

# Shaking up the LNG Scene

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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.

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# Key Points

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**D**ramatic changes in the global liquified natural gas (LNG) markets are already visible through market dynamics and stakeholders' behavior, but many other signs point to much more significant changes to come – a great reconfiguration, which could transform the way LNG is traded and have a far-reaching impact on natural gas markets.

The structure, business models and market players in the LNG business are changing greatly, forcing existing players to be innovative to survive.

Sellers and lenders need to accept that moving to more risky business areas will be necessary for gas to expand its role, notably by bringing electric power and industrialization to energy poor regions.

The gas industry tends to focus primarily on the power sector; it should also exploit its advantages by promoting gas use in the industrial and transportation sectors. Heat production and air quality improvement are two areas where gas has an advantage.

As buyers ask for more changes on pricing and supply flexibility, sellers are concerned that contract sanctity may be at risk. This could create major issues in convincing traditional lenders to finance LNG projects.

# Summary for Policymakers

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**A**s of late 2016, we are still at the very beginning of the coming wave of new LNG supply. Significant alterations can already be seen in market dynamics and stakeholders' behavior, but there are more profound changes to come. These will affect global LNG markets and involve market forces, business structures, pricing mechanisms and contractual practices. This evolution is unlikely to be smooth and it could be very significant, resulting in a total transformation of the way LNG is traded. Meanwhile, the future of LNG remains intertwined with that of natural gas.

New players with new business models have entered all parts of the LNG value chain. The LNG business is no longer dominated by state-owned utilities, mostly from Asia, on the importing side; and multinational and national oil companies, on the sellers' side. Floating LNG (FLNG) is one major change to liquefaction. Aggregators with a portfolio of LNG supplies, traders taking credit risk and over-contracted Japanese buyers are taking a larger role in LNG trading. In the downstream, new players are becoming involved in traditional LNG importing countries. Greater use of LNG for transportation and the development of small scale LNG are also expected to bring new players into the LNG sector.

Besides new companies entering the LNG business, potential importers are found as sellers search out new markets to absorb the wave of additional LNG supplies coming on stream. The current global LNG oversupply and the resulting price fall, both in long-term contract and spot market prices, did not boost demand in 2015. While selling interest is still focused on the largest and most dynamic regional LNG importers, other, smaller, LNG importing countries are also being considered.

At the same time, for its 'new normal' the LNG industry has to accept that assessing demand is no longer as easy as it was. Demand certainty, like

AAA-credit rated buyers, is becoming uncommon. Accordingly, sellers and lenders must accept that moving to more risky business areas will be necessary for gas to expand its role. Sellers' interest has turned to countries in Africa and Latin America with undeveloped, nascent or even nonexistent gas demand. These markets are small and the majority lack downstream infrastructure, but they are considered to have upward potential for LNG demand. This move to find new markets will put pressure on major institutional lenders to recognize the role that gas can play in powering industrialization in energy poor regions. To give financial support mostly to renewable energy projects, as some financial institutions do, risks leaving a large number of people in such areas without access to electric power. Natural gas should be better recognized for its potential in this respect and for its environmental advantages.

There is massive potential energy demand in those countries in need of urbanization and industrialization, where 1.2 billion people lack access to electricity and 2.6 billion people lack access to modern cooking facilities. This is an untapped but challenging market. Credit is a huge obstacle to developments in these countries and the overarching issue is to find international financial institutions prepared to assist in mitigating the credit risk. LNG can have an advantage here, in that a floating storage regasification unit (FSRU) can be removed and redeployed if there are payment problems. Affordability is also a key factor for such countries. While an LNG price of \$6 per million British thermal units (MMBtu) may appear low, it is still not affordable for many.

LNG markets can be expected to become more flexible as Asian buyers press for the creation of an Asian gas hub and, eventually, the inclusion of Asian hub prices in long-term LNG contracts. Possible

locations for such a hub are Japan, Singapore and China (Shanghai), though all three face obstacles. The establishment of an Asian gas hub would also call for agreement on contract standardization. In the current buyers' market, buyers are increasingly seeking more changes on pricing and supply flexibility and sellers are concerned that contract sanctity may be at risk. Completely changing the basis of long-term contracts would have far-reaching consequences, not least that banks would view the contracts and buyers in a totally different way.

