KAPSARC
مركز الملك عبدالله للدراسات والبحوث البترولية
King Abdullah Petroleum Studies and Research Center

Third-Party Access to Regasification Terminals: Adapting to the LNG Markets' Reconfiguration

Sammy Six and Anne-Sophie Corbeau

February 2017 KS-1760-DP054A

About KAPSARC

The King Abdullah Petroleum Studies and Research Center (KAPSARC) is a non-profit global institution dedicated to independent research into energy economics, policy, technology, and the environment across all types of energy. KAPSARC's mandate is to advance the understanding of energy challenges and opportunities facing the world today and tomorrow, through unbiased, independent, and high-caliber research for the benefit of society. KAPSARC is located in Riyadh, Saudi Arabia.

Legal Notice

Key Points

Substantial changes to global liquefied natural gas (LNG) markets, including the move toward the creation of an Asian trading hub, more flexibility through an increase of spot and short-term trade, liberalization in key Asian markets, emergence of new players and current oversupply, call for better access to existing regasification terminals, which does not hamper the development of new infrastructure.

- Around 420 million tons per annum (mtpa) or 54 percent of global regasification capacity offers, in theory, some sort of third-party access (TPA). However, this access happens rarely in practice outside of Europe. Many terminals in other regions don't offer TPA due to a lack of gas market liberalization and control of LNG terminals by incumbents.

- Access to LNG terminals may prove to be a cornerstone of successful liberalization policies in Asia given the key role of LNG as a source of gas supply.

- Regulators could opt for full or partial TPA or to implement an effective secondary market for TPA-exempted terminals to prevent capacity hoarding and minimize contractual congestions.

- Access to infrastructure – both pipeline and LNG import capacity – is a key factor for the establishment of a functioning trading hub. This goes hand-in-hand with initiatives to get rid of final destination clauses.

Summary for Policymakers

The LNG market is facing a set of changes which are pushing toward more flexibility and liquidity. But this transformation will remain incomplete if the last part of the value chain, i.e., LNG regasification terminals, remains inaccessible to existing and new players seeking to enter the business. Looking forward, there might be a bigger push toward more effective use of regasification capacity, especially if it is underutilized by incumbents. This could be achieved either by imposing total TPA, partial TPA or by creating functioning secondary markets to improve spot cargoes' access to short-term capacity. Many market forces currently at work could push toward this direction. These include globalizing the LNG market with an increasing number of players facing demand uncertainties and eager to be able to get rid of their contracted surplus, and to get more flexible supplies. This coincides with a push toward liberalization in some Asian countries, along with attempts to create one or several Asian trading hubs.

As of end-2015, global LNG import capacity amounted to 771 mtpa or 1,049 billion cubic meters per year (bcm/y). In theory, around 60 terminals (about 420 mtpa) in consuming countries are offering (at least partial) open access regimes, either regulated, negotiated or subject to conditions (GIIGNL 2016). Capacity offering TPA is usually located in regions or countries which have been through a liberalization process such as Europe, U.S., Singapore and, even though only partially, Japan. But in practice, TPA is mostly implemented in Europe, which also happens to be the only LNG importing region with two well-functioning trading hubs, enabling suppliers to use them as price benchmarks hubs. In this respect it is important to define TPA and discuss its debated significance from a competition perspective. U.S., Europe and Asia have witnessed significantly different regulatory evolutions of TPA to regasification terminals and creation of secondary markets for primary capacity, linked to the different evolution and maturity of their respective gas markets and the role played by LNG as a supply source.

The LNG market is rapidly globalizing, as a growing number of exporters and importers join a previously rather select club of players (GIIGNL 2016). These new entrants and traders seek a bigger role in the now global LNG trade. Meanwhile, the looming oversupply, notably in Asia, is putting many buyers in an overcontracted situation. They are therefore looking for ways to get rid of the surplus and are in need of flexibility to meet the unexpected variations of future demand. They are facing uncertainties not only regarding their countries' future LNG demand, but also their own demand due to the increasing pressure from competitors. Factors impacting a country's demand include future energy policy choices regarding nuclear, renewables and energy efficiency in the aftermath of the Conference of the Parties (COP21), to the competitiveness of gas versus coal and the interactions with domestic gas production and pipeline imports, where relevant. Liberalization processes of the power and gas markets impact on each buyer's sales through their competitiveness as well as their ability to pass on the cost of LNG supplies to the end users.

Buyers are no longer ready to accept inflexible terms for their LNG supplies since these could put them into more financial difficulties, especially after a tough period during 2011-14. They seek more flexible and diverse contractual terms (in terms of regions, procurement periods and price indexations). As spot and short-term LNG trade is expected to increase to as much as 43 percent by 2020 (Corbeau and Ledesma 2016), companies will attempt to use this new flexibility to optimize their portfolio as highlighted by the business plan of

JERA whereby buyers would use a mix of long-term and short-term contracts and spot (JERA 2016). As already demonstrated by recent behavior of Asian buyers, some are seeking to resell their contracted surpluses. If they succeed in the renegotiation of contract terms such as getting more flexibility or eliminating final destination clauses, LNG will have to be more easily redirected to alternative markets, which means more efficient access to import infrastructure will be needed.

Access to LNG import infrastructure is also likely to be a cornerstone of successful liberalization policies and creation of a trading hub. Two key Asian markets – Japan, the largest LNG importer and China, the largest Asian gas market and third-largest LNG importer – are undergoing liberalization. Korea envisages reforms in the longer term. One of the key elements of liberalization is better access to infrastructure, including LNG import terminals and pipelines. Additionally, three countries are actively seeking to create a trading hub: Japan, China and Singapore. While the creation of a transparent and liquid trading hub may still be years away, it has recently gained a high political profile in Japan as seen in the country's LNG strategy that was published in May 2016 (METI 2016). However, some preconditions have to be fulfilled, including the liberalization of wholesale gas prices and access to infrastructure. Given the key role that LNG plays in Asia, where some countries such as Japan, Korea and Taiwan depend almost entirely on it, access to LNG import infrastructure will play a determining role. Additionally, TPA can play a role in emergency response circumstances, thereby achieving better security (METI 2016).

Allowing third parties to access regasification terminals is key to expanding the free flow of LNG around the world, enhancing the development of spot and short-term LNG trade, helping buyers to resell their surplus and improving the state of liberalization in markets heavily dependent on LNG. In practice, however, third parties often experience regulatory, infrastructural and operational limits in trying to gain effective access. This is especially the case in large importing countries in Asia, such as Japan; while China offers limited TPA and Korea does not. The LNG terminal in Singapore offers TPA, but the sale of regasified LNG is limited to a few importers. It is crucial to better understand why TPA access is often lacking in practice, and what barriers incumbents are raising in order to prevent having to share their import capacities with other commercial entities. It is only by uncovering these often hidden dynamics that we can try to formulate some recommendations that would improve TPA conditions, spur competition and ultimately facilitate a smoother functioning of the international LNG market.

Why Third-Party Access to LNG Terminals Matters

Understanding TPA

TPA, in an energy market context, is defined as "the idea that in certain circumstances economically independent undertakings (…) should have a legally enforceable right to access and use various energy network facilities owned by other companies." (Kotlowski 2006). This report looks exclusively at TPA in the downstream area of the LNG value chain in the regasification phase that takes place at receiving terminals. TPA to liquefaction terminals falls outside the scope of this study.

The implementation of TPA to pipeline and LNG infrastructure has so far taken place within the framework of the liberalization of gas markets. Regulators, policymakers and energy companies alike have long argued over the merits of applying TPA to LNG regasification terminals. The discussions are centered on whether TPA enables or prevents more competition in the gas market and ultimately, benefits or erodes security of supply (BP & IGU 2011). On the one hand, TPA is said to promote competition in an open market because it allows new suppliers to enter the market (IEA 2013). LNG buyers now have more options to source cargoes on the spot market (BP & IGU 2011), which increases the liquidity of the overall gas market. Spot and short-term LNG trade reached 28 percent of global trade (or 68 mtpa) in 2015, against only 5 percent in 2000. When the pricing of spot cargoes is based on spot prices, TPA to LNG import terminals can erode the traditional pricing regime in those markets such as Asia where long-term contracts are mainly based on oil-indexation (Oxford Institute for Energy Studies 2014). Provided that an efficient and transparent access to the transportation system also exists, the new entrant has the opportunity to offer spot-based gas supplies to the end-user instead of the traditional price charged by the midstream incumbent. Such a trading hub can also improve the efficiency of the market by providing incentives to market participants to buy or sell supply imbalances to each other (IEA 2013).

