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Joint Study for Liquefied Natural Gas Market

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This report was prepared by the Working Group (WG) for the 'Multilateral Joint Study for Liquefied Natural Gas Market' under the Economic Research Institute for ASEAN and East Asia (ERIA) Energy Project. The members of the WG, who represent the participating East Asia Summit (EAS) region countries, discussed and agreed to utilise certain data and information provided by the Institute of Energy Economics, Japan (IEEJ) to analyse market trends. These data and information may differ from those normally or officially used in each country, and, therefore, the analysis results presented here should not be viewed as the official and national analyses of the participating countries.

FOREWORD

While liquefied natural gas (LNG) is playing an increasingly important role in the East Asia Summit (EAS) region, the Asian LNG market and its pricing system face various problems. One typical example is the presence of premiums in Asian LNG prices, which are emphasised when oil prices remain high. This is unique to Asia, where the regional LNG market, the world's largest LNG consuming market, has yet to develop fully and where LNG prices are not determined by supply and demand.

This problem seems to have subsided since 2014 due to lower oil prices, which, however, are not a fundamental solution with the underlying cause remaining. A lot has still to be done to ensure the sustainable use of LNG.

This study involved various discussions among economic experts from EAS countries and LNG exporting and importing countries, the results of which are expected to contribute to the development of the EAS region.

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Working Group Leader

Mr Ichiro Kutani

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ACKNOWLEDGEMENTS

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LIST OF ABBREVIATIONS

DES	delivered ex-ship
DQT	downward quantity tolerance
EAS	East Asia Summit
ERIA	Economic Research Institute for ASEAN and East Asia
FOB	free on board
IEEJ	The Institute of Energy Economics, Japan
LNG	liquefied natural gas
UQT	upward quantity tolerance
US	United States
WG	working group

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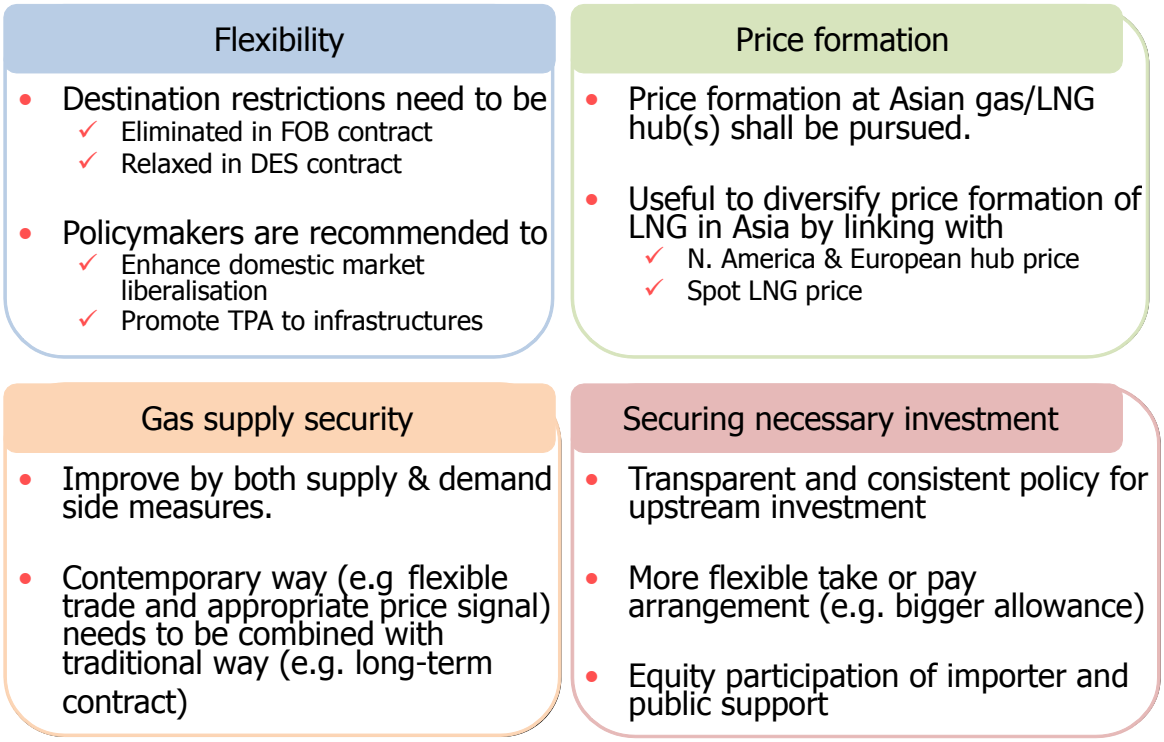
EXECUTIVE SUMMARY

The study was conducted by a group of experts to discuss Asian liquefied natural gas (LNG) market issues and was concluded to present policy recommendations.

The LNG market is in transition in terms of geographical and quantitative expansion, diversification of price formations, and lower oil and gas prices. In order to balance benefits between importers and exporters and to find workable solutions for sustainable LNG market development in varied energy situations in each importing and exporting country, the LNG market players and policymakers are encouraged to enhance their efforts to create a more flexible, transparent, and sustainable LNG market in Asia. Although the private sector is mainly responsible for commercial deals, the public sector is also encouraged to support in improving the business environment to develop a better-functioning LNG market especially in terms of flexibility, price formation, and gas supply security; and in securing necessary investments as shown in Chapter 4, Figure 4.1.

Overview of Policy Recommendations



DES = delivered ex-ship, FOB = free on board, LNG = liquefied natural gas, TPA = third-party access.
Source: Study Team.

CHAPTER 1

Introduction

1.1 Background and objective

Many East Asia Summit (EAS) countries show an upward trend in energy demand. The role of natural gas in energy supply becomes increasingly important from a variety of aspects, which include economic efficiency, diversification of energy, effective use of domestic resources, and reduction of environmental burden arising from energy use.

The global liquefied natural gas (LNG) market has seen big changes in recent years. In terms of supply and demand, while many new LNG importers are coming into the market, the LNG demand for large importers like Japan, China, and Europe is becoming uncertain. Besides, new liquefaction capacities are seemingly to start operation within the next few years. In terms of price, there is a downward trend in both oil-linked price and spot price. Importing countries may welcome this trend, but attention is required to its side effect for supply-side investment.

Asian LNG market cannot be insulated from these changes in the global market. Although this recent price trend seemingly indicates that Asia premium issue in the LNG price has diminished, the essential problem has not been resolved. Asia premium will be back depending on crude oil price. Therefore, resolving the Asia premium issue should be pursued and substantive reforms thereon should be recommended to achieve sustainable and sound development of the global LNG market.

With this background, this study aims to introduce policy recommendations for global LNG market.

1.2 Study method and work stream

A. Organise information about recent changes in the global LNG market

Literature survey will be conducted to organise information about recent changes in the global market, particularly with regard to LNG price formation.

B. Experts meeting

Multilateral experts meeting will be organised to discuss the following issues:

(i) What could be a credible price formation for both the LNG producer and the consumer?

(ii) What would be the prerequisites for creating a gas or LNG price hub in Asia?

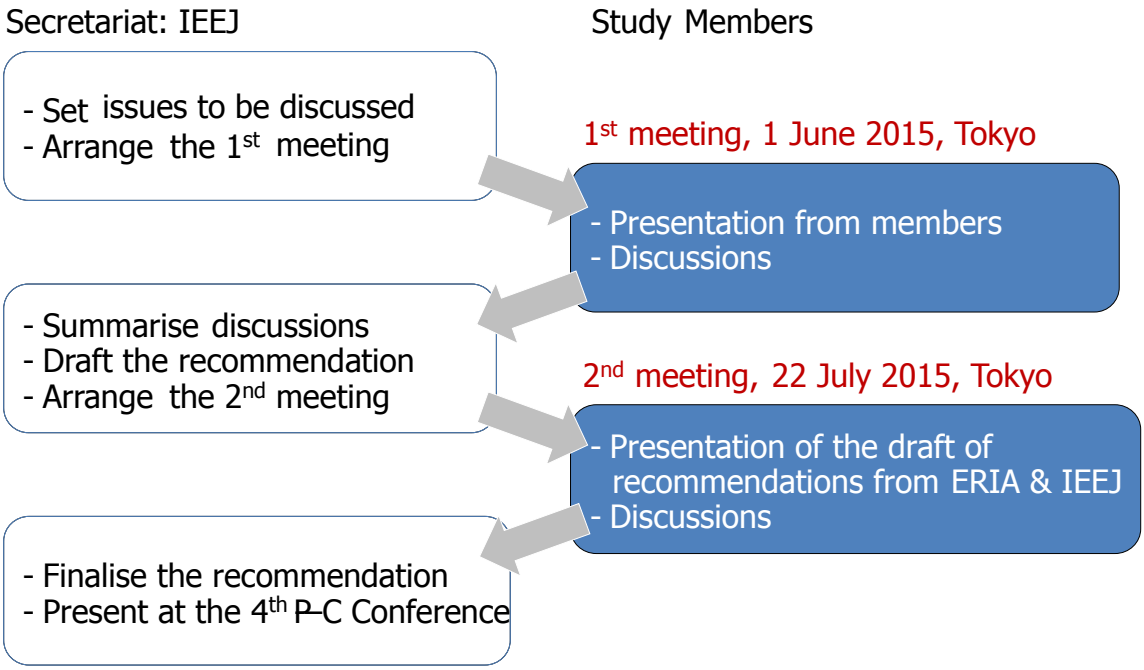
(iii) How do we ensure log-term supply side investment?