Finally, LNG remains an integrated part of the global gas market, representing around 10 percent of global gas demand, and thus is subject to many forces affecting the energy spectrum as a whole. These include policy decisions on climate change and air quality, geopolitical forces and the respective economics of the different fuels in diverse applications. The potential for switching from coal

to gas as a generation fuel, largely in Asia, and the benefits to air quality are massive – yet gas has failed to capitalize on this and the quality of air in major cities continues to deteriorate. Depending on policy decisions on transportation at a national or global level, the use of gas could also be promoted in this sector, though implementation would depend on the evolution of LNG prices against oil products.

To succeed, the gas industry will need to think beyond power-generation applications for its LNG. One route will be to recognize the value of heat, through the construction of combined heat and power (CHP) plants. LNG gives natural gas the unique potential to reach far away markets and to develop stranded assets, but to capitalize on this advantage requires finding ways to ensure gas from LNG can be developed at lower costs than today and can remain competitive against coal and renewables.

# Background to the Workshop

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**K**APSARC's Energy Workshop Series on natural gas started in March 2015. It aims at creating a collaborative space for discussion of the global trends and shifts in the global gas markets. The workshops bring together key stakeholders, including industry, consultants, policymakers, academics and financiers. This workshop is the third in the series and is largely dedicated to LNG markets. It also draws on the conclusions of the KAPSARC/OIES book *LNG Markets in Transition: The Great Reconfiguration*, which was published in September 2016 (Oxford University Press).

Discussions were framed around future LNG markets, the uncertainties regarding future LNG supplies beyond the current LNG wave hitting gas markets and changes to the traditional LNG business model. Buyers and sellers are as far apart as they have ever been in terms of their aspirations and demands, leading some to question whether current price formation and contract mechanisms can emerge unscathed from the supply surge. Sellers claim that new projects cannot be sanctioned without the security of long-term, oil-indexed contracts. Buyers, facing significant demand uncertainties, are becoming more selective about the terms they accept.

# Changing the Scene: New Players on the Rise

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**T**he LNG world – and the gas world, to some extent – used to be a ‘cozy’ club with a culture of strong relationships. A few players dominated LNG exports, while importers used to be (state-owned) utilities, mostly from Japan, Korea and Taiwan. This enabled them to build long-term partnerships. However, the nature of LNG industry relationships has fundamentally changed over the past 15 years, exacerbated by the influx of new players.

## Changes along the LNG value chain

New players with new business models have entered all parts of the LNG value chain, from liquefaction to downstream. Multinational and national oil companies have traditionally been responsible for financing and running large-scale and technically complex LNG ventures, while now buyers are increasingly becoming involved in the upstream part of LNG projects, and sellers have begun to move downstream. Cheniere, which started as an importer of LNG, has turned into an exporter, reinventing the LNG tolling structure and fracturing the traditional upstream model. FLNG also offers opportunities in liquefaction for new players, including medium-sized companies such as Ophir, Perenco, Golar – a traditional FSRU player – and Schlumberger. Schlumberger and Golar recently created a joint-venture named OneLNG.

Aggregators holding portfolio LNG have now taken a larger role in LNG trading. Around half of the long-term contracts concluded in 2015 and most of the short-term had ‘portfolio’ as origin, implying that they were not linked to any specific LNG project. Traders, such as Trafigura, Vitol and Gunvor, are increasingly observed in the field, taking credit risk and participating in LNG tenders in countries such as

Egypt and Pakistan. On the other hand, Japanese buyers are eager to participate in trading activities to get rid of their surplus.

But the biggest changes can be observed in the downstream business: in traditional LNG importing countries, new entrants are eager to participate in and, in some cases, seize the opportunity of liberalization processes. Increased use of LNG in the transportation sector and the development of small-scale LNG are also expected to bring new players into the business.

## Looking for new markets

Sellers have already begun to search for new markets, hoping these can help absorb part of the new and upcoming LNG supply additions. As we reach the end of 2016, potential new importers have appeared that were not even mentioned five years ago. Asia, which accounts for over 70 percent of the total LNG trade is, and will obviously remain, the largest importer. But Asian LNG demand barely grew in 2015, due in part to the benefits of cheap coal and incentivized renewables outweighing the drop in gas prices. The picture for the future of LNG in Asia is very uncertain and far from what was envisaged five years ago. Attention is still focused on the largest and most dynamic regional importers – Japan, Korea, Taiwan, China and India – but other, smaller, LNG importers could, together, make a difference in the future, with some potentially significant variations between the high and low LNG demand cases.