On the other hand, it can be argued that allowing TPA discourages further investments in additional LNG import capacity, which can ultimately harm an importing country's security of supply. Most U.K. LNG import terminals have been built by obtaining a TPA exemption, while the U.K. was at that time the most liberalized European gas market. More recently, the Dunkirk LNG import terminal in France, which started operations in July 2016, was also granted a 20-year exemption. However, quite often, these exemptions were also complemented by additional conditions allowing third parties to have access to unused capacity (use it or lose it (UIOLI) rules). Constructing an import terminal is relatively capital intensive – albeit not as much as liquefaction plants – and therefore quite prohibitive; without securing exclusive returns in advance, it could be difficult to justify the investment (BP & IGU 2011). However, liberalization and enforcing competition generally does not need to hamper infrastructure investment, and the opposite is often true in the case of optimal regulation and structural reform (Vahedi 2009). Ultimately, "the institutional framework needs to find the right balance between access and exemptions, meaning a right balance between dilution of incumbent's market power at the expense of new entrants and new investment with high levels of risk required for secure, diverse and competitive gas supply." (Tokgöz 2014). The much-quoted trade-off between TPA and security of supply is often false, as the former can contribute to the latter through enhancing diversification. The process of putting in place TPA may be painful for

incumbents as it will threaten their position and put them in financial difficulty. They are tied to their long-term oil indexed contracts, and will face competition from new entrants importing spot-indexed LNG, especially in the current oversupplied situation.

Status of TPA worldwide

As of end-2015, global regasification capacity amounted to around 771 mtpa (1,049 bcm/y), of which more than half (about 410 mtpa) is located in Asia. Based on GIIGNL data, it appears that around 310 mtpa of LNG regasification terminals offer TPA while another 110 mtpa provide either negotiated TPA or TPA subject to some conditions. This leaves around 340 mtpa with no TPA (See Figure 1). The region with the largest share of capacity with TPA (including with conditions) is Europe (92 percent). It is followed by Asia (51 percent), Americas (46 percent) while no terminal in the Middle East and Africa offers TPA. When there is TPA, terminal use agreements (TUA) can be based on (1) regulated access or (2) proprietary access (Tusiani and Shearer 2007). In the case of the former, access is required by the host country's regulatory agencies and the terminal operator is required to spell out the access terms and conditions in tariffs that are approved by the regulator and then published. This is what is understood under regulated TPA (rTPA).

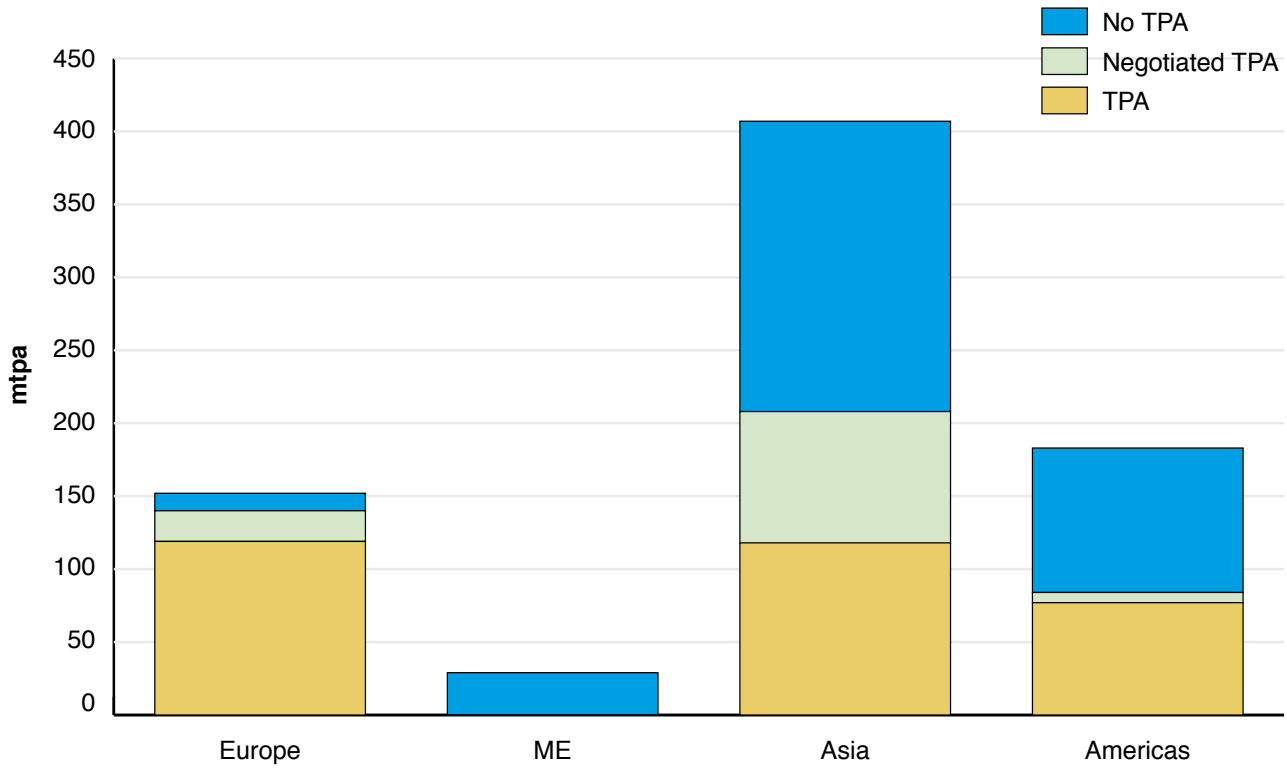

Figure 1. Third-party access to LNG terminals by region (2015).

Source: GIIGNL 2016.

In the latter case, the terms and conditions are negotiated between the terminal operator and each customer or capacity user individually under either a TUA or a Terminaling Service Agreement (TSA). Because each negotiation and eventual agreement is done on a bilateral basis, every TUA is generally different and case specific although in some regimes (e.g., the EU) the same conditions apply to all shippers. The terms of a TUA are mainly free of regulatory oversight and when there is more than one off-taker or user, a TUA is often preferred.

Not all capacity that has theoretical TPA is relevant or easy to access. In the Americas, around 60 mtpa of LNG capacity offering access is located in the U.S. and most of it is no longer used. A significant share of the capacity offering TPA in Asia is located in Japan, but so far no cargo has used TPA in that country. In contrast, Chinese LNG terminals are reported not to give TPA, but the government has been pressuring the national oil companies (NOCs) to give access to new entrants. In practice, ENN Holdings and Jovo have successfully concluded spot LNG purchases using CNPC's Rudong and Dalian terminals (the only two accessible as of 2016). In contrast, there are no signs of capacity hoarding in Europe, while the secondary capacity market is deemed to be active in all European countries according to reports from the Council of European Energy Regulators (CEER, 2014). However, this assessment was conducted in 2014 when the European gas market was no longer attracting much LNG supply due to lower prices than in Asia and reduced demand.

Regional Evolution of TPA Adoption

The liberalization of gas markets is a complicated multistep process based on three key elements: access to gas supplies, access to infrastructure and access to customers. Liberalized markets are mostly located in North America and Europe, while some Asian markets are currently attempting to follow this path. This largely explains the different status of TPA to LNG import terminals across regions. There is also certainly an influence of the relative importance of LNG supplies within the regions that have been through liberalization: LNG has never been as crucial in North America and Europe (except Spain and Portugal, which lack significant pipeline connections with the rest of the EU) as it can be in some Asian countries.

The progressive liberalization of markets, with customers being able to choose their suppliers gave new entrants access. Regarding access to infrastructure, i.e., the gas pipeline system, as a piece of natural monopoly, was evidently the first priority. In the EU, unbundling was applied first to the gas pipeline system, with regasification terminals and storage following only later as a byproduct of applying unbundling rules to TSOs that owned the LNG terminals and storage capacity. Whether TPA should be applied in a similar fashion to LNG import facilities has been the subject of much more intense discussion, and is centered on the question if those terminals should also be considered as "essential infrastructure" and as "natural monopoly"? (UNECE n.d.). If the regas terminal is indeed seen as "essential infrastructure" and part of the downstream, analogous to a pipeline and a natural monopoly due to its size and significance of the investments relative to the market, then it should be regulated accordingly. rTPA should be implemented in order to prevent monopolistic behavior. Unlike a pipeline, the situation of LNG terminals is less clear cut and market players have been debating on both definitions. By unbundling the LNG import terminal, the operator no longer owns the gas molecules and loses preferential relations with any customer, which entails that the independent operator now benefits from attracting as many commercial parties to its terminal as possible – as observed in the EU. However, if regas terminals are seen as simply a source of gas or part of the upstream, analogous to a gas field, there is no need for rTPA. The classification of a regas terminal's position in the value chain is therefore of crucial importance. In the EU, this led to mandatory TPA to apply to existing (or brownfield) LNG terminals whereas exemptions were granted for new ones in order not to deter infrastructure investment.

