AUSTRALIAN COMPETITION
& CONSUMER COMMISSION

Gas Inquiry 2017-2020

Guide to the LNG netback price series

October 2018

Australian Competition and Consumer Commission
23 Marcus Clarke Street, Canberra, Australian Capital Territory, 2601

Contents

About this guide

This document—*Guide to the LNG netback price series*, October 2018—explains how the ACCC calculates the LNG netback price series published on its website and provides guidance on how the series can be used by gas buyers in the East Coast Gas Market.

The publication of the LNG netback price series is one of the measures implemented by the ACCC as part of its Gas Inquiry 2017-2020 to improve transparency of gas prices in the East Coast Gas Market.

The ACCC welcomes feedback on the LNG netback price series and this guide. Comments can be made in writing to gas.inquiry@accc.gov.au.

Abbreviations

C&I	commercial and industrial
CPI	Consumer Price Index
CSG	coal seam gas
DES	delivered ex-ship
FOB	free on board
GSA	gas supply agreement
JKM	Japan Korea Marker
LNG	liquefied natural gas
MMBtu	Million British Thermal Units–see below, Units of Energy
Organisations	
ABS	Australian Bureau of Statistics
ACCC	Australian Competition and Consumer Commission
ICE	Intercontinental Exchange
RBA	Reserve Bank of Australia

Glossary

ACCC's 2015 inquiry: The ACCC's inquiry into the East Coast Gas Market in 2015, as reported on in April 2016.

ACCC's Gas Inquiry 2017-2020: The ACCC's three year inquiry into the supply of and demand for wholesale gas in Australia that commenced in April 2017.

Delivered ex-ship price: The price of gas delivered by ship to a destination port. This term is typically used for LNG prices.

East Coast Gas Market: The interconnected gas market covering Queensland, South Australia, New South Wales, the Australian Capital Territory, Victoria and Tasmania.

Free on-board price: The price of gas loaded on a ship at a port connected to an LNG plant.

Liquefaction: The process of liquefying natural gas.

Liquefied natural gas (LNG): Natural gas that has been converted to liquid form for ease of storage or transport.

LNG cargo: The LNG that is loaded on to an LNG tanker.

LNG netback price: A pricing concept based on an effective price of gas at a specific location or defined point, calculated by taking the delivered price of LNG and subtracting or 'netting back' costs incurred between the specific location and the delivery point of the LNG. For example, an LNG netback price at Wallumbilla is calculated by taking a delivered LNG price at a destination port and subtracting, as applicable, the cost of transporting gas from Wallumbilla to the liquefaction facility, the cost of liquefaction and the cost of shipping LNG from Gladstone to the destination port.

LNG plant inlet: The physical point at which natural gas is fed into an LNG production facility.

LNG train: A liquefied natural gas plant's liquefaction and purification facility.

Load factor: Measures the extent to which a buyer can take more than the average daily contract quantity throughout the year, subject to the cap imposed by the annual contract quantity.

Southern States: South Australia, New South Wales, the Australian Capital Territory, Victoria and Tasmania.

Spot market transactions: One-off transactions, as distinct from transactions occurring under supply contracts.

Take or pay multiplier: A contract term specifying the minimum proportion of annual contract quantity the buyer must pay for in each year irrespective of whether they take the gas.

Units of Energy

Joule—a unit of energy in the International System of Units

Gigajoule (GJ)—a billion (10^9) joules

Terajoule (TJ)—a trillion (10^{12}) joules

Petajoule (PJ)—a quadrillion (10^{15}) joules

Million British Thermal Units (MMBtu)

Wallumbilla Gas Supply Hub: An exchange for the wholesale trading of natural gas operated by the Australian Energy Market Operator located in Wallumbilla, Queensland. It is the pipeline interconnection point that links the LNG producers' gas production facilities to the East Coast Gas Market.

Wellhead: The equipment that acts as the surface termination point of an oil or gas well.

1. Introduction

1.1. Purpose of the LNG netback price series

In the ACCC's 2015 gas inquiry, the ACCC reported on the unprecedented changes that had occurred in the East Coast Gas Market in the preceding four years, following the development of the liquefied natural gas (LNG) export facilities in Queensland. The ACCC found that these changes had increased uncertainty and complexity in the market, particularly for commercial and industrial (C&I) gas users. When these users sought to renegotiate their long-term contracts when they expired, they found gas prices in the East Coast Gas Market were significantly higher and more volatile than in the past.[1]

In the ACCC's first interim report of its Gas Inquiry 2017-2020 in September 2017, the ACCC reported that the concerns of C&I gas users about the level and volatility of gas prices in the East Coast Gas Market had remained. C&I gas users were also concerned about the lack of adequate pricing information available to assist them in understanding the drivers of gas prices and what gas prices are likely to be in the future.[2]

A key problem for C&I gas users was the lack of an indicative price for gas in the East Coast Gas Market. The gas market was opaque and dominated by confidential bilateral contracts, giving C&I gas users limited insight into the prices being agreed in the market. The short-term trading markets and gas supply hubs in the East Coast Gas Market remained relatively thinly traded, so prices were not representative. There was limited shared understanding of what the most relevant LNG netback price marker was or how it should be calculated.

The lack of readily available pricing information and lack of an understanding of the drivers of gas prices impairs competitive bargaining and favours large incumbents in gas price negotiations.

Under current market dynamics, LNG netback prices based on Asian LNG spot prices play an important role in influencing domestic gas prices in the East Coast Gas Market.

An LNG netback price is not the sole factor that influences domestic prices in the East Coast Gas Market. Individual prices paid by gas users will also reflect other factors that may be relevant to their circumstances, including the terms and conditions of their gas supply and any applicable transportation or retailer charges.

When adjusted for these factors, an LNG netback price represents the price that a gas supplier would expect to receive from a domestic gas buyer to be indifferent between selling the gas to the domestic buyer and exporting it.

The publication of the LNG netback price series by the ACCC is an important step towards improving transparency of gas prices in the East Coast Gas Market and providing users with information that can be used in gas supply negotiations.

Over the course of the Gas Inquiry 2017-2020, the ACCC will monitor the effectiveness of the price series and accompanying materials, and will refine them as appropriate.

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1 ACCC, *Inquiry into the east coast gas market*, April 2016, pp. 29-36.

2 ACCC, *Gas inquiry 2017–2020 – Interim report*, September 2017, pp. 42-60.

1.2. How the LNG netback price series can be used

The ACCC has published the following information on its website:

- historical monthly LNG netback price series at the Wallumbilla Gas Supply Hub (Wallumbilla) in Queensland, dating back to January 2016, based on a measure of historical Asian LNG spot prices
- forward monthly LNG netback price series at Wallumbilla, extending to the end of the following calendar year, based on a measure of expectations of future Asian LNG spot prices.