Each expert will provide views and suggestions for each specific issue.

C. Derive policy recommendations

Through organised information and experts meeting, the study will derive policy recommendations for achieving a sound LNG market development. The study is aimed at sending policy message for global society and policymakers in the 4th LNG Producer–Consumer Conference which was held in Tokyo in September 2015.

Figure 1.1 Study Flow



IEEJ = The Institute of Energy Economics, Japan.
P–C = producer–consumer.
Source: Author.

CHAPTER 2

Background

Liquefied natural gas (LNG) prices in Asia had been considerably higher than those in the Atlantic market especially between 2011 and 2014 (Figure 2.1). The price gap, or Asian premium of LNG, could not be explained alone by transportation cost between Atlantic and Asian markets. The huge premium was a serious problem for LNG-importing countries in Asia.

The relaxation of supply–demand balance and the collapse of oil prices led to lower LNG price and decreased the Asian premium of the LNG. However, there remain four unresolved challenges:

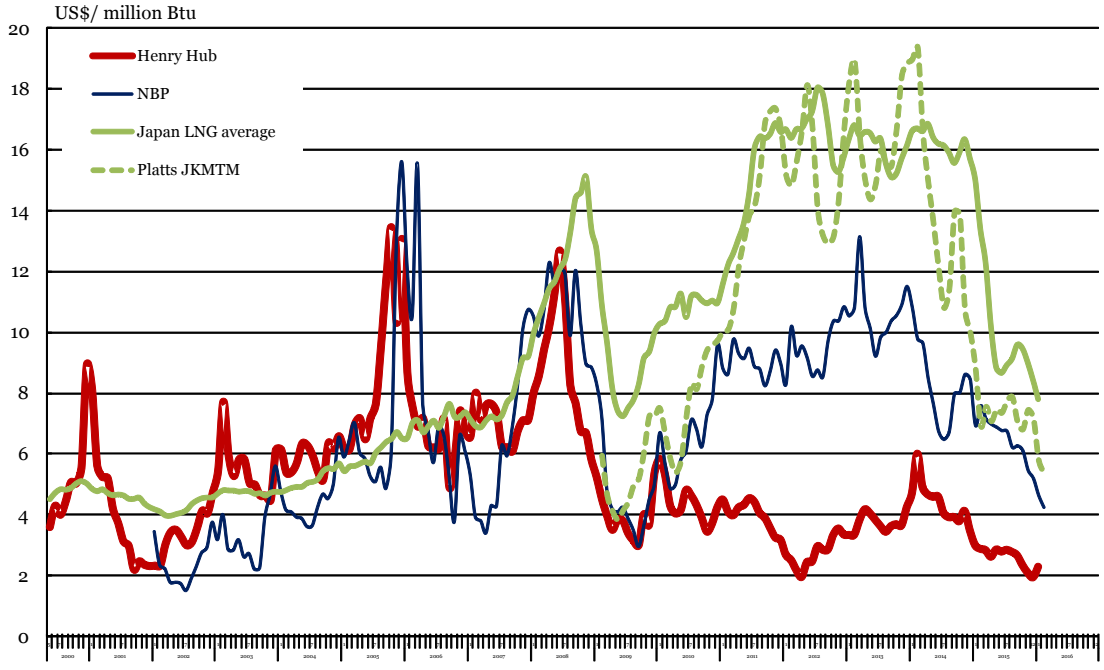
(i) Calling for flexibility in the LNG trade in Asia

(ii) Seeking appropriate price formation

(iii) Ensuring gas security

(iv) Securing investments to ensure future LNG supply

Figure 2.1. Transition of Gas Price



Btu = British thermal unit, LNG = liquefied natural gas, NBP = national balancing point, US$ = United States dollar.

Source: Energy Information Administration, USA; Trade Statistics, Japan; Platts, Energy Intelligence.

2.1 Calling for flexibility in the LNG trade in Asia

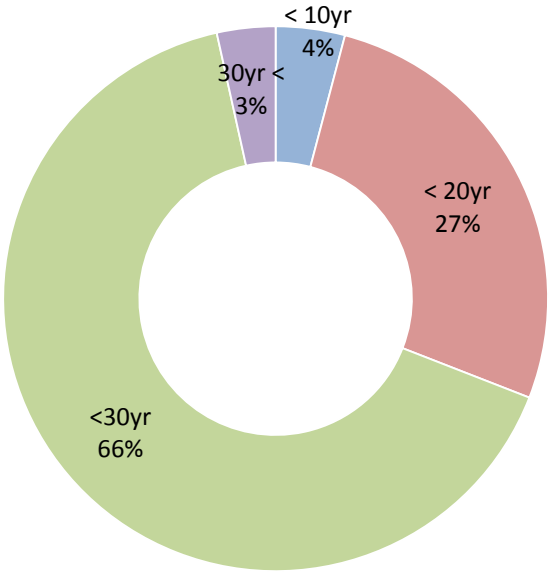
LNG transactions in Asia are usually characterised by large volume, long term, and rigid contractual terms. These characteristics have been brought about by high gas transport, liquefaction and storage cost of natural gas, as well as high investment risk associated with upstream developments and illiquid LNG market in Asia. Therefore, traditional LNG contracts for Asia feature certain terms to reduce upstream investment risks and secure operation in a quasi-vertically integrated manner.

First, products typically have been sold under long-term contracts that often span more than 20 years (Figure 2.2). This is still largely the same today especially for new LNG projects, while some existing LNG projects offer shorter contracts (Figure 2.3).

Second, terms of LNG contracts include the so-called 'take-or-pay' clause where a buyer is required to pay for the cargoes even if it cannot take them for whatever reasons, although 5 percent to 10 percent upward or downward quantity allowance is typically embedded in the contract.

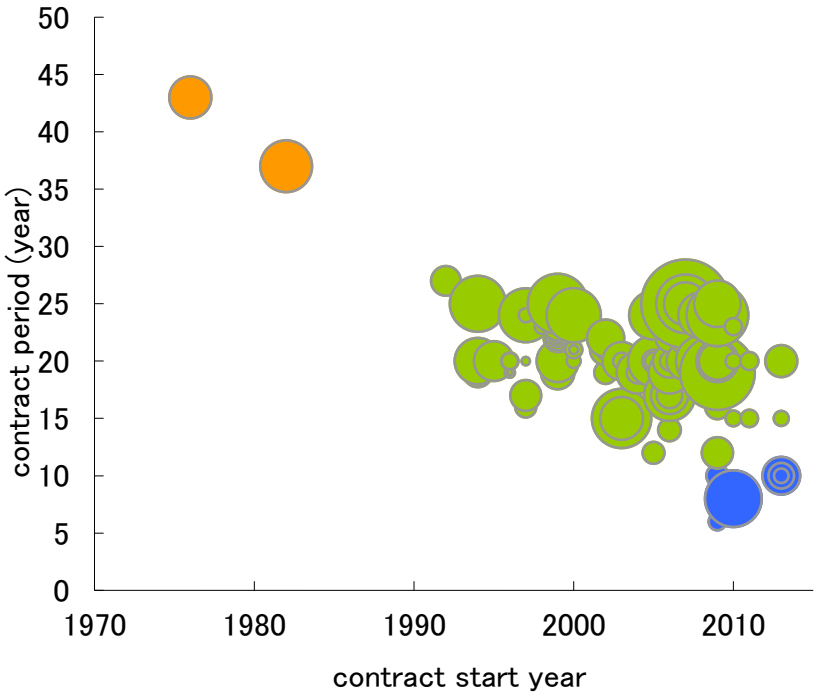
Third, in most LNG contracts for Asia, products are shipped only to specific geographical point(s) or country under 'destination clause'. This clause was originally intended to lower investment risk by reinforcing security of supply for buyers and of demand for sellers. With destination clause, even in the case of free-on-board (FOB) contract, a buyer is not allowed to resell a cargo to another buyer without the seller's consent. In Europe, the destination clause was made illegal to be incompatible with the Rome Treaty by the European Commission, and almost all destination clauses were removed in FOB contracts.