In many Asian markets there is a belief that building more renewables allows for greater coal burn as well, with not much being said about LNG. This view represents, at least in part, a hangover from the period 2011-14 when Asian markets faced high LNG prices. In addition, the electricity intensity of gross

## Changing the Scene: New Players on the Rise

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domestic product (GDP) is declining, which means that gas and coal demand will be influenced by their respective prices where a large fleet of power plants is available. However, if LNG prices remain low for an extended period of time, while oil and coal prices increase, this might nonetheless stimulate demand in the most price-sensitive markets in Southeast Asia and bring new LNG importers – such as the Philippines, Bangladesh, Myanmar and Vietnam – to the market faster. But these markets are already consuming natural gas and the role of LNG there would be to replace insufficient or declining gas production, notably in the absence of any viable pipeline alternative.

In terms of future LNG demand elsewhere in the world, interest has turned to countries with undeveloped, nascent or even nonexistent gas demand. These include, but are not limited to, Southern Africa (Namibia and South Africa), West Africa (Côte d'Ivoire, Ghana, Benin and Senegal) and parts of Latin America (Costa Rica, Panama, Colombia and Cuba) and, to a lesser extent, Eastern Europe (Romania, Estonia and Croatia). Although these markets are relatively small and mostly lack downstream infrastructure, their populations – except in Eastern Europe – are growing and an upward potential for LNG demand is noted. In some cases, this is driven by fuel switching opportunities, such as substituting oil and diesel in power and industry with gas and backfilling declining gas supply. But, in others, natural gas could help to meet power demand where there is insufficient generating capacity and access to power, hence spurring industrial development.

Forecasts are usually extremely modest for these new importing countries, which together are expected to represent only 3 percent of total LNG demand by 2030. This is because there appears to be very few strong candidates. They face many challenges, including financial and political instability, a general lack of creditworthiness plus the lack of gas and power markets regulation. Whether we are too conservative in our demand estimates, not anticipating that some countries could start importing LNG, is a valid question. Most gas demand forecasts have tended to be far from accurate predictors of actual consumption. The situation seen in Western Africa, where demand potential exists as a result of declining production in some countries and slow development of new fields, opens the door for LNG. In practice, the FSRU that is in place in Ghana is not operational, having been unable so far to secure parliamentary approval. In addition, the port infrastructure is not developed and most end-users are financially instable. Regionally, aggregating small-scale requirements and/or sporadic demand, to back up hydro, might boost LNG's share in these countries' primary energy mix, even though a regional solution seems to be a challenge in either Western Africa or Central America. Payment risk is also a crucial difficulty in these areas, which is probably why FSRUs are becoming popular since they can sail away in case of non-payment. Financing is the other side of the coin and it should be asked to what extent the financial community and multinationals would be interested in funding the gas chain.



# Glimmers of Hope

The gas industry has repeated like a mantra that gas is cleaner than coal and that gas can be the ideal partner for intermittent renewables. It faces two immediate issues: methane emissions and the affordability and competitiveness of gas. Against these environmental considerations – notably air quality – developing countries’ needs for urbanization and industrialization could provide new outlets for gas, including in non-power sectors.

The issue of methane emissions – an increasing focus among policymakers, non-governmental organizations, academics and the media – is challenging both the first assumption and the proposal that gas can be a bridge fuel on the road to a renewable energy future. Despite a relative lack of data, notably outside the U.S., some studies have cast doubts on the long-term usefulness of gas in mitigating climate problems.

**“The world is not running out of resources for its energy needs. It is instead wrestling with which energy resources to use. In this context, it is important to reconcile views on whether natural gas is a bridge fuel or just another dirty fossil fuel.”**

According to BP, renewables other than hydropower will represent only 7 percent of the global primary energy mix by 2030, up from 2 percent today. This means that the combined share of coal and gas will fall from 54 percent to 50 percent by 2030. Gas demand would still be expected to increase. The determining factors influencing the use of those two energy sources include price, availability and policy. Many developing countries are extremely price sensitive: gas is still not viable enough for them despite increased environmental pressure on using

coal and the availability of idle gas-fired capacity. Affordability will continue to be a key factor for such countries. While \$6/MMBtu may appear low, it is still not an affordable price for them: this is a problem that the industry has to deal with. However, while new players believe current low gas prices are here to stay, new LNG projects will need higher prices (\$7-8/MMBtu) to move ahead. If this works for these new importers from a policy point of view, despite the deflation in coal prices and renewable costs, then gas will be a growing market. But if this is not the case, there will be a reversion to coal – regardless of the environmental decisions taken at COP21 and COP22.

