas liberalization will legally become effective in 2017, also the EU still has to accomplish the infrastructures expansion in the Eastern and Southeastern area to ensure LNG imports and competitiveness against Russian pipeline gas.[106]. In spite of the different stage of development of the EU and Japanese energy market, shared concerns over supply security,[107] economic competitiveness and environmental sustainability bring about a structural convergence of national priorities which may justify further diplomatic effort.

Recommendations

With world's population set to reach the threshold of 9 billion people in 2040 and increasingly concentrating in urban and highly dense settlements, the sustainability of both universal modern energy access and mobility will be of tremendous impact. LNG is an environmentally and economically viable substitute of oil-products in transports, and a clean complement of renewables in power generation. As LNG globalized market would allow for a reliable diversification of resources, routes and importers, it is arguably a flexible tool to deliver energy security. In order to tackle current market uncertainties and secure future investments in natural gas, the discovery of a price mechanism linked to gas hubs and independent from oil indexation and volatility is fundamental. The legitimacy of prices set at functioning trading hubs will facilitate the confidence of banks and investors towards the LNG industry - decisive to ensure supply in mid- to long-term scenarios. If the creation of a functioning gas market

[104] The EU and Japan have pledged to reach, respectively, 0.17 and 0.16 kg of CO2 per dollar of GDP, with Japan aiming to achieve the world's lowest level of "emissions per GDP" (26% of GHG emissions reduction from the 2013 level, as set in its INDCs). It is noteworthy, however, that 2013 was a year of significant emissions increase in Japan, due to the progressive shut-down of all the nuclear power plants in the aftermath of Fukushima crisis.

[105] G7 Energy Ministerial Meeting 2016, Kitakyushu Initiative on Energy Security for Global Growth, Joint Statement.

[106] Current plans to expand the LNG use in those areas include the terminals at Krk (Croatia) and Tallin/Paldiski (Estonia) although they are capital intensive and the operational costs of LNG infrastructure are high.

[107] The Ukraine and Fukushima crisis clearly reemphasized the strategic importance of gas supply security and diversification. In this sense LNG is recognized by both as a flexible tool to diversify supplies and enhance the security of energy portfolios.

is subjected to the participants' willingness to shift to hubs, a key incentive to clear the glut will come from governments' commitment towards regulations differentiating coal and gas use in power generation, enforcing the use of LNG as a bunker fuel, and improving gas infrastructures. Being a business without a specific sector where it benefits from a dominant position in inter-fuel competition, the durability of market confidence relies upon a long-term institutional commitment to adopt "hands-off"[108] approaches with limited political interference on hubs, together with the pace of development of energy systems committed to deliver the COP21 goals.

No other sector than power generation has such a concentrated impact on global emissions. If the Asia-Pacific region is expected to drive the new power generation capacity over the next 25 years,[109] power capacity does not automatically mean power generation, and indeed coal dominates the sector in China and India. An even moderate carbon price (40$/tCO2) could still support the retirement of coal and less efficient power plants, but would demand an enforcement of the coal-to-gas reforms envisaged in the two countries.[110] In overall Asia the priority dispatch of low-cost low-carbon energy has been an especially sensitive issue not appropriately addressed thus far. Europe instead has to deal with the post-2020 massive phase-out of nuclear plants, so far the largest source of clean energy sources. On the other side, still heavily oil dependent transportation is - together with heavy industry - the main sector where the pace of emissions reduction falls short from the undertakings agreed in Paris. Improvements in the use of LNG fueled fleets by the heavy duty vehicles (HDVs), public transport and shipping sectors will likely help the development of sustainable fuel economies. Global demand for LNG in the shipping industry has recently started to grow. The Maritime Environment Protection Committee of the International Maritime Organization (IMO) required maritime bunkering to limit the use of sulfurs in maritime transportation, and the sale of LNG as a marine fuel could rise up to 24%, to 25 million mt/y by 2025.[111] Conversely, the adoption of natural gas vehicles (NGVs) has generally decreased due to the drop in oil prices.[112] In spite of recent gains in HDVs (particularly garbage trucks and public transport), the light duty vehicles (LDVs) sector has been keen to battery-powered solutions - up to the point that Shell has envisaged a peak in oil demand for 2020s -[113] also due to NGVs poor gas infrastructures and uncompetitive

