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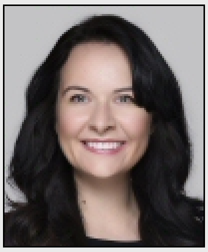

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Trends in LNG Supply Contracts and Pricing Disputes in the Asia Pacific Region
by S. Finizio, J.A. Trenor, and J. Tan

Trends in LNG Supply Contracts and Pricing Disputes in the Asia Pacific Region

By Steven P. Finizio, John A. Trenor, and Jared Tan[*]

The Asia Pacific region includes the largest import markets for LNG in the world, as well as some of the world's leading exporters. In many countries in the Asia Pacific region, demand for LNG is increasing because of growing energy needs and greener energy policies, among other reasons. At the same time, the landscape of the gas markets in the Asia Pacific region is changing. State-owned or incumbent gas companies and electricity utilities continue to import the majority of LNG, but new entrants have also emerged as a result of the steps taken to liberalize the gas markets in various countries in the region.

Although long-term LNG supply contracts have historically been a foundation of the industry and continue to play a defining role in LNG trade in the region, the volume of short-term and spot trades is increasing each year, presenting opportunities and challenges for sellers and buyers. Long-term contracts in the Asia Pacific region have historically contained oil-indexed price formulas, but the inclusion of additional contract price elements, including different indexes, has grown over time, as contract price formation in the Asia Pacific region evolves. Similarly, the clauses agreed by the parties to long-term LNG contracts in the Asia Pacific region to review and potentially revise the contract price formulas have evolved. These and other developments in the region, as well as the effects of dropping oil prices and the COVID-19 pandemic, may contribute to a continued increase in the number of price reviews and even arbitrations to resolve disputes between parties on pricing terms.

This article provides an overview of LNG trade in the Asia Pacific region, describes different types of LNG supply contracts and transactions, outlines key terms in long-term supply contracts, describes price formation mechanisms in LNG contracts, and then focuses on price review provisions and pricing disputes under long-term LNG supply contracts in the region. It concludes with a discussion of the future of price reviews in the Asia Pacific region.

I. Overview of LNG Trade in the Asia Pacific Region

The Asia Pacific region[1] began importing LNG 50 years ago, with the first LNG shipment imported into Japan in November 1969.[2] LNG trade, both globally and in the Asia Pacific region specifically, has grown dramatically since then. Over the past five years, global LNG trade has increased by 45%, led in particular by liquefaction capacity increases in Australia, the United States, and Russia, and by increased demand for natural gas, particularly in the Asia

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[1] This article uses the term "Asia Pacific" broadly to encompass all of the countries in both the "Asia" and "Asia Pacific" regions defined by the International Gas Union in its annual reports, which refer to all countries in Asia and the Pacific, with the exception of countries in the Middle East and the former Soviet Union. *See* International Gas Union, 2020 World LNG Report, at p. 97.

[2] *See, e.g.*, JERA, "JERA, 50th Year Anniversary of LNG (liquefied natural gas) to Japan," 1 November 2019, at https://www.jera.co.jp/english/information/20191101_419.

Pacific region.[3] The majority of that LNG trade is in long-term contracts, but shorter term and spot trades are increasing year by year, now accounting for over one-third of LNG trade.[4]

The Asia Pacific region is both the largest source of production for LNG exports globally and the largest destination for LNG imports in the world. On the supply side, countries in the Asia Pacific region are the source of production for 40% of global LNG trade and, on the demand side, account for almost 70% of global LNG imports.[5] LNG imports increased in all countries throughout Asia in 2019 and particularly in China – with the exceptions of Japan, South Korea, and Chinese Taipei (Taiwan), due to a milder winter, competition from coal-fired power generation, and the restart of nuclear reactors in Japan.[6]

1. LNG Import Markets in the Asia Pacific Region

The Asia Pacific region includes the largest LNG import markets in the world. Demand in the region has increased significantly over the past decade due to a number of factors, including continued economic growth (leading to an increase in demand for fuel), environmental policies and efforts to use cleaner energy sources (leading to an increase in switching from coal to natural gas),[7] and low oil prices (leading to reduced LNG prices due to predominantly oil-indexed long-term supply contracts).[8] Although it is too soon to predict the full impact of the COVID-19 pandemic on relative demand for LNG in particular countries, the Asia Pacific region will likely remain the largest importer of LNG for the foreseeable future.[9]

There is no single global market for LNG and indeed no single Asian market. Rather, each country has its own market for LNG, with significant differences in the regulatory frameworks, who buys and sells within the market, the role of pipeline gas supplies (if any), competition with other energy sources, and other factors. Of course, shifts in supply and demand around the world can have significant impacts on the market for LNG across countries, including across the Asia Pacific region.

Leading importers. The leading importers in the region – and globally – are Japan, China, South Korea, and India, and Chinese Taipei (Taiwan).[10] In each of the last five years, these five

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[3] U.S. Energy Information Administration, "Global LNG trade sets another record in 2019, recording the highest-ever annual growth," 23 April 2020, at https://www.eia.gov/naturalgas/weekly/archivenew_ngwu/2020/04_23/; *see also* GIIGNL, "LNG Markets and Trade," 2020, at https://giignl.org/lng-markets-trade-0 ("In 2019, global LNG trade accounted for 354.7 MT [million tonnes], a 13% increase vs. 2018."); GIIGNL Annual Report 2020, at p. 4.

[4] Long-term and medium-term contracts accounted for 66% of LNG trade in 2019, with spot volumes reaching 27%, and short-term contracts the remaining 7%. GIIGNL Annual Report 2020, at p. 7.

[5] *See* GIIGNL, "LNG Markets and Trade," 2020, at https://giignl.org/lng-markets-trade-0; *see also* GIIGNL Annual Report 2020, at pp. 4, 30. The Asia Pacific region's share of total LNG imports worldwide was 69.4% in 2019 (246.2 MT out of a total of 354.7 MT). *See* International Gas Union, 2020 World LNG Report, at pp. 14, 18; GIIGNL, Annual Report 2020, at p. 6. Indeed, between 2013 and 2018, the Asia Pacific region's share of total LNG imports worldwide has consistently ranged between 70% and 75%. *See* International Gas Union, 2020 World LNG Report, at pp. 20-21; International Gas Union, 2019 World LNG Report, at pp. 20-21.

[6] "Global LNG trade sets another record in 2019, recording the highest-ever annual growth," 23 April 2020, at https://www.eia.gov/naturalgas/weekly/archivenew_ngwu/2020/04_23/.

[7] *See* International Gas Union, 2019 World LNG Report, at p. 4.

[8] *See* L. Palti-Guzman, "The Future of Asia's Natural Gas Market: The Need for a Regional LNG Hub," Asia Policy, vol. 13:3, July 2018, at p. 4.

[9] *See* International Gas Union, 2019 World LNG Report, at p. 10.

[10] International Gas Union, 2020 World LNG Report, at p. 18. This article uses the term Chinese Taipei as used in the IGU World Report.

importers have accounted for more than 60% of global LNG imports.[11] The markets in these five largest importers, including the status of efforts to reduce historical monopoly control of imports and other aspects of the natural gas market, are described below, followed by brief overviews of Thailand and Singapore, two growing markets in the region that have announced plans to create regional natural gas hubs.

> Japan. Japan has been the world's largest LNG importer over the last decade,[12] accounting for 22% of the global market in 2019.[13] Japan relies heavily on oil, coal, and natural gas to meet its energy demand,[14] but, because it does not have an abundance of natural resources, almost all of the fossil fuels that Japan consumes are imported.[15] LNG imports satisfy roughly 25% of Japan's energy demand.[16] In addition to fossil fuels, Japan's energy needs are met through nuclear power and renewable energy.[17]
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> Following the 2011 Fukushima disaster, Japan's reliance on LNG imports increased, but LNG demand has been on a downward trend in recent years following the gradual restart of nuclear power plants,[18] as Japan's dependency on LNG as a percentage of energy consumption moves back toward pre-Fukushima levels. Unlike the rapidly growing economies in the Asia Pacific region (notably, China and India in particular), Japan does not have a fast-growing economy to drive growth in energy and LNG demand, and its energy consumption per capita has shrunk year-on-year over the past decade.[19] Nonetheless, Japan remains for now the largest LNG importer.[20]
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> In recent years, the largest LNG exporter to Japan by far has been Australia, providing 39% of LNG imports in 2019.[21] Japan also imports significant volumes from Malaysia, Qatar, Russia, Indonesia, and the United States.[22] Japan has the largest regasification

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[11] *See* International Gas Union, 2020 World LNG Report, at pp. 20-21; International Gas Union, 2019 World LNG Report, at pp. 20-21. The percentage was 62% in 2019 and ranged from 68 to 70% from 2015 to 2018.
[12] BP, Statistical Review of World Energy 2019, at p. 39.
[13] Japan imported 76.9 MT of LNG in 2019. International Gas Union, 2020 World LNG Report, at p. 18.
[14] Japan Ministry of Economy, Trade and Industry, Agency for Natural Resources and Energy, "Understanding the current energy situation in Japan – Part 1" (2019), at https://www.enecho.meti.go.jp/en/category/special/article/energyissue2019_01.html.
[15] For example, in 2018, 97.5% of LNG was imported. Japan Ministry of Economy, Trade and Industry, Agency for Natural Resources and Energy, "Understanding the current energy situation in Japan – Part 1" (2019), at https://www.enecho.meti.go.jp/en/category/special/article/energyissue2019_01.html.
[16] In 2017, 23.4% of Japan's energy needs were met by LNG (39.0% by oil and 25.1% by coal). Japan Ministry of Economy, Trade and Industry, Agency for Natural Resources and Energy, "Understanding the current energy situation in Japan – Part 1" (2019), at https://www.enecho.meti.go.jp/en/category/special/article/energy issue2019_01.html.
[17] In 2010, prior to the Fukushima disaster, 81.2% of Japan's energy was generated from fossil fuels, and 11.2% was from nuclear plants. In 2017, 87.4% of Japan's energy was generated from fossil fuels, and 12.6% was from nuclear plants. Japan Ministry of Economy, Trade and Industry, Agency for Natural Resources and Energy, "Understanding the current energy situation in Japan – Part 1" (2019), at https://www.enecho.meti.go.jp/en/category/special/article/energyissue2019_01.html.
[18] In 2019, total LNG imports into Japan decreased year-on-year by 5.6 MT down to 76.9 MT. International Gas Union, 2020 World LNG Report, at p. 18. In 2018, total LNG imports into Japan decreased year-on-year by 0.6 MT down to 83.2 MT. International Gas Union, 2019 World LNG Report, at pp. 16–17. *See also* "Japan LNG imports fall as nuclear plants restart," World Nuclear News, 5 March 2019.
[19] BP, Statistical Review of World Energy 2019, at p. 8.
[20] In 2019, Japan imported 76.9 MT of LNG, or 22% of the world's total imports. International Gas Union, 2020 World LNG Report, at p. 18.
[21] *See* International Gas Union, World LNG Report, at pp. 20-21.
[22] International Gas Union, 2020 World LNG Report, at pp. 20-21; *see also* BP, Statistical Review of World Energy 2019, at p. 40.

capacity in the world, currently 25% of global regasification capacity, and is expected to further expand.[23]

Japanese electric companies and gas utility companies import a significant amount of the LNG imported into Japan. Japan's largest LNG importer is JERA, a joint venture established in 2015 by two of Japan's largest electric companies: Tokyo Electric Power Group and Chubu Electric Power Group.[24] JERA reportedly imports 40% of Japan's total LNG.[25] At present, about 36% of the LNG imports are distributed by the gas utility companies in the form of city gas to the industrial, residential, and commercial sectors.[26] The remainder of LNG imports are consumed by the electric companies, which burn natural gas to generate electricity, and others.[27]

The Japanese government has taken significant steps in recent years toward liberalizing the electricity market. The retail market for electricity was fully deregulated in April 2016, allowing new market entrants to compete.[28] Before then, ten electric power companies distributed electric power to different parts of Japan through regional monopolies.[29] In April 2020, Japan implemented the unbundling of the transmission and distribution businesses.[30]

The Japanese government has also taken significant steps toward liberalizing the gas market. The retail market for gas was fully deregulated in April 2017, allowing new market entrants to compete.[31] Before then, regional gas utility companies held monopolies over the distribution of gas in different parts of Japan.[32]

The liberalization of the gas and electricity markets has introduced competition in the retail segments of the respective markets. Deregulation has resulted in new market entrants, which fuels competition and puts heightened pressure on the incumbent electric and gas utility companies to ensure that they procure the supply of LNG on more competitive and flexible terms.[33]

[23] As of February 2020, Japan's regasification capacity was 210.5 million tonnes per annum ("MTPA"). International Gas Union, 2020 World LNG Report, at p. 79.
[24] *See* "JERA – What's in a name?," at https://www.jera.co.jp/english/corporate/origin/.
[25] S. Shimbun, "LNG in focus as energy giants Chubu Electric and Tepco deepen ties with Jera venture," Japan Times, 29 March 2019.
[26] Japan Gas Association, "Gas Facts in Japan 2019-2020," p. 2, at https://www.gas.or.jp/gasfacts_e/.
[27] Japan Gas Association, "Gas Facts in Japan 2019-2020," p. 2, at https://www.gas.or.jp/gasfacts_e/.
[28] *See* Japan Electric Power Information Center, "The Electric Power Industry in Japan 2019," p. 7.
[29] *See* Japan Electric Power Information Center, "The Electric Power Industry in Japan 2019," p. 7.
[30] *See* Japan Electric Power Information Center, "The Electric Power Industry in Japan 2019," p. 11. A scheduled review conducted prior to the unbundling of these sectors confirmed that measures necessary to proceed with unbundling were properly being taken. *See* Japan Ministry of Economy, Trade and Industry, Agency for Natural Resources and Energy, "Results of the Review on the Circumstances Surrounding the Electricity Business Toward the Legal Unbundling of the Transmission/Distribution Sector," June 2019, at https://www.meti.go.jp/english/press/2019/pdf/0626_002a.pdf.
[31] H. Hashimoto, et al., "Japan's City-Gas Market – Full Retail Competition and Partnership," Institute of Energy Economics, September 2018, at p. 2, at https://eneken.ieej.or.jp/data/8070.pdf.
[32] "Factbox: Japan liberalizes gas supply to retail customer from April 1," Reuters, 31 March 2017.
[33] A. Abreu, "Dawn of a Global Commodity: LNG Trading Transformed" S&P Global Platts, 25 October 2017, at p. 29, at https://www.spglobal.com/platts/plattscontent/_assets/_files/en/specialreports/lng/lng-dawn-of-a-global-commodity-report.pdf.

The Japanese government has also announced plans to create a liquid LNG market and LNG trading hub in Japan.[34] In 2016, Japan's Ministry of Economy, Trade and Industry ("METI") published a paper entitled "Strategy for LNG Market Development," outlining initiatives that it would take to achieve the overriding goal of creating a "[f]lexible and liquid LNG market" and for Japan to "serv[e] as an LNG trading hub." In furtherance of this goal, METI set out a three-pronged approach: (a) enhancing the tradability of LNG; (b) establishing a proper price discovery mechanism; and (c) developing sufficient and accessible infrastructure.[35] Specific initiatives identified by METI included eliminating destination clauses in LNG supply contracts, developing a liquid LNG market, improving pipeline connectivity, and improving access to LNG terminals and reloading facilities. In 2017, the Japan Fair Trade Commission ("FTC") issued a report concluding that it is "highly likely" that destination restriction clauses in FOB contracts are anti-competitive[36] and that such clauses should not be included in new LNG contracts.[37]

China. China is the second largest LNG importer globally, accounting for 17% of the global market in 2019.[38] Since it first began importing LNG in 2006,[39] China has been the fastest-growing LNG market by a significant margin, with demand increasing dramatically in recent years.[40] The growth in demand for LNG has been driven by China's economic growth, as well as efforts to switch from coal to cleaner forms of energy.[41] China is projected to overtake Japan to become the world's largest LNG

[34] *See, e.g.*, O. Tsukimori, "Japan aiming to set up LNG trading hub by early 2020s," Reuters, 2 May 2016.

[35] Japan Ministry of Economy, Trade and Industry, "Strategy for LNG Market Development – Creating Flexible LNG Market and Developing an LNG Trading Hub in Japan," 2 May 2016, at pp. 7-8, at https://www.meti.go.jp/english/press/2016/pdf/0502_01b.pdf.

[36] *See* Japan Fair Trade Commission, "Survey on LNG Trades (Summary)," 28 June 2017, at p. 11, at https://www.jftc.go.jp/en/pressreleases/yearly-2017/June/170628_files/170628-1.pdf. For FOB contracts, the Japan FTC concluded: "Providing destination clauses is likely to be in violation of the Antimonopoly Act (Unfair Trade practices: Trading on Restrictive Terms). The restrictions on diversion as well as providing destination clauses are highly likely to be in violation of the Antimonopoly Act (Unfair Trade Practices: Trading on Restrictive Terms)." For DES contracts, the Japan FTC concluded: "Providing destination clauses, the provision to require 'seller's consent' to diversion or the provision of the necessary and reasonable requirements to diversion are not in itself problematic under the Antimonopoly Act. However, even if a buyer's request meets any requirements of necessity and reasonableness from a seller, when the seller refuses its consent to diversion, such refusals are likely to be in violation of the Antimonopoly Act (Unfair Trade Practices: Trading on Restrictive Terms). When a seller, on an operational or contractual basis, requests competition – restraining requirements for diversion, such requirements are highly likely to be in violation of the Antimonopoly Act (Unfair Trade Practices: Trading on Restrictive Terms)." *See also* S. Finizio, "Destination Restrictions and Diversion Provisions in LNG Sale and Purchase Agreements," in W. Rowley, *The Guide to Energy Arbitrations* (3d ed., 2019), at p. 225.