Figure 2.2. Liquefied Natural Gas Contract Volume by Contract Period (Existing contracts as of end of 2012)



Source: Various company websites and news articles.

Figure 2.3. Liquefied Natural Gas Contract Period by Contract Year
(Existing contracts as of end of 2012)



Note: Size of circle represents contract volume.
Source: Various company websites and news articles.

While some contracts have offered relatively flexible terms in recent years, inflexibility still remains in many LNG contracts in Asia. Importers need flexibility in gas trade not only to accommodate demand fluctuation but also, in the case of Japan, to prepare for unpredictable future domestic gas demand as a result of power and gas market liberalisations. Flexibility is also important for establishing gas-on-gas (market) pricing because this pricing is possible only through flexible trading activities and subsequent growth of liquidity in the LNG market.

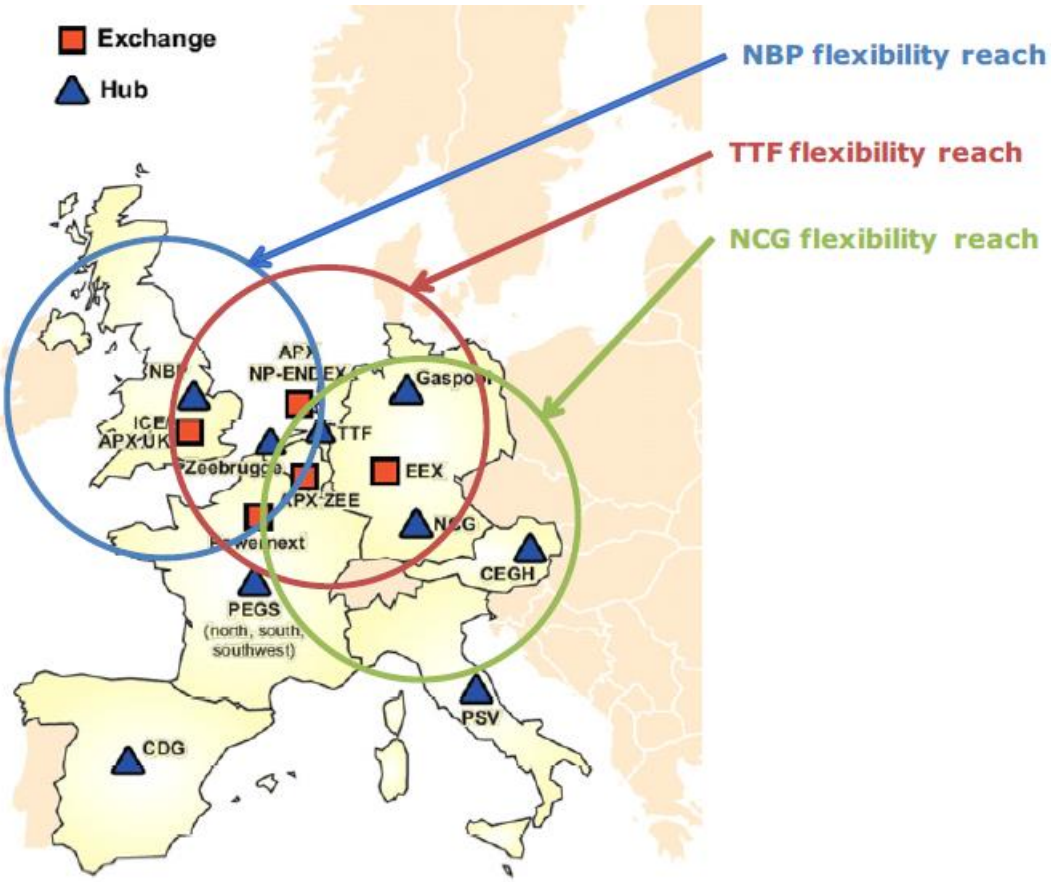
2.2 Seeking appropriate price formation

It is well known that the LNG in Asia has traditionally been priced in relation to crude oil price – typically Japan's average crude import price or Japan customs-cleared crude. Such oil indexation is an issue not only for price formation but also for flexibility because, due to the structure of price formulas, oil indexation prices cannot follow market fundamentals in a timely manner.

The oil indexation originated from Europe where majority of imported gas was priced by formula so that natural gas could compete with alternative fuel (mainly fuel oil and gas oil) in the market of importing countries. However, gas-on-gas pricing has been increasing in Europe because wholesale markets or hubs have become liquid enough to replace oil-

indexed prices that could not follow the fundamentals of the LNG market especially in 2009 and 2010 (Figure 2.4).

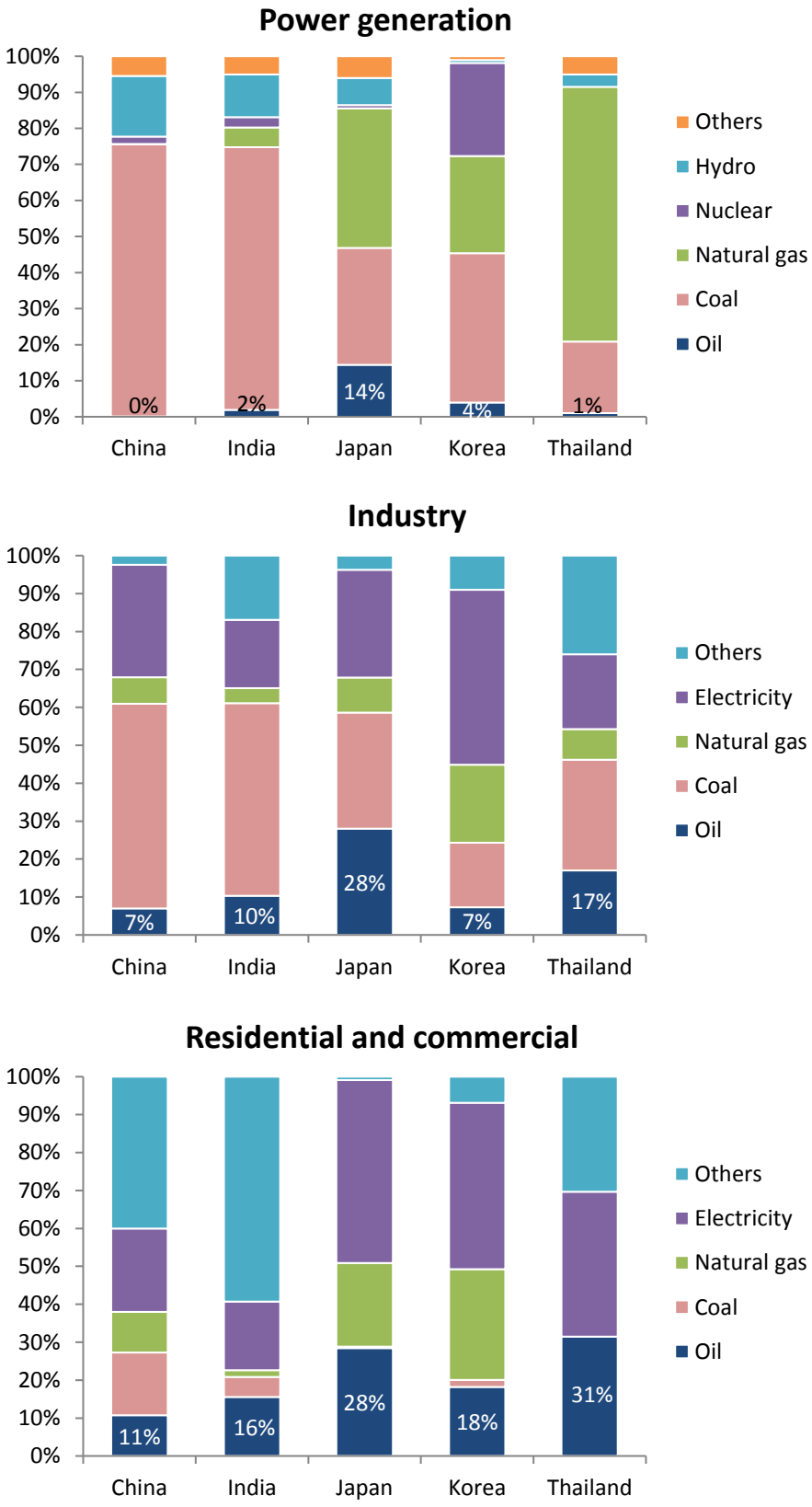
Figure 2.4 Gas Hubs in Europe



NBP = national balancing point, NCG = NetConnect Germany, TTF = title transfer facility.
Source: International Energy Agency, Developing a Natural Gas Trading Hub in Asia, 2013.