[108] IEA, *The Asian Quest for LNG in a Globalising Market*, 2014

[109] The Asia-Pacific installed capacity is expected to triple and electricity generation to double, with renewable energy making up nearly two thirds of the 4,890 GW added. See Bloomberg New Energy Finance, *New Energy Outlook (NEO)*, 2016.

[110] The reforms feed expectations on LNG imports to raise, by 43% to 26 million mt (2016) plus further 22% (2017) for China, and 19% (2016) plus further 45% (2017) in India, due to a combination of growth in consumption and spot LNG price decline.

[111] LNG as a bunker fuel complies with the requirements of MARPOL Annex VI, making it viable even if a more stringent cap on Sulphur is put in place. However, in spite of the recent deal struck on ships' emissions containment in the framework of the IMO, a report by shipping and oil industry associations has already called for a postponement from 2020 to 2025, and the stable use as a marine bunker-fuel is not likely to materialize before 2030s. See the IMO's Marine Environment Protection Committee (MEPC), 70th Session, Oct. 24-28, 2016.

[112] Micheal Sultan, *Navigant Sees Bumpy Ride Ahead for Adoption of NGVs*, New York, Natural Gas Week, Sep. 12, 2016

[113] Royal Dutch Shell has envisaged a peak oil demand to come within five to 15 years (http://www.bloomberg.com/news/articles/2016-11-02/europe-s-biggest-oil-company-thinks-demand-may-peak-in-5-years?emailid=5655d14ccb56e60fc6447e23&segmentId=7e94968a-a618-c46d-4d8b-6e2655e68320) and Nick Butler, on the FT, backed the announcement, arguing that with electric vehicles' production concentrating in Germany and China, competitiveness is boosting and soaks up petrol market's shares, creating incentives on both public and private

total cost for the main stakeholders.

Fuel efficiency standards together with differentiated pricing policies in favor of less polluting sources and technologies are likely to stimulate the LNG use in both power and transport sectors. Incentives can also include fiscal concessions (such as a tax relief or exemption directed to those reducing their pollutant emissions), regulatory innovations (such as combined legislations to limit the use of sulfurs in maritime transportation and particulate emissions of urban diesel transportation) and measures in support of R&D and capacity building. Furthermore, considering the sector's inherent capital intensity as well as the role of economies of scale in fostering economic viability, the development of the LNG industry needs to be underpinned by governments shared commitment to support extensive and coherent LNG deployment on nation-wide scales. Otherwise, investors' would not probably justify big money transfers for geographically limited policies and the consequent limited scope for investment returns. Regulatory certainty has thus the lion's share in incentivizing LNG use. Regulatory frameworks in the power and transport sectors - balanced between providing guidelines and flexibility toward stakeholders' decisions and customization of needs - can recover the security of gas demand in the short-term, providing the essential confidence to unblock loans and secure the supplies over the long run.[114] When different regional schemes endure in the implementation of carbon pricing policies, price control can transform into spending burdens and carbon leakage, with energy intensive industries facing issues of competitiveness from free riding countries. Without a cross-countries and even cross-regional alignment, low-carbon policies can transform into serious threats to competitiveness, with some countries making the most of using low-priced coal at the expense of other parties' efforts to contain carbon emissions. In as long as inherent scientific and economic uncertainties remain over climate change,[115] the urgency to meet environmental goals may ask for transregional frameworks of cooperation to be included in policy responses, to ensure equal policy effectiveness for both governments and companies across different regions. This does not mean to establish one-size-fits-all solutions, as carbon damages can be internalized, as seen, according to different methods (taxes, cap-and-trade, and hybrid mechanisms) and countries' own priorities.