[37] *See* Japan Fair Trade Commission, "Survey on LNG Trades (Summary)," 28 June 2017, at p. 13 ("Based on this report, when LNG sellers conclude a new contract or revise a contract after the expiration, LNG sellers should not provide competition restraining clauses nor take business practices which lead to the restrictions of resale and so on. Also, as for the existing contracts before the expiration, LNG sellers, at least, should review competition-restraining business practices which lead to restrictions of resale and so on.").

[38] China imported 61.7 MT of LNG in 2019. International Gas Union, 2020 World LNG Report, at p. 18.

[39] *See* U.S. Energy Information Administration, "China becomes world's largest natural gas importer, overtaking Japan," 6 December 2018, at https://www.eia.gov/naturalgas/weekly/archivenew_ngwu/2018/12_06/ ("In 2017, China became the world's second largest LNG importer, with LNG imports growing steadily every year since 2006—when China began importing LNG—except 2015.").

[40] Chinese LNG imports grew by 14% from 2018 to 2019. *See* International Gas Union, 2020 World LNG Report, at p. 21; GIIGNL, Annual Report 2020, at p. 6. Chinese imports grew by almost 40% from 2017 to 2018, an increase of 15.8 MT, the largest ever volume increase for a single market. *See* International Gas Union, 2019 World LNG Report, at pp. 11, 21.

[41] China's 12th and 13th Five-Year Energy Plans and other governmental policies promote the use of natural gas and renewables in place of coal. *See* S. O'Sullivan, "China's Long March to Gas Price Freedom: Price Reform in

importer in 2024,[42] although Chinese LNG demand growth slowed in 2019 as a result of a lower economic growth rate, easing of efforts to switch from coal to gas, acceleration of domestic gas production, and increasing availability of renewables.[43] China has also begun to meet some of its natural gas demand by relying on new gas supply from the Power of Siberia Russia-China pipeline.[44]

China still relies on coal to meet a large, but decreasing percentage of its energy needs. In 2018, 58% of China's energy consumption was fueled by coal, but this was a historic low, down from 72% just ten years ago.[45] The share of natural gas in China's energy mix was 7.4% in 2018, but gas consumption is on a clear upward trend.[46] Although China produces a large amount of natural gas, it now relies on imports to meet 43% of its demand for natural gas.[47] A large proportion of natural gas is imported via gas pipelines from Turkmenistan, Uzbekistan, Azerbaijan, Myanmar, and more recently Russia. However, pipeline gas supply faces inherent infrastructural limitations, so China has turned to LNG supply to meet its growing natural gas demand.[48]

In recent years, the largest LNG exporter to China has been Australia by a wide margin (supplying over 45% in 2019), followed by Qatar, Malaysia, and Indonesia.[49] China has the third largest regasification capacity in the world and is building significant additional capacity.[50]

China has taken some steps to liberalize its natural gas market.[51] For example, in 2016, the National Development and Reform Commission ("NDRC") introduced benchmark city-gate prices for non-residential users, allowing suppliers and purchasers to agree on prices that could move up as much as 20% higher and drop as much as agreed, with no

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the People's Republic," Oxford Institute for Energy Studies, at pp. 8, 11 (2018).

[42] *See* "U.S., China will be world's biggest LNG exporter and importer in 2024: IEA," Reuters, 16 July 2019.

[43] *See* GIIGNL, Annual Report 2020, at p. 6.

[44] *See* "Analyst: Russia pipe gas supplies may further slow China's LNG import growth," S&P Global Platts, 18 October 2019; *but see* "China's new Russian natural gas pipeline won't worry LNG, oversupply will: Russell," Reuters, 2 December 2019 (noting that "the new pipeline is unlikely to have much of an impact on China's LNG demand, as it will effectively serve a market not currently reached by LNG imports…. What this means is that the fuel from the Power of Siberia pipeline is likely mainly to displace coal, especially in industry and residential heating during winter.").

[45] BP, Statistical Review – 2019: China's Energy Market in 2018, at p. 1, at https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-china-insights.pdf.

[46] Natural gas consumption increased by 18% from 2017 to 2018. BP, Statistical Review – 2019: China's Energy Market in 2018, at p. 2, https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-china-insights.pdf.

[47] BP, Statistical Review – 2019: China's Energy Market in 2018, at p. 1, at https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-china-insights.pdf. In 2018, China produced 162 billion cubic metres ("bcm") or 119 MT of natural gas. BP, Statistical Review – 2019: China's Energy Market in 2018, at p. 1, at https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-china-insights.pdf.

[48] *See* A. Abreu, et al., "Opportunities and challenges of China's LNG expansion," S&P Global Platts, 28 March 2018, at p. 3, at https://www.spglobal.com/platts/plattscontent/_assets/_files/en/specialreports/lng/sr-china-lng-expansion-032018.pdf.

[49] *See* International Gas Union, 2020 World LNG Report, at pp. 20-21.

[50] As of the end of 2019, China's regasification capacity was 77.4 MTPA, after adding 24.1 MTPA of new capacity between 2017 and 2019. China is projected to add up to 28.9 MTPA of regasification capacity by 2023. International Gas Union, 2020 World LNG Report, at p. 79.

[51] *See, e.g.*, M. Chen, "The Development of Chinese Gas Pricing – Drivers, Challenges and Implications for Demand," Oxford Institute for Energy Studies, at p. 13 (2014).

price floor.[52] In mid-2018, the NDRC also announced a harmonization of residential prices with non-residential city-gate prices, resulting in an increase in residential prices.[53]

China's three national oil companies ("NOCs"), which own the pipelines,[54] have traditionally monopolized the importation of LNG, but non-NOCs have carved out a small proportion of market share in recent years.[55] According to a 2018 report, non-NOCs have entered into eight LNG supply contracts (with terms ranging between five and 25 years) and are expected to import 10% of China's 2020 contracted LNG volume.[56]

The NDRC has also adopted measures to provide non-NOCs with access to certain infrastructure. In 2014, the NDRC issued the 2014 Measures for the Supervision and Administration of Fair Opening of Oil and Gas Pipelines Network (Trial Measures), which granted third-party access to midstream infrastructure, including LNG receiving terminals, pipelines, and storage facilities, for a trial period of five years.[57]

In 2019, after the trial period, the government issued the 2019 Measures for Regulation of Fair and Open Access to Oil and Gas Pipeline Facilities.[58] The 2019 Measures are more detailed and require operators to provide all eligible users access to their facilities through transparent tendering processes and to separate their pipeline business from other segments, including upstream production and sales.[59]

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[52] *See* S. O'Sullivan, "China's Long March to Gas Price Freedom: Price Reform in the People's Republic," Oxford Institute for Energy Studies, at p. 42 (2018); S. Cornot-Gandolphe, "China's Quest for Blue Skies – The Astonishing Transformation of the Domestic Gas Market," IFRI Center for Energy, September 2019, at p. 35; C. Feng, W. Shan, and H. Fan, "LNG Plays a More Crucial Role in China's Gas Supply: LNG Import Outlook and Strategies," October 2019, at p. 5, at https://www.gti.energy/wp-content/uploads/2019/10/05-LNG19-02April2019-Feng-Chenyue-paper.pdf.

[53] Residential prices had remained flat and depressed at levels substantially lower than non-residential prices up to that point. *See* S. Cornot-Gandolphe, "China's Quest for Blue Skies – The Astonishing Transformation of the Domestic Gas Market," IFRI Center for Energy, September 2019, at pp. 36–37; S. O'Sullivan, "China's Long March to Gas Price Freedom: Price Reform in the People's Republic," Oxford Institute for Energy Studies, at p. 49 (2018); C. Feng, W. Shan, and H. Fan, "LNG Plays a More Crucial Role in China's Gas Supply: LNG Import Outlook and Strategies," October 2019, at p. 5, at https://www.gti.energy/wp-content/uploads/2019/10/05-LNG19-02April2019-Feng-Chenyue-paper.pdf.; S. Yun Fan, "China's residential natural gas price hike to ease pressure on upstream producers, LNG importers," S&P Global Platts, 29 May 2018.

[54] *See* S. O'Sullivan, "China's Long March to Gas Price Freedom: Price Reform in the People's Republic," Oxford Institute for Energy Studies, at p. 36 (2018).

[55] In 2018, non-NOCs' share of China's total LNG imports was approximately 5%. *See* J. Yang and X. Zhou, "The Next Wave of Chinese LNG Importers," IHS Markit, April 2019, at p. 4.

[56] *See* A. Abreu, et al., "Opportunities and challenges of China's LNG expansion," S&P Global Platts, 28 March 2018, at pp. 5-6, at https://www.spglobal.com/platts/plattscontent/_assets/_files/en/specialreports/lng/sr-china-lng-expansion-032018.pdf.

[57] *See* G. Zhao, et al., "LNG Terminals in China - Project Development, Third Party Access and Foreign Investment Issues," 18 February 2020, at https://www.kwm.com/en/knowledge/insights/lng-terminals-in-china-project-development-third-party-access-and-foreign-investment-issues-20200218.

[58] *See* G. Zhao, et al., "LNG Terminals in China - Project Development, Third Party Access and Foreign Investment Issues," 18 February 2020, at https://www.kwm.com/en/knowledge/insights/lng-terminals-in-china-project-development-third-party-access-and-foreign-investment-issues-20200218.

[59] *See* A. Bowles, "Analysis: China's latest energy liberalization policy set to break oil and gas monopolies," S&P Global Platts, 6 June 2019.

Several non-NOCs are already operating their own LNG receiving terminals.[60] In December 2019, the Chinese government set up another state-owned national oil and gas pipeline company that will own pipeline assets taken from the three NOCs and is supposed to provide fair market access to infrastructure to third parties. The move is intended to improve market competition by unbundling production, transportation, and sales.[61]

South Korea. South Korea is the third largest importer of LNG in the world, accounting for 11% of the global market in 2019.[62] From 2015 to 2018, South Korea saw year-on-year growth in LNG imports,[63] but in 2019 South Korean LNG imports declined as the result of nuclear power generation, a mild winter, and high starting inventories.[64] As the International Gas Union notes, the reduction in LNG imports is expected to be temporary.[65]

South Korea's energy demands are met by a mix of nuclear power, renewables, coal, and natural gas, supplied by imported LNG. It currently relies on coal and nuclear power in particular, but a significant proportion of South Korea's energy needs (16.9% in 2017) is met by natural gas.[66] To meet its demand for natural gas, South Korea depends primarily on LNG imports, as it has negligible domestic gas production and no pipeline supply.[67] One key feature in the Ministry of Trade, Industry and Energy's 8th Electricity Plan, which includes projections for South Korea's electricity needs up to 2031, is further switching from coal to natural gas, with a substantial increase in the capacity of LNG power plants.[68]

In recent years, the largest LNG exporter to South Korea has been Qatar (accounting for almost a third), followed by Australia.[69] South Korea also imports significant

[60] *See, e.g.*, A. Abreu, et al., "Opportunities and challenges of China's LNG expansion," S&P Global Platts, March 2018, at pp. 4-5, at https://www.spglobal.com/platts/plattscontent/_assets/_files/en/specialreports/lng/sr-china-lng-expansion-032018.pdf.

[61] *See* "China sets up state oil, gas pipe firm to boost competition: Xinhua," Reuters, 8 December 2019.

[62] South Korea imported 40.1 MT of LNG in 2019. International Gas Union, 2020 World LNG Report, at p. 18.

[63] BP, 2019 Statistical Review of World Energy, at p. 39.

[64] GIIGNL, Annual Report 2020, at p. 6.

[65] International Gas Union, 2020 World LNG Report, at p. 79 ("LNG import is set to temporarily decrease owing to the start-up of new long-planned nuclear and coal-fired power plants.").

[66] South Korea Ministry of Trade, Industry and Energy, 8th Basic Plan for Long-term Electricity Supply and Demand, at p. 44, at https://policy.asiapacificenergy.org/sites/default/files/8th%20Basic%20Plan%20for%20Long-term%20Electricity%20Supply%20and%20Demand%20%282017%20-%202031%29.pdf.

[67] W. Keun, "South Korea's Energy Policy Change and the Implications for its LNG Imports," Oxford Institute for Energy Studies, at p. 6 (2018).

[68] *See* South Korea Ministry of Trade, Industry and Energy Press Release, "Ministry announces 8th Basic Plan for Electricity Supply and Demand," 14 December 2017, at http://english.motie.go.kr/en/pc/pressreleases/bbs/bbsView.do?bbs_cd_n=2&bbs_seq_n=605 ("Between 2017 and 2030, … [t]he total capacity of LNG power plants would expand to 47.5 GW from 37.4 GW…. Under the new energy roadmap, natural gas and renewable energy sources will have a greater share in the generation mix in terms of installed capacity."). *See also* South Korea Ministry of Trade, Industry and Energy, 8th Basic Plan for Long-term Electricity Supply and Demand, at p. 43, at https://policy.asiapacificenergy.org/sites/default/files/8th%20Basic%20Plan%20for%20Long-term%20Electricity%20Supply%20and%20Demand%20%282017%20-%202031%29.pdf ("Compared with the base scenario, the share of coal-fired generation decreased further while the share of LNG generation increased.").

[69] *See* International Gas Union, 2020 World LNG Report, at pp. 20-21.

volumes from the United States, Oman, Malaysia, and Indonesia.[70] South Korea has the second largest regasification capacity in the world.[71]

Korea Gas Corporation ("KOGAS") is the country's sole wholesaler as other importers are only permitted to import natural gas for their own power production.[72] However, in 2016, the South Korean government approved plans to allow the private sector to import LNG and resell to utility companies starting in 2025.[73] In 2018, KOGAS imported 86% of South Korea's LNG imports; the remaining 14% was purchased by other Korean power utilities.[74] KOGAS also owns five of the seven LNG import terminals in South Korea,[75] the transmission system, and more than 90% of storage capacity as of 2017.[76] South Korea has more than 30 distribution companies, each operating within its own region and purchasing wholesale gas from KOGAS at a government-approved price, which it then sells to end users.[77]

India. India is the fourth largest importer of LNG globally, accounting for 7% of the global market in 2019.[78] India began importing LNG in 2004, and its imports have increased substantially in recent years.[79] This is attributable largely to population growth and economic development, which have, in turn, led to a corresponding increase in energy demand, which India has supplied in part with imported LNG.[80]

In 2016, the Indian government announced its intention to become a "gas based economy" by developing domestic production but also by building facilities to import LNG, developing pipeline infrastructure, and developing gas consuming markets like fertilizer, power, transport, and other industries.[81] In 2018, Prime Minister Modi announced plans to shift away from reliance on crude oil, due to pollution, by increasing India's natural gas consumption by 250% by 2030.[82] India's ability to reach this goal may be affected by infrastructure constraints, especially in terms of domestic pipelines

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[70] International Gas Union, 2020 World LNG Report, at pp. 20-21.
[71] South Korea has 125.8 MT of regasification capacity at the end of 2019. International Gas Union, 2020 World LNG Report, at p. 79.
[72] "S Korea to allow buyers to bypass Kogas, import LNG directly from 2025," S&P Global Platts, 14 June 2016.
[73] W. Keun, "South Korea's Energy Policy Change and the Implications for its LNG Imports," Oxford Institute for Energy Studies, at pp. 14-15 (2018); "S Korea to allow buyers to bypass Kogas, import LNG directly from 2025," S&P Global Platts, 14 June 2016.
[74] "Kogas adopts new LNG pricing method to try keep S Korean utilities off imports," S&P Global Platts, 10 January 2020.
[75] *See* GIIGNL, Annual Report 2020, at p. 51.
[76] W. Keun, "South Korea's Energy Policy Change and the Implications for its LNG Imports," Oxford Institute for Energy Studies, at p. 4 (2018).
[77] *See* U.S. Energy Information Administration, "Country Analysis Brief: South Korea," July 2018, at p. 12.
[78] India imported 24 MT of LNG in 2019. International Gas Union, 2020 World LNG Report, at p. 18.
[79] *See* BP, Statistical Review of World Energy 2019, at p. 39; International Gas Union, 2020 World LNG Report, at p. 18.
[80] *See* BP, Statistical Review – 2019: India's Energy Market in 2018, at p. 1, at https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-india-insights.pdf.
[81] India Ministry of Petroleum and Natural Gas, "Steps Being Taken to Make India a Gas Based Economy," 21 November 2016, at https://pib.gov.in/newsite/PrintRelease.aspx?relid=153957.
[82] "India's Modi targets gas exchange to ease shift from oil," Reuters, 22 November 2018 (quoting Prime Minister Modi stating that "[w]e want to increase the use of natural gas by 2.5 times by the end of next decade").

to move LNG from coastal import facilities to areas further inland.[83] Moreover, coal remains an abundant and inexpensive alternative.[84]

India currently relies heavily on oil and coal for its energy needs. Coal represents more than 50% of India's energy mix, oil represents 30%, and natural gas currently accounts for only about 6%.[85] Demand for natural gas is met in part by LNG imports, and in part by domestic production (although domestic production has been on the decline for nearly a decade).[86] India does not currently import pipeline gas, but the TAPI (Turkmenistan-Afghanistan-Pakistan-India) pipeline is under construction and will meet part of India's demand for natural gas when ready.[87]

In recent years, the largest LNG exporter to India has been Qatar (accounting for almost a half).[88] India also imports significant volumes from Nigeria and Angola, and more recently from Australia and the United States.[89] India has the seventh largest regasification capacity globally, with significant additional regasification capacity under construction.[90]

India imposes an open general license regime for the importation of LNG, but the terms and conditions of such supply contracts are left to be determined by the buyers and sellers of LNG.[91] The major importers of LNG in India are state-owned oil and gas companies, including Petronet LNG (India's largest gas importer), GAIL (India) Limited, and Indian Oil Corporation Ltd.