New importers also need to have confidence that LNG will be available, not just when it is diverted from mature Asian markets. There is, however, a bias against imported energy, while renewables are seen as domestic – even though all the parts of a windmill or a solar panel must be imported. At the same time gas is becoming less competitive than renewables technology and has no monopoly on flexible power generation. Looking forward, potential future technology evolutions, such as batteries, may also remove the need for gas-fired peaking power plants.

The environment is clearly a key driver but, again, countries’ policy choices differ widely. There is a high level of cynicism about climate change in many Asian countries, which are currently opting for new-build coal power plants and renewables. Gas seems to have already lost the argument there as we move forward. Accordingly, the gas industry may have to be more proactive in explaining the benefits of gas use as governments take policy decisions based on their knowledge at a specific time and their understanding of the implications in terms of costs and infrastructure requirements. Further, the issue of carbon capture and storage (CCS) seems to have been placed on the back burner. Deemed difficult

## Glimmers of Hope

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and expensive, it does not now appear a priority for the gas industry, despite the availability of depleted fields in which to store CO<sub>2</sub>. However, CCS could potentially benefit coal more than gas.

In this bleak environment, there are still some glimmers of hope. Greenhouse gas emissions are not the only environmental factor to consider: air quality is crucial, too, and this is where gas can have a significant edge. The World Health Organization reports show 3 million premature deaths annually from air pollution. Substituting coal with natural gas can achieve major improvements in public health. Consequently, policymakers must increasingly consider the full cost of electricity including externalities – most importantly, health. When such a cost is included, gas becomes cheaper than coal for both baseload and mid-merit. The potential for switching from coal, essentially in Asia, is so massive that it is rarely estimated. However, this issue is not new and the quality of air in major cities is deteriorating. In this area, gas has still not gained sufficient traction, despite being mooted as a solution for quite some time.

Those countries in need of urbanization and industrialization, whose 2.6 billion people still use wood and animal dung to cook their food and heat their homes, represent an untapped but challenging market. There is a huge potential energy demand, counterbalanced by a very low state of development. Urbanization presents more opportunities for gas than a rural society. Africa is rarely considered as a gas market and even less as a viable LNG importing region. In this respect, Central America is also worth considering. Most planned upstream and LNG import developments are led by the power generation sector, either new plants or conversions from existing plants. This restricted focus does not consider the entire economy: available supply could precipitate more demand in industry and potentially in the commercial and transportation sectors.

It would be a real step forward in policy terms for international financial institutions to support the role of gas as a bridge fuel, or as a conversion from coal, since if they mostly commit to helping renewable energy development projects they risk leaving people without access to electricity. So far only the Inter-American Development Bank has stepped forward. Recently, though, some institutions have recognized that if they want to limit coal use in Asia, they have to talk about gas, not just renewables. This is somewhat contradicted by the fact that some large development banks in Northeast Asia have financed coal-fired assets and not taken account of carbon resilience in their long-term scenarios. The international oil companies could take a role by moving down the value chain, sponsoring FSRUs and including power in their projects.

There is also a need to think beyond power as overcapacity has pushed up gas to the mid-merit. The value of heat should also be considered. In China, 90 percent of the 24 GW of gas-fired plants recently built are CHP. While renewables could potentially replace fossil fuels for industrial applications requiring low temperatures, levels of heat above 500°C are harder to reach. Depending on transportation sector policy decisions at a national or global level, LNG could have a role to play in that, too, though any decision is highly dependent on the evolution of LNG prices against oil product. The decision by the International Maritime Organization to implement sulphur caps by 2020 could help LNG in the marine sector. Such a move would not be smooth as the diesel lobby is very strong.

Finally, natural gas also has essential by-products: natural gas liquids (NGLs). Gas production enables access to NGLs, which are a key element of our modern lives through the production of plastics, petrochemical feedstock and synthetic rubber for tires. They are also widely used as heating or cooking fuels.