The historical and forward LNG netback prices are measures of export parity prices, at Wallumbilla, for LNG spot sales into northeast Asia. Gas buyers in the East Coast Gas Market and other parties can use this information to:

- observe historical trends of Wallumbilla export parity prices, including seasonal patterns in both the level and volatility of those prices
- identify transient or longer-term changes in Wallumbilla export parity prices, resulting from changes in Asian LNG spot prices, LNG shipping costs or AUD/USD exchange rates
- estimate an indicative reference price of gas in the East Coast Gas Market, taking into account all the relevant factors and limitations (as discussed in section 3), with such estimate applicable:
    - at a specific point in time
    - at a particular location in the East Coast Gas Market
    - to an offer or agreement to supply gas for a term of up to two years
- in the course of calculating an estimate of an indicative reference price, substitute any of the inputs or assumptions used by the ACCC in the calculation of forward LNG netback prices with their own
- compare an estimate of an indicative reference price to contemporaneous gas prices being offered or agreed in the East Coast Gas Market for supply with a term of up to two years.

For the purpose of negotiations between a supplier and buyer concerning future gas supply, the most relevant reference prices are forward LNG netback prices over the proposed period of supply.

1.3. Limitations of the LNG netback price series

The publication of the series does not represent:

- the ACCC setting a level of gas prices in the East Coast Gas Market or any other market in Australia
- the ACCC's forecast of international or domestic gas prices
- the ACCC's forecast of any of the inputs used in the calculation of the LNG netback prices (such as shipping costs or foreign exchange rates)
- an endorsement by the ACCC of the price reporting agencies whose data are used in the calculation of LNG netback prices (Platts, Argus and the Intercontinental Exchange (ICE)), nor the specific methods adopted by those agencies.

The extent to which an LNG netback price is relevant as a price marker in negotiations for domestic gas supply may vary. Parties to a negotiation should satisfy themselves that the LNG netback price is the most appropriate reference point. In using the published LNG netback price series, parties should also be aware that:

- the published LNG netback prices have been calculated specifically for the East Coast Gas Market and are not applicable to any other locations in Australia
- the LNG netback price is not the sole factor that influences gas prices offered or agreed in the East Coast Gas Market – other factors should also be taken into account, particularly the individual non-price terms and conditions of gas supply and any applicable transportation or retailer charges (as discussed in section 3.1.1)
- there may be specific dynamics that affect how the LNG netback prices influence gas prices in their particular location in the East Coast Gas Market – different pricing dynamics apply in states and territories outside Queensland (as discussed in section 3.1.2)[3]
- the published LNG netback series is most relevant for an offer or agreement to supply gas for a term of up to two years – for long-term gas supply (e.g. 5-10 years), further information is needed and, potentially, gas price markers other than Asian LNG spot prices would be more appropriate
- the data from Platts, Argus and ICE used by the ACCC is derived using the specific methods adopted by those entities – each data set has its own limitations (see section 3)
- the ACCC takes the data from Platts, Argus and ICE as given – the ACCC does not have any input into the method used by each agency in deriving the data nor does the ACCC amend the data in any way.

1.4. Publication of additional information

Over time, the ACCC intends to publish additional information on its website alongside the LNG netback price series to improve transparency of gas prices in the East Coast Gas Market, including information on transportation charges and estimates of gas production costs.

The ACCC will update this guide to explain the published information and how it can be used in conjunction with the LNG netback price series.

1.5. Structure of this guide

Section 2 of this guide explains the fundamental concepts of LNG netback pricing and sets out the method adopted and data sources used by the ACCC to calculate the prices published in the LNG netback price series.

Section 3 of the guide provides an overview of the ACCC's current approach to assessing price outcomes in the East Coast Gas Market, and provides users of the LNG netback price series with guidance on the interpretation and use of published LNG netback prices.

[3] ACCC, *Inquiry into the east coast gas market*, April 2016, pp. 42-53.

2. LNG netback pricing: concept and calculation method

Section 2.1 below explains the concept of LNG netback pricing, while section 2.2 sets out the ACCC's method for calculating the prices published in the LNG netback price series and section 2.3 provides worked examples.

2.1. Concept of LNG netback pricing

Natural gas that is exported is transported by pipeline from gas production wells to an LNG processing facility where it is converted to LNG, and then loaded onto an LNG tanker. The LNG cargoes can be sold either at the point the gas is loaded onto the tanker, or on a delivered basis, in which case the cargo is shipped to a destination port. LNG cargoes may be sold under long-term LNG contracts (such as those that can underpin investment in LNG facilities), under short-term contracts, or into LNG spot markets.

LNG producers invest capital to construct the LNG facilities (including the LNG plant and transmission pipelines). Each of the steps involved in producing and exporting LNG also causes costs to be incurred. Some costs are fixed in the short-run (such as the cost of maintenance) while other costs can change, depending on the quantity of LNG being produced (such as the amount of gas used as fuel in the liquefaction process).

For the purpose of making short- and long-run decisions, LNG producers typically seek to determine the effective price that they could receive for exported LNG after applicable costs are subtracted from the LNG price. This is done by taking the LNG price and subtracting or 'netting back' the costs incurred between a particular location (such as upstream processing facilities to remove impurities after the gas is extracted from the well) and the delivery point of the LNG. This price represents an export parity price of gas for that location—also known as an LNG netback price.

Sections 2.1.1 and 2.1.2 below set out the types of costs that are generally considered in the context of short- and long-run decision making by LNG producers and how the respective LNG netback prices are calculated.

2.1.1. Short-run LNG netback prices

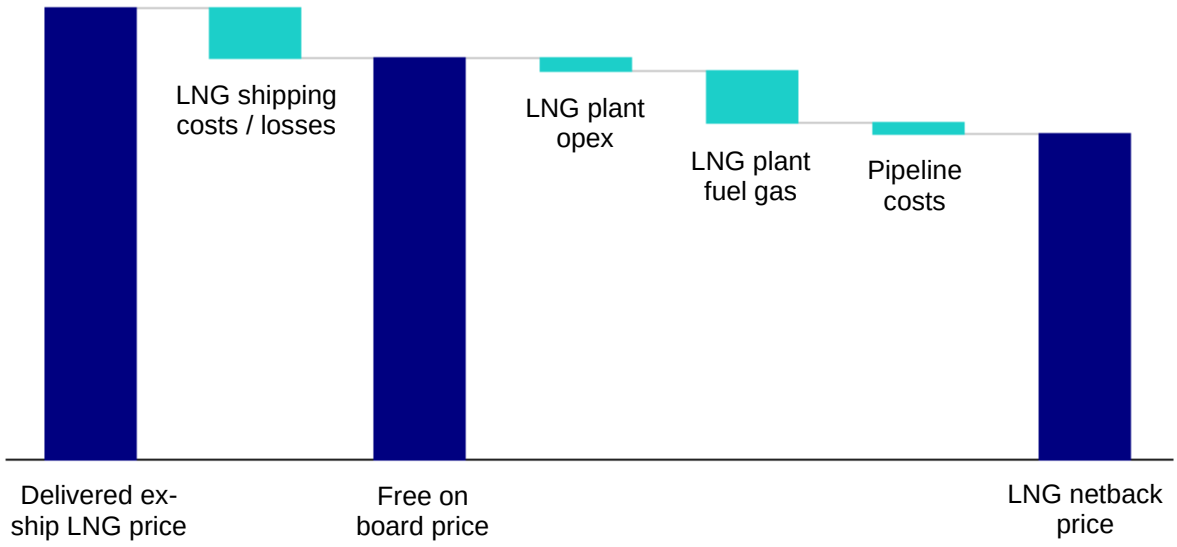
There is a range of short-run decisions that could be made by LNG producers. For example, in the short-run an LNG producer may expect to produce gas in excess of what is required to satisfy its long-term LNG contracts. The LNG producer would therefore need to decide whether to sell this excess gas as LNG on the international market or supply it as gas to a domestic buyer.