India has taken some preliminary steps to liberalize its gas market. In 2013, India's Petroleum and Natural Gas Regulatory Board released "'Vision 2030' Natural Gas Infrastructure in India," a report discussing policy and regulatory measures to prepare India's gas sector for the future. One of the measures identified was the need to unbundle the transmission and marketing of natural gas.[92] The Indian government did not take immediate steps in response to the report, but in 2018 it announced that it was working on unbundling the transmission and marketing of natural gas.[93] India's largest gas distributor, GAIL, is still in the process of splitting its transmission and marketing

[83] *See* U.S. Energy Information Administration, "Growth in India's LNG Imports will Depend on Completion of Connecting Pipelines," 8 May 2020, at eia.gov/todayinenergy/detail.php?id=43655.
[84] *See* S. Mohanty, S. Kanoi, and H. Min Lee, S&P Global Platts, "Analysis: In India's energy mix, gas faces tough battle with coal," 15 August 2019.
[85] BP, Statistical Review – 2019: India's Energy Market in 2018, at p. 2, at https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-india-insights.pdf.
[86] BP, Statistical Review of World Energy 2019, at p. 32.
[87] *See, e.g.*, "Tension over Kashmir not to affect TAPI: Pakistan assures Turkmenistan," Economic Times, 15 September 2019.
[88] *See* International Gas Union, 2020 World LNG Report, at pp. 20-21.
[89] International Gas Union, 2020 World LNG Report, at pp. 20-21.
[90] India has 34.5 MT of regasification capacity, with an additional 24 MT of capacity under construction as of February 2020. International Gas Union, 2020 World LNG Report, at p. 79.
[91] *See generally* India Ministry of Petroleum and Natural Gas, "Import of Natural Gas," 23 July 2018 ("LNG is imported under open general license on the terms and conditions mutually agreed upon between the buyers and sellers.").
[92] *See* India Petroleum and Natural Gas Regulatory Board, "'Vision 2030' Natural Gas Infrastructure in India," 2013, at p. 68.
[93] A. Corbeau, et al., "The Challenges Facing India on its Road to a Gas-Based Economy," King Abdullah Petroleum Studies and Research Center, 29 October 2018, at p. 29, at https://www.kapsarc.org/research/publications/the-challenges-facing-india-on-its-road-to-a-gas-based-economy/.

businesses, through a spin-off of its transmission business, but no concrete timelines have been announced.[94] In 2018, GAIL began to allow third-party access to its pipeline network.[95]

<u>Chinese Taipei (Taiwan)</u>. Chinese Taipei is the fifth largest importer of LNG globally, accounting for 5% of the global market in 2019.[96] After a decade of year-on-year growth in LNG imports,[97] Chinese Taipei's LNG imports fell slightly in 2019 by 0.2 MT,[98] but in the long term LNG imports are expected to increase, as the result of government plans to increase the proportion of LNG in its energy mix from 38% to 50% by 2025, and to gradually decrease its use of coal.[99] Chinese Taipei also has plans to eliminate nuclear energy from its energy mix by 2025, in furtherance of the government's policy to create a "nuclear-free homeland," by phasing out the country's six operating reactors and not renewing their operating licenses.[100]

Chinese Taipei has the eleventh largest regasification capacity globally.[101] In order to handle expected increases in LNG imports, Chinese Taipei is expanding its regasification capacity by adding capacity to an existing terminal and constructing another.[102] In 2019, Chinese Taipei had the highest regasification utilization globally.[103] CPC Corporation, the state-owned petroleum and natural gas company, is the sole LNG importer in Chinese Taipei and owns all of the gas terminals, transmission systems, and storage facilities.[104]

<u>Other importers in the region</u>. In addition to the major LNG importers discussed above, several other countries in the Asia Pacific region import smaller volumes of LNG, including Pakistan, Thailand, Bangladesh, Indonesia, Singapore, and Malaysia (in order of decreasing LNG volumes), and Indonesia and Malaysia are also significant LNG exporters, as discussed below.[105] Moreover, additional countries, including Vietnam and the Philippines, are expected to begin importing LNG later this decade.[106] Both Thailand and Singapore have announced ambitions to become regional LNG hubs, and those two markets are discussed briefly below.

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[94] *See* N. Sharma, "GAIL Begins Process to Hive Off Pipeline Business into Separate Unit," BloombergQuint, 23 December 2019.
[95] *See* India Ministry of Petroleum and Natural Gas, "Petroleum and Natural Gas Minister launches online portal for Common Carrier Capacity booking on GAIL's pipelines," 27 August 2018. *See also* N. Sharma, "GAIL Begins Process to Hive Off Pipeline Business into Separate Unit," BloombergQuint, 23 December 2019.
[96] Chinese Taipei imported 16.7 MT of LNG in 2019. International Gas Union, 2020 World LNG Report, at p. 18.
[97] BP, Statistical Review of World Energy 2019, at p. 39.
[98] International Gas Union, 2020 World LNG Report, at p. 18.
[99] *See* "Drewry: Taiwan's LNG Imports to Grow; Expect More Long-Term Contracts," International Shipping News, 17 May 2019.
[100] "Taiwan Government Maintains Nuclear Phase-Out," World Nuclear News, 1 February 2019.
[101] Chinese Taipei has 14 MT of regasification capacity, as of February 2020. International Gas Union, 2020 World LNG Report, at p. 79.
[102] International Gas Union, 2020 World LNG Report, at p. 79.
[103] International Gas Union, 2020 World LNG Report, at p. 79 ("Chinese Taipei registered the highest regasification utilisation in 2019 at around 113%; the market has typically received higher volumes than its announced regasification capacity. 2019 saw Chinese Taipei's terminals working above its full utilisation rate all year round, with the exception of February 2019.").
[104] *See* D. Wang, "Taiwan's LNG Imports in 2019 Stagnate First Time in 10 Years," S&P Global Platts, 14 January 2020.
[105] International Gas Union, 2020 World LNG Report, at pp. 20-21.
[106] *See, e.g.*, K. Iwamoto, "Singapore aims to be Asia LNG hub as demand soars," Nikkei Asian Review, 30

Thailand. Thailand is currently a smaller LNG importer, the fourteenth largest globally, accounting for just 1% of the global market in 2019.[107] However, Thailand has seen year-on-year increases in LNG imports since 2011.[108] LNG imports into Thailand are also expected to continue to increase in the future. In 2018, Thailand's National Energy Policy Council approved the Power Development Plan 2018-2037 ("PDP"), which maps out the country's long-term energy needs and capacity. Under the PDP, more than half of Thailand's energy needs are projected to be met through natural gas consumption by 2037.[109] To achieve this, Thailand plans to drastically increase its LNG imports.[110] The bulk of Thailand's natural gas demand is met currently by domestic production and pipeline gas from Myanmar.[111] Domestic production, however, has been on the decline since 2014.[112]

Thailand's state-owned oil and gas company, PTT, is the primary importer of LNG and the owner of Thailand's only receiving terminal.[113]

Thailand's Energy Regulatory Commission has recently passed third-party access rules as part of a push to liberalize the gas market. In 2018, the government issued a license to Thailand's energy provider, the Electricity Generating Authority of Thailand ("EGAT") to purchase its own spot cargoes.[114]

Thailand currently has the twelfth largest regasification capacity globally.[115]

The government recently announced plans to make Thailand a free-trade hub for LNG.[116] To accommodate the increase in LNG trade flows into Thailand, the existing LNG terminal is being expanded, and a second receiving terminal is under construction.[117]

Singapore. Singapore is also a smaller LNG importer, the twentieth largest globally, accounting for only 1% of the global market in 2019.[118] However, Singapore has seen

December 2019.

[107] Thailand imported 5.0 MT of LNG in 2019. International Gas Union, 2020 World LNG Report, at p. 18.

[108] *See* BP, Statistical Review of World Energy 2019, at p. 39.

[109] *See* "Thailand Approves Power Plan, Expects Capacity to Reach 77 GW by 2037," Reuters, 30 April 2019 ("By 2037, 53 percent of total capacity would be from natural gas ….").

[110] *See* "Thailand Plans to Quadruple LNG Imports to Boost Electrification Levels," Gas to Power Journal, 13 February 2020.

[111] In 2018, Thailand produced 37.7 bcm (or 27.9 MT) of natural gas, imported 7.8 bcm of pipeline gas from Myanmar, and imported 6.2 bcm of LNG. *See* BP, Statistical Review of World Energy 2019, at pp. 32, 40, 41.

[112] *See* BP, Statistical Review of World Energy 2019, at pp. 33 and 41. *See also* "UPDATE 1-Thailand seeks LNG, new energy resources as gas reserves dwindle," Reuters, 9 January 2014.

[113] International Gas Union, 2020 World LNG Report, at p. 102; J. Jaganathan, "UPDATE 2-Thailand's EGAT seeks LNG for first time as market liberalises," Reuters, dated 21 August 2018 (noting that PTT had been Thailand's sole LNG importer previously).

[114] EGAT has a lease agreement with PTT for use of its terminal and gas pipeline. *See* Y. Praiwan, "LNG hub comes together quickly," Bangkok Post, 10 February 2020. EGAT's first shipment arrived in December 2019. EGAT, "EGAT Celebrates the First LNG Cargo Slot," 6 January 2020.

[115] Thailand has 11.4 MT of regasification capacity, as of February 2020. International Gas Union, 2020 World LNG Report, at p. 79.

[116] *See* Y. Praiwan, "LNG hub comes together quickly," Bangkok Post, 10 February 2020; J. Prakash, "Thailand reveals LNG hub ambitions," Gas World, 9 March 2020.

[117] *See* "PTT reveals regional LNG trading plan," Bangkok Post, 13 September 2019.

[118] Singapore imported 3.3 MT of LNG in 2019. International Gas Union, 2020 World LNG Report, at p. 18.

year-on-year increases in LNG imports since it began importing LNG in 2013.[119] Singapore's demand for LNG in the long-term is expected to increase as Singapore transitions from its current reliance on pipeline gas to greater importation of LNG. As of 2018, over 70% of Singapore's natural gas was imported via pipeline (from Malaysia and Indonesia), with just under 30% from LNG imports.[120] By 2025, Singapore is expected to rely on LNG imports to meet more than half of its gas demand. These plans are in part based on concerns about continuing to rely on pipeline gas from Malaysia and Indonesia because of pricing and growing domestic demand in those countries.[121]

Singapore has a liberalized natural gas market with both private and state-affiliated LNG importers. The Singapore Energy Market Authority ("EMA") issues licenses to companies involved in the transport, shipping, retail, and importation of gas, as well as operators of the LNG terminal and onshore receiving facilities for piped natural gas.[122] The EMA has capped the quantity of spot LNG that can be imported to 10% of long-term contracted pipeline and LNG supply.[123]

Singapore has the thirteenth largest regasification capacity globally[124] and is constructing another LNG receiving terminal, which is scheduled to be operational by 2030.[125] The second LNG terminal reportedly could be used "to split up large-scale LNG shipments into smaller parcels and supply them to the region."[126] Singapore is also a global leader in LNG re-exports, although volumes were only 0.4 MT in 2019.[127]

Singapore has ambitions to become a regional trading hub for LNG, capitalizing on its geographic location and building on its existing platform as a center for trade and finance.[128] Singapore announced plans to become an LNG hub in 2016.[129] In mid-2015, the Singapore Exchange launched the Singapore LNG Index Group (the "SLInG index"), an index reflecting FOB spot prices for LNG delivered in Singapore, as well

[119] *See* BP, Statistical Review of World Energy 2019, at p. 39; International Gas Union, 2020 World LNG Report, at p. 18.
[120] *See* E. Yep, "Analysis: LNG to surpass piped gas in Singapore's future energy mix," S&P Global Platts, 6 December 2019.
[121] *See* E. Yep, "Analysis: LNG to surpass piped gas in Singapore's future energy mix," S&P Global Platts, 6 December 2019 (also noting that one of Indonesia's contracts with Singapore involving supply from the Suban field is due to expire in 2023).
[122] *See* Singapore Energy Market Authority, "Gas Licences," at https://www.ema.gov.sg/Licensees_Gas_Licences.aspx.
[123] *See* Singapore Ministry of Trade and Industry, "Round Up Speech for the Second Reading of the Gas (Amendment) Bill," 1 October 2018, at para. 7, at https://www.mti.gov.sg/Newsroom/Speeches/2018/10/Round-Up-Speech-for-the-Second-Reading-of-the-Gas-Amendment-Bill ("To further increase dynamism in our gas market, EMA has also formalised the spot LNG import framework in October 2017. Interested parties can now import spot LNG, subject to a market-wide cap of 10% of our long-term contracted gas sales agreements.").
[124] Singapore has 11 MT of regasification capacity as of February 2020. International Gas Union, 2020 World LNG Report, at p. 79.
[125] "Singapore plans to build second LNG terminal – PM," Reuters, 25 February 2014.
[126] K. Iwamoto, "Singapore aims to be Asia LNG hub as demand soars," Nikkei Asian Review, 30 December 2019.
[127] International Gas Union, 2020 World LNG Report, at p. 16. *See also* GIIGNL, Annual Report 2019, at p. 5. Re-exporting is discussed further below.
[128] *See, e.g.*, E. Gerden, "Singapore moves closer to becoming a global LNG trading hub," August 2018, Gas Processing News; K. Iwamoto, "Singapore aims to be Asia LNG hub as demand soars," Nikkei Asian Review, 30 December 2019.
[129] "Oil as LNG pricing peg: SGX seeks change," Straits Times, 26 January 2016.

as tradeable SLInG derivatives.[130] In July 2019, however, the Singapore Exchange announced that it would discontinue publication of the SLInG index, citing low participation.[131]

To date, none of these efforts to create an LNG hub in the Asia Pacific region – whether in Japan, Singapore, Thailand, or elsewhere – has resulted in the development of a liquid hub, as discussed further below.

2. Sources of LNG Exported to Markets in the Asia Pacific Region

The leading exporters of LNG to markets in the Asia Pacific region are Australia (75.4 MT in 2019), Qatar (52.3 MT), Malaysia (26.3 MT), Indonesia (15.3 MT), Russia (13.6 MT), and the United States (12.5 MT).[132] The roles of each of these countries in exporting LNG to the Asian Pacific region are briefly discussed below.

<u>Australia</u>. Australia is the leading exporter of LNG to markets in the Asia Pacific region, supplying roughly 30% of LNG imported by countries in the Asia Pacific region in 2019.[133] In particular, Australia is the largest LNG supplier to the two biggest markets in the region, Japan and China.[134] Australia has been the main source of LNG for China's fast-growing demand for LNG imports[135] and has been steadily growing its production capacity.[136] Australia is expected to continue being the leading LNG exporter to the Asia Pacific region.[137]

<u>Qatar</u>. Qatar is the second largest exporter of LNG to markets in the Asia Pacific region, supplying 21% in 2019.[138] In particular, Qatar is the largest LNG supplier to the third, fourth, and fifth biggest markets in the region, South Korea, India, and Chinese Taipei.[139] Qatar's production has stayed roughly constant over the years following a self-imposed moratorium on production in the North Field in 2005.[140] However, Qatar announced in April 2017 that it was lifting the moratorium, and in late 2019 it

[130] "SGX sets up LNG price index," Offshore Energy, 12 June 2015; KPMG, "Developing liquidity in the LNG Market," January 2017, at p. 12, at https://assets.kpmg/content/dam/kpmg/jp/pdf/jp-en-lng-liquidity-market.pdf. The Singapore government described the SLInG index as an "assessment-based LNG pricing index by a diverse group of players along the LNG value chain" that would provide "a platform for price discovery and risk management options for traders." Speech by Minister Iswaran at the LNG Supplies for Asian Markets 2016, at para. 23, at https://www.mti.gov.sg/Newsroom/Speeches/2016/03/Speech-by-Min-Iswaran-at-the-LNG-Supplies-for-Asian-Markets-LNGA-2016.
[131] J. Jaganathan, "Singapore to stop 'Sling' LNG indices, sheds hopes of main price hub," Reuters, 30 July 2019.
[132] International Gas Union, 2020 World LNG Report, at pp. 20-21.
[133] *See* International Gas Union, 2020 World LNG Report, at pp. 20-21.
[134] *See* International Gas Union, 2020 World LNG Report, at pp. 20-21.
[135] H. Gloystein and J. Jaganathan, "Having a gas: Australia dominates China's LNG supply," Reuters, 14 July 2019.
[136] In 2019, Australia boosted production capacity with the start-ups of the INPEX-operated Ichthys project and the Shell-operated Prelude floating LNG facility. *See* International Gas Union, 2020 World LNG Report, at p. 15.
[137] Australia's LNG exports grew by 13% from 2018 to 2019. *See* International Gas Union, 2020 World LNG Report, at pp. 20-21. They grew by over 20% from 2017 to 2018. *See* International Gas Union, 2019 World LNG Report, at pp. 20-21.
[138] *See* International Gas Union, 2020 World LNG Report, at pp. 20-21.
[139] International Gas Union, 2020 World LNG Report, at pp. 20-21.
[140] *See* T. Finn, "Qatar restarts development of world's biggest gas field after 12-year freeze," Reuters, 3 April 2017.

announced plans to hike its production capacity by 64% over the following seven years with new expansions to the North Field.[141]

Malaysia. Malaysia is the third largest exporter of LNG to markets in the Asia Pacific region, supplying almost 11% in 2019.[142] Its exports globally have stayed roughly constant for many years.[143] Japan is the biggest recipient of Malaysia's LNG exports,[144] but recently its national oil and gas company, Petronas, has identified China and India as target markets as demand in mature markets such as Japan and South Korea is saturating.[145]

Indonesia. Indonesia is the fourth largest exporter of LNG to markets in the Asia Pacific region, supplying about 6% in 2019,[146] but exports have been falling year-on-year since 2016 and have generally declined over the past decade.[147] The decline in exports is a result of depleting legacy fields and rising domestic gas demand.[148]

Russia. Russia is the fifth largest exporter of LNG to markets in the Asia Pacific region, supplying about 5.5% in 2019.[149] Russia has recently announced plans for LNG export projects in Sakhalin and the Arctic to boost LNG exports.[150]

United States. The United States is the sixth largest exporter of LNG to markets in the Asia Pacific region, supplying about 5% in 2019.[151] U.S. LNG exports to the Asia Pacific region were mainly to South Korea, Japan, and India in 2019.[152] The United States has recently overtaken Malaysia to become the third largest LNG exporter globally, and in 2019 total LNG exports increased by 63%.[153] Although U.S. LNG exports have generally been competitive in markets in the Asia Pacific region, the margin of competitiveness is tight, particularly given the longer distance and transportation costs.[154] U.S. LNG exports to China have been affected by U.S.-China trade disputes. In May 2019, China imposed a 25% tariff on U.S. LNG.[155]

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141 *See* H. Wang and R. Perkins, "Qatar boosts LNG expansion plans with new 'mega trains,'" S&P Global Platts, 25 November 2019.