# New LNG Projects: Who Blinks First?

**N**ew LNG projects currently face a double difficulty: uncertainty over future LNG demand, strongly related to uncertainty over natural gas demand; plus the current low oil and gas price environment. Forward prices do not indicate an LNG glut that would see the gap between European and U.S. prices closing, while Asian and European gas prices are nowhere near the level necessary for financial go-ahead for an LNG project. It is a given in the gas industry that LNG projects need long-term commitments, but buyers facing demand uncertainty are reluctant to commit for another 20 years. At the same time, there is pressure from LNG buyers to move to other types of price indexation, complicating negotiations even further.

New LNG capacity will be required to prevent a market contraction – with the associated high gas prices – as LNG markets rebalance around 2020-25. This creates a dilemma for LNG developers and buyers. New projects have long lead times – approximately five years for greenfield projects – while expansion projects can take up to three years. This means final investment decisions (FIDs) would have to be taken over the next two or three years, despite the uncertainties. The question is ‘who blinks first?’ Will suppliers wait until they have more certainty, or take the risk of moving forward based on a longer-term view, perhaps financing the project on their own balance sheet rather than from banks’ lending? That would disadvantage those small players that still need bank financing.

Capital costs for new projects have yet to follow prices downward and, consequently, breakeven LNG prices above \$10/MMBtu are the biggest problem the gas and LNG industry faces. Before 2005, the cost of the liquefaction train was a strong indicator of what the total capital cost of an LNG project would be. However, since 2005, capital costs have been driven by costs ‘outside the train’. Those include marine foundations and infrastructure such

as building estuaries, jetties, and material off-loading facilities and platforms. In addition, many of the projects announced since 2005 have been in remote places, where building accommodation camps and use of third-party services, such as airports and laundry and cooking camps, will involve a premium.

**“Current gas prices are telling us that we do not need any more LNG for the time being, but the forward market is not telling us, however, when we need [additional LNG]”**

Against this background, brownfield projects are better placed to lead future FIDs, given the existing infrastructure in place. This is highlighted by BP’s FID on Tangguh’s train 3 in July 2016. FLNG is another new trend and is considered to be an innovative way of trimming infrastructure cost as it eliminates subsea pipelines and onshore developments. Some companies, such as Golar, use a standardized approach to FLNG based on existing vessels. This is a game changer from a cost standpoint since the company get the existing vessel for essentially no cost. FLNG has not yet been tested, but Petronas is scheduled to deploy its first FLNG later in 2016. Meanwhile, other projects such as Browse FLNG and Petronas FLNG 2 have been shelved and delayed in early 2016. Coral FLNG, on the other hand, has secured a long-term gas purchase contract, which puts it a step closer to FID.

Developers of greenfield projects need to find something in their project configuration – site selection and simplicity of scope – that gives them an advantage, differentiating them from the rest. Woofibre LNG, the second project to take FID in 2016, secured low electricity rates from the British

## New LNG Projects: Who Blinks First?

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Columbia government in Canada. The Magnolia LNG project, for instance, is situated on the U.S. Gulf coast, on an existing LNG shipping channel, and shares a turning basin with existing LNG terminal Trunkline/Lake Charles LNG, which gives it a unique site advantage. It is also close to an electricity substation and an existing feeder pipeline, and has road access to the site. The combination of these factors gives Magnolia LNG a substantial advantage. A modular approach can help, though the difficulty is to choose the right size for each train.

While a lot of existing projects are currently operating on the basis of liquefaction costs considered as sunk cost, this is not economically viable in the long term. Companies need to recover their capital costs and no FID will proceed on just the basis of short-run marginal costs. This is particularly true for U.S. LNG plants that some analysts expect to run at low utilization rates, though without explaining whether this implies they might shut down for part of the year. As oversupply builds up over the coming years, it remains to be seen who will provide the flexibility factor as long as oversupply lasts: Russia, which has until now taken the role of swing global producer, but which appears unwilling to continue, or the U.S. LNG plants. If this rivalry puts downward pressure on prices

that could delay future FIDs even further. Another concern is the current trend of low offtakes – all the contracts signed in 2015 except one were for annual quantities below 1.1 million metric tons (mtpa). This creates a big challenge for projects as it requires many offtakers – each of them scrutinized by the banks – to have one train sanctioned. Alternatively, a portfolio approach can be adopted by which aggregators contract the LNG then resell it through secondary contracts.