In making this decision, the LNG producer would compare a short-run LNG netback price to the price it could receive from the domestic buyer to determine the more commercially attractive option. The costs that are deducted when determining a short-run LNG netback price for the purpose of a short-run commercial decision would typically capture only those costs that would be expected to change over the short-run.

In this scenario, the costs that are deducted when determining the short-run LNG netback price would reflect short-run marginal costs—that is, the costs that would be avoided in the short-run by not converting the excess gas to LNG and instead supplying the domestic buyer. They would not include any costs that are fixed over the short-term or the recovery of the capital invested in LNG facilities, since costs that cannot be avoided in the short-run are not typically taken into account when making short-run commercial decisions.

A short-run LNG netback price at a particular location is calculated by taking a delivered ex-ship (DES) LNG price and subtracting the cost of shipping the LNG from the loading port to the destination port, the short-run marginal cost of liquefaction, and the short-run marginal cost of transporting the gas from the relevant location to the LNG production facility. This is illustrated in chart 2.1 and explained further below.

Chart 2.1: Stylised short-run LNG netback price calculation



In chart 2.1, the DES price represents the delivered price of LNG at the destination port. LNG shipping costs and losses are deducted from the DES price to give a free on board (FOB) price, which represents the effective price of LNG at the point it is loaded onto the LNG tanker. These shipping costs reflect the cost of chartering an LNG vessel, loading and discharge port fees, the cost of LNG tanker fuel oil, as well as the value of the LNG that is lost during shipping due to boil-off.

The FOB price is netted back to a particular location by subtracting short-run marginal LNG plant operating costs (such as labour and electricity), the value of marginal gas consumed during the liquefaction process, and the short-run marginal cost of transporting gas from the location to the LNG production facility.

This gives a short-run LNG netback price which can then be used for comparison to domestic gas prices at the relevant location (see section 3).

2.1.2. Long-run LNG netback prices

Long-run decisions by LNG producers, such as whether to invest in new LNG production facilities or whether to expand existing facilities, would require calculation of a long-run LNG netback price.

A long-run LNG netback price at a particular location is calculated using the same method as explained above and as shown in chart 2.1. The key difference, however, is that the liquefaction and transportation costs that are deducted to derive long-run LNG netback prices reflect long-run average costs (rather than short-run marginal costs).

In contrast to short-run LNG netback prices, long-run netback prices account for fixed costs and the capital proposed to be invested in LNG facilities (including transmission from gas wells to LNG production facilities). When these fixed and capital costs are taken into

account, long-run LNG netback prices enable an LNG producer to determine whether they would expect to achieve a sufficient commercial return on its investment in the LNG facility over its economic life.

2.2. ACCC method for calculating the prices in the LNG netback price series

The prices published by the ACCC in the LNG netback price series are short-run LNG netback prices based on measures of Asian LNG spot prices (the relevance of these prices are discussed further in section 3.1.2). The measures of LNG prices are netted back to Wallumbilla, as this is the pipeline interconnection point that links the LNG producers' gas production facilities to the domestic market.

To calculate a short-run LNG netback price at Wallumbilla, the following short-run marginal costs are deducted from a measure of Asian LNG spot prices:

- LNG freight costs
- LNG plant costs, and
- Pipeline transportation costs.

The sections below explain the ACCC's method for calculating the prices shown in the LNG netback price series, and set out the steps taken to convert delivered LNG prices to LNG netback prices at Wallumbilla for both the historical and forward series.

2.2.1. LNG prices

The starting point for calculating an LNG netback price at any given time is a measure of the LNG price. As noted above, the ACCC has based the prices in the LNG netback price series on measures of Asian LNG spot prices.

The sections below set out the measure of Asian LNG spot prices the ACCC uses for the historical component of the LNG netback price series, and the measure the ACCC uses for expectations of future Asian LNG spot prices.

Historical LNG prices

For the historical LNG netback price series, the ACCC uses the Japan Korea Marker (JKM) as assessed daily by S&P Global Platts ('Platts') as a measure of Asian LNG spot prices.

The JKM is Platts' price assessment for physical LNG spot cargoes delivered ex-ship into northeast Asia.[4] These daily price assessments are published by Platts (to subscribers) in US$/MMBtu on the basis of information obtained from market participants such as producers, consumers, traders, brokers, shippers and other active spot market participants.[5] Information that is considered by Platts when making price assessments includes firm offers and bids, expressions of interest, confirmed trades, and third party reports of transactional activity.[6]

Platts assesses the JKM on the basis of LNG cargoes delivered over a particular calendar month, with the relevant month depending on when the assessment is made. On the 16th of each month, the JKM month rolls over to the calendar month commencing six weeks ahead.

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4 Platts, 'Platts JKM LNG Price Assessment', https://www.spglobal.com/platts/en/our-methodology/price-assessments/natural-gas/jkmt-japan-korea-marker-gas-price-assessments

5 Platts, *Methodology and specifications guide: Liquefied natural gas assessments and netbacks*, July 2018, p. 15.

6 Platts, *Methodology and specifications guide: Liquefied natural gas assessments and netbacks*, July 2018, p. 3.

For example, on 16 July, Platts commences assessing the JKM on the basis of cargoes to be delivered over the month of September. Price assessments will continue to be in relation to September deliveries until 16 August, when the JKM month rolls over to October.

The historical LNG netback prices published by the ACCC for any given month are based on Platts' JKM price assessments for LNG deliveries in that month. For example, an historical LNG netback price for September will be based on an average of JKM price assessments in respect of the month of September, which means that the netback price will be based on the JKM as reported between 16 July and 15 August of that year.[7]

Forward LNG prices

For the forward LNG netback price series, the ACCC uses prices for JKM futures contracts that are quoted by ICE, as at the time of publication, as a measure of expectations of future Asian LNG spot prices.

These are cash-settled futures contracts based on Platts' JKM price assessments for a given calendar month, and are traded in increments of 10,000 MMBtu (which is around 10.5 TJ or 0.3 per cent of a typical LNG cargo). ICE JKM futures prices are settled daily and published in US$/MMBtu on the ICE website.[8] The daily prices are determined by ICE using contract volumes traded on each day, as well as using price data from a number of sources including spot, forward and derivative markets for both physical and financial products.[9]

Trading for contracts in respect of a given future calendar month ceases on the 15th calendar day of the preceding month (which aligns with the last day that Platts assesses the JKM in respect of LNG deliveries in that future month), after which the contract is settled. The final settlement price is based on the average of all of Platts' JKM price assessments in respect of LNG deliveries in the relevant futures contract month.[10]

For example, a September JKM futures contract will cease trading on the 15th of August, which is the last day that Platts will assess the JKM on the basis of LNG cargoes delivered in September. The final settlement price for the futures contract would be the average of the JKM price assessments in respect of September—that is, the average of JKM prices reported by Platts between 16 July and 15 August.

The forward LNG netback prices published by the ACCC for a given future month are based on the end-of-day JKM futures prices quoted by ICE in respect of the day before publication.