142 *See* International Gas Union, 2020 World LNG Report, at pp. 20-21.

143 *See* International Gas Union, 2020 World LNG Report, at pp. 20-21; International Gas Union, 2019 World LNG Report, at pp. 20-21.

144 *See* International Gas Union, 2020 World LNG Report, at pp. 20-21.

145 *See* E. Yep, "Analysis: Malaysia's Petronas taps new markets amid paradigm shift in Asian LNG," S&P Global Platts, 12 November 2019.

146 *See* International Gas Union, 2020 World LNG Report, at pp. 20-21.

147 *See* International Gas Union, 2020 World LNG Report, at pp. 20-21; International Gas Union, 2019 World LNG Report, at pp. 20-21.

148 *See* "Analysis: Indonesia natural gas exports set to slump to 2-decade low in 2019," S&P Global Platts, 6 August 2019.

149 *See* International Gas Union, 2020 World LNG Report, at pp. 20-21.

150 *See* O. Tanas, D. Khrennikova, and D. Murtaugh, "Russia's LNG ambitions advance with multi-billion export plans," World Oil, 5 September 2019.

151 *See* International Gas Union, 2020 World LNG Report, at pp. 20-21.

152 International Gas Union, 2020 World LNG Report, at pp. 20-21.

153 International Gas Union, 2020 World LNG Report, at p. 15.

154 *See, e.g.*, J. Bordoff and A. Losz, "If You Build It, Will They Come? The Competitiveness of US LNG in Overseas Markets," Columbia Center on Global Energy Policy, November 2016, at p. 3.

155 *See* "China raises US LNG import tariffs to 25%," Oil and Gas Journal, 14 May 2019; J. Jaganathan, "Chinese demand for US LNG unlikely to surge as long as tariffs remain," Reuters, 16 January 2020.

Production of LNG in all of these exporting countries in 2020 will be severely affected by the economic impacts of the COVID-19 pandemic, the short- and long-term effects of which remain to be seen.

Some issues relating to changing supply and demand, including the potential effects of the pandemic, as well as others are discussed below. The next section describes LNG supply contracts and transactions.

II. LNG Supply Contracts and Related Transactions in the Asia Pacific Region

LNG can be supplied and traded through a number of different types of contracts and transactions. This section describes contracts used to trade LNG internationally, as seen in the Asia Pacific region. Significant volumes continue to be traded through long-term point-to-point supply contracts, as described below, although parties are increasingly trading LNG through shorter term contracts. Parties in the region also enter into a variety of other transactions to buy and sell LNG internationally, including through portfolio contracts, diversion and swap agreements, and by re-exporting delivered LNG.

LNG is sold through supply contracts of differing duration: long-term, medium-term, short-term, and spot contracts.[156]

LNG historically has been supplied to the Asia Pacific region (and globally) through long-term sale and purchase agreements (SPAs). These long-term contracts are valuable to sellers in order to secure the capital necessary to make large investments for production, liquefaction, and related infrastructure. These long-term contracts are also valuable to buyers to obtain security of supply for their consumption needs and those of their customers.[157] As the International Gas Union explains, "[l]ong-term contracts continue to play an important role in securing financing for the development of the liquefaction projects and [in securing] supplies to importing markets."[158]

Although increasing volumes of LNG are being sold through shorter term contracts, approximately two-thirds of total LNG volumes globally were supplied under long-term contracts in 2019.[159]

Historically, many buyers of LNG in the Asia Pacific region have been national and regional gas companies and electricity utilities that burn gas to generate electricity. Generally speaking,

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[156] These are not universally defined terms. Generally, long-term contracts are for an agreed duration between 10 to 30 years, although they can be longer (or shorter) and may include provisions that allow for extension or renewal. According to the International Gas Union, new long-term contracts tend to be for 11 to 20 years. *See* International Gas Union, World LNG Report 2020, at p. 27 ("The typical new LNG SPA contract duration is now 11-20 years, rather than 20+ years which was a common practice in the past."); GIIGNL, Annual Report 2020, at p. 9 (noting that the average duration of new long- and medium-term contracts concluded in 2019 was 13.9 years, and ranged from 5 to 30 years). Medium- and short-term contracts are contracts with a duration of months or several years. Spot contracts are for single cargoes delivered within several months from the transaction date.

[157] *See, e.g.*, International Gas Union, "Wholesale Gas Price Formation – A Global Review of Drivers and Regional Trends," June 2011, at p. 19.

[158] International Gas Union, World LNG Report 2020, at p. 27.

[159] *See* GIIGNL Annual Report 2020, at p. 7. *See also* International Gas Union, 2020 World LNG Report, at p. 27 ("Out of the 362 MTPA sold through SPAs during the past 10 years, 271 MTPA [75%] was sold with a contract duration of more than 10 years.").

those companies were interested in securing long-term supply and could often pass price risk on to their customers.[160]

That is changing, and in many countries in the Asia Pacific region some of the buyers are less interested in long-term contracts and increasingly concerned with price risk. The factors driving an increase in the number and volume of shorter and more flexible contracts include steps taken by governments to deregulate and liberalize domestic markets and to encourage new entrants, which leads incumbents to become more focused on competitively priced and flexible LNG supply; so-called over-supply of LNG;[161] and expiring long-term contracts, which have given some buyers the ability to enter into more flexible and shorter-term contracts, or to buy LNG on the spot market when spot prices are more favorable.[162]

For example, JERA – the world's largest LNG import company – announced in 2016 that it planned to cut the volume of LNG it buys under long-term contracts by 42% by 2030.[163] Recently, JERA reportedly replaced some volumes under expiring long-term contracts with contracts for much shorter durations.[164] Similarly, China National Offshore Oil Corporation ("CNOOC") entered into two supply agreements in 2018, both for durations of four years.[165]

However, there are also many examples of new long-term contracts recently concluded by buyers in the Asia Pacific region.[166] Indeed, both JERA and CNOOC entered into new long-term contracts in 2019, for 17 years and 13 years, respectively,[167] and additional buyers in China, Chinese Taipei, India, Japan, South Korea, and other Asia Pacific countries entered into over a dozen other new long-term LNG contracts in 2018 and 2019.[168] Many parties will continue to enter into new long-term contracts for supply to the Asia Pacific region, motivated by security of supply, greater price predictability and stability, and project financing.[169]

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[160] *See, e.g.*, L. Palti-Guzman, "The Future of Asia's Natural Gas Market: The Need for a Regional LNG Hub," Asia Policy 13:3, July 2018, at p. 6.

[161] *See, e.g.*, S. Stapczynski, A. Shiryaevskaya, and N. Malik, "Global Oversupply Sets up LNG for a Year of Record Low Prices," 24 January 2020.

[162] *See* A. Abreu, "Dawn of a Global Commodity: LNG Trading Transformed," S&P Global Platts, 27 October 2017, at p. 28, at https://www.spglobal.com/platts/plattscontent/_assets/_files/en/specialreports/lng/lng-dawn-of-a-global-commodity-report.pdf.

[163] *See* O. Tsukimori, "Japan's Jera plans 42 percent cut in long-term LNG contracts by 2030," Reuters, 10 August 2016 ("The company now buys 34.5 million tonnes per annum (mtpa) of LNG under contracts for 10 years or longer. By 2030, that will drop to about 20 million mtpa, President Yuji Kakimi said.").

[164] *See, e.g.*, E. Yep and C. Atre, "Term Contracts: Long Story Short," in A. Abreu, "New Horizons: The forces shaping the future of the LNG market," S&P Global Platts, July 2019, at p. 37, at https://www.spglobal.com/platts/plattscontent/_assets/_files/en/specialreports/lng/lng-market-new-horizons-report.pdf ("For example, JERA secured a three-year, 2.5 million mt/year contract with Malaysia's Petronas from 2018, when its 15-year 4.8 million mt/year contract was renewed. It also replaced a 25-year, 4.3 million mt/year contract with the UAE's ADNOC with a three-year deal for 0.5 million mt/year from 2019.").

[165] *See* GIIGNL, Annual Report 2019, at p. 6.

[166] *See* GIIGNL, Annual Report 2019, at p. 6 (noting that in 2018 PetroChina entered into two agreements for durations of 22 and 25 years respectively); GIIGNL, Annual Report 2020, at p. 8 (noting that in 2019 Tohoku Electric entered into an agreement for a duration of 18 years).

[167] *See* GIIGNL, Annual Report 2020, at p. 8.

[168] *See* GIIGNL, Annual Report 2020, at p. 8; GIIGNL, Annual Report 2019, at p. 6.

[169] *See* International Gas Union, 2020 World LNG Report, at p. 93 (noting the continued use of long-term agreements "as a means of addressing security of supply, price stability, and project financing"). *See also* "Japan's Jera plans 42 percent cut in long-term LNG contracts by 2030," Reuters, 10 August 2016 (noting that "essential volumes" of about 20 MTPA will continue to be procured under long-term contracts, notwithstanding a shift away from long-term contracts).

Moreover, there are well over a hundred existing long-term gas supply agreements to the Asia Pacific region that will remain in force for a number of years.[170]

In addition to the so-called point-to-point contracts (i.e., contracts involving delivery of LNG cargoes from a seller producing from a specified origin to a buyer) discussed above, portfolio contracts (i.e., contracts that do not specify the origin of supply or the destination of delivery[171]) are increasingly common. Portfolio contract volumes constituted 26% of total volumes contracted globally between 2016 and 2019 according to the International Gas Union. Portfolio contracts can offer considerable flexibility to both sellers and buyers. Under a typical portfolio contract, the seller can optimize its portfolio by sourcing gas from anywhere in its portfolio, allowing the seller to reduce transportation and other costs, and the buyer similarly can optimize its portfolio by deciding where to receive particular cargoes. There are reports that some buyers in the Asia Pacific region, including large companies in Japan, are pursuing portfolio contracting.[172]

Parties can also create destination flexibility and other efficiencies under point-to-point contracts by diverting cargoes (either through provisions in a supply contract or through a separate agreement) and through swap agreements.

A diversion is when a cargo is delivered to a different destination than specified in the parties' contract and can be used to obtain a higher price and create other benefits, such as reduced shipping costs. Provisions addressing the possibility of diverting cargos are increasingly common in LNG SPAs, and diversions should increase in the Asia Pacific region as fewer contracts include destination restrictions.

Swap agreements can be used to create efficiencies by, among other things, reducing shipping costs or changing when a buyer receives a cargo.[173] Buyers in Japan and India, for example, have entered into swap agreements for deliveries of LNG from the United States.[174]

In addition to such transactions, once LNG is delivered, it also can be sold to other countries, rather than being re-gasified for use in the local market. Where an LNG terminal is capable of both unloading and loading LNG, a buyer may choose to re-export LNG after delivery in order to sell it to a buyer in another market at a higher price, although the process of unloading, storing, and reloading LNG creates additional costs that may make re-exporting uneconomic.[175] Some terminals also provide transshipment services, where LNG is transferred between two

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[170] *See, e.g.*, GIIGNL, Annual Report 2020, at pp. 10–15.

[171] *See, e.g.*, International Gas Union, 2020 World LNG Report, at p. 33. Under a typical portfolio contract, the seller can choose where to supply each cargo from, and the buyer can choose where each cargo will be delivered, subject to the specific terms of the contract.

[172] *See* International Gas Union, 2020 World LNG Report, at p. 33 ("Japanese buyers have also shown interest in becoming portfolio players, as evidenced by redirecting excess volumes to other markets during periods of low domestic demand."). JERA has formed a joint venture with a subsidiary of Electricité de France to sell LNG into markets in Europe and Asia, which reportedly has about 10 MTPA of tradable volume. *See* S. Zawadzki and O. Vukmanovic, "Asian energy giants hedge U.S. LNG buying spree with European deals," Reuters, 4 July 2018; J. Jaganathan, "Top LNG buyer JERA, EDF start up JV to expand spot, short-term trade," Reuters, 18 April 2019.

[173] There can be many forms of swap agreements. In simple terms, in a location swap agreement, two sellers under separate supply contracts agree to deliver their cargoes to the other seller's buyer, thereby swapping delivery destinations; in a time swap agreement, parties may swap delivery times.

[174] *See* "Update 1-Tokyo Gas signs location swap deal with UK's Centrica," Reuters, 21 November 2016; N. Verma, "India's GAIL signs 1st time-swap deal for US LNG with Gunvor," Reuters, 3 March 2017.

[175] *See* S. Finizio, "Destination Restrictions and Diversion Provisions in LNG Sale and Purchase Agreements," in W. Rowley (ed.), *The Guide to Energy Arbitrations* (3rd ed., 2019), at pp. 229–230.

ships via on-shore pipes, or ship-to-ship offshore. This is often used to break down LNG cargoes into smaller volumes that can be sold regionally. As noted above, Singapore's facilities can be used for re-exporting LNG and transshipment services,[176] and it has plans to use its new LNG terminal to divide cargoes into smaller volumes to supply regionally.[177]

The next sections outline some of the key terms in long-term LNG supply contracts and then price formation mechanisms.

III. Common Clauses in Long-Term LNG Supply Agreements

Although long-term LNG supply contracts vary greatly from agreement to agreement, they share certain common provisions, which are described briefly below. Many of these provisions are found in both pipeline and LNG contracts, although LNG contracts include some distinct terms to reflect the different nature of LNG. The specific terms agreed depend on the outcome of negotiations between the parties and are negotiated in connection with the contract price provisions, discussed further below, which reflect the interplay of all of these terms.

a. *Delivery point, shipping terms, and shipping schedule*: An SPA will specify the delivery point for the LNG (usually a specified port) as well as where title and risk transfer from the seller to the buyer. LNG is usually shipped "free on board" ("FOB"), meaning title and risk shift to the buyer when the LNG is loaded onto the ship and the buyer is responsible for shipping costs, or delivery "ex-ship" ("DES") or "delivered at terminal" ("DAT"), meaning the seller retains title and risk until the LNG is unloaded, and the seller is responsible for shipping costs.[178] An SPA may also include a shipping schedule.

b. *Delivery specifications*: In addition to specifying the delivery point, an SPA will include provisions regarding the quality of the gas to be delivered, e.g., a specific calorific value, maximum sulfur content, and other minimum and maximum specifications.

c. *Supply and "take-or-pay" obligations*: An SPA will specify the quantity of LNG that the seller must supply and that the buyer must purchase. This is often expressed as an annual obligation and typically referred to as an "annual contract quantity." Most SPAs include a "take-or-pay" obligation stipulating a minimum annual quantity that the buyer commits to take delivery of or pay for if it does not take delivery, although some impose a "take-and-pay" obligation.[179] The amount by which a buyer may offtake less than the full annual contract quantity (e.g., by 5-10%) is known as the "downward quantity tolerance."[180] The effect of a take-or-pay obligation may also be mitigated by other

[176] SLNG, "Transhipment Services," at https://www.slng.com.sg/website/content.aspx?wpi=Transhipment+Services&mmi=105&smi=190.
[177] K. Iwamoto, "Singapore aims to be Asia LNG hub as demand soars," Nikkei Asian Review, 30 December 2019.
[178] *See* S. Finizio, "Destination Restrictions and Diversion Provisions in LNG Sale and Purchase Agreements," in W. Rowley (ed.), *The Guide to Energy Arbitrations* (3rd ed., 2019), at p. 224.
[179] The minimum annual quantity that the buyer must take or pay for varies by contract, but the percentage can be up to 100% of the annual contract quantity. Historically, the percentage in long-term LNG SPAs has frequently been 95 to 100%, although parties may negotiate a lower figure (e.g., 85 or 90%) in certain circumstances, e.g., during a so-called buyer's market.
[180] Some SPAs even contain an "upward quantity tolerance," entitling the buyer to offtake more than the annual contract quantity.

contract terms, including provisions that allow a buyer that has not taken delivery of (but has paid for) the minimum quantity in one contract year to take additional quantities in future years, often called a "make up" right.

d. *Delivery flexibility*: An SPA may include flexibility rights that allow the buyer to vary the volume and timing of its offtake. For example, an SPA may recognize the seasonality of demand by allowing the buyer to take more cargoes during certain times of year and fewer during others. As noted above, an SPA may also have "make-up" rights, which allow the buyer to take quantities in a later year. Some SPAs include optionality rights that allow the seller to vary the volume and timing of its supply obligation.

e. *Destination flexibility, diversion rights, and destination restrictions*: There are certain practical limits to the flexibility available in an LNG supply contract because LNG is delivered periodically, by ship, in large cargoes. Moreover, the ability to vary the timing of LNG deliveries depends on a number of factors, including the shipping schedule, access to ships, variable voyage times, access to the port and unloading facilities, and the time required to load and unload the LNG and to regasify it. Some SPAs therefore also provide for some form of destination flexibility, which can be used to deliver the LNG to a destination of the buyer's choosing to manage its own volume commitments or to take advantage of price arbitrage by selling to higher-priced markets. Destination flexibility may also enable the buyer to enter into swap transactions, as discussed above. Some SPAs include diversion provisions, which can be used to change the port to which a cargo will be delivered (and potentially take advantage of price differences in different markets). Such provisions may provide for price revisions or profit sharing when the delivery point changes.[181]

Conversely, an SPA may include a destination restriction that prevents the buyer from selling the LNG outside of a specified geographic market. Such clauses are generally not seen in European contracts after the European Commission indicated that they may violate competition law,[182] and, as discussed above, in 2017 the Japan FTC issued a report concluding that it is "highly likely" that destination restriction clauses in FOB contracts are anti-competitive and should not be included in new LNG contracts.