Americas

U.S: From open access to exemptions to obsolescence?

In the U.S., LNG regas terminals were originally considered as part of the transportation chain under the 1938 Natural Gas Act and therefore obliged to offer open access to third parties (von Hirschhausen 2006). Four terminals that opened by the late 1970s, early 1980s therefore, were downstream regulated. From the 1980s till the early 2000s, U.S. imported very low volumes of LNG and two of the four initially built terminals were mothballed in 1980. Lake Charles, which started deliveries in 1982, was unused between 1983 and 1989. In the face of declining natural gas domestic production and rising demand for gas, interest in imported LNG rose again. However, due to concerns over the attractiveness of this rTPA framework in generating new investments, the Federal Energy Regulatory Commission (FERC) decided to change it in 2002. The FERC's "Hackberry Decision" got rid of rTPA by classifying LNG regas terminals as sources of supply rather than as part of the transportation chain. This reversal of policy was then codified in the Energy Policy Act of 2005 (de la Flor, Parada and de Vicente 2013).

All import terminals which received approval since 2002 have been exempted from TPA. As a result, a dual system is now in place in the U.S. – older import terminals along the East Coast and the Gulf of Mexico largely offer open access, and newer import terminals along the Gulf Coast were mainly exempted from offering open access. Strongly rising domestic production of shale gas since 2006 has completely undermined the rationale behind Hackberry and developing new LNG import terminals – up to the point that these import terminals are now being retrofitted into export terminals – however, the policies regarding TPA have been kept intact.

Mexico

Although it imports gas mainly via pipeline from the U.S., Mexico also has three operational LNG import terminals – two on its Pacific (west) coast and one on its Atlantic (east) coast (GIIGNL 2016). Access to pipelines and other infrastructure including regasification terminals is currently regulated by Mexico's Energy Regulatory Commission (CRE) and obliges incumbents to provide third parties with services such as transportation whenever there is spare capacity (Reuters 2016). There are two types of LNG storage permits: open-access and self-use. Open-access permit holders are heavily regulated and supervised by the CRE. Users may also transfer rights and obligations to a third party (GIIGNL, 2012). Effective access to downstream gas infrastructure has traditionally been limited because of physical constraints – similar to Japan, see Asia section below – given that the Mexican pipeline network is largely underdeveloped and lacks sufficient excess capacity (United States International Trade Commission 2001).

Chile

Chile operates two LNG import facilities, the Quintero and Mejillones terminals (Sepúlveda n.d.). Open access is not enforced, although the Mejillones terminal, which operates as a tolling facility, offers TPA on a voluntary and conditional basis. Third parties can regasify and store their gas in exchange for a rental fee as long as they are the ones contracting the LNG supply, and can do so without firstly securing slots in the terminal's annual delivery program (ICIS 2013). This short-term access delivery model is called the "slot spot" initiative and has been introduced to accommodate the fluctuating gas needs of the country's northern power generators and industrial consumers. The example of Chile shows that TPA to LNG terminals can be applied in many different ways apart from the classical model.

EU: From non-open access to a hybrid regime of rTPA and exemptions

Regas terminals in the EU went through a similar regulatory trajectory although in reversed order and more quickly. Before the EU embarked on its multistage liberalization process over the 1990s and 2000s, LNG import terminals were owned and exclusively operated by vertically integrated companies. There was simply no way a third party could apply for access and there were no EU-wide regulations in place. Besides, there was no wide access to customers (apart from the U.K.) before the early 2000s and access to pipelines was also difficult in the absence of regulation. This started to change when the First Gas Directive was enacted in 1998, which made each regas terminal (seen as part of the downstream and therefore a natural monopoly) subject to TPA – however, it was up to each individual Member State to decide whether to implement rTPA or negotiated TPA (nTPA). The First Directive also set the threshold of market openings as well as third party access to pipelines and legal unbundling of the transmission part of the company.

This system failed to incentivize effective open access in most countries and was consequently replaced in 2003 by the Second Gas Directive.

The new regime enforced rTPA by default and got rid of nTPA but made exemptions possible – albeit on a case-by-case assessment in which a terminal needs to fulfill a couple of pre-established criteria – which were described in article 22 of the Second Gas Directive (now article 36 of the Third Gas Directive). Investors in a new terminal will have to argue that the level of investment risk would be too high if an exemption was not given, and ensure that the exemption will not obstruct the effective functioning of the EU's internal gas market. In practice, they often made it a condition for obtaining finance due to concerns that without the exemption the terminal may be subject to tariff/rate of return regulation. The Third Gas Directive of 2009 has not significantly altered the rules of the previous Gas Directive concerning LNG import terminals in Article 36, which means that open access conditions in the EU, similar to the U.S., currently also consist of rTPA (mainly applied to brownfield terminals that have spare capacity), and exemptions to it (largely for greenfield terminals where investments depend on long-term capacity agreements). However, the EU strongly toughened rules regarding pipeline infrastructure, imposing on countries the choice of either ownership unbundling, independent transmission operator or independent system operator in order to improve access to pipelines.

Most of the EU's regas capacity is now offering TPA, even though seven new terminals have already obtained an exemption and OLT Toscana had the exemption waived (seeTable 1). Due to high existing regas capacity in Europe compared to actual imports (152 mtpa as of end-2015 compared to LNG imports of 38 mtpa in 2015),

Table 3. Standard deviation according to the model.

Country	Terminal	Operator	Capacity (mtpa)
The Netherlands	Rotterdam	GATE	8.8
U.K.	Isle of Grain	Grain LNGw	15.1
U.K.	South Hook	South Hook	15.7
U.K.	Dragon	Dragon LNG	5.6
Italy	*OLT*	*OLT*	*2.8*
Italy	Rovigo*	Adriatic LNG (Qatar Petroleum, Edison, Exxon)	5.9
France	Dunkirk	Dunkirk LNG and upon commissioning Gaz-Opale	9.6

Source: KAPSARC.

Note: The LNG terminal OLT Toscana in Italy was initially granted a TPA exemption. However, in 2012 it asked to waive the exemption due to low utilization. The regulator agreed and the exemption was withdrawn in its full scope, and the LNG terminal was fully and irrevocably subject to the regulated system. The terminal can therefore benefit from revenue guarantee whereby it can safeguard profit.

* TPA on 20 percent of total capacity.

very few additional terminals are likely to proceed except in islands (Malta) and Eastern Europe for diversity of supply. Exemptions have so far mainly been given to new terminals that are part of an upstream project (e.g., in the U.K.) as well as merchant terminals (BP & IGU 2011). New terminals that are exempted from TPA have nevertheless mainly been developed under a UIOLI model, which means that the owner of the terminal has primary capacity rights, while third parties can negotiate to gain access to secondary or unused capacity (Cogan 2008). Exemption regulations therefore need to make sure that terminal operators do not monopolize operations by hoarding capacity, which would ultimately harm competition. It is the appropriate national regulatory authority that will be responsible for monitoring the effective functioning of anti-hoarding mechanisms and congestion management procedures.

Asia: Competition and liberalization redefined

The Asian liberalization experience so far is different from the U.S. and Europe, owing to the region's varying interpretation of competition. Governments of large consuming countries in Asia that are to a large extent dependent on foreign imports of not only gas but all types of fossil fuels, have traditionally advocated for a strong role for their national oil and power companies in guaranteeing security of supply. The Asian approach therefore is to have only a very limited amount of state-backed players entering into long-term sale and purchase agreements (SPAs), as they believe this strengthens their bargaining power and ultimately lands them a better price than a multitude of smaller and private players (King & Spalding 2014). This explains why in general, gas market liberalization in Asia has been progressing at a much slower pace than in the west, and why there have not been strong government mandates to open up access to LNG terminals specifically, apart from some minor exceptions notably in Singapore. Even more so than in the west, LNG import terminals in Asia are generally purpose-built and their capacity is mainly reserved for a single or limited number of users. Markets heavily dependent on LNG imports may be harder to liberalize – particular where there are no competing pipeline sources. Competition in Asia, furthermore, is limited because the gas market in many of these countries is too small (e.g., Taiwan, Singapore, Vietnam), gas infrastructure is not interconnected (e.g., Japan and most of Southeast Asia), gas is often the dominant fuel in the primary energy mix (e.g., Singapore, Taiwan) and import facilities are often absent or limited at best (e.g., Vietnam).

Asia represents about 70 percent of global LNG imports, hence changes in this region will have implications for markets worldwide. It is worthwhile zooming in on Northeast Asia (Japan, Korea and China) in particular as this part of the continent represents almost 50 percent of the world's regasification capacity (IGU 2015) and 56 percent of LNG imports (GIIGNL 2016).