As noted in section 1, the forward component of the LNG netback price series extends to the end of the following calendar year. This means that in January of a given year, the forward LNG netback prices will be based on JKM futures prices extending 23 months into the future (that is, to December of the following year). This will remain the end point of the forward series until the start of the following year, at which point it will again be extended.

2.2.2. LNG freight costs

For a given measure of Asian LNG spot prices, the next step in a netback price calculation is to deduct a measure of LNG freight costs, which represents the cost of shipping an LNG cargo from the loading port to the destination port.

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7 Netback prices are calculated separately for each day of the period based on daily JKM assessments, and then averaged over the month. See section 2.3 for a worked example of the calculations.

8 ICE Futures Europe Report Centre, https://www.theice.com/marketdata/reports/144

9 ICE, 'JKM LNG (Platts) future', https://www.theice.com/products/6753280/JKM-LNG-PLATTS-Future

10 ICE, 'JKM LNG (Platts) future', https://www.theice.com/products/6753280/JKM-LNG-PLATTS-Future

The sections below set out the measure of LNG freight costs the ACCC uses for the historical component of the LNG netback price series, and the measure the ACCC uses for expectations of future LNG freight costs.

Historical LNG freight costs

For the historical LNG netback price series, the ACCC uses Platts' daily assessments of LNG freight costs between Gladstone and Japan/Korea. The reference delivery port Platts uses for this price assessment is Futtsu in Tokyo Bay.

Platts publishes a single daily value (to subscribers) in US$/MMBtu indicating the implied cost of a voyage between Gladstone and Futtsu. These daily freight cost estimates are based on a range of both static and variable inputs and assumptions. The individual components of these LNG freight costs are as follows:[11]

- Port costs – This reflects costs incurred at the loading port and discharge port. Platts' assumed port costs are published on its website in its LNG methodology guide.[12]
- Charter costs – This is the cost of chartering the LNG tanker for a round-trip voyage structure, and an assumed three-day loading/discharging period. A ballast rate assessment is also included to value the return leg of the voyage, as typically ship-owners seek payment from charterers to position and re-position their ship. The hire rate is determined using Platts' daily Asia Pacific LNG Day Rate assessment, and the ballast rate is published under Platts' Asia Pacific Ballast Rate assessment (both of which are available to subscribers).
- Boil-off costs – This reflects the estimated value of the volume of LNG that is lost during the voyage due to boil-off. Platts uses assumptions on the rates of boil-off for different legs of the voyage (such as when the tanker is in port and when it is *en route*) and the capacity of the LNG tanker (including its fillable volume) to estimate the quantity of LNG boil-off, which is then valued at the destination price (that is, using the relevant JKM).
- Fuel costs – This reflects the estimated cost of LNG tanker fuel oil costs. Platts uses assumptions on the consumption rate of fuel oil in combination with Platts' daily Singapore bunker fuel price assessment (available to subscribers) to estimate the total fuel cost for the voyage.

For the purpose of the ACCC's historical LNG netback price series, Platts' daily Gladstone-Futtsu LNG freight cost assessments are subtracted from daily JKM prices to give free on board (FOB) prices at Gladstone in US$/MMBtu.

Forward LNG freight costs

For the forward LNG netback price series, the ACCC uses forward LNG freight costs between Gladstone and Tokyo assessed by Argus Media.

Argus assesses forward LNG freight costs on a weekly basis in US$/MMBtu for each month of a 24-month period commencing at the first full month after the time of the estimate. Argus provides this data to the ACCC and the ACCC republishes these assessments under licence on the LNG netback price series web page.

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11 For a more detailed explanation of Platts' LNG freight cost methodology, see Platts, *Methodology and specifications guide: Liquefied natural gas assessments and netbacks*, July 2018, https://www.spglobal.com/platts/plattscontent/_assets/_files/en/our-methodology/methodology-specifications/lngmethodology.pdf

12 Platts, *Methodology and specifications guide: Liquefied natural gas assessments and netbacks*, July 2018, p. 26. https://www.spglobal.com/platts/plattscontent/_assets/_files/en/our-methodology/methodology-specifications/lngmethodology.pdf

The Gladstone-Tokyo forward freight rates assessed by Argus comprise the cost of chartering the vessel, fuel costs, and boil-off losses (which are consumed as fuel) over a round trip from Gladstone to Tokyo. Argus uses the following key assumptions:[13]

- Argus assumes a standard-sized dual-fuel diesel electric (DFDE) vessel for the voyage.
- Boil-off is assumed to be burnt on the outward leg to power the vessel, while the return leg is powered using bunker fuel.
- The bunker fuel cost is based on the Argus assessment of Singapore high-sulphur fuel oil swaps.
- The charter cost is based on Argus' daily assessment of charter rates east of Suez, as well as its 24-month global forward curve informed by market participant indications and global LNG arbitrages.

For the purpose of the ACCC's forward LNG netback price series, Argus' forward LNG freight costs for a given future month are subtracted from the ICE JKM futures quote for the corresponding month to give a forward FOB price at Gladstone in US$/MMBtu.

2.2.3. Unit conversions

Once Gladstone FOB prices in US$/MMBtu are determined, it is necessary to convert these prices from US to Australian dollars, and to convert the units of energy from MMBtu to GJ. For all energy unit conversions the ACCC uses a conversion of 1 MMBtu = 1.055 GJ.

For the purpose of the historical LNG netback price series, historical daily Gladstone FOB prices are converted to Australian dollars using exchange rates published by the RBA for corresponding days. For the forward LNG netback price series, each forward Gladstone FOB price is converted to Australian dollars using a five-day average (ending on the day of the JKM futures quote) of exchange rates published by the RBA. These conversions result in a Gladstone FOB price in A$/GJ.

2.2.4. LNG plant costs

For a given measure of Gladstone FOB prices in A$/GJ, the next step in the calculation of netback prices is to deduct LNG plant costs. For this, the ACCC has used estimates of short-run marginal LNG plant costs—that is, the costs that would be avoided by LNG producers if the excess gas that would otherwise be sold into the Asian LNG spot market were not converted to LNG and instead diverted to the East Coast Gas Market. These costs include the value of the gas that is consumed as fuel during the liquefaction process, as well as LNG plant operating expenditure.

The sections below set out the measures of LNG plant fuel and operating costs the ACCC uses for the historical component of the LNG netback price series, and the measures the ACCC uses for the forward component of the series.

Historical LNG plant costs

To estimate short-run marginal LNG plant operating expenditure, the ACCC uses information obtained semi-annually from the three Queensland LNG producers on short-run marginal operating costs.

For the purpose of the historical LNG netback price series, the average of the short-run marginal operating costs incurred by each LNG producer in the most recent 12-month period

[13] For more information see Argus, 'Argus LNG Daily Methodology and Specifications Guide', https://www.argusmedia.com/-/media/Files/methodology/argus-lng-daily.ashx

for which data is available is used. This average is subtracted from the Gladstone FOB price, which gives an effective price that is then used to determine the value of LNG plant fuel gas.