[181] *See, e.g.*, S. Finizio, "Destination Restrictions and Diversion Provisions in LNG Sale and Purchase Agreements," in W. Rowley (ed.), *The Guide to Energy Arbitrations* (3rd ed., 2019), at p. 227; H. Sullivan, "LNG Sale and Purchase Agreements," in P. Griffin (ed.), *The Law and Business of LNG* (3rd ed., 2017), at p. 211.

[182] In investigations of both LNG and pipeline contracts, the European Commission has taken the position that "territorial restriction clauses (re-export prohibitions) and mechanisms having similar effects," including the effect of reducing the opportunity for the buyer to pursue arbitrage sales, constitute a "severe restriction" on competition. *See* European Commission Press Release, *Commission settles investigation into territorial sales restrictions with Nigerian gas company NLNG*, dated 12 December 2002, IP/02/1869 ("once the gas is delivered and paid for, the buyer is free to re-sell the gas wherever it wishes."); European Commission Press Release, "Commission and Algeria reach agreement on territorial restrictions and alternatives clauses in gas supply contracts, 11 July 2007, IP/07/1074 (indicating that profit-sharing mechanisms that entitle the seller to share the buyer's profit from an onward sale of LNG to a more profitable destination had an equivalent anti-competitive effect to destination restrictions, although profit-sharing mechanisms may be permitted where an SPA provides for delivery ex-ship and title to the gas remains with the seller until the ship is unloaded).

f. *Price*: Most SPAs today (apart from short-term and spot contracts) include contract price provisions that use a formula to set the price of LNG, rather than a fixed price. Approaches to contract price provisions are discussed in more detail below.

g. *Price Review*: Some, but not all, long-term SPAs include a provision that allows the parties to review and potentially revise the contract price under certain conditions. These provisions may be referred to as price "review," "revision," "adjustment," or "re-opener" clauses and are discussed in more detail below.

h. *Force majeure*: A SPA will usually include a force majeure clause that provides that a party may be excused from performance of a contractual obligation in light of an unexpected event beyond its control in certain circumstances.[183] The scope and operation of force majeure clauses differ considerably from contract to contract. Such clauses typically define certain covered events that may excuse contractual performance if the covered event prevents (or, in some contracts, hinders or delays) performance of a contractual obligation. Common examples of covered events are acts of God, natural disasters, war, riot, and (in some contracts) epidemics, as well as other events beyond the parties' control. Some clauses exclude certain events, and some clauses also carve out certain contractual obligations that may not be excused. Clauses often set forth certain requirements, such as notice, and remedies for force majeure, which might include termination for prolonged force majeure preventing performance.

i. *Hardship*: Some SPAs contain hardship clauses that allow a party suffering hardship – a concept that may or may not be defined under the contract – to notify its counterparty and request negotiations to address the effects of the alleged hardship.[184] Some hardship clauses specify the consequences of a failure to reach agreement on how to address alleged hardship, while others are silent.

j. *Governing law and dispute resolution*: SPAs typically specify the applicable law agreed by the parties to govern the contract. Long-term LNG contracts are very frequently governed by English or New York law, with SPAs in the Asia Pacific region more commonly governed by English law. Many, but not all, SPAs provide for international arbitration (often under the ICC, LCIA, AAA/ICDR, or UNCITRAL rules) to resolve any disputes.

SPAs contain numerous other provisions regarding the parties' rights and obligations, all of which are carefully negotiated between the parties and determine the allocation of risks. Modern SPAs are frequently between 50 and 100 pages.

[183] *See generally* J. Trenor and H. Lim, "Navigating Force Majeure Clauses and Related Doctrines in Light of the Covid-19 Pandemic," YAR, April 2020, at pp. 14-15.
[184] *See generally* J. Trenor and H. Lim, "Navigating Force Majeure Clauses and Related Doctrines in Light of the Covid-19 Pandemic," YAR, April 2020, at p. 16.

IV. Price Mechanisms in the Asia Pacific Region

This section discusses in more detail the evolution of pricing provisions in long-term LNG supply contracts in the Asia Pacific region, as well as the role of spot gas and hubs on pricing.

1. Contract Price Formation in Long-Term LNG Supply Contracts in the Asia Pacific Region

Contract price formation, i.e., the type of price formula that the parties agree in their natural gas sales contract, depends on a variety of factors. These factors include whether the contract is for pipeline gas or LNG, the geographical regions in which the gas is produced and destined for consumption, and whether the gas is sold under a long-term contract or a shorter term (such as a fixed price contract on the spot market). The terms of supply negotiated by the parties can also have a significant impact on both contract price formation and the price level agreed by the parties.

The price of LNG in Asia has historically been tied to the price of crude oil, which was the main alternative fuel to LNG when countries in Asia first began importing LNG some 50 years ago.[185] Although the very first LNG contracts for delivery to the Asia Pacific region contained fixed prices,[186] the vast majority of subsequent long-term contracts have included price formulas indexing the price of LNG to that of crude oil.

Oil-indexed contract price formulas were introduced into Japanese LNG SPAs in the early 1970s. The standard price structure of oil-indexed formulas for Asian LNG contracts was then, and often continues to be:[187]

$$P_{LNG} = A \times P_{Crude\ Oil} + B,$$

[185] *See, e.g.*, IGU Wholesale Gas Price Formation – A Global Review of Drivers and Regional Trends, June 2011, at p. 20.

[186] For example, the first contract for delivery of LNG to Asia was the SPA between Phillips Petroleum Co. and Marathon Oil Co., on the one hand, and Tokyo Electric Power Co. and Tokyo Gas Co. Ltd., on the other hand, to supply LNG from Alaska to Japan for a period of 15 years at a fixed price of $0.52 per MMBtu. *See Phillips Petroleum Co. v. Comm'r of Internal Revenue*, 101 T.C. 78, 84 (U.S.T.C. 1993) (quoting the contract price provision of the SPA: "Buyers shall pay Sellers for all LNG delivered to Buyers hereunder prior to June 1, 1984, a price of United States fifty-two cents (52¢) per million Btu's delivered.").

[187] This type of oil-indexed formula, commonly used in SPAs for LNG destined for the Asia Pacific region, is much simpler in structure than many oil-indexed formulas used in Europe. Oil-indexed formulas in Europe, for both pipeline and LNG contracts, historically linked the price of gas to a basket of oil products (and sometimes other products such as coal), including gas oil, heavy fuel oil, and light fuel oil. Such formulas typically calculate the difference between agreed base prices for the alternative fuels and the price of the alternative fuel over time, and involve pass-through factors, conversion factors to convert the energy content of the alternative fuel to natural gas, and a base price, as well as other elements. *See, e.g.*, J. Trenor, "Gas Price Disputes under Long-Term Gas Sales and Purchase Agreements," in D Schwartz (ed.), *The Energy Regulation and Markets Review* (7th ed., 2018), at p. 35; Energy Charter Secretariat, "Putting a Price on Energy: International Pricing Mechanisms for Oil and Gas," at p. 154, at https://www.energycharter.org/fileadmin/DocumentsMedia/Thematic/Oil_and_Gas_Pricing_2007_en.pdf (providing an example of a "stylized" price formula: "Pm = Po + 0.60 × 0.80 × 0.0078 × (LFOm – LFOo) + 0.40 × 0.90 × 0.0076 × (HFOm – HFOo"). Hub-based pricing elements also play a much larger role in European price formation. *See, e.g.*, J. Trenor, "Gas Price Disputes under Long-Term Gas Sales and Purchase Agreements," in D Schwartz (ed.), *The Energy Regulation and Markets Review* (7th ed., 2018), at p. 36.

where P_{LNG} is the price of LNG in US$/MMBtu,

A is a coefficient negotiated by the parties, frequently called the "slope" (essentially converting barrels of oil into an agreed number of MMBtu),

$P_{Crude\ Oil}$ is the price of crude oil in US$/bbl, and

B is a constant in US$/MMBtu negotiated by the parties.[188]

The coefficient A (the slope) reflects the extent to which the change in the price of the indexed crude oil is passed through to the buyer on an energy equivalent basis.[189] A slope of 0.1724 (17.24%) (with no constant added) would reflect oil parity in which the full amount of the oil price change would be passed through to the buyer.[190] A slope less than 0.1724 means that less than the full change in the price of crude oil is passed along to the buyer.

The slope agreed in any particular contract depends on a variety of factors, including when the contract was negotiated, whether it is a so-called buyers' or sellers' market at the time, the respective negotiating leverage of the parties, and the specific terms of the contract, such as the term, the allocation of risks between the buyer and seller, the flexibility of deliveries, etc. Slopes have historically been negotiated in the range of 11 to 16%,[191] higher in sellers' markets and lower in buyers' markets, although parties occasionally reach agreement outside this range.[192]

The constant B typically reflects in part the cost of delivering the LNG to its destination (in a DES contract), as well as other costs, and has historically often been between $0.50 and $1.00.[193]

One of the earliest oil-indexed and most influential contract price formulas for LNG contracts in the Asia Pacific region is the 1973 SPA between Pertamina and the so-called Western Buyers for the import of LNG into Japan.[194] The slope of the oil-indexed price formula in the Pertamina

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188 In some contracts, the "constant" B can be linked to inflation and rise over time. *See, e.g.*, A. Flower and J. Liao, "LNG Pricing in Asia," in J. Stern (ed.), *The Pricing of Internationally Traded Gas* (2012), at p. 339.

189 This is roughly analogous to the "pass through factors" used in European and Atlantic Basin contracts. *See, e.g.,* IGU Wholesale Gas Price Formation – A Global Review of Drivers and Regional Trends, June 2011, at p. 20 (noting that the exposure to crude oil prices is typically reduced to 80 to 90% as a result of the slope less than 0.1724).

190 One barrel of oil has the equivalent energy content of 5.800 MMBtu of LNG, and 1 / 5.8 equals 0.1724. *See* BP Statistical Review of World Energy, Approximate Conversion Factors, at p. 2, at https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/statistical-review/bp-stats-review-2019-approximate-conversion-factors.pdf. In other words, a price formula that recognizes the energy equivalence of the indexed crude oil and the delivered LNG would be:

$$P_{LNG} = 0.1724 \times P_{Crude\ Oil}$$

191 *See, e.g.*, International Gas Union, 2020 World LNG Report, at p. 27.

192 For example, the slope in the Australian North West Shelf LNG contract with CNOOC for delivery to Dapeng, China, is 5.25 percent. *See, e.g.*, S. Cornot-Gandolphe, "Stratégie Gazière de la Chine: Développer la concurrence entre production nationale et importations," October 2014, at p. 48, at https://www.ifri.org/sites/default/files/atoms/files/note_scg_3_11_14_revuemd.pdf.

193 In FOB contracts, the constant B may be negotiated closer to zero. *See, e.g.*, A. Flower and J. Liao, "LNG Pricing in Asia," in J. Stern (ed.), *The Pricing of Internationally Traded Gas* (2012), at p. 344.

194 LNG Sales Contract between Pertamina and Chubu Electric Power Co., Inc., Kansai Electric Power Co., Inc., Kyushu Electric Power Co., Inc., Nippon Steel Corporation, Osaka Gas Co., Ltd., and Toho Gas Co., Ltd., dated

LNG contract was 0.1485 (14.85%), which has been agreed frequently in many subsequent LNG contracts.[195] The Pertamina-Western Buyers formula when deliveries began in 1977 was:[196]

$$P_{LNG} = 0.1485 \times P_{Crude\ Oil} + 0.60$$

The price index used in the formula for the price of crude oil varies by contract. The most commonly used price index for crude oil in LNG contracts in the Asia Pacific region is the Japan Customs-cleared Crude (JCC), often called the Japanese Crude Cocktail. The JCC is calculated as the average monthly price of customs-cleared crude oil imported into Japan.[197] Parties to SPAs for LNG destined for many other countries in the Asia Pacific region have adopted oil-indexed formulas based on the JCC crude oil price, due to the significant volumes of crude oil that Japan imports, the reliability of the calculation of the JCC crude oil price based on data from the Japanese government, and the fact that Japanese contracts using the JCC price established a benchmark followed by others in the Asia Pacific region.[198]

Some long-term LNG contracts in the Asia Pacific region have used and continue to use a crude oil price index other than the JCC. For example, early contracts often used the Government Selling Price of crude oil.[199] Indonesian contracts often used the Indonesian Crude Price (ICP), an average price of a basket of internationally traded Indonesian crude oils, which is still used in some contracts today.[200] Some contracts in the Asia Pacific region use the price of Brent crude oil as the price index.[201]

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3 December 1973.

[195] R. Shepherd, et al., "Potential LNG Production from North Slope Gas: Report for the State of Alaska by Gas Strategies," 12 May 2008, at p. 20, at https://www.arlis.org/docs/vol1/AlaskaGas/Report/Report_GSC_2008_PotentialLNGProduction.pdf ("LNG pricing in Asian LNG markets followed a stable pattern from the major fall in oil price in early 1986 until the year 2000. During this period virtually all projects moved to a price formula of the form: $P = 0.1485 \times JCC + \alpha$.")

[196] Therefore, with a price of crude oil at roughly \$14.50 in 1977, the price of LNG under this formula would have been 0.1485 × \$14.50 + \$0.60, equal to \$2.75/MMBtu. Under this formula, LNG would be sold at a premium to the energy equivalent of crude oil for crude oil prices below US\$25/bbl and at a discount for higher crude oil prices.

[197] *See* Petroleum Association of Japan, "Oil Statistics," at https://www.paj.gr.jp/english/statis/. For details regarding the calculation of the JCC crude oil price, *see* "FAQ: Japan Crude Cocktail," at https://www.cmegroup.com/education/frequently-asked-questions-japan-crude-cocktail.html.

[198] *See, e.g.*, IGU Wholesale Gas Price Formation – A Global Review of Drivers and Regional Trends, June 2011, at p. 20 (noting that JCC price calculation is "considered a credible, transparent and neutral index").

[199] *See, e.g.*, IGU Wholesale Gas Price Formation – A Global Review of Drivers and Regional Trends, June 2011, at p. 20.

[200] A. Flower and J. Liao, "LNG Pricing in Asia," in J. Stern (ed.), *The Pricing of Internationally Traded Gas* (2012), at p. 357.

[201] *See generally* A. Flower, "LNG Supply Outlook 2016 to 2030," July 2016, at http://www.beg.utexas.edu/files/energyecon/think-corner/2016/CEE_Advisor_Research_Note-Andy_Flower_LNG_Supply_Outlook-Aug16.pdf, at p. 34 (noting that "Brent crude oil prices have been used in some contracts since Brent is widely traded which makes it possible to hedge some of the price exposure"). For a recent contract for the sale of U.S. LNG indexed to Brent crude (albeit in an SPA with full destination flexibility, which is common in U.S.-sourced contracts), *see* "NextDecade and Shell Execute 2 MTPA, 20-Year LNG Sale and Purchase Agreement," 1 April 2019, at https://investors.next-decade.com/news-releases/news-release-details/nextdecade-and-shell-execute-2-mtpa-20-year-lng-sale-and ("Pursuant to the SPA, Shell will purchase LNG on a free-on-board basis starting from the commercial operation date of Rio Grande LNG, currently expected in 2023, with approximately three-quarters of the purchased LNG volumes indexed to Brent and the remaining volumes indexed to domestic United States gas indices, including Henry Hub. The SPA is the first-ever long-term contract with LNG produced out of the United States to be indexed to Brent and comes with full destination

The contract price formula in most LNG contracts in the Asia Pacific region uses a rolling average price of crude oil, typically an average of the preceding three or perhaps six or nine months. Combined with the way in which the JCC crude oil price is calculated after month end, this use of a rolling average over several months introduces a time lag in the effect of a change in crude oil prices on the price of LNG under such formulas.[202] The use of a rolling average in the contract price formula also serves to moderate in part the effects of short-term fluctuations in crude oil prices on the price for LNG.

Over time, additional elements have been introduced into the contract price formulas in some SPAs for LNG destined for the Asia Pacific region to dampen the impact of high or low oil prices on the calculated LNG price.