Japan: From ineffective nTPA to ineffective rTPA?

Having virtually no access to domestic sources of oil and natural gas and given its geographic and infrastructural isolation as a collection of islands, Japan has had to depend on coal, fuel oil and especially LNG imports to satisfy its growing demand for power. Due to the Fukushima nuclear disaster of 2011, Japan's LNG imports have increased from 71 mtpa in 2010 to 89 mtpa in 2014, reinforcing its position as the world's largest LNG importer, and has since 2012 accounted for

over one-third of global purchases (EIA 2015). The country embarked on a careful and partial gas market liberalization effort in 1995, and then introduced mandatory TPA to the pipelines owned by its four major gas utilities in 1999 (GIIGNL 2012). Five years later in 2004, TPA to regasification terminals was introduced but only on the basis of bilateral negotiations (Platts 2013). Based on GIIGNL data, most LNG terminals in Japan offer TPA access or at least negotiated TPA (GIIGNL 2016). In practice, however, these terminals are not seen as essential infrastructure given that construction of a new terminal is deemed possible and TPA is therefore only "desirable" (Parada 2011). Moreover, incumbents are not obliged to enter into negotiations when and if a third party seeks access. Therefore, in practice, no third party has effectively gained access to LNG terminals in Japan although most of them offer TPA in theory.

In 2015, Japanese legislators authorized the liberalization of the retail gas market in 2017 followed by the full unbundling of the major city gas pipeline networks in Tokyo, Nagoya and Osaka by 2022 in order to allow new entrants (The Japan Times 2015). Ensuring rTPA instead of nTPA to LNG import terminals was also put forward in the amended Gas Business Act and is of crucial importance to the wider liberalization effort and Japan's goal to become an international LNG hub within the coming decade (Argus Global LNG a. 2016). Japan is a larger market than the U.K., which is among the most liquid in Europe. Yet, Japan does not have precise rules concerning TPA to LNG terminals. The goal of having an efficient TPA to infrastructure was reaffirmed by the LNG strategy published in May 2016, which aims to create a flexible and liquid LNG market and trading hub (METI 2016). In order to achieve these goals, open and satisfactory infrastructure is deemed necessary. Japan does not particularly need additional import infrastructure, but better pipeline interconnectivity would be useful. However, the Japanese government promotes TPA to LNG terminals for the following reasons:

- It is an essential element to develop a transparent trading hub (IEA, 2013).
- It can improve security of gas supply.
- Sellers could benefit from TPA to expand their LNG sales by leveraging market mechanisms.
- It can help Japan's case against destination clauses in LNG supply contracts as it is argued that these kind of restrictions hurt competition (Energy Intelligence 2016).

Analysts in Japan do not expect a rush by third parties in case they are allowed full access to LNG terminals because of the country's fragmented pipeline infrastructure and uncertain outlook for gas demand in the wake of nuclear restarts. The plans to legally unbundle the network of the three leading gas companies by 2022 appear quite late when compared with the ambitions of creating an LNG trading hub and liberalizing the gas market.

Meanwhile, Japan is moving forward in its efforts to tackle final destination clauses. The Japanese Fair Trade Commission (FTC) launched a formal investigation into these clauses in late 2016. At a time when the country is heading toward an overcontracted supply situation, being able to redirect LNG supplies will require parties to have access to other terminals.

Korea: No TPA in sight, for now

Similar to Japan, Korea is also almost entirely dependent on imports of energy to meet its demand. Although coal is by far the country's

largest source of power generation, Korea is the world's second-largest LNG importer after Japan (EIA 2015). KOGAS holds a de facto monopoly over Korea's purchase, import and wholesale distribution of natural gas, making it one of the world's largest LNG importing company. Its title as the world's largest LNG buying company was recently overtaken by Japan's JERA, a joint venture set up by Tokyo Electric Power Co. (TEPCO) and Chubu Electric Power (Reuters 2015).

As of 2016, there are five LNG terminals operating in Korea. Four are owned and operated by KOGAS, while the fifth (Gwangyang) is operated by POSCO to supply its power plant as well as a K-Power-owned plant. Korea briefly discussed whether to adopt rTPA or nTPA to KOGAS' pipeline and LNG infrastructures in 1999 and decided to go for nTPA (Ming-Zhi Gao 2010). Open access, however, is in theory possible for those companies who want to directly import LNG for their own use without reselling and after cumbersome negotiations with KOGAS, which in practice has largely meant that companies do not even try to enter the market (IEA 2013). The conditions to have access to the pipeline system are quite dissuasive. In 2013, the IEA reported:

> In order for the facility user to have access to the transmission pipeline, the user must submit an application to KOGAS, prepared in accordance with the Network Access Code. The application should contain details such as the connection point (entrance and exit points), duration of usage (starting date and term), the expected volume (annual and monthly), maximum volume per hour, gas specification (heating value, pressure, etc.) at least 12 months before the expected starting date of the usage (IEA 2013).

Obviously, players that would like to use the benefits of short-term or spot LNG trading would be disadvantaged if they have to submit plans one year in advance.

The debate about structurally reforming Korea's noncompetitive market structure is largely muted, as it is a good example of an Asian country where one single public company is charged with guaranteeing security of supply, despite the inefficiencies generated (Ko 2014). However, it seems that liberalization is envisaged by 2025, when a gap would emerge between forecast demand and contracted LNG supply, leaving KOGAS in a dominant position until then.

China: Experimentation of TPA driven by market conditions

Despite the fact that natural gas only accounts for a small share in its primary energy consumption, China is still the third-largest gas consumer in the world, well ahead of Japan and Korea (JODI 2016). Unlike Japan and Korea, China started importing LNG only in 2006 due to its sizable domestic natural gas reserves (EIA 2015). Until recently, there were no regulations in China that made it possible for parties other than the three large state-owned oil companies – CNPC, Sinopec and CNOOC – to access the country's downstream facilities (IEA 2012).

In 2014, however, the country's National Development and Reform Commission (NDRC) issued TPA ''guidelines'' for the first time as a result of a number of Chinese new entrants pushing the NOCs for access to their LNG terminals (ICIS 2015). The number of new entrants is growing rapidly, including gas distribution companies and domestic gas suppliers such as ENN, Guanghui and Jovo; city-gas companies such as Beijing Gas Group; and power generating companies such as Huadian, Huaneng and Guangdong Development. Most of

these new entrants do not (yet) have their own LNG import terminals. But as they are struggling to get access to the incumbents' terminals given that TPA is processing at a slow pace, the NDRC is encouraging them to develop their own terminals. Jovo became the first Chinese private company to own and operate an import terminal in Dongguan, while ENN is building one in Zhoushan. While this allows private companies to enter the Chinese market, it may also keep terminal utilization low, making the LNG import system slow. Meanwhile, China's policy no longer encourages floating storage and regasification units (FSRUs) due to high taxes and a lengthy approval process by maritime authorities and the NDRC that is causing delays (LNG Jounal 2016).

The timing of these changes is crucial as incumbents have a legacy of long-term contracts, most of which have oil indexation and sometimes high slopes for those negotiated during the 2007-10 period, which was a sellers' markets. Due to the lags in the formulas, the contract prices have dropped more slowly than LNG spot prices in Asia. At the same time, the new Chinese entrants could have access to spot LNG supplies (or even on a short-term basis) and undercut these incumbents – similar to what happened in Europe in 2009-10. These would face a double danger: losing market share and being undercut by other players. They are therefore mostly reluctant to give access to their LNG terminals. Additionally, even if new entrants get access to the terminals, the issue of getting access to the pipeline system remains. As a result, many are transporting the LNG by truck.

PetroChina now makes it possible, after negotiations, for other companies to use their receiving terminals at Rudong and Dalian. It needs to be noted that TPA contracts are awarded in the form of master sales agreements, and can therefore not be interpreted as legally binding. In 2015, a tanker was scheduled to arrive at the Dalian LNG terminal, but could not discharge as the Chinese private buyer was unable to obtain a TUA in time. China is experimenting with liberalization and attracting private companies to its domestic LNG market because it does not want to see the already low terminal utilization rates slip further given its slower pace of economic growth and growing pipeline import capacity. Third parties are interested in supplying gas to the Chinese market because of the current large spread between low spot prices in the global market and high regulated prices in the domestic market. Cheaply priced and abundantly available supplies of LNG on the spot market have incentivized companies to compete with the NOCs who source their LNG and pipeline supplies mainly based on long-term contracts. This can be interpreted as a sign that the outlook for natural gas demand in China is positive, driven to a large extent by air quality concerns in major cities. This view seems supported by the government as indicated by announcements in November 2016 that it will support import companies that can secure LNG at cheaper prices, either through their own terminals or by using existing facilities. However, details on the implementation are still not available as this report is written.