To estimate the value of LNG plant fuel gas, the ACCC uses data obtained from the three Queensland LNG producers on daily quantities of LNG plant feedgas and LNG production. This data is used to calculate LNG plant efficiency, which is a measure of the amount of LNG that is produced for every additional unit of gas that is fed into the LNG plant.[14]

For the historical LNG netback price series, LNG plant efficiency is calculated on a quarterly basis. Daily feedgas and LNG production data from each LNG producer over a given quarter is used to perform regression analysis, where feedgas data is regressed on LNG production data for the given quarter.[15] The regression coefficient provides an estimate of each producer's LNG plant efficiency. For example, if using a given LNG producer's data the coefficient is 0.95, this means that for this producer, each additional GJ of gas fed into the LNG plant will result in 0.95 GJ of LNG being produced. Put another way, this means that for each additional unit of feedgas into the LNG plant over this period, LNG plant efficiency is 95 per cent.

Using the LNG plant efficiency estimates for each LNG producer, an average of LNG plant efficiency for the quarter is calculated. These quarterly averages of LNG plant efficiency are multiplied by Gladstone FOB prices—net of short-run marginal LNG plant operating costs—to give an effective price at the LNG plant inlet.

The timing of the data used to adjust for LNG plant efficiency is different for historical LNG netback prices in the series before and after the ACCC commenced publishing the price series in October 2018. For historical LNG netback prices before October 2018, the adjustment for LNG plant efficiency is made using data from contemporaneous quarters. For historical LNG netback prices after October 2018, the adjustment is made using data from the corresponding quarter of the previous year.[16] This is because the ACCC collects this data semi-annually and will not have contemporaneous data at the time of each update of the price series.

The approach adopted by the ACCC for the historical series is different to that of the forward series (for which the ACCC discloses estimates of LNG plant efficiency) so that it is not possible for Platts' raw JKM or freight cost information to be inferred.

Forward LNG plant costs

As noted above, the ACCC uses information obtained from the three Queensland LNG producers to estimate short-run marginal LNG plant operating expenditure.

The same estimates of short-run marginal operating costs are used for the purpose of forward LNG netback price series as for the historical LNG netback price series (as described in the section above). The estimates used for the forward series are, however, adjusted for inflation. This method is based on an assumption—consistent with the submissions of LNG producers over the course of the ACCC's consultation process—that LNG plant operating costs do not materially change over the short term.

Subtracting the inflation-adjusted estimates of short-run marginal operating costs from the forward Gladstone FOB price gives an effective price that is then used to account for the value of LNG plant fuel gas.

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[14] This contrasts with average LNG plant efficiency, which is a measure of the amount of LNG produced with a given quantity of feedgas over a given time period.

[15] Linear regression using Ordinary Least Squares.

[16] Year-on-year data is used to account for any seasonal impacts on LNG plant efficiency.

For the purpose of the forward LNG netback price series, a slightly different approach to that of the historic series to account for LNG plant fuel gas is used. The regression method described above in relation to the historical series is used, but for the purpose of the forward series, the average of each producer's LNG plant efficiency for the most recent 12-month period for which data is available (rather than by quarter) is calculated. This average is multiplied by forward Gladstone FOB prices—net of short-run marginal LNG plant operating costs—to give an effective forward price at the LNG plant inlet.

As noted above, the approach adopted by the ACCC for the forward series (for which the ACCC discloses estimates of LNG plant efficiency) is different to that of the historical series so that it is not possible for Platts' raw JKM or freight cost information to be inferred.

2.2.5. Transportation costs

Once an effective LNG plant inlet price is determined, the next step in the calculation of LNG netback prices is to account for short-run marginal pipeline transportation costs from the wellhead[17] to the LNG plant. These costs may include pipeline tariffs, operating expenditure and ancillary costs such as compression.

The ACCC uses information obtained from the three Queensland LNG producers on short-run marginal transportation costs from the wellhead to the LNG plant to calculate an average of the LNG producers' short-run marginal cost. For both the historical and forward LNG netback price series, the average of short-run marginal transport costs derived from the most recent data obtained from LNG producers are subtracted from the effective price at the LNG plant inlet to give an LNG netback price at the wellhead.

To calculate an LNG netback price at Wallumbilla, the costs of transporting gas from the wellhead to Wallumbilla also need to be taken into account. However, the information obtained from LNG producers indicates that, currently, the short-run marginal costs they incur in transporting gas to Wallumbilla are negligible.

The ACCC has therefore taken short-run marginal costs of transporting gas from the wellhead to Wallumbilla to be zero in both the historical and forward LNG netback price series. This means that the short-run LNG netback price at the wellhead can effectively be regarded as the LNG netback price at Wallumbilla.

2.3. LNG netback price at Wallumbilla: worked examples

The sections above set out the individual components of the prices in the ACCC's LNG netback price series, how they are derived and how they are used in the calculation of netback prices at Wallumbilla. This section provides worked examples, using dummy figures, showing the step by step calculation of historical and forward netback prices, respectively.

Historical LNG netback prices

Step 1: Start with an LNG price

The ACCC's calculation of a historical monthly LNG netback price (say for September in a given year) starts with Platts' JKM price assessments in respect of LNG cargoes to be delivered in September of that year. These price assessments would be published by Platts from 16 July to 15 August.

[17] To be exact, references to wellhead should be read as ex-plant (i.e. at the point gas is ready to be injected into a pipeline to be sent to Wallumbilla or the LNG plant after it has been processed to remove impurities).

For this example, the netback calculation is done for 16 July. Assume that the JKM on 16 July was assessed at US$8/MMBtu.

Step 2: Subtract LNG freight costs

Platts' LNG freight cost assessment for Gladstone to Japan/Korea on 16 July is subtracted from the JKM as assessed on 16 July to give a FOB price at Gladstone.

Assuming an LNG freight cost of US$0.50/MMBtu, this would result in a Gladstone FOB price of US$7.50/MMBtu.

Step 3: Convert to A$/GJ

The Gladstone FOB price in US$/MMBtu for 16 July is divided by the AUD/USD exchange rate as published by the RBA for 16 July, and then divided by an MMBtu/GJ conversion factor to give a FOB price in A$/GJ.

Assuming an AUD/USD exchange rate of 0.75 and using an energy conversion of 1 MMBtu = 1.055 GJ, this would result in a Gladstone FOB price of A$9.48/GJ.

Step 4: Subtract LNG plant costs

The ACCC's estimate of short-run marginal LNG plant operating expenditure (averaged across the Queensland LNG producers) is subtracted from the 16 July Gladstone FOB price.

Assuming that the average of short-run marginal operating expenditure is $0.05/GJ, this would result in a FOB price net of operating expenditure of $9.43/GJ.

This price is then used to adjust for the value of gas consumed as fuel during the liquefaction process, which is done by multiplying the price by the ACCC's estimate of marginal LNG plant efficiency over the corresponding quarter from the previous year (averaged across the Queensland LNG producers).

Assuming that the average of marginal LNG plant efficiency is 95 per cent, this would result in an effective price at the LNG plant inlet of $8.96/GJ.

Step 5: Adjust for transportation costs

The ACCC's estimate of short-run marginal transport costs between the wellhead and the LNG facility (averaged across the Queensland LNG producers) is subtracted from the effective LNG plant inlet price for 16 July.

Assuming that the average of short-run marginal transport costs between the wellhead and the LNG facility is $0.05/GJ, this would result in a price at the wellhead of $8.91/GJ.

As noted in section 2.2.5 above, based on information obtained from the LNG producers the short-run marginal costs of transportation between the wellhead and Wallumbilla is currently assumed to be zero. Therefore, the price at the wellhead of $8.91/GJ in this example represents the LNG netback price at Wallumbilla for 16 July.