In a high oil price era, some importers and observers in traditional Asian LNG importing countries start to question the relevance of oil indexation as price formation process because natural gas has already replaced oil to a significant extent and, thus, little competition between natural gas and oil especially for power generation. As far as China and India are concerned, the dominant fuels are coal for power generation and industry sectors, and biomass and electricity for household and commercial sectors. Therefore, in those countries, competition between oil and natural gas is limited. In other words, one can question whether oil indexation as natural gas pricing for Asian importers is still appropriate (Figure 2.5).

Figure 2.5 Share of Oil in Energy Use in Major Countries



Source: International Energy Agency, Energy Balance, 2015.

Many Asian LNG buyers have been seeking alternative pricing in recent years. United States (US) LNG prices will be based on Henry Hub price, liquefaction, and transportation costs. Some of the new contracts feature hybrid pricing of Henry Hub, national balancing point or spot LNG price, and oil indexation. With the continued pricing diversification, it is clear that the Asia LNG price should reflect Asian market fundamentals with accuracy and timeliness.

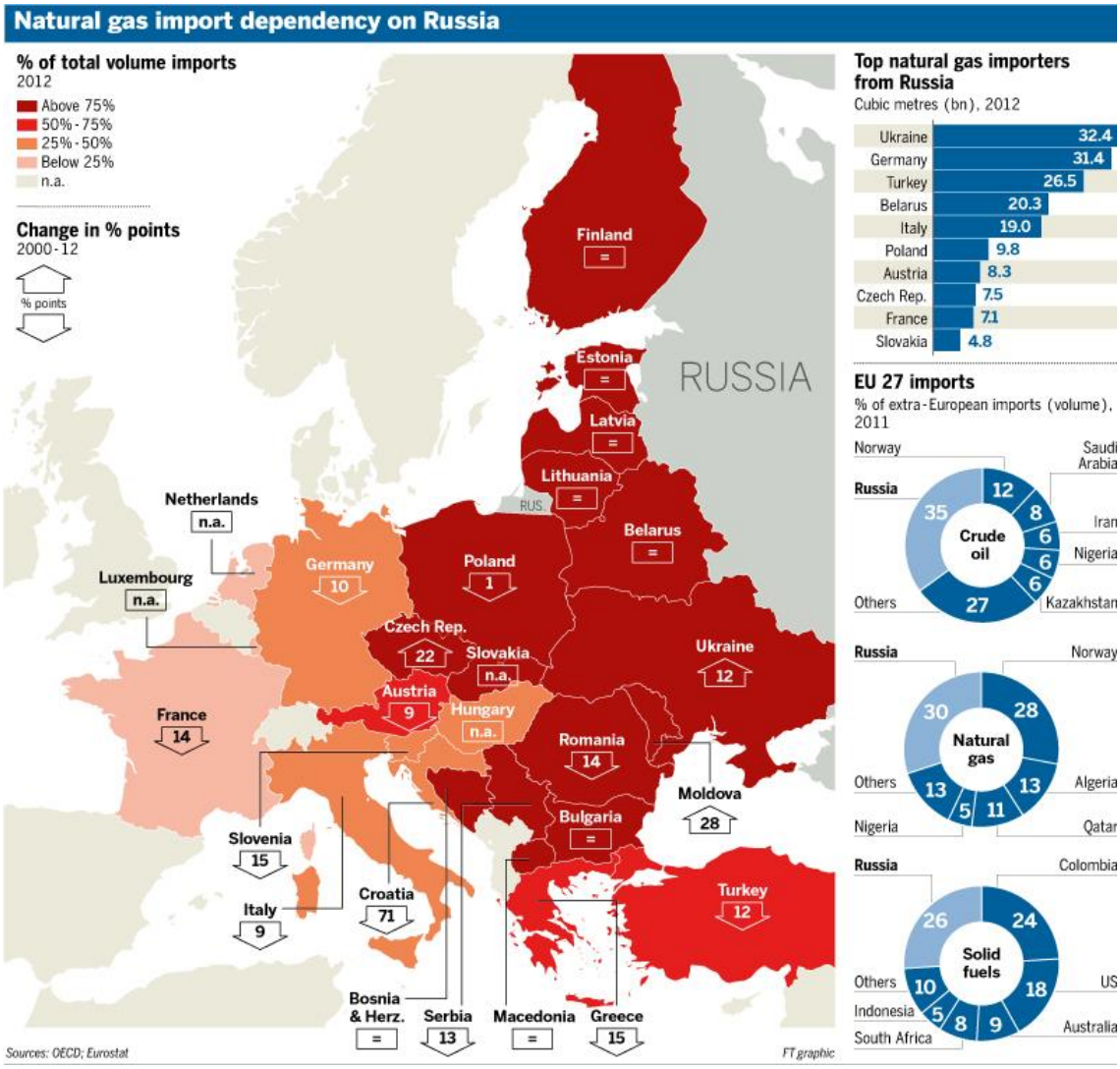
3. Ensuring gas security

Gas security issue has been spotlighted in Europe particularly since mid-2000s. Gas supply disruptions, especially in a winter heating season, undermined the security of supply in some European countries. In response to this situation, the European Union intensified its gas supply security discussions and implemented some policies, which include diversifying supply sources and enhancing flexibility of gas supply on a global basis (Figure 2.6).

The discussion has become widely recognised and has been shared among many countries even outside of Europe, as demonstrated by a declaration of the 2014 Brussels G7 Summit that supports the relaxation of destination clauses for promoting gas security. Based on common perception, a flexible, transparent, and competitive energy market, including gas or LNG market, is one of the core principles to build energy security. In addition, the European Commission has developed a new concept of 'Energy Union', which includes gas or LNG supply security as one of its pillars.

The series of discussions have enhanced awareness of LNG consumers in Asia on the importance of LNG supply security and trade flexibility. While each importing country in Asia faces different energy challenges, rising import dependency is urging importing countries to pursue flexible LNG supplies to ensure gas security.

Figure 2.6 Natural Gas Import Dependency on Russia in Europe

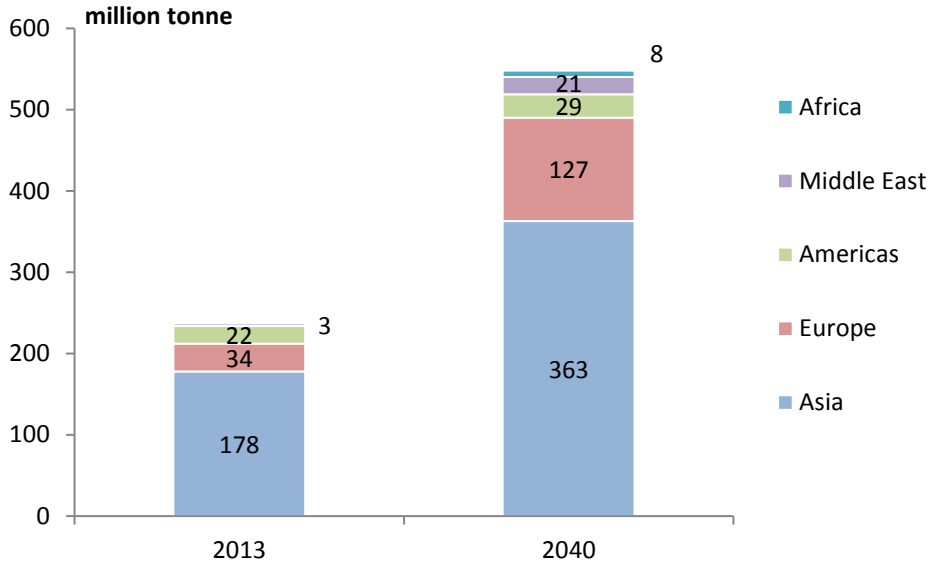


EU = European Union,
US = United States.
Source: Financial Times, 27 Apr 2014.