India

India currently has four LNG import terminals: Dahej, Hazira, Kochi and Dabhol. Dahej and Kochi are operated by Petronet, Dabhol by GAIL and Hazira is a merchant terminal operated by Shell/Total. According to GIIGNL, Petronet's LNG terminals offer TPA on a case-by-case basis. Similar to Italy, India has been thinking of requiring the owners of its terminals to offer up to a third of their total capacity to outside companies (The Indian Express 2012). Until recently, this was not implemented, and the country's inflexible and monopolistic gas infrastructure prevented third parties from importing their own LNG through existing terminals; they even considered bringing in gas via FSRUs even though access to pipelines is still not

available (Indian PetroPlus 2016). In practice, the business model of India's terminals (notably Dahej as Kochi is not fully operational yet) has changed over time: Dahej started with capacity for its equity partners and sourced by Petronet (essentially from Qatar). However, the business model is being reoriented toward a tolling model with capacity offered to other market players (Torrent, GSPC) on a long-term basis. Dahej's capacity will increase to 17.5 mtpa in 2018, with half of it sold as tolling to third parties. The Hazira LNG terminal regasified gas sourced by itself, by GSPC and Reliance (PWC, 2016). One of the key issues preventing a functioning TPA or even market players being interested in TPA for LNG terminals is that it is not implemented to the transmission network, managed largely by GAIL. The network is underutilized even as a significant expansion is planned.

Singapore

Singapore is home to Asia's first multiuser, open-access terminal offering re-exports (King & Spalding 2014). This feature, along with Singapore's strategic location in the Strait of Malacca – the world's busiest LNG tanker traffic chokepoint – has propelled the city-state into Asia's most likely near-future gas trading hub. Plans to significantly expand the capacity of the terminal, as well as the potential construction of a second terminal and integration with the Singapore Stock Exchange, could eventually support a Singapore LNG price marker (Jones Day 2014).

However, Singapore's LNG business model is primarily that of a tolling terminal, where only BG had initially a license to import LNG (3 mtpa). This is due to earlier consultations with the industry concluding that Singapore should procure LNG through a single aggregator (EMA 2013). The policy on gas import control will be lifted once BG reaches its franchise of 3 mtpa or by 2023, whichever is earlier. The current capacity is already much higher (6 mtpa) and a further expansion to 11 mtpa is already underway. Consequently, access to the LNG terminal will be subject to available spare capacity, such as tank capacity and berthing slots. In June 2014, Singapore's regulator (the Energy Market Authority - EMA) launched a request for proposal (RFP) to appoint up to two LNG importers on top of the 3 mpta supplied by BG. Four companies were shortlisted including BG, Pavilion Gas, Sembcorp Industries and Shell, while Pavilion Gas and Shell were selected in October 2016. Additionally, Singapore aims to allow gas customers to import up to 10 percent of their needs from the spot market (Platts 2016). There is also a possibility for secondary LNG trading since October 2015.

Rest of Asia

Gas liberalization processes have been quite timid in other Asian countries. However, in 2015, the Energy Regulatory Commission in Thailand approved the national energy company PTT to issue third party entry codes, which could enable third parties to access PTT's pipelines and PTT LNG's terminal in Map Ta Phut. The goal is to promote competition in the gas market (The Nation 2015). In May 2016, the Gas Supply (Amendment) Act 2016 was approved in Malaysia, which allowed the implementation of TPA in order to introduce competition in the LNG import sector. Up until now, only Petronas could use the terminal.

Other countries in the world

In the majority of the remaining countries, the LNG chain is firmly in the hands of one company. Partial TPA could prove a solution, but if this is not joined by access to the pipeline system it stands little chance of being implemented on a practical basis.

Why Are Open-Access Regimes Difficult to Implement?

There is often a wide divergence between theory and practice when it comes to effective access to LNG import terminals. Although TPA might be enshrined in economic access rules, this does not necessarily mean that it is wanted – both from an incumbent and newcomer's perspective – or enforced. In this section, we seek to answer the question why TPA is often just a theoretical concept rather than a true competition enabling tool.

There are a number of reasons why incumbent companies that are operating an existing LNG regas terminal are resistant to allow third parties to access their facilities. These include:

Loss of market share and revenues. Third parties that import LNG through an existing terminal may have access to supplies at cheaper prices on the spot market than what the incumbent has contracted on a long-term basis. They may also not immediately find a buyer. If storage capacity is inadequate, this would mean they would be forced to sell the surplus LNG into the local market, which is served by the incumbent. In both cases, this means reducing the price and the latter's market share and margins (O'Sullivan 2015). This is, for example, a particular concern for China's NOCs, which own and operate low-utilization terminals (specifically CNOOC which operates seven out of China's nine import terminals or 70 percent of the country's LNG import capacity). PetroChina, for example, only allows the private company ENN Energy access to its Rudong terminal by forcing it to sell its imports within 30 days after the onshore discharge of the cargo (BMT 2015).

Lower prices and having to share guaranteed market with other entities is the product of competition, one of the main rationales behind the EU's liberalization policies, which is intended to mainly benefit the consumer. In China, as in the rest of Asia, however, the government deploys a different interpretation of competition and has so far mainly been supporting state-owned companies tasked with building the required import infrastructure. This might change now that the LNG supply chain is in place and given the inefficient use of the infrastructure by state majors. Although some progress has been achieved in attracting third parties, liberalization efforts are still suffering from many instances of "regulatory capture" [this refers to "the process by which regulatory agencies eventually come to be dominated by the very industries they were charged with regulating" and is based on a theory associated with George Stigler (Investopedia 2016)]. UIOLI clauses, for example, are usually not enforced, unlike in the EU.

Regasification is a low-revenue business. Among the different costs of the main components of the LNG value chain – liquefaction, shipping and regasification – the latter is the least expensive. The cost of a regas terminal is dependent on many variables, such as local construction costs, cost of land, regasification technology used (open-rack versus gas-fired vaporizers), capacity, storage, etc. (Tusiani and Shearer 2007). Terminal costs can vary anywhere from $0.35/MMBtu to $1.00/MMBtu, with most terminals charging about $0.50/MMBtu for regasification of LNG cargoes. In other words, there is not a lot of money to be made by offering regasification services, which is another reason why integrated players prefer to ensure their own value chain.

Operational challenges. Third party access makes the optimization of the plant difficult to implement, particularly storage capacity, which is the most expensive component of terminal construction costs. Shippers need to keep gas in store until they get their next cargo (otherwise, stored quantities would be "negative"). Each user will be dependent on the others acting in accordance with the TUA to ensure equitable access to capacity. A key aspect will concern the receiving and unloading of LNG tankers, which is covered by the TUA's scheduling procedures. In the agreed annual program, users are allocated a number of berthing or delivery slots with a specified arrival time and laytime for unloading. This program has to be enforced. There is some degree of leeway though: a vessel would have a 36-hour window to arrive, discharge and depart, compared with a delivery time of about 30 hours (Le Fevre, C. 2016).

Gas quality differences. Owners of regas terminals often claim that their facilities are not interchangeable with gas supplies that have different energy content (Platts 2013). Natural gas, similar to oil, can have different compositions leading to quality differences (BP & IGU 2011). LNG mainly consists of methane (85-98 percent by volume) but the composition of LNG depends on the physical qualities of the natural gas and the kind of treatment the gas receives at the liquefaction plant. LNG that contains small amounts of liquefied petroleum gases (LPG, propane/butane) is said to be "lean," while the opposite makes it "rich." LNG import terminals are usually built to handle gas of a particular quality or calorific value, similar to an oil refinery, which also has an ''ideal'' crude feedstock slate. Japan and Korea, for example, typically import relatively rich LNG; China and India are more flexible and can also handle leaner LNG. This implies that China and India are better able to import a wider calorific value range of spot cargoes compared to Japan and Korea. European countries also import different types of gas, however, their relative qualities are broadly similar, which makes it easier to trade gas across national borders. Differences in qualities are usually not an issue for a terminal from a technical or operational perspective, and this argument can therefore be interpreted largely as an excuse by the incumbent not to offer TPA to interested parties.