Step 6: Average of daily netback prices

The process set out in steps 1–5 above are repeated for each JKM assessment day between 16 July and 15 August to give daily LNG netback prices at Wallumbilla for each day. These netback prices are averaged to give an LNG netback price for September.

Forward LNG netback prices

Step 1: Start with an LNG price

The ACCC's calculation of a forward LNG netback price for a given future month starts with an ICE JKM futures quote, at the time of calculation, for that future month.

For this example, the netback calculation is done for the month of July the following year. Assume that, at the time of calculation, the price of a JKM futures contract for July of the following year is quoted by ICE at US$6/MMBtu.

Step 2: Subtract LNG freight costs

Argus' forward LNG freight cost estimate for Gladstone to Tokyo for July of the following year is subtracted from the JKM futures price to give a forward FOB price at Gladstone.

Assuming a forward LNG freight cost of US$0.30/MMBtu, this would result in a forward Gladstone FOB price for July of the following year of US$5.70/MMBtu.

Step 3: Convert to A$/GJ

The forward Gladstone FOB price in US$/MMBtu for July of the following year is divided by a five-day average of the AUD/USD exchange rate as published by the RBA (ending on the day of the JKM futures quote), and then divided by an MMBtu/GJ conversion factor to give a FOB price in A$/GJ.

Assuming a five-day average AUD/USD exchange rate of 0.75 and using an energy conversion of 1 MMBtu = 1.055 GJ, this would result in a forward Gladstone FOB price of A$7.20/GJ.

Step 4: Subtract LNG plant costs

The ACCC's estimate of short-run marginal LNG plant operating expenditure (averaged across the Queensland LNG producers) is subtracted from the forward Gladstone FOB price.

Assuming that the average of short-run marginal operating expenditure is $0.05/GJ, this would result in a FOB price net of operating expenditure of $7.15/GJ.

This price is then used to adjust for the value of gas consumed as fuel during the liquefaction process, which is done by multiplying the price by the ACCC's estimate of marginal LNG plant efficiency over the most recent 12 month period where the ACCC has obtained data (averaged across the Queensland LNG producers).

Assuming that the average of marginal LNG plant efficiency is 95 per cent, this would result in an effective forward price at the LNG plant inlet of $6.79/GJ.

Step 5: Adjust for transportation costs

The ACCC's estimate of short-run marginal transport costs between the wellhead and the LNG facility (averaged across the Queensland LNG producers) is subtracted from the effective forward LNG plant inlet price.

Assuming that the average of short-run marginal transport costs between the wellhead and the LNG facility is $0.05/GJ, this would result in a forward price at the wellhead of $6.74/GJ.

As noted in section 2.2.5 above, based on information obtained from the LNG producers the short-run marginal costs of transportation between the wellhead and Wallumbilla is currently assumed to be zero. Therefore, the forward price at the wellhead of $6.74/GJ in this example represents the forward LNG netback price at Wallumbilla for July in the following year.

3. Using the LNG netback price series

Section 3.1 below provides background to the ACCC's analysis in its Gas Inquiry 2017-2020 of the factors influencing prices in the East Coast Gas Market, as well as the ACCC's current framework for assessing price outcomes in the market.

Section 3.2 provides users of the LNG netback price series with guidance on the interpretation and use of published LNG netback prices.

3.1. Background

3.1.1. Factors influencing prices in the East Coast Gas Market

In its Gas Inquiry 2017-2020, the ACCC has recognised that there is a range of factors that could influence gas prices in the East Coast Gas Market.[18] The ACCC's current view is that, under certain circumstances, the following factors could act as a reference price:[19]

- LNG netback prices
- the cost of gas production
- prices in short-term domestic gas markets, and
- electricity prices.

The ACCC considers that, of these factors, LNG netback prices have the most influence on domestic gas prices under current conditions in the East Coast Gas Market (this is explained further in section 3.1.2 below).

However, there are several other factors that may also contribute to gas prices that are ultimately offered to individual gas buyers:

- **Transportation costs**—If gas is supplied on a delivered basis to a user, then pipeline tariffs will add to the delivered cost of gas. In addition, transportation costs may influence gas commodity prices under certain circumstances (see section 3.1.2 below).
- **Non-price terms and conditions in gas supply agreements (GSAs)**—Providing users with flexibility in the way gas is supplied under GSAs, such as through take-or-pay and load factor provisions, can impose costs on suppliers that would be expected to be passed on to gas buyers.
- **Retailer costs and margins**—Costs incurred by retailers in supplying end-users (such as in relation to transportation and storage services) and retailer margins can also form part of gas price offers from retailers.

Over the course of the Gas Inquiry 2017-2020, the ACCC will add materials to the LNG netback price series web page and this guide to further explain how these factors can influence gas prices.

3.1.2. Influence of LNG netback prices in the East Coast Gas Market

To date, there has been no widely accepted reference price of gas in the East Coast Gas Market. In the absence of such a reference price, the prices paid by gas buyers under GSAs are determined by the outcome of bilateral negotiations with suppliers.

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[18] ACCC, *Gas Inquiry 2017-2020 Interim report*, April 2018, pp. 34-42.

[19] For further discussion of these factors see ACCC, *Gas Inquiry 2017-2020 Interim report*, April 2018, pp. 34-42.

In its Gas Inquiry 2017-2020, the ACCC has adopted a bargaining framework for assessing pricing outcomes in various locations in the East Coast Gas Market. Given the influence that LNG netback prices currently have on domestic gas prices with LNG exports forming an important alternative to domestic gas supply (as discussed above), this framework uses LNG netback prices as a starting point.

The sections below explain the relevance of Asian LNG spot prices as the starting point under this framework, and the difference in pricing outcomes that is expected between Queensland and the Southern States.

Relevance of Asian LNG spot prices

As noted above, the ACCC considers that LNG netback prices are a key factor influencing gas prices in the East Coast Gas Market under current market conditions. The establishment of the LNG projects in Queensland and the linking of the domestic gas market with the international LNG market have changed the alternatives available to buyers and sellers in gas price negotiations. In particular, it has created opportunities for gas producers to sell gas for export and for gas buyers to purchase gas that would otherwise be exported.

At present, the supply and demand balance in the East Coast Gas Market is tight, and the LNG producers in aggregate expect to produce excess gas (above what is required to meet long-term LNG contracts) over the near term. This means that the next best alternative for gas buyers when negotiating with domestic suppliers is to buy gas from the LNG producers that would otherwise be sold for export. In circumstances where the LNG producers are the marginal suppliers of gas into the East Coast Gas Market, the price at which they would be willing to sell gas to domestic buyers influences the market price of gas. To have an incentive to supply excess gas to the domestic market, the LNG producers must receive a domestic price at least equal to what it could receive selling the gas as LNG (less the costs it would avoid by not liquefying the gas and shipping it to an international port).