4. Securing investments to ensure future liquefied natural gas supply

The Asian LNG demand is expected to double and reach 363 million tonnes per annum in 2040, according to IEEJ (Figure 2.7). As such, continuous investment, which will commercialise supply potentials especially in Australia, North America, Russia, and Africa is expected to ensure security of LNG supply in Asia in the future. However, it is becoming critical to secure adequate and timely investments under the low gas price circumstance.

Figure 2.7. Liquefied Natural Gas Demand Outlook



Source: International Energy Economics, Asia/World Energy Outlook, Oct 2015.

Long-term contracts have been playing a major role to commercialise new LNG projects. Flexible market does not necessarily exclude long-term contracts. On the contrary, it is important to recognise the utility of long-term contracts especially for new, remote, green-field, and large-scale projects. However, future long-term contracts should feature gas-on-gas (market) pricing by such means as implying hub price element into a price formula.

CHAPTER 3

Discussions in the Working Group Meeting

This chapter will summarise major discussions in the two WG meetings.

3.1 Prospects for the Asian liquefied natural gas market

Extensive discussions were held on the trends and prospects for the global liquefied natural gas (LNG) market especially for the Asian LNG market. While Asia's growing population and economies are giving rise to energy demand, environmental problems are further stimulating the LNG market. Specifically, Asian developing economies refer to the pollution of air, water, etc. and not to greenhouse gas emissions. One of the important political agenda in developing economies is to alleviate these environmental problems, including serious air pollution in large cities in East China. One effective solution is to promote the use of natural gas, which contains less sulphur and produces no dust when burned. In most parts of Asia, domestic natural gas production fails to keep pace with growing demand. Boosting LNG imports while accelerating the adoption of clean coal and renewable energy technologies could fuel competition and diversification among energy sources.

On the other hand, natural gas demand is on the decline in Europe. Although gas-fired power generation is widely used for peak shaving in Latin America, natural gas is being supplied through pipelines from the US to Mexico. Such trends together could put downward pressure on the LNG demand in these regions. Thus, the Asian LNG market, especially the use of natural gas for power generation, is a key to forecasting the demand for LNG.

Since natural gas demand in Asia is highly sensitive to market prices, LNG should be supplied at affordable prices. Simultaneously, it should remain competitive against other fuel sources, such as coal and oil products, and should be used sustainably. It is also important to extend pipelines for gas distribution.

On the supply front, LNG exports from the US, where many projects are underway, are noteworthy given its supply potential. Specifically, a new market mechanism is expected to be in place since shipping destinations are not restricted and the pricing is not linked to oil prices. In addition, natural gas exports from Russia through the pipeline system is a key to forecasting China's LNG demand (i.e. the LNG supply–demand balance in Asia).

3.2 Impact of lower crude oil prices

With the oil market being sluggish, since the oil-linked pricing is the mainstream of existing contract, it resulted in a sharp decrease in the LNG prices. Moreover, as the LNG market eases, price gaps are narrowing between Europe and Asia, while they remain between North

America and Asia. The backlash from higher LNG prices, which has resulted in a significant outflow of national wealth, will surely bring economic benefits to LNG importing countries. Given the present circumstances, some importers may accept the oil-linked pricing. However, it makes sense to continue making efforts to create a hub-based pricing system when considering the original intention of pursuing rational pricing mechanism, taking into account the possibility of higher oil prices in the years ahead.

Natural gas is gaining a competitive edge over other energy sources in the US, while regulations on coal are becoming more stringent, prompting the power-generation sector to switch to natural gas.

Meanwhile, decreasing export revenues is having a negative economic impact on exporters and is expected to slow down investments in new gas resource development. For example, there has been a decreased interest by international oil companies (traditional major investors) and Japanese trading houses in investing in new LNG projects in Australia. Russia is no exception – projects for constructing a new LNG project near the Arctic Ocean and gas pipelines to China are likely to fall behind schedule. These situations are undesirable for importers, as well as for exporters. While the LNG market is easing, a slowdown in new LNG projects development could lead to short supply when demand picks up. The market is volatile in nature – the longer and deeper it eases, the longer and stronger the strain will be.

Lower LNG prices and the easing of its market are having an impact on the power balance between sellers and buyers. In fact, the terms and conditions of contracts for both new and existing LNG projects are changing.

Higher oil prices have led to higher LNG prices in recent years, with exporters being in favour of the oil-linked pricing. However, if the present situation continues – where LNG prices remain low due to lower oil prices – exporters may give up the oil-linked pricing for their own benefit. Given that a pricing system that does not reflect actual supply–demand fundamental is doomed to lose the confidence of both the exporters and the importers, the establishment of a sound LNG market and a hub-based pricing is beneficial for both parties.

3.3 Functioning the Asian liquefied natural gas market

The existence of hubs, which provide the market price of natural gas, helps the market function more effectively. Gas and power market liberalisation in importing countries will result in a greater need for well-functioning markets. Take Japan, for example, where the power and gas markets are being liberalised. With future demand increasingly uncertain, buyers are demanding lower prices, fuelling the need to increase the flexibility of LNG transactions. These changes also drive the need to create hubs.

Such flexibility is also important in improving the short-term supply security. An environment where the LNG can be traded any time by any one ensures a balanced supply–demand situation. Also important is the medium- to long-term supply security. For example, the LNG supply can be secured through firm contracts if gas demand is expected to increase over the

long term. Likewise, securing demand over the long term makes it possible to invest in high-risk resource development. Thus, long-term firm contracts remain viable, while both exporting and importing countries are expected to create a balanced portfolio over the short, medium, or long term.

The relaxation or abolishment of destination restrictions is one key condition to creating hubs. It will also stimulate short-term and spot transactions for adjustment purposes which is expected to increase the confidence of a pricing system reflecting real-time market conditions. In reality, however, shipping destinations are restricted by contracts between private companies, leaving little room for third parties to get involved. In addition, the period for reviewing the terms and conditions of the contracts is limited considering that these conditions usually concern long-term transactions. The only possible way, therefore, is to review them in phases when the contracts are renewed. Another option is to make the restriction on destinations illegal like in the case of Europe.

The liberalisation of domestic markets is also a key to increasing the number of traders and the amount of transactions. Europe's example shows the need to take a multilevel approach – such as abolishment of monopolies, institutionalisation of third-party access, improving transparency of usage and pricing of infrastructure, and establishment of regulatory authorities implementing these measures – which requires political determination and an extended period.

The development of infrastructure for natural gas is equally important. In Europe, for example, the extensive network of international pipelines forms the basis of flexible and active intra- and inter-regional transactions. With this network, the existing hubs in Europe have been established. In addition to transactions through the pipeline system, hub can be designed for spot LNG transactions as well. Since the geographical, political, and economic conditions of Asia are different from those in Europe where solid hubs are already in place, hubs that suite the needs of its region should be created.

It is often pointed out that the possible impact of a hub-based pricing system on investment should be taken into account. This is based on the assumption that oil prices are the world's most reliable index and that other indices are considered risky by private financial institutions, and this could dampen their appetite for investment. The fact, however, is that investment levels remain relatively high in the US (where hub prices serve as benchmarks) and in Europe (where hub prices are becoming standards). This is because gas is highly marketable in a highly liquid market, such as the US Henry Hub, though price fluctuation risks remain.