Third parties, on their part, are often discouraged from applying for access and seek a share of the gas market because of the following regulatory, infrastructural or operational barriers:

Unclear access rules. Timely publication of its services and conditions by the terminal operator in a clear and transparent manner is an essential part of a well-functioning TPA regime (NERA 2006). An interested third party applicant needs to be able to easily access all relevant commercial and operational information: services offered and conditions applied; tariff derivation, methodology and structure; and all relevant technical, contracted and available capacities. This will allow a commercial entity to exploit business opportunities driven by both short- and long-term market developments. In reality, however, transparency is often lacking. This is not typically the case in Europe (although access rules for TPA exempted terminals are often not published). In order to promote and facilitate third party access to European LNG terminals, the Council of European Energy Regulators (CEER) proposed GLE – the organization representing LNG terminals operators – to develop a common facilitating

tool making existing information on access more easily accessible to the market. Some members have agreed on a voluntary basis to have a common transparency template. As of early 2017, 16 operators have joined the scheme. Transparency is often lacking in Asia. Access rules in Japan, for example, are not clear when it comes to potential fees and restrictions and are not made available to the public by the gas and power utilities (Platts 2013). Moreover, if individual regulatory authorities are not willing to enforce TPA outside their jurisdiction, there is no overarching regional regulatory body such as the European Commission.

Lack of access to the gas pipeline network. TPA to import terminals is usually complemented by TPA to the pipeline system. This way, companies importing LNG can more easily deliver their gas to the wholesale market and smaller end users. Europe and the U.S. have an intricate and widespread pipeline network in which gas can flow relatively unrestricted. But in Japan, for example, the domestic gas pipeline system is fragmented and does not cover the entire country, meaning third parties are only able to sell their gas in certain regions after paying a fee to the local gas utility that owns those regional pipelines (Platts 2013). The reason why Japan does not have a nationwide trunk line system is due to its challenging topography and island formation as well as because natural gas is largely used in power, which is generated close to LNG regas terminals. Korea's pipeline system is also quite limited, in terms of scope – although there are plans to significantly expand it by 2027 (IEA 2014) – and access – the country's pipeline system is governed by nTPA but no third party has used it so far, similar to its LNG import terminals. There have been many discussions about China's pipeline system and the possibility to spin off pipeline assets from CNPC and Sinopec, but this has faced opposition among policymakers. CNPC was recently said to consider pipeline spinoff unlikely (Bloomberg 2016).

Unrealistic capacity bidding notice periods. A commercial party looking to access a regas terminal needs to know well in advance how much capacity is available at a specified time. Often though, for example in Europe, spare capacity is offered only one or two weeks in advance by the terminal operator. This is too short of a window for an interested party to bid for available slots and for shippers to make logistic arrangements. Much also depends on market conditions: short windows are more of an issue when markets are tight. On the other extreme, there are cases where third parties need to apply for capacity well in advance. This is, for example, the case in South Korea where one needs to submit an application to use capacity at the KOGAS terminals five years (!) in advance (IEA 2014). Needless to say it becomes impossible for interested entities to exploit short-term commercial opportunities.

Operational challenges. Regas terminals offering services to multiple customers might experience a variety of operational challenges (Sutherland 2010). These include for example the terminal berths' maximum capabilities, available storage capacity (including off-site storage), navigational difficulties, limitations on tanker size and shipping schedules, etc. Included here is the interchangeability of different gas qualities, which might complicate the handling and regasification of cargoes that may fall outside the terminal's optimal ''processing slate.''

Small consumer retail markets. In contrast to the traditional LNG process chain, which is commercially oriented toward the wholesale sector (gas and electric utilities), the retail LNG business is predominantly oriented toward serving the smaller end users (GIIGNL 2015). These consist, for example, of industrial and commercial customers, non-utility generators and consumers of LNG as shipping or trucking fuel. Retail LNG often substitutes for traditional fuels in smaller applications, it is sold to weaker credit quality customers and offered contractually on a shorter term basis. This market is an important outlet for third parties, but its modest size is often a barrier for companies in Asia to consider regasifying their own cargoes.

This is for example the case in Japan (Platts 2013). As mentioned before, import terminals in Japan mainly serve isolated load centers and LNG is distributed via small coastal tankers and containers (GIIGNL 2015). The country is planning to develop area-wide pipelines, which would connect city gas conduit networks that are independently operated in each area, but this would require large capital investments over a long period. Retail LNG is a bigger market in China, where it is used to support the energy needs of those far outside major urban centers and pipeline networks. In the future, however, this retail market might also shrink given China's pipeline network expansion.

Looking Forward

LNG and gas markets are in a state of flux. A wave of new supplies have started reaching the market at the same time as demand for LNG is weakening in key importing countries, which has resulted in oversupply and falling prices. Lower prices did not stimulate demand in 2015 because competing fuels, such as coal, renewables and nuclear, were even more attractive from an economic and/or policy perspective (KAPSARC 2016). This has started to change since mid-2016 amid higher coal prices, but gas prices have been increasing as well in Europe and Asia. The current buyer's market is here to stay, at least in the medium term, as more LNG from predominantly the U.S. and Australia heads for Asian and European shores.

Looking forward, there is likely to be a push toward a more effective use of TPA with the Asian region taking the lead. This is driven by the following factors:

The liberalization processes taking place in Japan and China: as mentioned before, liberalization could have taken place in Europe and North America even without effective TPA to LNG terminals as long as TPA on pipelines was enforced (given that both regions relied mostly on domestic production and pipeline imports). But the lack of efficient TPA to terminals is likely to provide bigger hurdles in countries highly dependent on LNG. Should liberalization start in Korea and Taiwan, an effective access to LNG terminals would also be essential. Given the current weight of domestic gas production and pipeline imports in China, access to pipelines is likely to be the main focus of legislators. Depending on the future role of LNG there, enforcing effective TPA could become a top priority for the government.

Several Asian countries have the ambition of creating a trading hub, albeit it is not clear whether they want a gas hub or an LNG trading hub, a virtual or a physical trading hub. Given the size of the Asian gas market, there is room for the three to coexist. In 2013, the IEA identified a few essential criteria for countries to develop as the first stage toward a functioning trading hub: hands-off government attitude, liberalization of wholesale gas prices and TPA to infrastructure (IEA 2013). Singapore's open access terminal makes it confident that it can become the first Asian LNG trading hub. Meanwhile, Japan has become very vocal about its desire to create a similar hub both at the G-7 level and also by publishing an LNG strategy in May 2016. This strategy also looks at other elements such as getting rid of final destination clauses that limit or prohibit the resale of LNG.

Japan, Korea and China are likely to find themselves over contracted in the medium term, prompting companies to seek a more efficient way of disposing of unwanted LNG once the flexibility measures in the contracts (relaxed take-or-pay) as well as swap opportunities are exhausted. Japanese companies are preparing themselves to sell actively on the spot market.

New players are emerging on the global LNG markets. The rise of new entrants is creating demand for access to import infrastructure, especially where it is available and underutilized, for example in China. Meanwhile, traders could be also interested in opportunities to reach end-users directly, or utilize LNG storage capacity (as Trafigura does in India).

> Finally, many Asian incumbents have contracted LNG at oil indexed prices while others have contracted U.S. LNG at Henry Hub plus transportation and liquefaction costs. These may be above spot LNG prices should the oversupply continue post 2020, creating an opportunity for other players to undercut the incumbents. From a government perspective, this represents a lower cost for the end user but it is a threat to incumbents.

Import terminals in Europe and the Pacific Basin, which were commissioned and built during an era of high prices and on the presumption of almost linear gas demand growth, have low utilization rates. Usage of regas terminals in Europe have fallen to only 25 percent in 2015 (IGU 2016), from 53 percent in 2010 (King & Spalding 2015). Terminal operators have responded by adapting their facilities to provide new services, such as ship reloading, transshipment, bunkering etc. Average utilization rates in Europe are now slowly rising as more LNG cargoes come back due to the increase in LNG supply and drop in Asian imports as well as convergence between the U.K.'s NBP marker and Asia's JKM spot price (Oilprice 2015). Utilization rates in Asia's largest LNG markets have also dropped. Japan's average was 44 percent in 2015, down from 47 percent in 2014 (IGU 2016). Rates will probably decline further as the country's receiving capacity is expanded, especially if nuclear facilities are brought back online. In Korea, utilization rates in 2015 stood at 34 percent, down from 38 percent in 2014. One new terminal is expected online in 2017. Regas terminals in China have seen stable rates, at 50 percent in 2015 compared with 51 percent in 2014. In China, LNG stored in import terminals is used to cover seasonal fluctuations given the country's limited underground storage capacity and for security of supply reasons. This helps explain why China's utilization rates are higher than Japan, Korea and Europe. However, as a result of an impressive number of new terminals expected to start operations in 2016-17, coupled with slowing demand growth for gas, utilization rates in China are expected to decline significantly.