The non-price risks to future LNG projects that may arise through deferring FIDs can be as important to watch for as the price risks. A continued long pause in LNG development might push companies to reorganize their project portfolio, assessing LNG as high cost, and this could lose LNG talent in the process, risking slowing down planning and implementation of future LNG projects. More importantly, when, after a lengthy spell of no FIDs, new ventures need to be developed, buyers will have become accustomed to spot purchases and it will be hard to revert to long-term oil-linked contracts, should this prove what the LNG industry wants. New project developments would need to include innovative price formulas in their contracts to attract buyers, but still encourage investment for the supplier.

# How Significant are the Contractual Changes?

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**T**he market has turned into a buyer's market and they are eager to use this new position to introduce contractual changes. But this is a cyclical market: at some point, there will be a shift back toward sharing risk. New supply will be needed and buyers may have to accept a different set of conditions or move upstream to invest. The current situation is similar to that in Europe in 2009/10: oversupply, overcontracted buyers and low gas prices. Buyers want more flexibility in terms of take-or-pay, contract duration, and more spot in their portfolio, as well as a change in pricing mechanisms. This is because of uncertain future long-term demand, both at country and company level, and the difficulty of committing for 20 years in such an environment. The rise in the spot and short-term LNG trades seems almost inevitable, driven by the quantities of uncommitted LNG, portfolio LNG, flexible U.S. LNG and only limited extensions of expiring contracts.

Expected upcoming changes in contractual practices will have a long-term impact on future projects. Contract and price renegotiations are not unusual – Europe has seen many of these since the economic crisis in 2009. Prices and take-or-pay requirements have been amended. But such renegotiations are more unusual in Asia. The movement for change was led by Japan, which is keen to remove final destination clauses from long-term contracts, viewing them as an obstacle to the creation of a Japanese trading hub. They disappeared in Europe 15 years ago because they were ruled as anti-competitive behavior. But once destination clauses have gone, how far can the renegotiation go? There is also pressure from Asian players toward hub pricing, even though there is still some confusion between pricing mechanisms and levels. There are various motives behind this push, such as price discovery – albeit from a very low basis – and risk mitigation.

Any transition to hub pricing is likely to be messy. It could potentially happen in less than 10 years should a discontinuity emerge between spot and contract prices that would result in losses for utilities and prompt large end-users to source their LNG by themselves.

Three countries are taking the lead in establishing an Asian gas hub: Japan, Singapore and China (Shanghai). They still face obstacles, such as the lack of liquidity, transparency and third-party access. The current library of contractual relationships is not set up to facilitate such moves. For example, LNG import terminals may be underutilized, but regulation or contractual obligations may limit third-party access. Market liquidity is a real difficulty: even if Japanese buyers were sourcing one-third of their supplies as spot cargoes, this would mean only one or two cargoes per day. A fundamental issue to establishing a hub is defining what type it should be: a virtual or physical hub, an LNG or gas hub. There is also a need for contract standardization, which calls for more general cooperation from companies and governments. Singapore is a politically neutral place, but it is a small market unless the wider Southeast Asian gas market is taken into consideration. China is trying to introduce a price reform, but at this stage Shanghai is still mostly city gate price than a hub, without access to infrastructure. Japan's Ministry of Economy, Trade and Industry (METI) is pushing for the creation of a hub, but here again there is no access to infrastructure. There is also the possibility of different pricing points co-existing in those countries, while a trading hub would exist somewhere in the South China Sea. Singapore has the legal tools to develop such a hub, and aggregating regional small scale demand could boost the possibility.

The relationship between an Asian trading hub, European gas prices and U.S. Henry Hub (HH) gas

## How Significant are the Contractual Changes?

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prices would be interesting to observe. HH would still be a key element influencing the cost of U.S. LNG, but as the U.S. becomes a large exporter, import prices could also have an influence on HH. There are some questions as to whether HH would still be relevant a few years from now, as the center of U.S. gas production shifts to the Marcellus Shale play in the northeast. The lack of physical liquidity at HH is a concern, but the financial aspects are healthy so HH is expected to keep its role as a gas price benchmark.