For example, beginning in the mid-1980s, as oil prices fell, sellers successfully introduced so-called S curves into the formulas in some LNG contracts for delivery to Japan, and the use of S curves became increasingly common by the 1990s.[203] An S curve reduces the slope of the formula (say, from 0.1485 to 0.07) when the crude oil price falls below or rises above certain defined pivot or kink points (say, at US$15 and US$25/bbl in these initial contracts in the 1980s and 1990s).[204] These different slopes at the two pivot points result in a zig-zag line resembling an S curve, rather than a straight line, when plotting the LNG price calculated by the formula based on changing crude oil prices. S curves help to protect the seller when oil prices drop below the lower pivot point and help to protect the buyer when oil prices rise above the upper pivot point.

Sometimes parties have agreed on so-called price-out-of-range provisions, which limit the applicability of the price formula to oil prices within a specified range and typically call for the parties to "meet and discuss" in good faith if the oil price falls outside that range. Many of these initial ranges were set at US$11-29/bbl. When the JCC price exceeded US$29/bbl in 2003, price-out-of-range negotiations, often protracted, occurred under many such contracts.[205]

In the 1990s, some buyers were successful in introducing caps and floors on the oil price entered into the price formulas and thus imposing caps and floors on the resulting LNG prices to protect even further from high or low oil prices.[206]

Over time, based on the relative strength of buyers and sellers in the market, these various elements of the contract price formation have been introduced, eliminated, and introduced

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flexibility.").

[202] *See, e.g.*, K. Koyama, Institute of Energy Economics Japan, "Time Lag between Crude Oil and LNG Price Movements," 9 October 2015, at https://eneken.ieej.or.jp/data/6342.pdf.

[203] *See, e.g.*, IGU Wholesale Gas Price Formation – A Global Review of Drivers and Regional Trends, June 2011, at p. 20.

[204] For S curves agreed in the last decade, the pivot or kink points have been centered around a much higher crude oil price and the reduction of slope below and above the pivot points is not as great. *See, e.g.*, N. Cassidy and M. Kosev, "Australia and the Global LNG Market," in Bulletin of the Reserve Bank of Australia, March Quarter 2015, at p. 37 ("Empirically, the s-curve 'kinks' appear to occur at oil prices below around US$40–60/barrel and above US$90–110/barrel."); J. Jensen, "International Natural Gas Pricing – A Challenge to Economic Modeling," at Figure 10, at https://www.eia.gov/naturalgas/workshop/pdf/Session1_Jensen.pdf; A. Flower and J. Liao, "LNG Pricing in Asia," in J. Stern (ed.), *The Pricing of Internationally Traded Gas* (2012), at p. 345 ("The lower kink point has been in the range $30 to $60/bbl with the upper kink between $90 and $110/bbl.").

[205] *See, e.g.*, A. Flower and J. Liao, "LNG Pricing in Asia," in J. Stern (ed.), *The Pricing of Internationally Traded Gas* (2012), at p. 340.

[206] *See, e.g.*, IGU Wholesale Gas Price Formation – A Global Review of Drivers and Regional Trends, June 2011, at p. 20.

again, with different slopes, constants, pivot points, caps, and floors negotiated in different contracts. While many of these pricing elements were first introduced in LNG contracts for delivery to Japan, many have been used in contracts for LNG destined for other countries in the Asia Pacific region.

More recently, some buyers and sellers have agreed on a wider variety of price formation mechanisms, including those described in the following section. For example, in 2019, Shell and Tokyo Gas announced a long-term SPA linked, in part, to coal prices, with the rest "priced off conventional gas- and oil-linked indexes."[207]

2. The Role of Spot Gas and Hubs on Pricing in the Asia Pacific Region

This section briefly addresses the role of the spot gas and hubs on contract price formation in the Asia Pacific region.

As explained above, historically, LNG trade globally and in the Asia Pacific region in particular has been built on long-term SPAs.[208] These long-term contracts are valuable to sellers in order to secure the capital necessary to make large investments for production, liquefaction, and related infrastructure. These long-term contracts are also valuable to buyers to obtain security of supply for their consumption needs and those of their customers.[209] Both buyers and sellers have some predictability of prices under these long-term SPAs as well, given the contract price formula.

However, the spot and short-term market for LNG began in the late 1990s and early 2000s, as additional production came on line and buyers sought to supplement their long-term commitments.[210] Spot and short-term LNG trade has grown dramatically over the past 20 years. In 2000, spot and short-term LNG trade amounted to only about 5 MT, just 5% of global LNG trade.[211] By 2019, spot and short-term LNG trade had increased to 119 MT and accounted for 34% of total LNG trade.[212]

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[207] Y. Obayashi and J. Jaganathan, "Tokyo Gas, Shell Sign LNG Deal Linked to Coal Pricing in Rare Move," Reuters, 5 April 2019 ("As far as Tokyo Gas and Shell know, this is the first time a pricing formula linked with a coal index has been used with LNG contracts.").

[208] C. Pirrong, Trafigura, "Fifty Years of Global LNG: Racing to an Inflection Point, September 2014, at p. 8, at https://www.trafigura.com/media/1284/2014_trafigura_fifty_years_of_global_lng_en.pdf ("From its inception, the LNG industry has been based on longterm contracts between suppliers and buyers…. These contracts have been instrumental in securing the capital necessary to construct what are very expensive, and long-lived, assets.").

[209] *See, e.g.*, IGU Wholesale Gas Price Formation – A Global Review of Drivers and Regional Trends, June 2011, at p. 19.

[210] U.S. Department of Energy, "Global LNG Fundamentals," October 2017, at 122 ("The short-term and spot market began to emerge in the late 1990s-early 2000s.").

[211] *See* GIIGNL, "The LNG Industry," 2013, at p. 9, at https://giignl.org/sites/default/files/PUBLIC_AREA/Publications/giignl_the_lng_industry_fv.pdf.

[212] GIIGNL, "LNG Markets & Trade, LNG Trade," at https://giignl.org/lng-markets-trade-0. Of that 119 MT in short-term and spot trade in 2019, 95 MT was spot trade and the remaining 24 MT was short-term trade. GIIGNL Annual Report 2020, at p. 7.

Much of that growth in spot LNG trade has occurred in the Asia Pacific region and was spurred by the aftermath of the Fukushima nuclear disaster in 2011.[213] Asia Pacific spot LNG trade almost tripled from 2010-2014 alone.[214]

Spot LNG prices are determined by supply and demand and can fluctuate widely, particularly in comparison to the general development of prices under formulas in long-term SPAs. Factors that influence spot LNG prices include weather (e.g., price spikes during cold winters as demand rises), economic swings in supply and demand, prices of other fuels, comparable prices under long-term SPAs, etc.[215] As explained below, the opportunity to buy or sell LNG at spot prices that differ considerably from prices under long-term SPAs can lead to disputes between contractual parties.

Over the past 10 to 15 years, buying and selling gas at physical or virtual hubs in some countries has developed, expanding the ability of buyers and sellers to make spot (and futures) trades of natural gas.[216] Among the most liquid hubs are Henry Hub in the United States (which has been operating for decades), the National Balancing Point (NBP) in the United Kingdom, and the Title Transfer Facility (TTF) in the Netherlands, all of which have been made possible by the interconnection of multiple natural gas pipelines, allowing buyers and sellers to trade increasing volumes of natural gas to create a reliable price marker for spot (and futures) trades.

As the volume of trading on hubs has increased, many (but by no means all) parties to long-term SPAs for both pipeline and LNG contracts in certain regions, especially Europe and the Atlantic Basin, have incorporated (to varying degrees) hub pricing in their contract price formulas.[217] For example, the contract price formula in an SPA might index part or all of the contract price by reference to a rolling average of a specified price on a designated hub (e.g., month-ahead TTF price).[218] Other contracts may include the adoption of a "price corridor" that may function to keep part or all of the contract price rendered under an oil-indexed formula within a band around a rolling average of designated hub prices.[219] Numerous other hub-based pricing mechanisms have been agreed. Notably, a hub-based contract price formula does not mean that the contract price necessarily equals the designated hub price at any point in time; rather, the contract price in a hub-based formula fluctuates (in part or full) with the designated hub price.

Although these hub-based pricing mechanisms have become more common in LNG SPAs in certain regions, hub-based pricing in long-term SPAs is much less common for deliveries of

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[213] Joint Study by the International Energy Agency and Korea Energy Economics Institute, "LNG Market Trends and Their Implications: Structures, drivers and developments of major Asian importers," at p. 4, at https://globallnghub.com/wp-content/uploads/2019/10/LNG_Market_Trends_and_Their_Implications.pdf ("The demand shock caused by the aftermath of the 2011 Great East Japan Earthquake led to the emergence of an Asian LNG spot market.").

[214] *See* EIA, "Natural Gas Prices in Asia Mainly Linked to Crude Oil, But Use of Spot Indexes Increases," 29 September 2015, at https://www.eia.gov/todayinenergy/detail.php?id=23132.

[215] *See generally* A. Alim, P. Harley, and Y. Lan, Baker Institute for Public Policy, "Asian Spot Prices for LNG and Other Energy Commodities," at pp. 6-7, at https://www.bakerinstitute.org/media/files/files/e3564e5f/CES-AsianSpotPricesLNG-110315.pdf.

[216] *See* J. Trenor, "Gas Price Disputes under Long-Term Gas Sales and Purchase Agreements," in D Schwartz (ed.), *The Energy Regulation and Markets Review* (7th ed., 2018), at p. 36. A physical hub is a distribution point located on a natural gas pipeline system – and a virtual hub is a virtual trading point – at which gas is bought and sold in spot and forward trades for standardized gas products without flexibility. *Id.*

[217] *Id.*

[218] *Id.*

[219] *Id.*

LNG to the Asia Pacific region. This is due, in large part, to the lack of any liquid hub in the Asia Pacific region, for the time being. Although there has been talk about the possibility of an Asian LNG hub in certain countries for some time,[220] the development of a liquid LNG hub in the Asia Pacific region does not appear to be on the near-term horizon, for reasons many have discussed.[221]

Nevertheless, over the past ten years, a number of long-term SPAs for LNG destined for the Asia Pacific region have incorporated hub-based pricing or the use of certain price markers designed to reflect pricing in the region.

For example, as U.S. LNG production expanded, many long-term SPAs for LNG from the United States for LNG destined for the Asia Pacific region have incorporated the standard Henry Hub-based price formula used by U.S. producers.[222]

The contract sales price (CSP) formula adopted by the U.S. LNG company Cheniere Energy (and used in many other U.S. LNG contracts) for delivery FOB on the Gulf Coast of the United States is:

$$\text{CSP} = (1.15 \text{ x HH}) + \text{Xy}$$

where: HH is the Henry Hub futures price in US$/MMBtu for the month in which the cargo's delivery window begins, and

Xy is a constant in US$/MMBtu applicable for each contract year, an agreed percentage of which increases annually based on a designated inflation rate.[223]

The contract price is therefore 115% of the Henry Hub price plus the constant Xy, which is intended to cover the investment and operating expense of the liquefaction facility. The 15% markup on Henry Hub prices is intended to cover the costs of obtaining the natural gas and delivering it to the facility and any gas used in liquefaction.[224]

[220] Among countries that have been mentioned as the possible location of an Asian LNG hub are Japan (as the worlds' largest LNG importer), China (which is rapidly increasing its LNG imports), and Singapore (which although a much smaller LNG market has touted its geographic position and liberalized market).

[221] *See, e.g.*, M. Fulwood, "Asian LNG Trading Hubs: Myth or Reality," May 2018, at https://energypolicy.columbia.edu/sites/default/files/pictures/Asian%20LNG%20Trading%20Hubs_CGEP_Report_050318.pdf.

[222] The first such long-term SPA for the sale of U.S. LNG to Asia was signed in 2011 between Cheniere and GAIL of India, and deliveries began March 2018. *See* LNG Sale and Purchase Agreement between Sabine Pass Liquefaction, LLC and GAIL (India) Ltd., 11 December 2011, at https://www.sec.gov/Archives/edgar/data/1383650/000138365011000083/exhibit101gaillngsaleandpu.htm#s16376B78CD39F53B782F1A7D5AB4F819. *See also* "India gets first US LNG shipment at Dabhol," Economic Times, 30 March 2018, at https://economictimes.indiatimes.com/industry/energy/oil-gas/india-gets-first-us-lng-shipment-at-dabhol/articleshow/63547215.cms?from=mdr.

[223] *See, e.g.*, LNG Sale and Purchase Agreement between Sabine Pass Liquefaction, LLC and GAIL (India) Ltd., 11 December 2011, at https://www.sec.gov/Archives/edgar/data/1383650/000138365011000083/exhibit101gaillngsaleandpu.htm#s16376B78CD39F53B782F1A7D5AB4F819.

[224] *See, e.g.*, A. Flower, "LNG Supply Outlook 2016 to 2030," July 2016, at http://www.beg.utexas.edu/files/energyecon/think-corner/2016/CEE_Advisor_Research_Note-Andy_Flower_LNG_Supply_Outlook-Aug16.pdf, at pp. 34-35.

The Xy constant, or liquefaction fee, charged by Cheniere has varied by contract, ranging from US$2.25 to US$3.50.[225] The Cheniere contracts are FOB; if a seller delivered LNG to Asia under a Henry Hub-based formula, a transportation fee would be added.

According to the International Gas Union, 24% of volumes sold globally under long-term LNG contracts were indexed to Henry Hub in 2019, with 68% indexed to oil.[226]

Although U.S. LNG companies are often comfortable with using Henry Hub-indexed price formulas for LNG destined for countries in the Asian Pacific region, not all buyers in the region are, as Henry Hub reflects supply and demand of natural gas in the United States, not in the Asia Pacific region.

As noted above, the Asia Pacific region currently has no established local hub that reflects regional supply and demand for natural gas to use in a hub-indexed price formula, but several price reporting agencies, such as Platts, Argus, ICIS, and others, have created various price assessments of the price of LNG delivered to Asia. Perhaps the most influential to date has been S&P Global Platts' Japan Korea Marker (JKM). According to S&P Global Platts, the JKM price reflects the spot market value of cargoes delivered (DES) into Japan, South Korea, China, and Taiwan.[227] Platts determines the JKM price by asking buyers, sellers, and traders to report prices and/or bids and offers at the end of each trading day and assesses the spot price on the basis of the information collected.[228] Prices in many spot and short-term contracts are based on the JKM.[229]

The JKM has also been used as the price basis for at least some long-term LNG contracts.[230] For example, in 2019, U.S. LNG company Tellurian has entered into a contract with Total S.A. and a memorandum of understanding with Vitol to supply LNG from its Driftwood LNG project in Louisiana at a price based on JKM.[231]

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[225] *See, e.g.*, Cheniere Energy, "Barclays CEO Energy-Power Conference," September 2014, at https://cqpir.cheniere.com/sec-filings/all-sec-filings/content/0001383650-14-000070/0001383650-14-000070.pdf, at slides 8, 13.

[226] International Gas Union, 2020 World LNG Report, at p. 27.

[227] *See* S&P Global Platts, "What is Platts JKM?," at https://www.spglobal.com/platts/en/our-methodology/price-assessments/lng/jkm-japan-korea-marker-gas-price-assessments.

[228] *See* S&P Global Platts, "How Does Platts Assess JKM?," at https://www.spglobal.com/platts/en/our-methodology/price-assessments/lng/jkm-japan-korea-marker-gas-price-assessments; *see also* A. Alim, P. Harley, and Y. Lan, Baker Institute for Public Policy, "Asian Spot Prices for LNG and Other Energy Commodities," at https://www.bakerinstitute.org/media/files/files/e3564e5f/CES-AsianSpotPricesLNG-110315.pdf, at pp. 6-7.

[229] Notably, in April 2020, the JKM dropped to an all-time low. *See* E. Kravtsova, and J. Jaganathan, "Price Agency Platts Says JKM LNG Price Falls to Record Low," Reuters, 23 April 2020 ("The drop means that the JKM price is now almost at parity with the Henry Hub gas price in the United States, discouraging spot cargo deliveries from the United States to Asia as the coronavirus pandemic dampens global gas demand in an already heavily oversupplied market.").

[230] *See, e.g.*, International Gas Union, 2020 World LNG Report, at p. 27 ("While oil indexation is still common in Sales and Purchase Agreements (SPAs), there is an increasing trend to tie LNG contracts to European gas prices (NBP and TTF), the Japan/Korea Marker (JKM) and other hybrid pricing models involving multiple commodities.").

[231] *See* Tellurian, "Tellurian Reports 2018 Results," 19 February 2019, at https://www.tellurianinc.com/news-and-presentations/tellurian-reports-2018-results/ ("Entered into a Memorandum of Understanding (MOU) with Vitol S.A. to supply 1.5 million tonnes per annum (mtpa) of LNG from Tellurian's offtake capacity at Driftwood, with the price based on the Platts Japan Korea Marker (JKM) for a minimum term of 15 years."); Tellurian Press Release, "Total and Tellurian Sign HOA for Equity Investment in Driftwood and 2.5 mtpa LNG," 2 April 2019, at https://ir.tellurianinc.com/press-releases/detail/210/total-and-tellurian-sign-hoa-for-equity-investment-in

Other price markers have been reportedly used in long-term LNG contracts into the Asia Pacific region, with parties relying on a wider variety of contract price formation mechanisms.

International gas prices fell to record lows in 2019,[232] and those prices have fallen significantly further in 2020. With the majority of price formulas indexed to oil in long-term SPAs in the Asia Pacific region, the prices under those oil-indexed contracts have fallen significantly in 2020, with the fall in crude oil prices. Moreover, in 2019 spot LNG prices in Asia were the lowest in ten years.[233] These prices are creating difficulties for many LNG suppliers and may lead to price disputes, as discussed below.

V. LNG Pricing Disputes in the Asia Pacific Region

This section first discusses pricing disputes that arise in connection with LNG supply contracts, as well as common terms in price review clauses in both Europe and the Asia Pacific region. The section then provides a brief overview of LNG price reviews that have taken place in the Asia Pacific region, and the relief sought as a result, before concluding by discussing the future of price reviews in the Asia Pacific region.