It is hard to understand why new regas terminals are still being built in Northeast Asia given the individual country's low utilization rates and uncertain demand outlook for gas. Instead of adding more greenfield capacity, governments should enforce a more efficient use of its existing terminals by allowing third parties to access capacity currently hoarded by NOCs and incumbents. This could be done by further liberalizing the gas and power markets. What is needed, foremost, is a change in the mindset of policymakers in the region toward liberalization and a belief that greater competition can enhance, instead of compromise, security of supply (King & Spalding 2014). Allowing third parties to bring in more short-term and spot volumes would, for example, enable these countries to respond more quickly to unforeseen supply disruptions and also moderate price risks by balancing supply portfolios between long- and short-term cargoes. In general, a consuming country would significantly improve its import diversification ratio by increasing its supply sources. The current buyers' market provides an excellent opportunity to achieve this. Japan's JERA, for example, plans to increase its purchases of short-term and spot cargoes three- or fourfold by 2030 from current levels in order to limit its exposure to long-term contracts (Argus Global LNG a. 2016).

If getting access to state-owned import terminals remains as difficult as it is currently, private entities could look at other alternatives. One alternative could be FSRUs. These floating units have many benefits relative to an onshore facility: it can (1) be

built at half the cost and twice as fast; (2) operate wherever there is a demand for it; (3) be made from old reconverted LNG carriers; and (4) peak regas capacities are gradually increasing (Oil and Gas Investments Bulletin 2012). FSRUs are increasingly popular – the global fleet is expanding fast, with terminals opened in 2015 in Pakistan, Egypt and Jordan – as they significantly lower the barriers of entry for aspiring LNG importers (WoodMackenzie 2016). Chartering an FSRU instead of applying for access at a state-owned onshore terminal could make sense for those companies that could not easily obtain access to the Asian LNG market via the conventional route. However, there can also be regulations in place that effectively prevents companies from accessing the market via FSRUs. China, for example, does not allow ship-to-ship transfers, which is problematic because FSRUs are classified as ships. This would imply that a lot of conventional regas terminals could face the risk of becoming obsolete and in effect, turn into ‘‘stranded assets.’’ FSRUs could be a way for Asian governments to stimulate incumbents to implement effective TPA to regas terminals. For now, large volumes of uncommitted LNG will still have to find their way through the existing LNG import infrastructure, given that new FSRUs require various infrastructural connections that are not always cheap and technically straightforward (Argus Global LNG b. 2016). These units also command high operating costs compared to an onshore facility, and are mainly installed temporarily (e.g., for peak purposes). While upfront CAPEX is lower for FSRUs, and therefore reduces the entry price for new players, one has to take OPEX into account. The overall costs (CAPEX+OPEX) are not doubled in an onshore configuration compared to an FSRU and, in some cases, one can end up with costs above the conventional LNG terminal in the longer term and with less operational flexibility due to the FSRU’s limited storage capacity. As such, if a country is determined for gas to play a larger role in its energy mix in the long run, it might be more economical to build a conventional LNG regas terminal on land and use it efficiently.

Conclusion

The global LNG market is changing profoundly: new entrants seeking to shake the stronghold of incumbents, a looming oversupply that will amplify after 2017 and the overcontracted situation of key Asian gas players. These factors are likely to drive a fundamental reconfiguration on the way LNG is traded. Still, changes on the supply side such as more flexible spot LNG and the potential removal of final destination clauses on the one side, against the drive for liberalization and creation of trading hubs on the other may all be hampered if access to LNG terminals remained restricted.

This is particularly important in Asia – by far the largest importing region, where LNG tends to represent a disproportionate amount of the gas supply and is therefore essential to any key global market change. But, here, TPA has been rare in theory and even rarer in practice due to the fundamentally different supply picture and resulting conservative government attitude toward competition and liberalization. Incumbents, wary about sharing their facilities because of the risk of losing revenues and facing challenges to their market share, may instead opt to guarantee their own value chain. Third parties have encountered difficulties in accessing downstream infrastructure because NOCs and their governments have raised a variety of regulatory, infrastructural and operational barriers. There has been some pressure recently from a few governments on incumbents to give access, but no fundamental change yet.

Still, the pressure is building. New entrants are eager to exploit the benefits of cheaper spot LNG to undercut incumbents, even if that means building their own infrastructure. With low utilization rates at existing regasification terminals, governments are slowly beginning to realize that these inefficiencies, as well as the advent of lower cost import and regas alternatives such as FSRUs, are impacting the economics of these terminals as well as the commercial viability of greenfield terminals.

The benefits of TPA to LNG terminals are unlikely to be delivered if TPA to pipeline infrastructure is not implemented at the same time, or even before. A transparent and efficient access to pipelines is even more essential than that to LNG terminals given the nature of pipelines as a natural monopoly. Regulatory regimes are to be implemented with the aim of promoting of competition, security of supply and without discrimination, while paying attention to operational challenges. The rules of tariffs and other information pertinent to market players must be easily available – in English and in the national language. For example, European countries have put in place the guidelines for good practice in relation to TPA services, tariffs and balancing, as well as guidelines on calculation methodologies and transparency requirements. Tariffs should reflect actual costs incurred, on the basis of an efficient and structurally comparable LNG system operator and an appropriate return on investments.

Such pressures do not automatically call for full TPA access, which will be strongly opposed by incumbents, but could result in partial TPA or access to under-utilized capacity through effective regulation. There is no “one size fits all” when it comes to TPA to LNG terminals. In Europe, many terminals existed before the rules were created and are now offering access, but the greenfield projects have largely opted for TPA exemption. It depends on how integrated the national markets are: a large interconnected market such as Europe can have a mix of terminals with access and exemption, as importers will in theory still be able to move gas around the continent by accessing its pipeline network.

References

Argus Global LNG a. 2016. Tokyo pursues role as Asia LNG hub. London: Argus.

Argus Global LNG b. 2016. Europe to take 40mn t/yr of US LNG. London: Argus.

Bloomberg. 2016. "China's CNPC Said to See Pipeline Spinoff as Becoming Unlikely." Bloomberg News. July 21. http://www.bloomberg.com/news/articles/2016-07-21/china-s-cnpc-said-to-see-pipeline-spinoff-becoming-unlikely-iqvtgc0p.

BMT. 2015. Opportunities emerge for private firms to enter China's LNG market. May 1. http://www.bmt.org/news/2015/05/opportunities-emerge-for-private-firms-to-enter-chinas-lng-market/.

Bolton, Leigh, interview by Sammy Six. 2016. (January 14).

BP & IGU. 2011. Guidebook to Gas Interchangeability and Gas Quality. Sunbury on Thames & Oslo: BP & IGU.

Cogan, John P. 2008. Hedging Gas Supply Risks: Are LNG Terminals the Answer? Bloomberg European Law Journal.

Corbeau, Anne-Sophie. 2016. "LNG contracts and flexibility." In LNG Markets in Transition: the Great Reconfiguration, by Anne-Sophie Corbeau. Oxford University Press.

Corbeau, Anne-Sophie, and David Ledesma. 2016. LNG markets in transition: the great reconfiguration.

de la Flor, Francisco P., interview by Sammy Six. 2016. (January).

de la Flor, Francisco P., Luis I. Parada, and Maria A. de Vicente. 2013. "Regulatory Constraints for the Competitive Operation of LNG Terminals: the regulatory debate on coexistence of regulated and unregulated terminals." LNG17. Houston: Gas Technology Institute.

EIA. 2015. China Country Analysis. Washington, D.C.: EIA.

EIA. 2015. Japan Country Profile. Washington, D.C.: EIA.

EIA. 2015. South Korea Country Profile. Washington, D.C.: EIA.

EMA. 2013. "Singapore's Import of LNG." LNG Producer-Consumer Conference. Tokyo.

Energy Intelligence. 2016. Japan Regulator Investigating LNG Shipping Restrictions. Energy Intelligence.

Financial Chronicle. 2010. Hazira LNG terminal opens to 3rd party imports. July 27. http://www.mydigitalfc.com/petroleum/hazira-lng-terminal-opens-3rd-party-imports-291.

GIIGNL. 2015. Retail LNG & The Role of LNG Import Terminals. Neuilly-sur-Seine: GIIGNL.

GIIGNL. 2016. The LNG Industry in 2015. Neuilly-sur-Seine: GIIGNL.

GIIGNL. 2012. Third Party Access to LNG Terminals. Neuilly-sur-Seine: GIIGNL.

ICIS. 2013. Chile's Mejillones LNG terminal to start flexible access. December 12. http://www.icis.com/resources/news/2013/12/12/9735421/chile-s-mejillones-lng-terminal-to-start-flexible-access/.

ICIS. 2015. LNG Focus: The Dilemma of Dealing With Chinese LNG Buyers. April 30. http://www.icis.com/press-releases/dilemma-of-dealing-with-chinese-lng-buyers/.

IEA. 2013. Developing a Natural Gas Trading Hub in Asia: Obstacles and Opportunities. Paris: OECD/IEA.

