



# LNG Markets Daily Methodology

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## Introduction to LNG Markets Daily

LNG Markets Daily (LMD) contains independent price assessments and indices for global spot LNG markets and charter rates. It also contains in-depth analysis on price drivers, commentary on each day's trading activity and daily news covering the factors moving the market price.

LMD is published daily in Singapore as a PDF with data also available through an FTP feed.

Assessments are made for Asian and Middle Eastern locations at 16:30 time, on the day of publication.

Assessments for European locations are made at 16:30 London time, on the day prior to publication.

Assessments for US and South American locations are made at 14:30 US Eastern Time, on the day prior to publication.

Assessments for global prompt and mid-term charter rates are made at 16:30 Singapore time, on the day of publication.

## General methodology

ICIS continuously develops, reviews and revises its methodologies in consultation with industry participants. The product specifications and trading terms and conditions used are intended to reflect typical working practices prevalent in the industry.

ICIS publishes market assessments based on information continuously gathered from market participants about: spot transactions, spot bid and offer levels, contract price negotiations, prices of related commodities, and relevant freight costs.

ICIS does not make retrospective adjustments or changes to price assessments based on information received after publication time in all cases or after any cut-off point specified in individual methodology documents.

ICIS regards all arm's length transactions which meet its specification criteria as carrying equal weight.

ICIS uses proprietary models where necessary to normalize data to the typical specifications for cargo size and date ranges given for each commodity.

Some ICIS assessments are the product of calculation alone, for example in markets where insufficient market activity takes place to permit price assessment, or where a market habitually itself sets prices according to a formula. Such calculated assessments are noted as such in their detailed methodology specifications.

ICIS endeavours to cross-check all the transaction information it gathers. ICIS will not use information for assessment purposes where such checks call into doubt the accuracy of the original information, or where a transaction appears to have occurred under circumstances that render it non-repeatable or otherwise markedly unusual.

## Rationale for LNG methodology

All ICIS LNG prices contained in LMD are intended to provide a reliable and accurate measure of physical market value on the traded markets.

As the LNG spot market is still a relatively immature market with sporadic trading for many locations, ICIS judges its assessment methodology to be best suited to this market. Liquidity is not deep enough in any region yet to provide a reliable deals-weighted price index by ICIS' standards of reliability. ICIS gathers and publishes deals data to provide maximum transparency to its subscribers and uses deals information as supporting evidence for its assessments where it is available.

ICIS produces several Regional Indices, responding to the LNG industry need for reference prices, which incorporate a wider pool of demand centres. These Regional Indices are a calculated average of the ICIS daily assessments for the key markets within each region.

## Assessment

For markets at all stages of development, ICIS deems its assessment methodology to be appropriate. This methodology is designed to discover the tradable value of a commodity at a particular point in time. The single value published in LMD represents the price the commodity is most likely to transact at. As transactions are not regular for many LNG destinations, the value frequently represents a point in between the highest firm bid and the lowest firm offer. The published price does not always represent the midpoint of this bid/offer spread and ICIS uses its knowledge of market direction and market length/tightness to determine value in all instances where the firm bid/offer spread is more than 10 US cents wide and there is no confirmed transaction.

ICIS assesses physical value for the delivery periods where there is typically the most trading activity. In the case of spot LNG this is usually the two front months. ICIS rolls its month-ahead assessments mid-way through the calendar month to reflect the concentration of liquidity on the largest spot demand markets of East Asia.

## Regional Index

ICIS provides six regional indices for two front months: East Asia (EAX), South America (SAX), Mediterranean (MDX), Middle East and North Africa (MENAX), NW Europe (NEX) and Iberia (IBX). The indices provide a measure of the commodity's value across markets that share geographic proximity and will typically compete against each other for the commodity on the global market. Differences in price within each region are typically the result of differing demand profiles.

The indices are calculated using an arithmetic average of the day's delivered-ex ship (DES) front month and second month ahead assessment for specific pricing points in each region (see below). ICIS publishes all component assessments within each regional index, providing maximum transparency for a regional price indication, without having recourse to more subjective notions of relative value to produce a single figure representing several markets.

ICIS does not weight the elements of this index, in order to avoid introducing subjective judgements as to the amount of purely spot LNG which may be delivered into each market for each month in the future.