1. Pricing Disputes in Long-Term LNG Supply Contracts

A wide variety of disputes can arise in connection with LNG supply contracts, including:

- disputes over supply shortfalls or interruptions;
- disputes over the quality of gas delivered;
- offtake disputes or shortfalls;
- disputes about diversions of cargoes, re-exporting/re-loading LNG, profit sharing, and destination restrictions;
- force majeure claims;
- hardship claims;
- disputes concerning competition law and other regulatory issues;
- disputes concerning extensions and termination; and
- pricing disputes.

This section focuses on pricing disputes under long-term LNG supply contracts, how those disputes have been addressed contractually and in practice in the Asia Pacific region, and how those disputes may be addressed going forward.

("Tellurian and Total will enter into a sales and purchase agreement (SPA) for a further 1.5 mtpa of LNG from Tellurian Marketing's LNG offtake volumes from the proposed Driftwood LNG export terminal. The SPA will be for the purchase of LNG free on board (FOB) for a minimum term of 15 years, at a price based on the Platts Japan Korea Marker (JKM)."); P. Ramsay, "Tellurian Takes Flexible Approach," Petroleum Economist, 26 March 2019, at https://www.petroleum-economist.com/articles/midstream-downstream/lng/2019/tellurian-takes-flexible-approach (interview with Tarek Souki, Tellurian's senior vice-president for LNG trading and marketing) ("It is cif linked, but it is a fob contract. We account for a shipping differential, it is JKM minus a formula we have agreed.").

[232] International Gas Union, 2020 World LNG Report, at p. 26 ("International gas prices reached record low levels in 2019 driven by increasing natural gas production, the commissioning of new export infrastructure and limited demand response from Asian markets.").

[233] *Id.* at p. 26 ("The decline in prices was caused by a mild winter in both Asia and Europe and a continuous increase in LNG supplies mainly from the US but also from Russia, Australia and others.").

Many issues can lead to pricing disputes. Pricing disputes arise, for example, as the result of:

- changes in supply or demand in the economy as a whole or in the natural gas market in particular;
- regulatory or other market changes, including market liberalization;
- changes in oil prices or another index to which the contractual price for LNG is linked;
- different prices available under other long-term supply contracts or in other markets;
- different prices for LNG available through spot sales;
- the ability to take advantage of price differences in other markets by diverting or re-exporting LNG; and
- downstream price pressure in a market (due to demand changes, competition, regulation, etc.).

As discussed above, many – but not all – long-term gas supply contracts include some form of price review clause that allows the parties to periodically review and potentially revise the contract price formula, although their specific terms can vary greatly. In some regions – Europe and the Atlantic Basin, for example – price review clauses are common in both long-term LNG and pipeline contracts. In the Asia Pacific region such clauses were less common in the past, but they are becoming much more common. The terms of such clauses, and approaches to them in the Asia Pacific region, are discussed in the next section.

2. Common Terms in Price Review Clauses in Long-Term Gas Supply Contracts

A price review clause is a contractual mechanism that allows for the parties to periodically review and potentially revise the contract price formula in certain circumstances. Such clauses usually seek to balance: (a) the need for some certainty and predictability about pricing, and (b) the recognition that circumstances may change over the duration of the contract necessitating a revision of the formula to restore the parties' bargain.[234] Revising the price formula in a long-term LNG supply contract can have very significant financial consequences given the volumes of gas involved.

The terms of price review clauses vary considerably. The approaches to such clauses in long-term supply contracts to Europe and to the Asia Pacific region are described below. This article first discusses price review clauses in contracts to Europe because of the wide use of such clauses in that region, and the number of disputes that have arisen pursuant to those clauses helps provide some insight into how those clauses are understood and applied in practice.

A. Common Terms in Price Review Clauses in Europe

In long-term gas supply contracts for European markets, most price review clauses include provisions governing:

- *frequency*, i.e., when and how many requests can be made (e.g., once every three years);

[234] *See* J. Trenor, "Gas Price Disputes Under Long-Term Gas Sales and Purchase Agreements," in D. Schwartz, *The Energy Regulation and Markets Review* (7th ed., 2018), at p. 36.

- *additional unscheduled requests*, i.e., whether and when a party can make a "wildcard" or "joker" request in addition to scheduled requests;[235]
- *the process for requesting a price review*, i.e., how to obtain a price review (often setting forth requirements for providing notice of the price review request, as well as requiring the parties to meet and discuss or negotiate in response to a request);
- *standards*, i.e., what must be established to obtain a revision and how the price will be revised, if the requirements are met; and
- *consequences*, i.e., what rights the parties have if they cannot reach agreement in response to a price review request (which usually include the right to commence an arbitration).[236]

Gas price reviews under long-term gas supply contracts are often described as having two phases: the trigger phase and the adjustment phase.[237] During the trigger phase, the party seeking a revision must show that the prerequisites for a price revision have been met. During the adjustment phase, the parties address what the appropriate adjustment, if any, to the contract price should be.[238]

It is common in European contracts to require that the party seeking to revise the price must establish a change of circumstances or a market development not reflected in the contract price in order to "trigger" a price review. Some clauses require that a party seeking to revise the price must show that there has been a "change of circumstances" or a market development during a specified period of time (the "review period").[239]

Some price review provisions also specify that the change of circumstances must:

- have taken place within a defined market (e.g., the national market of the buyer, certain countries, a region, etc.);
- be an "economic" change or be significant or substantial;

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[235] Price review clauses usually stipulate that contractual price revisions can occur only periodically. A wildcard or joker request allows a party to make an exceptional request earlier than otherwise. Such clauses typically limit the number of such requests (e.g., one over the lifetime of the contract). *See* J. Trenor, "Gas Price Disputes Under Long-Term Gas Sales and Purchase Agreements," in D. Schwartz, *The Energy Regulation and Markets Review* (7th ed., 2018), at p. 39.

[236] Given the confidentiality of most gas supply contracts, very few price review clauses are public. One such clause in a long-term LNG supply contract between a Trinidad producer, Atlantic LNG, and a Spanish buyer, Gas Natural, was made public in court proceedings and is therefore frequently discussed. It provides: "If at any time either Party considers that economic circumstances in Spain beyond the control of the Parties, while exercising due diligence, have substantially changed as compared to what it reasonably expected when entering into this Contract or, after the first Contract Price revision …, at the time of the latest Contract Price revision …, and the Contract Price resulting from the application of the formula … does not reflect the value of Natural Gas in the Buyer's end user market, then such Party may, by notifying the other Party in writing and giving with such notice information supporting its belief, request that the Parties should forthwith enter into negotiations to determine whether or not such changed circumstances exist and justify a revision of the Contract Price provisions and, if so, to seek agreement on a fair and equitable revision of the above-mentioned Contract Price provisions …." *See Gas Natural Aprovisionamientos SDG, S.A. v. Atlantic LNG Co. of Trinidad and Tobago*, No. 08 Civ. 1109, 2008 WL 4344525 (S.D.N.Y. 16 September 2008).

[237] *See* S. Finizio, M. Bock, "The Adjustment Phase in Gas Price Reviews Under Long-Term Gas Supply Contracts," in J. Freeman and M. Levy, *Gas and LNG Price Arbitrations* (2nd ed., 2020), at p. 169.

[238] *See* S. Finizio, M. Bock, "The Adjustment Phase in Gas Price Reviews Under Long-Term Gas Supply Contracts," in J. Freeman and M. Levy, *Gas and LNG Price Arbitrations* (2nd ed., 2020), at p. 169.

[239] *See* J. Trenor, "Gas Price Disputes Under Long-Term Gas Sales and Purchase Agreements," in D. Schwartz, *The Energy Regulation and Markets Review* (7th ed., 2018), at p. 39.

- be unexpected;
- be beyond the control of the parties; and/or
- not already be reflected in the existing contract price.[240]

In addition, some price review provisions expressly require the party seeking a revision to establish that a revision is "justified" (often without expressly defining what that means).

If the party seeking a price revision has established the threshold requirements at the "trigger" stage, clauses typically require the parties to seek agreement on the specific revision or adjustment, if any, to be made to the price formula. Some clauses are silent on the "adjustment" standard; some require that the adjustment be "fair," "reasonable," or "equitable" (or some combination of these or similar adjectives) or restores the parties' bargain; and some require the formula to be revised to reflect the change of circumstances established at the "trigger" stage.[241]

Some clauses also require the parties to take into account certain benchmarks, such as import prices into a designated market or the ability of the buyer "in any case" to economically market the gas.[242]

B. Common Terms in Price Review Clauses in the Asia Pacific Region

Historically, many LNG supply contracts in the Asia Pacific region took a different approach to that used in European contracts, although that approach has changed in many more recent contracts, as it has become increasingly common for contracts in the region to have clauses that are similar to those in Europe and other regions.

Until the 1990s, many long-term gas supply contracts in the Asia Pacific region either did not contain price review clauses or addressed price disputes through clauses that provided that the parties would "meet and discuss" such issues or through other contractual provisions, such as hardship clauses. That has changed over time, with more long-term LNG supply contracts in the region including more detailed and prescriptive price review clauses.[243]

As noted, one approach in the region, which is still seen in some existing contracts, was to require the parties to "meet and discuss" a price revision. Some example clauses are below:

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[240] *See* J. Trenor, "Gas Price Disputes Under Long-Term Gas Sales and Purchase Agreements," in D. Schwartz, *The Energy Regulation and Markets Review* (7th ed., 2018), at pp. 40–41; S. Finizio, M. Bock, "The Adjustment Phase in Gas Price Reviews Under Long-Term Gas Supply Contracts," in J. Freeman and M. Levy, *Gas and LNG Price Arbitrations* (2nd ed., 2020), at p. 172.
[241] *See* S. Finizio, M. Bock, "The Adjustment Phase in Gas Price Reviews Under Long-Term Gas Supply Contracts," in J. Freeman and M. Levy, *Gas and LNG Price Arbitrations* (2nd ed., 2020), at p. 172.
[242] *See* S. Finizio, M. Bock, "The Adjustment Phase in Gas Price Reviews Under Long-Term Gas Supply Contracts," in J. Freeman and M. Levy, *Gas and LNG Price Arbitrations* (2nd ed., 2020), at p. 174; J. Trenor, "Gas Price Disputes Under Long-Term Gas Sales and Purchase Agreements," in D. Schwartz, *The Energy Regulation and Markets Review* (7th ed., 2018), at p. 41.
[243] For an in-depth discussion of the evolution of price review clauses in long-term LNG supply contracts in Asia, *see* A. Ason, "Price Reviews and Arbitrations in Asian LNG Markets," Oxford Institute of Energy Studies, April 2019; *see also* J. Stern, "LNG Pricing: Challenges in the Late 2010s," in J. Stern (ed.), *The Pricing of Internationally Traded Gas* (2012), at p. 488; A. Ason, "Price reviews: Are Asian LNG contract terms finally changing?," in "LNG in Transition: From Uncertainty to Uncertainty," Oxford Institute of Energy Studies, September 2019, at p. 33.

> "If in the future another Liquefied Natural Gas project is placed into operation to supply Japan with natural gas from foreign sources, such as Alaska, Canada, Australia, Brunei and the Middle East under similar conditions such as volume, distance, liquefaction, and ocean transportation techniques, contract term and so forth, Sellers will hold a discussion with Buyers concerning the price as herein set forth, and shall endeavor to find a solution satisfactory to all parties concerned."[244]
>
> "If Seller or Buyer desires a review of the prices set out in this Agreement due to a change in relevant circumstances resulting in such prices being significantly disadvantageous to either Seller or Buyer compared with the prices for other LNG sold into Japan on similar terms to this Agreement, then ... Buyer and Seller shall meet and discuss in good faith to review such prices."[245]
>
> "A Party may give a notice ('Price Review Notice') to the other Party to renegotiate the Contract Price no earlier than [DATE]. Following the issue of the Price Review Notice, the Parties shall meet in good faith and discuss the matter with a view to agreeing what Price Adjustment (if any) is required. If the Parties agree upon such matters, they shall amend the Contract Price to reflect the revisions (if any) so agreed. Such revised Contract Price shall apply from the Review Date … until the end of the Supply Period and neither Party is entitled to give a further Price Review Notice to the other Party. If, within a period of six (6) months after the Price Review Notice was issued, the Parties have not agreed upon a Price Adjustment, either Party may terminate this Agreement upon giving notice to the other Party and such notice shall come into effect at the end of the Contract Year during which it is served."[246]

Other contracts in the region contain more detailed price review procedures, although those clauses can differ from those in European contracts. For example, long-term gas supply contracts in the Asia Pacific region often have taken a different approach to:

- *frequency*, by providing that a party could only request a price review once every five or ten years or that there may be only one or two opportunities to make a request over the term of the contract (although in more recent clauses it is increasingly common to provide the right to seek a price review more frequently);
- *additional unscheduled requests*, by not providing for a "wildcard" or "joker" request in addition to the scheduled price reviews;
- *the process for requesting a price review*, by providing for no procedure other than that the parties meet and discuss a price review request, as noted above, and some have not provided a time limit for such discussions;

[244] LNG Sale and Purchase Agreement between Phillips Petroleum Co. and Marathon Oil Co., as Sellers, and Tokyo Electric and Tokyo Gas, as Buyers, dated 6 March 1967, quoted in *Phillips Petroleum Co. v. Comm'r of Internal Revenue*, 101 T.C. 78, 84 (U.S.T.C. 1993).
[245] Unidentified contract, quoted in Lord Justice George Leggatt, "Negotiation in Good Faith: Adapting to Changing Circumstances in Contracts and English Contract Law," 19 October 2018, Jill Poole Memorial Lecture Aston University, at https://www.judiciary.uk/wp-content/uploads/2018/10/leggatt-jill-poole-memorial-lecture-2018.pdf.
[246] Long Term LNG Sale and Purchase Agreement Between Qatar Liquefied Gas Company Limited and Pakistan State Oil Company Limited, 8 February 2016, published by Business Recorder, at https://www.brecorder.com/pdf/lng.pdf.

- *standards*, by not addressing in detail what is required to establish the right to a price revision or how the price is to be adjusted (and, as discussed below, where such standards are expressed, they can differ from those in European contracts);
- *consequences*, by not addressing what happens if the parties fail to reach agreement on a price review request, although some contracts provide for the right to terminate the contract, and others expressly provide for a dispute resolution mechanism such as arbitration or expert determination.

When contracts in the region set forth a defined "trigger" requirement, they often do not require the establishment of a change of circumstances (which is a common requirement in many European clauses). Instead, it has been more common to refer to comparisons to price benchmarks such as current market prices for LNG or prices under new long-term LNG contracts in a specified region as a basis for triggering a price revision.[247]

With regard to the adjustment of the contract price formula if the requirements for a revision are established, some price review clauses in the region do not include any specific standard for adjusting the price, while others refer to price benchmarks or use similar phrases to those used in European contracts (e.g., that a revision should be "fair," "reasonable," "equitable," etc.).

3. LNG Price Reviews in the Asia Pacific Region

Although details are not often made public, the parties to long-term LNG supply agreements for delivery to the Asia Pacific region have been reviewing and revising their contract prices, both formally under price review clauses and informally, soon after the first deliveries to the region began in 1969. For example, the parties to the first LNG contract in the region – the 1967 SPA between Phillips Petroleum and Marathon Oil, as sellers, and Tokyo Electric and Tokyo Gas, as buyers – revised the contract price pursuant to their "meet and confer"-type price review clause at least ten times during the 1970s.

A detailed background regarding the parties' revisions of the contract price (which was a fixed price) under the price review provision is set forth in a U.S. tax court case.[248] The court explained the genesis, negotiations, and outcome of the first price review under that contract:

> "After the LNG project had become operational, Phillips determined that the economics of the LNG project were unfavorable at the contracted price. In March 1972, Phillips' and Marathon's representatives, relying on paragraph 9.1(b) of the LNG sales agreement [setting forth the price review provision], which became effective after an LNG project in Brunei was put in place to sell LNG to Japan, quoted supra, met with Tokyo Electric and Tokyo Gas to discuss the possibility of increasing the price of LNG due to increased cost of production, liquefaction, and transportation. Several meetings were held at which both sides argued whether the economics of the trade justified their respective positions relative to changing the price of the LNG under the LNG sales

[247] For example, the Phillips/Marathon contract, quoted above, provided that the seller was obliged to discuss pricing issues "[i]f in the future another Liquefied Natural Gas project is placed into operation to supply Japan with natural gas from foreign sources … under similar conditions …." LNG Sale and Purchase Agreement Between Phillips Petroleum Co. and Marathon Oil Co., as Sellers, and Tokyo Electric and Tokyo Gas, as Buyers, dated 6 March 1967, quoted in *Phillips Petroleum Co. v. Comm'r of Internal Revenue*, 101 T.C. 78, 84 (U.S.T.C. 1993).

[248] *See Phillips Petroleum Co. v. Comm'r of Internal Revenue*, 101 T.C. 78, 87-89 (U.S.T.C. 1993).

agreement…. On April 28, 1972, the parties to the LNG sales agreement executed an amendment increasing the price to 57 cents per MMBtu effective April 28, 1972."[249]

Having detailed public information about a price review and its outcome is rare, however. Most price reviews are confidential, and therefore information about them is often at best anecdotal.[250] Nevertheless, as discussed below, both buyers and sellers in the Asia Pacific region appear to be seeking price reviews more frequently, both informally and formally, by invoking price review clauses, and several pricing disputes have resulted in arbitrations.