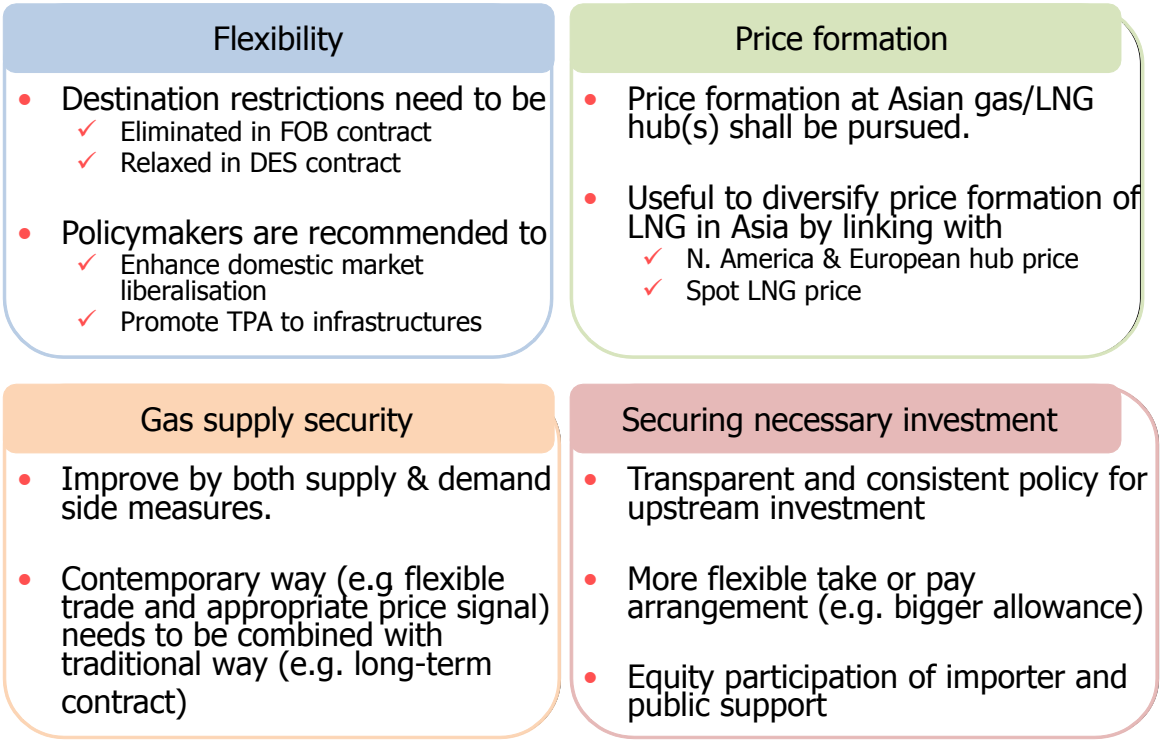
Although the key players in the LNG business are the private companies, the government concerned should support them. It is obvious, in particular, if the infrastructure is crucial for national energy security where the government shall take responsibility, and its investment risks involved are too high for private businesses to undertake. Support measures, however, should not cause significant inefficiency nor should it lead to too much intervention in the market.

CHAPTER 4

Policy Recommendation

The liquefied natural gas (LNG) market is in transition in terms of geographical and quantitative expansion, diversification of price formations, and lower oil and gas prices. In order to balance benefits between importers and exporters and to find workable solutions for sustainable LNG market development in varied energy situations in each importing and exporting countries, the LNG market players and policymakers are encouraged to enhance their efforts to create more flexible, transparent, and sustainable LNG market in Asia. Although the private sector is mainly responsible for commercial deals, the public sector is encouraged to support in improving the business environment to develop a better-functioning LNG market especially in terms of flexibility, price formation, and gas supply security; and in securing necessary investments (Figure 4.1).

Figure 4.1. Overview of Policy Recommendation



DES = delivered ex-ship, FOB = free on board, LNG = liquefied natural gas, TPA = third-party access.
Source: Study Team.

4.1 Flexibility

Enhancing flexibility is the key to a better-functioning LNG market in Asia. Not only international LNG but also domestic gas markets should be more flexible.

Contractual flexibility should be enhanced by eliminating destination restrictions in FOB contracts and relaxing them in DES contracts.

Policymakers are recommended to enhance domestic gas market liquidity through liberalising domestic gas market and prices, and developing adequate and accessible gas infrastructure capacities by promoting such measures as third-party access to gas infrastructures where applicable.

4.2 Price formation

Oil indexation has rapidly lost its relevance in recent years because oil is increasingly less competing than gas and is unable to track LNG market fundamentals. Gas-on-gas competition (market) pricing is fundamentally desirable so that the market fundamentals of LNG can be directly reflected on price.

Price formation at Asian gas or LNG hub(s), such as wholesale domestic gas market in Asian importing countries, as well as in spot LNG market, should be pursued. Singapore intends to establish a hub, and some other countries are exploring the possibility of this kind, including Japan. Further investigations and actions toward establishing Asian gas or LNG hub(s) are suggested.

It will be useful to diversify price formation of LNG in Asia by linking with North American and European hub pricings and spot LNG pricing, while tackling the following: (i) modifying Japan customs-cleared crude pricing to better reflect market conditions; and (ii) making continued efforts to develop Asian gas or LNG hub(s).

4.3 Gas supply security and the role of functioning market

Gas supply security attracts greater interest not only in Europe, where the conflict in Ukraine overshadows, but also in many Asian countries since their gas demand and import dependency soar.

Gas supply security should be improved by both supply and demand side measures, such as diversification of supply sources, including pipeline gas; development of emergency response scheme; improvement of energy efficiency; removal of price subsidies; and enhancement of demand flexibility.

Contemporary approach, such as flexible trade, for instance, between the European and Asian markets, and appropriate price signal of LNG are suggested to be pursued since these are important elements that can ensure, particularly in short term, gas supply security in a global LNG market. Traditionally, long-term contract has played this role. However, when

considering dramatically changing circumstances in each regional market, where steady progress takes place toward market liberalisation, it is obvious that long-term contact alone cannot fulfil the requirement of supply security.

Further, destination restrictions in contract need to be eliminated or relaxed to enhance flexible trade of LNG.

4.4 Securing necessary investments

It is critical to secure adequate and timely investments to realise additional LNG supply potential to meet the growing LNG demand in Asia, particularly in a current lower gas price circumstances.

The governments of LNG exporters are expected to maintain transparent and consistent policy to encourage upstream developments, while respecting social and environmental considerations and restrictions. The governments of LNG importers are expected, on the other hand, to promote adequate and accessible infrastructure developments.

Take-or-pay condition has been playing an important role to commercialise new LNG projects. However, in response to substantially changing market, it is suggested to pursue expanding allowances of downward quantity tolerance (DQT) and upward quantity tolerance (UQT) as much as possible.

Equity participation of importers and public support are suggested to be hired when private finance is not sufficiently available due to price uncertainty in the future.

Appendix 1. A Statement Paper of the Working Group

Recommendations

for a Better-Functioning

Liquefied Natural Gas Market in Asia

September 2015

The Economic Research Institute for ASEAN and East Asia
The Institute of Energy Economics, Japan

Acknowledgements

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The ERIA and the IEEJ take full responsibility for the wording and contents of this report.

Introduction

As a result of the first series of the Multilateral Joint Study Group on LNG in 2014, Masakazu Toyoda, CEO and Chairman of IEEJ, presented the 'Recommendations to Realize the Sound Development of LNG Market' at the 3rd LNG Producer–Consumer Conference in November 2014. The LNG market has been undergoing dramatic changes especially since the latter half of 2014. The most significant one is the collapse of oil prices, which led to lower Asian LNG prices. New liquefaction capacities and slower-than-expected demand decreased spot LNG prices even lower. As a consequence, Asian premium of LNG shrunk substantially.

While lower price is welcome for LNG importers in Asia, there remain unresolved issues, such as the lack of Asian benchmark price for LNG, inflexibility of LNG contracts, and security of gas supply. On the other hand, lower oil and gas prices pose a question as to how upstream investment is secured to ensure future LNG supplies, taking into consideration the long lead time for gas development. In the summer of 2015, the second series of Multilateral Joint Study Group on LNG examined these issues.

This document was drafted by IEEJ with an aim to make new recommendations to stakeholders and governments to promote sound development of the LNG market in Asia, based on discussions with a group of experts. This will be presented at the 4th LNG Producer–Consumer Conference on 16 September 2015 in Tokyo.

Recommendations for a Better-Functioning Liquefied Natural Gas Market in Asia

Background: Changes and challenges in the Asian liquefied natural gas market

The Asian liquefied natural gas (LNG) prices had been considerably higher than those in Atlantic market especially between 2011 and 2014. The price gap, or Asian premium, of LNG could not be explained by transportation cost between the Atlantic and Asian markets. The huge premium was a serious problem for LNG-importing countries in Asia.

The relaxation of supply–demand balance and the collapse of oil prices led to lower LNG price and decreased the Asian premium of LNG. However, there remain four unresolved challenges:

1. Calling for flexibility in Asian liquefied natural gas

LNG transactions in Asia are usually characterised by large volume, long term, and rigid contractual terms. These characteristics have been brought about by high gas transport, liquefaction and storage cost of natural gas, as well as high investment risk associated with upstream developments and illiquid LNG market in Asia. Therefore, traditional LNG contracts for Asia feature certain terms to reduce upstream investment risks and secure operation in a quasi-vertically integrated manner.

First, products typically have been sold under long-term contracts that often span more than 20 years. This is still largely the same today especially for new LNG projects, while some existing LNG projects offer shorter contracts.

Second, LNG contracts include a so-called ‘take-or-pay’ clause where a buyer is required to pay for the cargoes even if the buyer cannot take them for whatever reasons, although 5 percent to 10 percent upward or downward quantity allowance is typically embedded in the contract.