Finally, a noteworthy aspect is represented by the role of social acceptance and public information. The promotion of a correct understanding of national economic returns has been increasingly included among the priorities of LNG development strategies.[116] The development of the LNG industry is indeed a thorny subject with high environment, economic and political stakes. Traditional administrative structures involve states relying on bureaucratic procedures and complex decision-making often

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sides (https://www.ft.com/content/6c7d9e1f-913f-3b2e-8719-12dde9774140?emailid=5655d14ccb56e60fc6447e23&segmentId=7e94968a-a618-c46d-4d8b-6e2655e68320). On the other hand, the IEA predicted in its latest World Energy Outlook report (WEO 2016) that oil demand will be raising up to 2040.

[114] Limited demand will still constrain final investment decisions for LNG export projects through 2017/2018, raising the risk of supply shortage in the post 2020s.

[115] Climate change is a variable of the stock of GHG emissions in the atmosphere, and harmful effects are not immediately detectable by emitters like the costs of abatement are.

[116] See MISE, 2015, cit.; COM(2016) 49 final Feb. 16 2016, cit.; METI, *Strategy for LNG Market Development. Creating flexible LNG Market and Developing an LNG Trading Hub in Japan*, May 2016, cit.

perceived as blurred by citizenship. Yet, rules do not gain authority simply because of their proven or inherent efficacy but because their status of standards and norms has been acknowledged by a particular context, where agents tend to conceive these rules as rational. In a public policy context, long-term commitment can only be guaranteed by public consensus. In the absence of correct information, there is a concrete risk that non-scientifically or technically proven assumptions will spread, generating public mistrust. Consequently, an auxiliary part of LNG recommended policies should entail the implementation of more inclusive and participatory decisional environment with the pedagogical intent to highlight the economic and environmental advantages of LNG among society. Failing to meet public expectations ultimately means to lose opportunities of endorsement, and significantly delay LNG projects and the establishment of an LNG global architecture itself.

The narrowing gap between LNG regional price differentials has produced a rapprochement of interests that could now lead to a convergence of visions among importing countries. And, in fact, the plea to seriously engage in collective initiatives to promote LNG appears in the energy security strategies of these two main actors of the gas scene. An Energy Mix strategy echoing the *Shigen Gaikou* ("diplomacy of resources") was issued in Japan at roughly the same time the Energy Diplomacy Action Plan was adopted by the EU. Synchronic in timelines and contents, the two strategies are an official acknowledgment that there is a window of opportunity for developing an international liquid market for LNG, and a statement of political will to bolster its demand on the consumer side. Emblematic has been the interest displayed by international leaders under the G7 Energy Ministerial Meetings where, from 2014 to 2016, the LNG has been regularly echoed as a flexible strategic instrument to deliver energy security at low-carbon costs. Beyond policy recommendations, a regular policy monitoring between peers enhances efficiency – by ensuring cohesiveness of standards and performances and of social and physical sciences' progress – and the legitimacy of the measures adopted, promoting the correct understanding of policies. A functional cooperation needs to involve consuming countries in a way that continuity in the policy approach and in common standards is guaranteed, in order to assess organically infrastructures, in terms of type, dimensions, costs and returns, and regulations on the base of shared and internationally accepted methods of evaluation. Trustful partnerships, knowledge sharing and peer reviews processes among governments, ministries and project developers reinforce a proactive approach aiming at not only being educative for the public community but also to spread essential information among stakeholders at all the layers of society.

Conclusion

Recent changes in the LNG industry have spurred the emergence of a diversity of collaborative actions. Going beyond the risk sharing practices of private business, the purpose of the present work was to explore the potential for those involving governments. The analysis focused on the current state of LNG markets, particularly in the Asian and European scenes, to assess the scope for inter-governmental energy partnerships in the development of globalized LNG markets, with a focus on the recent strategies of two of the most influential LNG importers, Japan and the EU.