Some market players are increasingly worried that in the future contract sanctity itself could be at risk, which would be a different matter than renegotiation of contractual clauses. One major factor in Europe in 2009/10 was that when companies started losing billions they began renegotiating their contracts

to find an acceptable solution for both buyers and sellers. Many of the examples of contracts being terminated involve situations in specific countries (closed systems), not the international environment of LNG trade. It is true that some individual contracts were scrapped, such as those between Algeria and the U.S., but those involved unique situations. Changing the basis of long-term contracts would have far-reaching consequences, not least that banks may be reluctant to support new LNG projects.

However, the rising flexibility of the LNG market can be expected to develop as a key feature. There are more short-term windows for some frontier markets. Financial institutions have not caught up with that trend, though, and a disconnect has emerged between banks' expectations and what buyers want.

# About the Workshop

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**K**APSARC convened its third workshop focused on natural gas markets with some 35 international experts to facilitate a dialogue on issues facing primarily LNG players. The workshop was held under a modified version of the Chatham House Rule. Participants consented to be listed below, however, none of the content in this briefing can be attributed to any individual attendee.

**Terrell Benke**, Senior Director, IHS Markit

**Neil Beveridge**, Senior Energy Analyst, Sanford C. Bernstein

**Robert Brooks**, President & Founder, RBAC, Inc.

**Chris Caswell**, Director - Gas Monetization Development, KBR

**Anne-Sophie Corbeau**, Research Fellow II, KAPSARC

**Jefferson Edwards**, General Manager for Gas Advocacy, Shell

**David Goldwyn**, Chairman, Energy Advisory Council, Atlantic Council

**Chris Goncalves**, Chair and Managing Director, Energy, BRG

**Paul Griffin**, Professor, Centre for Energy, Petroleum and Mineral Law and Policy, University of Dundee

**Marc Gyetvay**, Chief Financial Officer, Novatek

**Jace Han**, Energy Specialist, World Bank

**Hiroshi Hashimoto**, Senior Analyst at Gas Group, The Institute of Energy Economics, Japan (IEEJ)

**David Hobbs**, Head of Research, KAPSARC

**Thomas Holmberg**, Partner, Baker Botts

**David Ledesma**, Senior Research Fellow, Oxford Institute for Energy Studies (OIES)

**Pablo Lopez**, US Country Manager, Enagas

**Jane Nakano**, Senior Fellow, Energy and National Security Program, Center for Strategic & International Studies (CSIS)

**Sunita Narain**, Director General, Centre for Science and Environment (CSE)

**Pierre Noël**, Sultan Hassan al Bolkiah Senior Fellow for Economic and Energy Security, The International Institute for Strategic Studies (Asia) Ltd Remi Piet, Qatar University

**Remi Piet**, Assistant Professor of Public Policy, Diplomacy and International Political Economy, Qatar University

**Howard Rogers**, Director, Natural Gas Research Programme, OIES

**Susan Sakmar**, Visiting Assistant Law Professor, University of Houston Law Center

**Ben Schlesinger**, President, Benjamin Schlesinger and Associates, LLC

**Rami Shabaneh**, Research Associate, KAPSARC

**Adam Sieminski**, Administrator, Energy Information Administration (EIA)

**Sammy Six**, Research Associate, KAPSARC

**Jonathan Stern**, Chairman, Natural Gas Research Programme and Senior Research Fellow, OIES

**Terence Thorn**, Senior Advisor, International Gas Union (IGU)

**Coby van der Linde**, Director, Clingendael International Energy Program

**Franck van Oordt**, Senior Consultant, World Bank

**Greg Vesey**, CEO & Managing Director, LNG Limited

**Andrew Walker**, VP Strategy, Cheniere

**Victoria Zaretskaya**, Multidisciplinary Industry Economist, EIA

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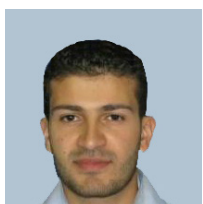
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## About the Team



**Anne-Sophie Corbeau**

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



**Rami Shabaneh**

Rami is a research associate focusing on natural gas market fundamentals. He holds a master's degree in sustainable energy development from the University of Calgary.



**Sammy Six**

Sammy Six was a research associate studying 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, which 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. The coming years will witness the fastest LNG export capacity expansion ever seen. Yet 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.



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