IEA. 2014. Energy Supply Security 2014: The Republic of Korea. Paris: OECD/IEA.

IEA. 2012. Gas Pricing and Regulation: China's Challenges and IEA Experience. Paris: OECD/IEA.

IEA. 2014. The Asian Quest for LNG in a Globalising Market. Paris: OECD/IEA.

References

IGU. 2015. World LNG Report. Fornebu: IGU.

IGU. 2016. World LNG Report 2016. Fornebu: IGU.

Indian PetroPlus. 2016. Oversupply in global LNG market: Why India can't take full advantage. June 22. http://indianpetroplus.blogspot.com/2016/06/oversupply-in-global-lng-market-why.html.

Investopedia. 2016. Regulatory Capture. http://www.investopedia.com/terms/r/regulatory-capture.asp.

JERA. 2016. "JERA business plan." JERA. February 10. http://www.chuden.co.jp/english/corporate/ecor_releases/erel_pressreleases/__icsFiles/afieldfile/2016/02/16/160210.pdf.

JODI. 2016. JODI Gas World Database. April 17. http://www.jodidb.org/TableViewer/tableView.aspx?ReportId=38673.

Jones Day. 2014. Singapore as Asia's LNG Hub: The Road Ahead. November. http://www.jonesday.com/files/Publication/ac8c196d-7ff2-4d20-aab4-81e140a836c6/Presentation/PublicationAttachment/a5d583a8-70a1-4ca2-af43-8804b6104c5e/Singapore%20as%20Asia%20LNG%20Hub.pdf.

KAPSARC. 2016. The Impact of Low Oil and Gas Prices on Gas Markets: A Retrospective Look at 2014-15. Riyadh: KAPSARC.

King & Spalding. 2015. LNG in Europe: An Overview of European Import Terminals in 2015. London: King & Spalding.

King & Spalding. 2014. Prospects for Development of an Asian LNG Trading Hub. February. http://www.kslaw.com/library/newsletters/EnergyNewsletter/2014/February/article1.html.

Ko, Yeonseok. 2014. A comparison between Korean gas market and oil market in the consideration of South Korean gas market reform. Austin: The University of Texas at Austin.

Kotlowski, Aleksander. 2006. "Third Party Access Rights in the Energy Sector: A Competition Law Perspective." Utilities Law Review 101-109.

Le Fevre, Christopher, interview by Sammy Six. 2016. (May).

LNG World News. 2016. Study: India's LNG demand to rise up to 17 pct by 2021. January 21. https://www.lngworldnews.com/study-indias-lng-demand-to-rise-up-to-17-pct-by-2021/.

LNG Jounal. 2016. "New LNG market players in China hindered by terminal restrictions." June. http://www.lngjournal.com/index.php/latest-news-mainmenu-47/item/89088-new-lng-market-players-in-china-hindered-by-terminal-restrictions.

METI. 2016. "Strategy for LNG Market Development." http://www.meti.go.jp/english/press/2016/pdf/0502_01b.pdf.

Ming-Zhi Gao, Anton. 2010. Regulating Gas Liberalization: a comparative study on unbundling and open access regimes in the US, Europe, Japan, South Korea and Taiwan. Alphen aan den Rijn: Kluwer Law International.

NERA. 2006. Third Party Access to LNG Terminals. Madrid: NERA Economic Consulting.

Newbery, David M. 2001. Privatization, Restructuring, and Regulation of Network Utilities. London: The MIT Press.

Oil and Gas Investments Bulletin. 2012. FSRUs: The Leading Edge of the LNG Market. June 3. http://oilandgas-investments.com/2012/natural-gas/fsru-lng-market/.

Oilprice. 2015. Europe Overtakes Asia As LNG's Hottest Market. February 25. http://oilprice.com/Energy/Natural-Gas/Europe-Overtakes-Asia-As-LNGs-Hottest-Market.html.

O'Sullivan, Stephen . 2015. Too much infrastructure, not enough gas. June 11. http://www.trustedsources.co.uk/blogs/china/too-much-infrastructure-not-enough-gas.

Oxford Institute for Energy Studies. 2014. Challenges to JCC Pricing in Asian LNG Markets. Oxford: OIES.

Parada, Luis I. 2011. Current State and Prospects of LNG in the UNECE Region. Geneva: UNECE.

Pillsbury, Winthrop, Shaw & Pittman. 2006. "Downstream LNG Commercial Issues." Annual Conference Program: LNG from A to Z. Chicago: International Bar Association. 8.

Platts. 2013. Japan's old but fresh debate on third-party access at its LNG terminals. November 28. http://blogs.platts.com/2013/11/28/lng-access/.

Platts. 2016. "Singapore LNG buyers to be allowed to import up to 10% from spot market." Platts. March. http://www.platts.com/latest-news/natural-gas/singapore/singapore-lng-buyers-to-be-allowed-to-import-27354079.

Reuters. 2015. Japan's Tepco, Chubu Electric name fuel venture Jera. April 15. http://www.reuters.com/article/japan-energy-utilities-idUSL4N0XC2W620150415.

Practical Law. 2016. Oil and gas regulation in Mexico: overview. June 1. http://uk.practicallaw.com/6-524-0285?source=relatedcontent.

Sepúlveda, Roberto. n.d. LNG in Chile: The 10th anniversary of Chile's natural gas crisis and the continued. http://www.cailaw.org/media/files/IEL/Publications/2014/ela-lng-chile-vol8-no4.pdf.

Société Générale & Transgás Atlântico. 2001. "Project Financing of a LNG Import Terminal as a Tolling Facility." Paris & Bucelas.

Sutherland. 2010. The Evolution of Market-Based Open Access. June 3. http://www.sutherland.com/portalresource/Market-BasedOpenAccessImport.pdf.

The Indian Express. 2012. Open accessibility rider mooted for LNG terminals. April 26. http://archive.indianexpress.com/news/open-accessibility-rider-mooted-for-lng-terminals/941479/.

The Japan Times. 2015. Electricity and Gas Liberalization. July 5. http://www.japantimes.co.jp/opinion/2015/07/05/editorials/electricity-and-gas-liberalization/#.Vw326fl95D_.

The Nation. 2015. "End-users to gain after third-party gas access codes get green light." April. http://www.nationmultimedia.com/business/End-users-to-gain-after-third-party-gas-access-cod-30257479.html.

The Oil & Gas Year. 2015. A Robust Market: India's LNG needs projects, policy and pipelines. February 10. http://www.theoilandgasyear.com/interviews/a-robust-market-indias-lng-market-needs-projects-policy-and-pipelines/.

Tokgöz, Emine. 2014. Third Party Access Regime and Building Competitive Gas Markets. Ankara: EPPEN.

Tusiani, Michael D., and Gordon Shearer. 2007. LNG: A Nontechnical Guide. Tulsa: PennWell Corporation.

UNECE. 2011. Current State and Prospects of LNG in the UNECE Region. Geneva: UNECE.

UNECE. n.d. Current Status and Perspectives for LNG in the UNECE Region: Introduction and Overview. New York: UN.

United States International Trade Commission. 2001. Natural Gas Services: Recent Reforms in Selected Markets. Washington, D.C.: U.S. International Trade Commission.

Vahedi, Simin. 2009. Does Third Party Access Have A Negative Effect on the Investment in Gas Infrastructures? Dundee: University of Dundee.

von Hirschhausen, Christian. 2006. Infrastructure Investments and Resource Adequacy in the Restructured US Natural Gas Market -- Is Supply Security at Risk? Cambridge: Center for Energy and Environmental Policy Research.

WoodMackenzie. 2016. Global LNG - FSRU overview 2016. January. http://www.woodmac.com/reports/lng-global-lng-fsru-overview-2016-35539602.

Notes

Notes

Notes

About the Authors

Anne-Sophie Corbeau

Anne-Sophie Corbeau is a research fellow specializing in global gas markets. Before joining KAPSARC, she worked for the International Energy Agency and IHS CERA.

Sammy Six

Sammy Six is a former research associate who studied oil and gas markets. He holds a master's degree in international relations from Ghent University, Belgium.

About the Project

KAPSARC is analyzing the shifting dynamics of the global gas markets. Global gas markets have turned upside down during the past five years: North America has emerged as a large potential future LNG exporter while gas demand growth has been slowing down as natural gas gets squeezed between coal and renewables. While the coming years will witness the fastest LNG export capacity expansion ever seen, many questions are raised on the next generation of LNG supply, the impact of low oil and gas prices on supply and demand patterns and how pricing and contractual structure may be affected by both the arrival of U.S. LNG on global gas markets and the desire of Asian buyers for cheaper gas.

www.kapsarc.org