With estimated 60 million mt/y free-destination LNG volumes hitting the market by 2020, the potential for developing a liquid, globalized LNG market is significant. Abundance of supplies, with overall 150 mtpa of LNG available over the 2015-20,[117] is likely to steadily drive price convergence of markets. Progressively oil-*de*linking LNG contract terms together with thriving spot prices and increased participation to swap markets allow expectations for a commoditization of LNG and the burgeoning of a globalized market. However, any commodity market needs to rely upon reliable prices. Before this *bridge fuel* – smoothing the way to energy transition by connecting energy demand growth with low carbon emissions – is widely adopted, trading LNG hubs, setting transparent prices at regional level, must be developed on a global scale. The development of well-functioning hubs does matter inasmuch as a significant amount of long-term contracts will expire at roughly the same time (2020-25) Asian demand and European excess capacity will have absorbed the current LNG glut. Meanwhile, the availability of new sources will be questioned by frozen new projects' FIDs, where low oil prices have significantly depressed oil-linked gas prices since 2014, making the O&G industry – and the capital intensive LNG in particular - a challenging business environment.

Current lack of gas demand security is a serious threat to the future supply security. The most immediate issue is the inadequacy of new investments due to unfair pricing and demand uncertainty. Competitive oil together with cheap coal and subsidized renewables have all represented important deterrents against natural gas consumption, notably in the two key sectors of transport (oil) and power generation (coal and renewables). Endeavors to boost consumption in the power and mobility sectors are essential to revitalize LNG demand; at the same time, the delivery of sustainable universal energy access and mobility are two of the biggest global challenges that contemporary society is called to tackle in the near future. If the biggest source of power in the future is expected to come from wind and solar,[118] the integration of carbon-free renewables into the grid and the source chosen to back-up their intermittency issue remain open questions. Emissions from the transport sector, on the other hand, have been steadily rising in recent years, and the forecasted growth in population and urbanization rate do not suggest that the process will reverse by itself.

Achievements in terms of sustainability require a paradigm shift of modern energy systems. To this extent, holistic approaches in the design of energy, economic and environmental policies pave the way for the comprehensive security and efficiency of the envisaged strategies. Overcoming narrow perspectives and short viewed policy goals, energy collaborative actions makes the shift an organic transition. A surge of LNG consumption strictly depends on a collective undertaking to ensure political and financial participation in the implementation of the infrastructures and regulations necessary to boost functioning trading hubs and price certainty. Coherence of visions, at least on the mid-term horizon, favors the implementation of effective carbon pricing – at this point already largely expected, as seen, by major O&G companies and global investments managers - that would benefit LNG demand. Finally, the inclusion of public

[117] Anne-Sophie Corbeau, Introduction, in Anne-Sophie Corbeau and David Ledesma (ed.), *LNG Markets in Transition: the Great Reconfiguration*, 2016, cit.
[118] Bruegel, *The Sound of Economics. Decarbonisation and Climate Change: Looking Ahead*, Nov. 8, 2016

information campaigns, allows for overall economic, environmental and social viability.

In recent history, the quest for widespread economic and social welfare has been steadily associated with the concern over energy access, making natural resources and their stable supply a matter of security. The concept of "national interest" has come to cover elements of economics, production and natural resources that lay well beyond the traditional concept of security, aiming to protect what is *within* a country's borders. Accordingly, within the core idea of national interests, the notion of "external interests" emerged, as crucially determining the fulfillment of "internal interests" of sustainable development. Energy partnerships bridge the internal and external dimensions of national security, and the current window of opportunities is a force to be reckoned with in the design of comprehensive, coordinated and effective global strategies. Coordinating domestic energy policies, in the absence of even a strong organizational body of global governance, is a matter of sophisticated, keen diplomacy. It is early to assess the effectiveness of collective commitment to develop natural gas functioning markets, as the emphasis on gas security and stable gas markets has only recently emerged in the global political agenda. The undeniable intensification of the international energy dialogue at ministerial meetings and deputed bodies suggests that there is still plenty of room left for a further expansion of cross-countries partnerships in the energy sector, including for LNG.

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