Third, in most LNG contracts for Asia, products are shipped only to specific geographical point(s) or country under ‘destination clause’. This clause was originally intended to lower investment risk by reinforcing security of supply for buyers and of demand for sellers. With destination clause, even in the case of free-on-board (FOB) contract, a buyer is not allowed to resell a cargo to another buyer without the seller’s consent. In Europe, the destination clause was made illegal to be incompatible with Rome Treaty by the European Commission, and almost all destination clauses were removed in FOB contracts.

While some contracts have offered relatively flexible terms in recent years, inflexibility still remains

in many LNG contracts in Asia. Importers need flexibility in gas trade not only to accommodate demand fluctuation but also, in the case of Japan, to prepare for unpredictable future domestic gas demand as a result of power and gas market liberalisations. Flexibility is also important for establishing gas-on-gas (market) pricing because it is only possible through flexible trading activities and subsequent liquidity growth of the LNG market.

2. Seeking appropriate price formation

It is well known that the LNG in Asia has traditionally been priced in relation to crude oil price – typically Japan's average crude import price or Japan customs-cleared crude. Such oil indexation is an issue not only for price formation but also for flexibility because, due to the structure of price formula, oil indexation prices cannot follow market fundamentals in a timely manner.

The oil indexation originated from Europe where the majority of imported gas was priced by formula so that natural gas can compete with alternative fuel (mainly fuel oil and gas oil) in the market of importing countries. However, gas-on-gas pricing has been increasing in Europe because wholesale markets (hubs) have become liquid enough to replace oil-indexed prices that could not follow the fundamentals of the LNG market especially in 2009 and 2010.

In a high oil price era, some importers and observers in traditional Asian LNG importing countries start to question the relevance of oil indexation as a price formation process because natural gas has already replaced oil to a significant extent and, thus, little competition between natural gas and oil especially for power generation. As far as China and India are concerned, the dominant fuels are coal for power generation and industry sectors, and biomass and electricity for household and commercial sectors. Therefore, in those countries, competition between oil and natural gas is limited in the first place. In other words, one can question whether oil indexation as natural gas pricing for Asian importers is still appropriate.

Many Asian LNG buyers are seeking alternative pricing in recent years. The US LNG prices will be based on Henry Hub price, liquefaction, and transportation costs. Some of the new contracts feature hybrid pricing of Henry Hub, national balancing point (NBP) or spot LNG price, and oil indexation. With the continued pricing diversification, it is clear that the LNG price for Asia should reflect market fundamentals in Asia with accuracy and timeliness.

3. Ensuring gas security

Gas security issue has been spotlighted in Europe especially since mid-2000s. Gas supply disruptions, in particular in a winter heating season, undermined security of supply in some

European countries. In response to this situation, the European Union intensified its gas supply security discussions and implemented some policies, which include diversifying supply sources and enhancing flexibility of gas supply on a global basis.

The discussion has become widely recognised and has been shared among many countries even outside of Europe, as demonstrated by a declaration of the Brussels G7 Summit in 2014 that supports the relaxation of destination clauses for promoting gas security. Based on a common perception, flexible, transparent, and competitive energy market, including gas or LNG market, is one of the core principles to build energy security. In addition, the European Commission has developed a new concept of 'Energy Union', which includes gas or LNG supply security as one of its pillars.

The series of discussions have enhanced awareness of LNG consumers in Asia for the importance of LNG supply security and trade flexibility. While each importing country in Asia faces different energy challenges, rising import dependency is urging importing countries to pursue flexible LNG supplies to ensure gas security.

4. Securing investments to ensure future liquefied natural gas supply

The Asian LNG demand is expected to double and reach 363 million tonnes per annum in 2040, according to IEEJ. As such, continuous investment, which will commercialise supply potentials especially in Australia, North America, Russia, and Africa, is expected to ensure security of LNG supply in Asia in the future. However, it is becoming critical to secure adequate and timely investments under the low gas price circumstance.

Long-term contracts have been playing a major role to commercialise new LNG projects. Flexible market does not necessarily exclude long-term contracts. On the contrary, it is important to recognise the utility of long-term contracts especially for new, remote, green-field, large-scale projects. However, future long-term contracts should feature gas-on-gas (market) pricing.

Recommendations

The LNG market is in transition in terms of geographical and quantitative expansion, diversification of price formations, and lower oil and gas prices. In order to balance benefits between importers and exporters and to find workable solutions for sustainable LNG market development in varied energy situations in each importing and exporting country, LNG market players and policymakers are encouraged to enhance their efforts to create more flexible, transparent, and sustainable LNG market in Asia. Although the private sector is mainly responsible for commercial deals, the public sector is encouraged to support in improving business environment to develop a better-functioning LNG market especially in terms of flexibility, price formation, and gas supply security; and in securing necessary investments.

1 Flexibility

Enhancing flexibility is the key to a better-functioning LNG market in Asia. Not only international LNG but also domestic gas markets should be more flexible.

1.1 Contractual flexibility should be enhanced by eliminating destination restrictions in free-on-board (FOB) contracts and relaxing them in delivered ex-ship (DES) contracts.

1.2 Policymakers are recommended to enhance domestic gas market liquidity through liberalising domestic gas market and prices, and developing adequate and accessible gas infrastructure capacities by promoting such measures as third-party access to gas infrastructures where applicable.

2 Price formation

The oil indexation rapidly has lost its relevance in recent years because oil is increasingly less competing than gas and is unable to track LNG market fundamentals. Gas-on-gas competition (market) pricing is fundamentally desirable so that the market fundamentals of LNG can be directly reflected on price.

2.1 The price formation at Asian gas or LNG hub(s), such as wholesale domestic gas market in Asian importing countries, as well as in spot LNG market, should be pursued. Singapore intends to establish a hub, and some other countries are exploring the possibility of this kind, including Japan. Further investigations and actions toward establishing Asian gas or LNG hub(s) are suggested.

2.2 It will be useful to diversify the price formation of LNG in Asia by linking with North American and European hub pricings and spot LNG pricing, while tackling the following:

(i) modifying Japan customs-cleared crude pricing to better reflect market conditions; and (ii) making continued efforts to develop Asian gas or LNG hub(s).

3 Gas supply security and the role of functioning market

Gas supply security attracts greater interest not only in Europe, where the conflict in Ukraine overshadows, but also in many Asian countries since their gas demand and import dependency soar.

3.1 Gas supply security should be improved by both supply and demand side measures, such as diversification of supply sources, including pipeline gas; development of emergency response scheme; improvement of energy efficiency; removal of price subsidies; and enhancement of demand flexibility.

3.2 Contemporary approach, such as flexible trade, for instance, between the European and Asian markets, and appropriate price signal of LNG are suggested to be pursued since these are important elements that can ensure, particularly short term, gas supply security in a global LNG market. Traditionally, long-term contract has played this role. However, when considering dramatically changing circumstances in each regional market, where steady progress takes place toward market liberalisation, it is obvious that long-term contact alone cannot fulfil the requirement of supply security.

3.3 Moreover, destination restrictions in contract need to be eliminated or relaxed to enhance the flexible trade of LNG.

4 Securing necessary investments

It is critical to secure adequate and timely investments to realise additional LNG supply potential to meet the growing LNG demand in Asia, particularly in a current lower gas price circumstances.

4.1 The governments of LNG exporters are expected to maintain transparent and consistent policy to encourage upstream developments, while respecting social and environmental considerations and restrictions. The governments of LNG importers are expected to promote adequate and accessible infrastructure developments.

4.2 Take-or-pay agreement has been playing an important role to commercialise new LNG projects. However, in response to substantially changing market, it is suggested to pursue expanding allowances of downward quantity tolerance (DQT) and upward quantity tolerance (UQT) as much as possible.

4.3 Equity participation of importers and public support are suggested to be hired when private finance is not sufficiently available due to price uncertainty in the future.

List of the Study Group Members

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Masakazu Toyoda	The Institute of Energy Economics, Japan
Laszlo Varro	International Energy Agency
Duan Zhaofang	CNPC Economics & Technology Research Institute, China

Appendix 2. Result of the 4th LNG Producer–Consumer Conference

1. Programme

The participants were grateful to have an opportunity to present their statement in Session 3 of the conference.

LNG Producer–Consumer Conference 2015
(Draft program, subject to change)
～Evolving LNG Market Towards Natural Gas Security～
September 16th, 2015
**Simultaneous interpretation between English and Japanese will be provided for all the sessions.*

12:00-13:00 Session 3:
LNG demand outlook & actions by consumers

Leaders and professionals from consuming countries will deliver special lectures. Energy consuming countries seeking competitive energy sources expect that natural gas would be a stable and competitive solution, while they face challenges, including security of supply, growing demand, appropriate pricing, and operational flexibility. LNG buyers, government officials, and research institutes will present their views about the LNG market, the major challenges, and the concrete measures they are taking for the procurement of LNG.