A different pricing dynamic would apply if LNG producers were not the marginal suppliers in the East Coast Gas Market. This would occur if domestic suppliers on the east coast produced sufficient quantities of gas, such that gas from the LNG producers were not required to satisfy marginal domestic demand. In these circumstances, it would be the supplier's next best alternative that would be more relevant in negotiations between gas suppliers and domestic gas buyers. The supplier's next best alternative would be to sell gas to the LNG producers for export or to delay production. In this scenario, the price at which the LNG producers would be prepared to pay for gas from domestic suppliers would influence the market price of gas.[20] To have an incentive to supply the domestic market, the domestic supplier would expect to receive a domestic price at least equal to what they would receive selling the gas to an LNG producer—which would, in turn, be no more than what the LNG producer would receive exporting the gas as LNG less avoided shipping, liquefaction and transport costs.

As mentioned above, the Queensland LNG producers, in aggregate, currently expect to produce quantities of gas in the near term in excess of what is required to satisfy long-term LNG contractual obligations. The most likely destination for this gas (if not used to supply the East Coast Gas Market) is the Asian LNG spot market. A domestic gas buyer's alternative to contracting with a domestic gas producer is to purchase gas that would otherwise be sold on the Asian LNG spot market, and the domestic seller's alternative is to sell gas to LNG producers that would then be sold on the Asian LNG spot market.

Therefore, in order to provide suppliers with a commercial incentive to supply excess gas to the East Coast Gas Market, gas buyers would expect to pay prices that are shaped by Asian

[20] This assumes that LNG producers have spare capacity in their trains to process additional gas.

LNG spot prices. Put another way, Asian spot LNG netback prices represent a domestic supplier's opportunity cost of supplying gas to the domestic market, where the alternative is exporting the gas as LNG on the Asian LNG spot market. That is, it reflects the foregone value to a supplier that could have been received if the gas had been exported.

To be of most use to domestic gas buyers under current market conditions, the prices published by the ACCC in the LNG netback price series are short-run LNG netback prices based on measures of Asian LNG spot prices. Over the course of its Gas Inquiry 2017-2020, the ACCC will consider whether to also publish LNG netback prices based on other LNG price markers.

Different outcomes expected in the Southern States

The prices published in the LNG netback price series are netback prices at Wallumbilla, and are therefore comparable to gas prices in Queensland. However, the pricing dynamics in the Southern States are different from those in Queensland.[21] Due to the cost of transportation between the Southern States and Queensland, there is a range of possible pricing outcomes in gas supply negotiations in the Southern States.

In the Gas Inquiry 2017-2020, the ACCC has explained the conceptual framework for determining the range of possible price outcomes in the Southern States and the conditions that would be expected to result in price outcomes at either end of this range.[22]

Users of the LNG netback price series can refer to these explanations for more information on the differing pricing dynamics across the East Coast Gas Market. In addition, over the course of the Gas Inquiry 2017-2020, the ACCC will update the LNG netback price series website and this guide with additional information on how this framework can be applied in practice.

3.2. Interpreting and using published LNG netback prices

3.2.1. Historical LNG netback prices

What can these prices be used for?

As set out in section 2.2.1, the historical component of the ACCC's LNG netback price series is based on the Platts JKM.

The level of the JKM at a given point in time is an indicator of the market price of spot LNG cargoes delivered to northeast Asia in the following months. It is therefore a measure of the price that an east coast LNG exporter could achieve if excess gas were sold as a spot cargo in that month. When the JKM is netted back to Wallumbilla by subtracting the avoidable costs of shipping, liquefaction and transport, it represents the exporter's opportunity cost of supplying gas to the East Coast Gas Market at that point in time.

There are benefits to market participants in knowing recent and historical LNG netback prices. It can inform market participants on how export parity prices at Wallumbilla have moved over time, both in terms of price level and volatility. This is important information for market participants to understand, given that Asian LNG spot prices have historically been subject to significant fluctuations for various reasons, including:

- seasonality, with typically higher prices over the northern hemisphere winter

[21] Southern States include South Australia, New South Wales, the Australian Capital Territory, Victoria and Tasmania.

[22] See ACCC, *Gas Inquiry 2017-2020 Interim report*, September 2017, pp. 67-70; ACCC, *Gas Inquiry 2017-2020 Interim report*, December 2017, pp. 36-37; ACCC, *Gas Inquiry 2017-2020 Interim report*, July 2018, pp. 52-53.

- short-term volatility, with prices having changed rapidly over short periods
- structural changes, with general price levels reflecting the supply and demand dynamics of the international LNG market
- movements in crude oil prices.

Further, by comparing LNG netback prices based on expectations of future Asian LNG spot prices to LNG netback prices based on measures of recent and historic prices, market participants should be better able to anticipate temporary or structural changes in LNG market supply-demand dynamics. This may put market participants in a better position to take timely action to mitigate any adverse price movements or to take advantage of any favourable price movements.

Limitations

While being useful for understanding how LNG netback prices at Wallumbilla have changed over time, the historical LNG netback prices in the ACCC's price series are not likely to be the most relevant reference price for negotiations between a supplier and a buyer concerning future gas supply. For this purpose, it would be more appropriate to calculate LNG netback prices based on measures of Asian LNG spot prices that are expected to prevail in the market during the relevant supply period (discussed further in section 3.2.2 below). This would better inform the parties in the negotiation of the supplier's opportunity cost of supplying the gas.

Further, as discussed in section 2.2.1 above, the Platts JKM is assessed on the basis of information collected on a daily basis from a range of LNG spot market participants such as producers, consumers, traders, brokers, shippers and other active market participants. As noted in section 1, the ACCC takes the JKM as assessed by Platts as given, and does not have any input into the methods used to derive these prices, nor does the ACCC amend Platts' data in any way.

It is also important to note that the prices published in the LNG netback price series represent netback prices at Wallumbilla using LNG freight cost estimates for Gladstone and using data on liquefaction and transport costs obtained from the Queensland LNG producers. Therefore, while the inputs used and final netback prices are relevant for the purposes of comparing with gas prices in the East Coast Gas Market, they would not be appropriate for use outside this market.

3.2.2. Forward LNG netback prices

What can these prices be used for?

As set out in section 2.2.1, the forward LNG netback prices in the ACCC's price series are derived using prices for JKM futures contracts quoted by ICE, as at the time of publication.

A JKM futures price for a given future month, quoted on a given day, indicates futures market participants' expectation, on that day, of the price of Asian LNG spot cargoes delivered in that given future month. This price can be converted to an LNG netback price at Wallumbilla by adjusting for the expected avoidable costs of shipping, liquefaction and transportation.

For a Queensland LNG exporter contemplating selling gas as an LNG spot cargo into Asia in a future month, the LNG netback price (adjusted for other factors such as non-price terms in a GSA) represents the price that an LNG exporter would expect to receive from a domestic gas buyer to be indifferent between selling the gas to the domestic buyer in a given month and selling the gas on the Asian LNG spot market in that month. Over a longer period of

future supply (such as a year), the forward LNG netback prices over that period can be averaged to determine this price.

The average of forward LNG netback prices over a given period of future gas supply can be used by gas buyers (such as C&I users) in negotiations with suppliers. For example, if a gas user were seeking gas supply over the next full calendar year, the LNG netback price series would allow them to calculate the average of forward LNG netback prices over that year. The user would then be able to use this average to, for example, assess price offers made by suppliers for that same period of supply (noting that other factors such as transportation costs, the terms and conditions of gas supply, and retailer charges may be relevant).