For example, there are reports of several sellers commencing formal price reviews beginning in 2010, with some resulting in revisions to the contract formulas increasing the contract price. One author refers to the period 2010 to 2014 as "the first 'wave' of LNG price reviews (in relative Asian terms)."[251] There is no indication that any of those price review requests resulted in arbitrations.

In 2015, Petronet (India's largest LNG importer) reportedly secured almost a 50% price reduction from RasGas, notably under a contract without a price review clause, after LNG spot prices had dropped significantly below the oil-indexed price due to a price floor in the formula.[252] The revision of the contract price formula in the Petronet/RasGas contract has been heralded as an "important event" that raises questions about "the possibility of contract review contagion."[253] Following that revision, there have been a number of formal price review requests by buyers, and several price review arbitrations have commenced.

In 2018, KOGAS initiated an arbitration against North West Shelf LNG, operated by Woodside Petroleum, under an LNG contract reportedly for 0.5 MT per year.[254] It is widely reported as the first LNG price review arbitration in Asia.[255] One report noted that the KOGAS/North West

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[249] *Phillips Petroleum Co. v. Comm'r of Internal Revenue*, 101 T.C. 78, 87 (U.S.T.C. 1993).
[250] For more detailed descriptions of contract price revisions in the Asia Pacific region, *see generally* A. Flower and J. Liao, "LNG Pricing in Asia," in J. Stern (ed.), *The Pricing of Internationally Traded Gas* (2012); A. Ason, "Price Reviews and Arbitrations in Asian LNG Markets," Oxford Institute of Energy Studies, April 2019.
[251] A. Ason, "Price Reviews and Arbitrations in Asian LNG Markets," Oxford Institute of Energy Studies, April 2019, at p. 2.
[252] *See* "Re-negotiated Qatar gas deal giving daily gain of $5/mmBtu," Hindu Business Line, 5 January 2016, at https://www.petronetlng.com/NewsContent.php?newsid=425 (interview with Petronet CEO Prabhat Singh). According to reports, the parties signed a new contract which changed the indexation in their price formula from JCC to Brent, eliminated the oil price floor and ceiling, and introduced a small constant, all with the effect of reducing the price from about $12-13/MMBtu down to around $6-7/MMBtu, and also agreed to waive Petronet's take-or-pay penalty. *See* "Petronet, RasGas agree new LNG price, penalty waived," LNG World News, 4 January 2016; *see also* A. Ason, "Price Reviews and Arbitrations in Asian LNG Markets," Oxford Institute of Energy Studies, April 2019, at p. 2.
[253] Credit Suisse, "Global LNG Sector," 5 February 2016, at pp. 20, 24, at https://research-doc.credit-suisse.com/docView?document_id=1057555651.
[254] Reported details of the arbitration are inconsistent. For example, a KOGAS spokesman stated that "[t]he contract allowed Kogas to call for price renegotiation to reflect major changes in the LNG markets." In contrast, the CEO of Woodside Petroleum, the operator of North West Shelf, responded that it was North West Shelf that had initiated the arbitration against KOGAS: "This was an old legacy contract that was at actually very low slopes …. The North West Shelf view is that Kogas owes the North West Shelf money, not the other way around." "Stakes high in Kogas-NWS LNG price dispute," Hellenic Shipping News, 22 February 2018. *See also* "As KOGAS goes into LNG arbitration, others may follow," Reuters, 13 February 2018.
[255] *See* J. Chung and J. Jaganathan, "S.Korea's KOGAS says in LNG arbitration with Australia's North West Shelf Gas," Reuters, 12 February 2018 ("Producers will be watching how the likes of the Chinese national oil companies, JERA (of Japan) and KOGAS choose to navigate upcoming price review opportunities, with large project value at stake.").

Shelf arbitration "could set an important precedent and open the floodgates for future contractual renegotiations and pricing reviews in the global LNG industry, with potential implications for all its stakeholders."[256]

A second reported arbitration was initiated by Osaka Gas against PNG LNG, operated by ExxonMobil, under an LNG contract reportedly for approximately 1.5 MT per year.[257] As with the KOGAS/North West Shelf arbitration, many reports have focused on the impact that the Osaka Gas/PNG LNG arbitration may have on the LNG industry in the Asia Pacific region more generally.[258] In addition to the KOGAS and Osaka Gas arbitrations, additional proceedings have commenced but are not yet public.

4. Relief Sought in Price Reviews in the Asia Pacific Region

Parties to long-term LNG supply contracts in the Asia Pacific region have reportedly obtained a variety of revisions through price review negotiations, both formal and informal, including changes to various aspects of the price formula:

- slope;
- constants;
- S-curve;
- minimum and maximum oil price inputs into the formula, or floors and caps;
- the indexation reference (e.g., from JCC to Brent); and
- the period of oil price averaging (e.g., from nine or six months, to three months).

These various elements of the contract price formula are discussed above.

There are also reports that, as part of price review negotiations, parties have agreed to modify other contract terms, such as offtake requirements, take-or-pay penalties, ability to offtake in later years, and destination restrictions. For example, Petronet reportedly obtained a waiver of the take-or-pay penalty as part of its informal price review negotiations with RasGas.[259]

5. The Future of Price Reviews in the Asia Pacific Region

It is not clear whether parties to LNG supply contracts in the Asia Pacific region will resort to price reviews – and arbitration of disputes that cannot be resolved through negotiation – as frequently as parties have in Europe over the past decade.[260] The nature of the global LNG

[256] "Stakes high in Kogas-NWS LNG price dispute," Hellenic Shipping News, 22 February 2018. *See also* J. Terceño, D. Phua and E. Stennett, "The LNG View: Gas Pricing Disputes Coming to Asia," at pp. 4–5 (2018).

[257] *See* A. Sheldrick and J. Jaganathan, "Japan LNG buyers talk tough as spot prices drop to 3-year lows," Reuters, 7 August 2019. Osaka Gas reportedly is seeking a reduction in the formula slope.

[258] *See, e.g.*, "Japanese LNG buyer seeking price arbitration in possible 'bellwether,'" Euromena Energy, 30 July 2019 ("A shift to a buyers' market has emboldened consumers that historically have been concerned about security of supply to seek greater contract flexibility and lower prices. 'It's unprecedented for a traditional LNG buyer to initiate arbitration in this way, presenting a new paradigm for LNG contract negotiations.'").

[259] *See, e.g.*, "Petronet, RasGas agree new LNG price, penalty waived," LNG World News, 4 January 2016; A. Ason, "Price Reviews and Arbitrations in Asian LNG Markets," Oxford Institute of Energy Studies, April 2019, at p. 2.

[260] In the last decade, there has been a very significant number of price reviews and subsequent arbitrations relating to long-term gas supply contracts in Europe and the Atlantic Basin. The factors cited for this include: liberalization of gas markets in Europe; increased competition, causing price pressure downstream; development of gas hubs in Europe at which gas can be purchased at prices determined by supply/demand; "decoupling" of oil prices and

trade is changing, and gas markets in the Asia Pacific region are distinct from each other and from those in other parts of the world. However, there are a number of reasons to believe that the recent increase in formal and informal price reviews and price review arbitrations in the Asia Pacific region is likely to continue, and indeed accelerate.

In addition to the fact that there currently are an increasing number of price reviews in the Asia Pacific region (including those that are not public), these factors include, but are not limited to, increasing price sensitivity and efforts to liberalization gas markets in most countries in the region.

Liberalization efforts: One factor that may make price reviews more likely is ongoing efforts to liberalize gas and power markets in the Asia Pacific region. Unlike in Europe, liberalization in the Asia Pacific region is being undertaken at the national level, rather than on a supranational basis (led by the European Union), and it therefore necessarily will proceed differently in different markets, and at different paces.[261] However, where steps are taken to liberalize the gas and power markets in a country, it usually introduces new market entrants and increased competition for customers. Coupled with measures that may limit the buyers' ability to pass prices on to customers, this increased competition puts pressure on buyers to reduce costs and offer prices to compete with those offered by new entrants. In these circumstances, price reviews become a more attractive option for buyers than when electricity production companies and gas distribution companies are regional monopolies and can pass on gas price increases to their customers.

Increase in global LNG supply: Over the past few years, there has been a significant increase in global LNG supply, with multiple new projects coming on line, particularly in Australia, the United States, and Russia.[262] This has resulted in a so-called oversupply of LNG in much of the Asia Pacific region,[263] which may be further exacerbated by the severe economic impact of the COVID-19 pandemic. In conjunction with increasing price sensitivity, this significant increase in global LNG supply may lessen concerns that buyers historically have had about security of supply and therefore create a greater willingness to use contractual price review mechanisms with less fear of risking their relationship with the seller.

Lower LNG spot prices: Another factor that may make price reviews more common in the region is the availability of much lower LNG spot market prices, which have dropped dramatically over the past year. Some buyers that would choose to buy more spot gas (at lower prices) may not be able to do so because their supply requirements are being met by long-term take-or-pay supply contracts. In these circumstances, price reviews may become a more attractive option under long-term LNG supply contracts linked to oil prices.

Oil price fluctuations: Another factor that may lead to more price reviews in the Asia Pacific region over time is oil price fluctuations. Because of the common use of oil indexation in the

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market prices for gas available at gas hubs in certain markets; unexpected supply/demand developments, including the global financial crisis beginning in 2008; a "gas glut" in Northwest Europe; the increase in large-scale LNG projects and development of shale gas in North America, resulting in a shift of LNG supply to Europe then Asia; the Fukushima disaster and greatly increased LNG demand in Asia; increased use of LNG for price arbitrage opportunities worldwide; and oil price changes.

[261] The approaches taken and status of liberalization in the major markets in the region are discussed above.

[262] *See, e.g.*, International Gas Union, 2020 World LNG Report, at p. 7.

[263] *See, e.g.*, S. Stapczynski, A. Shiryaevskaya, and N. Malik, "Global Oversupply Sets up LNG for a Year of Record Low Prices," 24 January 2020.

price formulas in LNG supply contracts to the Asia Pacific region, fluctuations in oil prices can have a significant impact on prices under these long-term contracts. The decline in oil prices starting in 2014 and accelerating in 2020 has put significant downward pressure on the prices that LNG buyers have paid under these long-term supply contracts. Sellers in some markets outside of the Asia Pacific region cited the significant decrease in oil prices in 2014-2015 as a basis for requesting price increases, and some sellers may similarly cite the 2020 drop in oil prices. Conversely, if oil prices begin to increase, buyers may argue that changing oil prices are a basis to revise existing price formulas.

Ongoing relevance of oil indexation: Some parties may argue that oil indexation (such as JCC or Brent) has lost economic relevance due to a variety of factors, such as market liberalization, increased natural gas competition, shifting use of competing fuels (e.g., away from crude oil to coal and renewables), and the increased availability of spot LNG at prices determined by supply and demand. Similar factors in Europe have been cited by parties in price reviews seeking to shift from oil-indexed formulas to hub-based pricing, either in whole or part, or the introduction of hub-based pricing elements, such as corridors. As discussed above, natural gas hubs have not yet developed in the Asia Pacific region, in contrast to Europe and North America, and it is not clear whether and when liquid hubs will emerge in the region. Therefore, it is unlikely there will be a similar industry-wide shift toward hub-based pricing in the Asia Pacific region in the near term. However, parties may nevertheless argue that oil indexation no longer serves the purpose it once did and seek price revisions to reduce oil indexation in favor of other pricing elements.

It is not clear that price reviews in the Asia Pacific region will ever be as prevalent as they have become in Europe and some other regions. As noted above, the Asia Pacific region is made up of very distinct markets, and therefore the effects and timing of these various factors may vary by country. Moreover, some long-term contracts in the region do not include price review provisions, and parties are increasingly using shorter term contracts, which often do not provide for price reviews. Cultural differences also may play a factor, with parties in at least some parts of the region preferring to take a less formal and more conciliatory approach to pricing issues,[264] and parties may also have learned lessons (both positive and negative) from the heavier use of price review arbitration in other parts of the world.

Despite these considerations, it remains likely that price reviews – both formal and informal – will not just continue, but will increase, and that there will be a notable growth in the number of arbitrations when parties are unable to reach agreement. Long-term LNG supply contracts in the region increasingly provide expressly for the right to commence arbitration if agreement is not reached on a price revision,[265] and the increase in price sensitivity and competition described above may place parties under significant pressure to use the contractual mechanisms available to them. Indeed, many of the factors discussed above may make it increasingly difficult for parties to reach consensual solutions to pricing disputes, particularly in light of severe economic pressure exacerbated by the COVID-19 pandemic. In fact, in the current circumstances, the lack of detail in some price review clauses may increase the possibility of disputes and actually cause some parties that are not satisfied with the outcome of negotiations

[264] *See* D. Speller, J. Lim, and J. Li, "Oil and Gas Arbitration in the Asia-Pacific Region," Asia-Pacific Arbitration Review, 2019, at p. 44.
[265] *See, e.g.*, A. Ason, "Price Reviews and Arbitrations in Asian LNG Markets," Oxford Institute of Energy Studies, April 2019, at pp. 12-13.

to commence formal proceedings under general dispute resolution clauses in their contracts even where the price revision clause does not expressly provide such a right.

Although some parties may be cautious about commencing formal proceedings due to cultural reasons or a reluctance to disrupt a long-standing commercial relationship, it is not clear what overall effect such concerns will have in light of commercial pressures on parties. Either party to an LNG supply contract may commence an arbitration, and a number of significant parties active in the Asia Pacific region regularly seek price reviews under their contracts in other regions and use arbitration as a means to pursue such revisions when negotiations fail to reach agreement. Moreover, there is an increasing number of new market participants that may not have the same reluctance to initiate arbitration to resolve contractual disputes.

In Europe and other parts of the world, parties to long-term supply contracts share the same concerns about not disrupting their commercial relationships and, in many cases, avoided formal proceedings for many years by agreeing informally to price revisions. Those parties nonetheless began to use formal contractual mechanisms, including arbitration, as the stakes involved became too important to ignore if negotiations failed to reach agreement. Many of those parties have come to believe that resorting to arbitration to resolve a dispute can be reconciled with the continuation of commercial relationships and view arbitration as another contractual mechanism. Indeed, as an illustration of this, after KOGAS commenced its price review arbitration against the Woodside Petroleum-led North West Shelf LNG described above, the parties signed a Memorandum of Understanding for a new project.[266]

Global events over the past six months are likely to contribute further to pricing disputes under long-term LNG contracts in the Asia Pacific region and increase the likelihood of price reviews and even arbitrations to resolve disputes.

Oil prices have plunged precipitously since late 2019, collapsing to the lowest levels in almost 20 years, falling from US$60/bbl at the end of 2019 to the US$20/bbl range. Oil prices had fallen in the first quarter of 2020 due a drop in demand, but the price war between Saudi Arabia and Russia in March 2020 sent prices plummeting further, when Russia refused to back production cuts that had been agreed with members of the OPEC oil producers' group.[267] This dramatic drop in oil prices will have a profound impact on oil-indexed LNG prices under many long-term LNG contracts in the Asia Pacific region. Due to the lag built into oil-indexed price formulas, and due to rolling averages and other features, the full impact of this drop in oil prices on LNG prices under these long-term contracts will continue to be felt over the coming months.

Moreover, the massive economic impact of the COVID-19 pandemic may lead to an increase in pricing disputes in the region. The pandemic has resulted in a significant downturn in economic activity around the world, including throughout the Asia Pacific region, as lockdowns and other government measures are implemented across the world to slow the spread of the virus. This in turn has contributed to a significant decrease in LNG demand.[268]

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[266] *See* S. Lee, "KOGAS Signs MOU with Australia's Woodside for Hydrogen Research," Business Korea, 4 July 2018.

[267] *See, e.g.*, "Coronavirus: Oil price collapses to lowest level for 18 years," BBC, 30 March 2020.

[268] *See, e.g.*, GIIGNL, Annual Report 2020, at p. 3 ("In the near term, the disruptive impact of the Covid-19 outbreak on the economies of importing countries will exert downward pressure on LNG demand in an already oversupplied market."); International Gas Union, 2020 World LNG Report, at p. 27 ("The first quarter of 2020 has proven to be very challenging for natural gas and LNG producers, as historically low gas prices have prevailed throughout the winter season. First, the increase in LNG exports combined with a mild winter across the Northern

The International Gas Union notes that LNG imports into China have dramatically dropped as a result of a slowdown in industrial and commercial activity.[269] Indeed, several LNG importers in China reportedly declared *force majeure* under their supply contracts to refuse delivery of some cargoes.[270]

As discussed above, this decrease in demand for LNG adds to the so-called oversupply of LNG in the region, and spot prices have fallen as a result. For example, by February 2020, the JKM price had fallen to an all-time low.[271]

The combined pressures of falling oil-indexed prices and low spot prices for LNG will only exacerbate the factors discussed above that are likely to contribute to the increase in formal and informal price reviews and arbitrations under long-term LNG supply contract in the Asia Pacific region.

Hemisphere lead to a counter-cyclical drop in international gas prices. The bearish tone continued throughout February and March as markets around the world started to announce lockdowns in order to control the spread of the COVID-19 virus…. This will lead to depressed commercial and industrial activity around the world, which will have a negative impact on gas demand throughout this crisis.").

[269] International Gas Union, 2020 World LNG Report, at p. 27.

[270] *See, e.g.*, S. Stapczynski and A. Shiryaevskaya, "More Chinese LNG orders canceled under new force majeure claims," World Oil, 5 March 2020.

[271] *See* "Infographic: Coronavirus outbreak throws global LNG markets into turmoil," S&P Global Platts, 20 February 2020, at https://www.spglobal.com/platts/en/market-insights/latest-news/natural-gas/022020-infographic-lng-coronavirus-covid-19.