Speech & Panel Discussion:
- Mr. Yuji Kakimi, President, JERA Co.
- Mr. Sheng-Chung Lin, Chairman, CPC Corporation
- Mr. Michiaki Hirose, President, Tokyo Gas Co., Ltd.
- Mr. Masakazu Toyoda, Chairman and CEO, The Institute of Energy Economics, Japan (IEEJ)
- Mr. Takayuki Sumita, Director-General for Commerce, Distribution and Industrial Safety Policy, Japan

Moderator
- Mr. Guy Caruso, Senior Adviser, Energy and National Security Program, Centre for Strategic and International Studies

Q&A:

2. Brief summary of presentation

The LNG Joint Study Group, which was set up in 2014 based on the proposal of the Institute of Energy Economics, Japan (IEEJ), continued the discussions after the 4th LNG Producer–Consumer Conference and came up with four recommendations for the sound development of the Asian liquefied natural gas (LNG) market, taking into account rapid changes in market conditions, such as a slump in oil prices.

1. Recommendation for improving the flexibility of LNG transactions

The Asian LNG market should be more flexible to function more effectively, which also applies to each East Asia Summit (EAS) country's domestic gas market, as well as to the global LNG market.

- Relaxation or abolishment of destination restrictions in LNG trade agreements
- Effort to liberalise domestic gas markets

2. Recommendation for optimising the pricing system

As the conventional oil-linked pricing system is rapidly losing its rationality, a more appropriate system should be developed to reflect LNG market conditions in Asia.

- Effort to create (liquefied) natural gas hubs in Asia
- Effort to diversify LNG pricing in Asia

3. Recommendation for improving the security of natural gas supply

Improving the security of supply is a key challenge for Asian countries that are increasingly dependent on imports.

- Measures for both supply and demand sides, such as diversification of supply sources, emergency response, and energy-saving measures
- Pursuing supply security through increased flexibility of transactions and price signals in addition to conventional long-term contracts

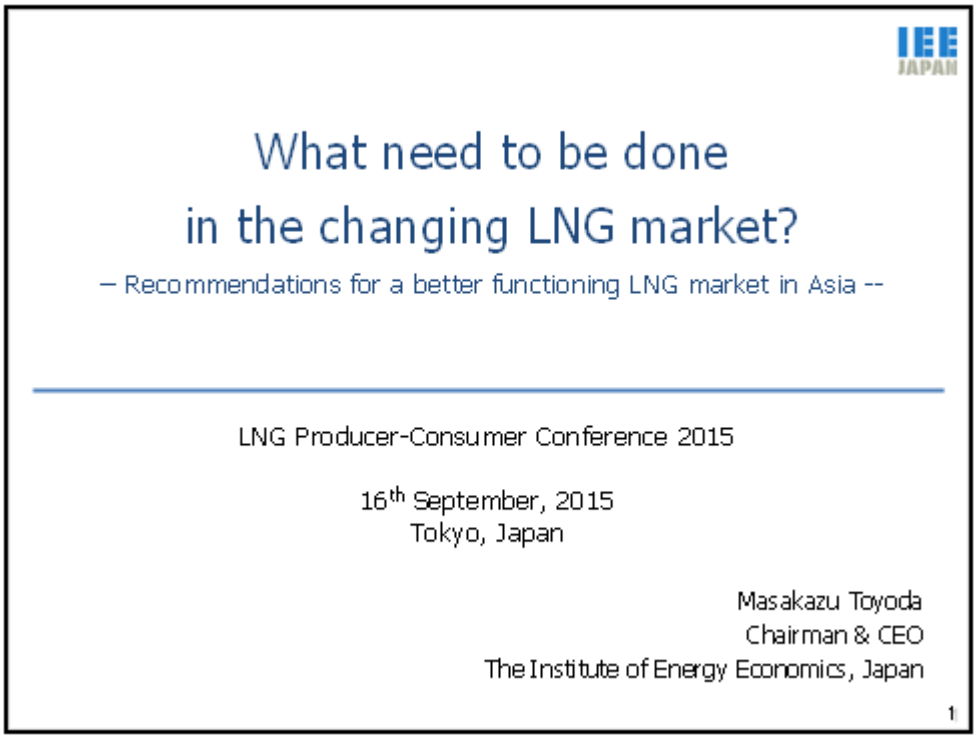
4. Recommendation for securing the required investments

Investments should be made in a timely manner to meet the growing demand for

natural gas.

- Creation of a transparent, predictable climate for investment in LNG exporting countries
- More flexible take-or-pay conditions (expansion of the scope of DQT/UQT)
- Capital participation by LNG importers and use of public assistance

3. Presentation material



We are a group of research experts

Launched in 2014

Delivered message to 2014 LNG P-C conference

2nd series of discussions

Deliver message to 2015 LNG P-C conference

- The study is supported and funded by ERIA (Economic Research Institute for ASEAN and East Asia)

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Key questions

- Has Asia Premium been eliminated?

  No. It looks like premium reduced, but still exist considerably.

- Is oil-indexation still relevant ?

  No. A relevance has been rapidly disappearing, and we need to pursue appropriate price formation.

- Can traditional security measure (e.g. long-term contract, Take or Pay) alone fulfill a requirement of security in importing countries?

  No. Importing countries need to seek more flexible measures by reflecting their changing regional and domestic market.

- Does recent low oil/gas price bring difficulty for upstream investment?

  Yes. We need to take actions to commercialize possible new supplies.

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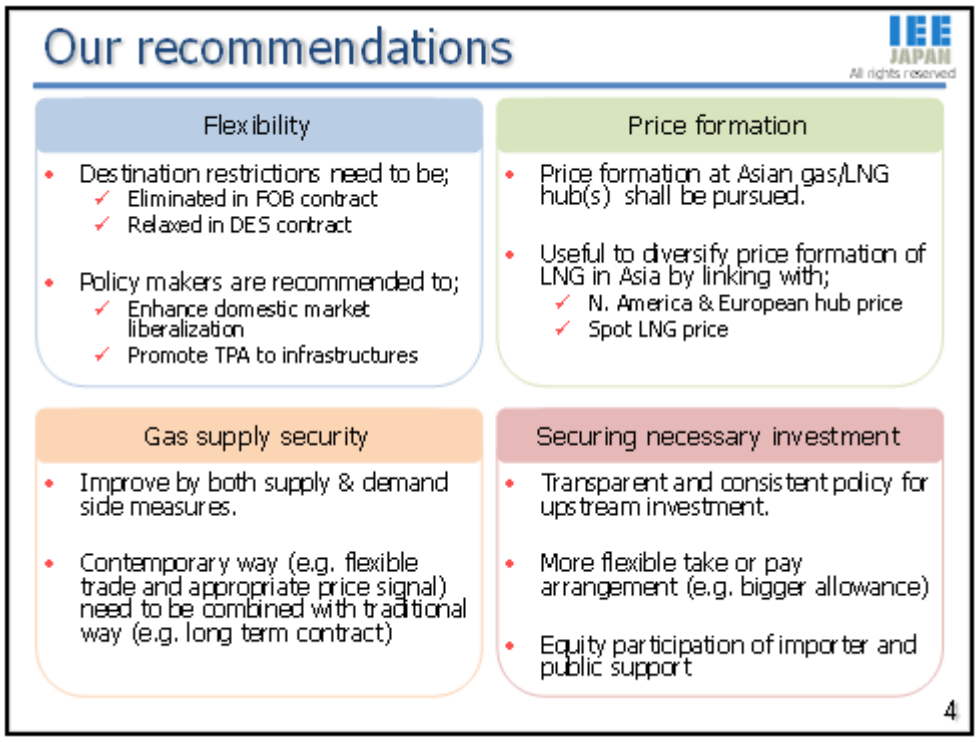

4. Extraction from the Official Summary Statement

- The Institute of Energy Economics, Japan (IEEJ)

Enhanced flexibility of LNG transactions is essential to realise a functioning LNG market in Asia. The market should also introduce pricing mechanisms that timely reflects prevailing market conditions. Supply security measures should include those of flexible contract terms and conditions and price signals, not necessarily limited to purely balancing measures. In order to secure timely investment in upstream development, it is necessary to promote better investment environment, more flexible take-or-pay applications, equity participation by companies from importing countries, and institutional supports by governments from importing countries.