Limitations

The extent to which a forward LNG netback price is relevant as a price marker in negotiations for future domestic gas supply may vary. Parties to a negotiation should satisfy themselves that an LNG netback price based on Asian LNG spot prices is in fact the most appropriate reference point in the circumstances of their gas supply negotiations. If pricing dynamics in the East Coast Gas Market change, it may be that a different pricing marker is more appropriate. There may also be circumstances relating to the specific negotiations that make other factors (discussed earlier) material to the outcome of the negotiation.

As noted in section 1, the forward LNG netback prices published by the ACCC do not represent the ACCC's forecast of what domestic prices should or will be at any particular point in time. They represent an indication of expectations at a point in time using one specific measure – the JKM futures price. The ACCC considers that this is an appropriate measure for the purpose of providing a price marker, however there are other sources of expectations of future LNG prices, such as those provided by industry analysts.

Market participants seeking to use forward LNG netback prices based on JKM futures in their negotiations should also be aware of its limitations. JKM futures are financial contracts based on the realised level of the Platts JKM for the relevant future month. Therefore, JKM futures are based on prices achieved in financial markets rather than on prices for physical cargoes achieved in commodity markets.

The JKM futures market is also currently relatively illiquid beyond around 6 months, compared to some of the more mature derivatives markets (for example, oil futures). This means that futures quotes for months beyond this are based on a relatively small number of transactions and therefore may be less indicative of market expectations about future prices. However, the ACCC notes that this market has been growing over recent years and this growth is expected to continue.[23]

Market participants should also be aware that JKM futures prices can change significantly over a short period of time. This means that for the purpose of gas supply negotiations, it is important for market participants to refer to forward LNG netback prices based on the latest JKM futures prices.

Further, as noted above in relation to historical LNG netback prices, the inputs used and final LNG netback prices at Wallumbilla published by the ACCC are relevant for the purposes of comparing with gas prices in the East Coast Gas Market; they would not be appropriate for use outside this market.

[23] Platts, 'CME clears its first JKM LNG swap deal', 25 August 2017, https://www.platts.com/latest-news/natural-gas/london/cme-clears-its-first-jkm-lng-swap-deal-27867146.

Practical tips for using the LNG netback price spreadsheet

The forward LNG netback prices published on the ACCC website are based on JKM futures prices for each month commencing at the month after publication and extending to the end of the following calendar year. As set out in section 2.2, the JKM futures prices are netted back to Wallumbilla using a range of inputs and assumptions.

The ACCC has made its method for calculating forward LNG netback prices (including the inputs used) transparent so that users of the price series have the option of substituting the ACCC's calculated inputs for their own alternatives, and thereby determining alternative LNG netback prices.

Below are some practical tips that may be useful to users in making such adjustments. To make any adjustments, we recommend that users download the most recent version of the LNG netback price series Excel spreadsheet available from the price series web page.[24]

Using alternative inputs

In the LNG netback price series spreadsheet, users are able to replace any of the inputs and assumptions with alternatives. This includes forward LNG prices, LNG freight costs, exchange rates, LNG plant operating costs and fuel gas, and pipeline transportation costs. All input cells in the LNG netback price spreadsheet are highlighted blue.

For example, figure 3.1 below (taken from the LNG netback price series spreadsheet) shows JKM futures prices quoted on a particular day for given futures contract months. These can be replaced either with updated JKM futures prices quoted by ICE,[25] or with alternative measures of future Asian LNG spot prices.

The effect of any changes to inputs will flow through to the final calculation of LNG netback prices at Wallumbilla.

Figure 3.1: Forward LNG price inputs

ICE JKM futures				
Date of quote	Contract month	Settlement price (US$/MMBtu)	Open interest (no. of lots)	Open interest (PJ equivalent)
28 Sep 18	November 2018	11.300	3,418	36.06
28 Sep 18	December 2018	12.450	4,320	45.58
28 Sep 18	January 2019	13.150	2,215	23.37
28 Sep 18	February 2019	13.150	1,931	20.37
28 Sep 18	March 2019	11.800	1,218	12.85
28 Sep 18	April 2019	10.400	840	8.86
28 Sep 18	May 2019	9.550	840	8.86
28 Sep 18	June 2019	9.450	840	8.86
28 Sep 18	July 2019	9.450	670	7.07
28 Sep 18	August 2019	9.550	670	7.07
28 Sep 18	September 2019	9.650	670	7.07
28 Sep 18	October 2019	10.350	390	4.11
28 Sep 18	November 2019	10.950	390	4.11
28 Sep 18	December 2019	11.400	390	4.11

Average LNG netback prices over a future supply period

For a given period of gas supply within the forward LNG netback price time horizon (that is, the end of the following calendar year), individual LNG netback prices for each month of the supply period can be averaged to estimate a domestic supplier's opportunity cost of

[24] https://www.accc.gov.au/regulated-infrastructure/energy/gas-inquiry-2017-2020/lng-netback-price-series

[25] JKM futures quotes published at https://www.theice.com/marketdata/reports/144

supplying the East Coast Gas Market over that period. As noted above, this can be used by gas buyers in negotiations with suppliers to assess price offers made by suppliers for that same period of supply (noting that other factors such as transportation costs, the terms and conditions of gas supply, and retailer charges may be relevant).

For example, figure 3.2 below (taken from the LNG netback price series spreadsheet) shows LNG netback prices at Wallumbilla based on JKM futures prices quoted on a particular day. If a gas buyer were seeking supply over a calendar year (2019 in this example) then the LNG netback prices for each month over calendar 2019 would be averaged.

Figure 3.2: Average of forward LNG prices

LNG netback price calculations				
Forward netback month	AUD/USD exchange rate	Gladstone FOB price (A$/GJ)	LNG plant efficiency	Netback price at Wallumbilla (A$/GJ)
November 2018	0.7245	13.73	0.9450	12.88
December 2018	0.7245	15.13	0.9450	14.20
January 2019	0.7245	15.98	0.9450	15.00
February 2019	0.7245	16.01	0.9450	15.03
March 2019	0.7245	14.40	0.9450	13.51
April 2019	0.7245	12.71	0.9450	11.92
May 2019	0.7245	11.64	0.9450	10.90
June 2019	0.7245	11.45	0.9450	10.72
July 2019	0.7245	11.40	0.9450	10.67
August 2019	0.7245	11.49	0.9450	10.76
September 2019	0.7245	11.61	0.9450	10.88
October 2019	0.7245	12.47	0.9450	11.68
November 2019	0.7245	13.23	0.9450	12.41
December 2019	0.7245	13.82	0.9450	12.97

Extending the forward period

While the forward period for the price series published by the ACCC ends at the end of the following calendar year, users are able to extend this. ICE quotes JKM futures prices beyond this, so users are able to use these as measures of forward LNG prices (noting, as mentioned above, that liquidity in the JKM futures market is currently relatively limited beyond a period of around 6 months).

Users may also substitute these extended measures of forward LNG prices for alternative measures, such as forecasts by commodity price reporting agencies or industry analysts.

3.3. Publication of additional information

As noted in section 1, over the course of Gas Inquiry 2017-2020, the ACCC intends to publish additional information on its website alongside the LNG netback price series, including information on transportation charges and estimates of gas production costs.

The ACCC will update this guide to explain the published information and how it can be used in conjunction with the LNG netback price series.

The ACCC welcomes feedback on the LNG netback price series and this guide. Comments can be made in writing to gas.inquiry@accc.gov.au.