## Primary price references published in LMD are as follows:

Definition of delivery and loading locations

DES	Assessment basis port	Other regional ports considered	Units quoted
Japan	Tokyo Bay	Chita, Himeji, Kawagoe, Niigata, Oita, Sakai, Sodeshi, Tobata, Yanai, Yokkaichi, Joetsu, Mizushima, Tomakomoi, Naoetsu	\$/MMBtu
South Korea	Pyeong Taek	Gwangyang, Incheon, Tongyeong, Samcheok	\$/MMBtu
China	Guangdong	Fujian, Shanghai, Rudong, Dalian, Ningbo, Zhuhai, Dongguan, Tangshan, Qingdao, Hainan	\$/MMBtu
Taiwan	Yung An	Taichung	\$/MMBtu
Singapore	Jurong Island	N/A	\$/MMBtu
Thailand	Map Ta Phut	N/A	\$/MMBtu
India	Dahej	Hazira, Kochi, Dabhol	\$/MMBtu
Dubai	Jebel Ali	N/A	\$/MMBtu
Kuwait	Mina Al Ahmadi	N/A	\$/MMBtu
Egypt	Ain Sukhna	N/A	\$/MMBtu
Turkey	Aliaga	Marmara	\$/MMBtu
Greece	Revithoussa	N/A	\$/MMBtu
Italy	Rovigo	Panigaglia, OLT Toscana	\$/MMBtu
Spain	Huelva	Barcelona, Bilbao, Cartagena, Ferrol, Sagunto	\$/MMBtu
Portugal	Sines	N/A	\$/MMBtu
Netherlands	Rotterdam	N/A	\$/MMBtu
Belgium	Zeebrugge	N/A	\$/MMBtu
France	Montoir	Fos Cavaou, Fos Tonkin	\$/MMBtu
Britain	Isle of Grain	Dragon, South Hook, Teesside	\$/MMBtu
Mexico East	Altamira	N/A	\$/MMBtu
Brazil	Pecem	Salvador	\$/MMBtu
Argentina	Bahia Blanca	Escobar	\$/MMBtu
Chile	Quintero	Mejillones	\$/MMBtu

FOB	Assessment basis port	Units quoted
Middle East	Ras Laffan	\$/MMBtu
North Africa	Arzew	\$/MMBtu
West Africa	Bonny Island, Angola	\$/MMBtu
Far East	Bintulu	\$/MMBtu

Trinidad	Point Fortin	\$/MMBtu
US Gulf	Sabine Pass	\$/MMBtu
Northeast Asia	Sakhain	\$/MMBtu
Australia	NWS	\$/MMBtu
Northern Europe	Snøhvit	\$/MMBtu

FOB reload	Assessment basis port	Other regional ports considered	Units quoted
Spain	Sagunto	Huelva, Cartagena, Ferrol, Barcelona, Bilbao, Sines	\$/MMBtu
Northwest Europe	Zeebrugge	Gate, Grain	\$/MMBtu

Charter rates	Vessel type	Location	Units quoted
Prompt	TFDE	Atlantic	\$/day
Prompt	Steam	Atlantic	\$/day
Prompt	TFDE	Pacific	\$/day
Prompt	Steam	Pacific	\$/day
Mid-term	TFDE	Global	\$/day
Mid-term	Steam	Global	\$/day

## Recent changes to this methodology

Date	Assessment	Change
31 October 2017	Brazil basis port	Pecem replaces Guanabara Bay as basis port, Salvador added as other regional port
31 October 2017	India DES, Spot bids/offers table	Half-month assessments added. Spot bids/offers table to include bids and offers for the Middle East and India
4 September 2017	N/A	Completed methodology consultation
22 March 2017	NBP, TTF Day-ahead and Weekend	Added
8 July 2016	TTF front months	Added
11 May 2016	US DES, US Gulf Reload	Removed
11 May 2016	US Gulf FOB	Added
17 February 2016	Bunker prices	Changed provider source
18 September 2015	FOB reload – Northwest Europe	Replaces Zeebrugge FOB reload assessment
18 September 2015	DES – Egypt, Mexico	New assessments added
26 May 2015	N/A	Edits explanation of methodology consultation
26 May 2015	DES – other regional ports	Added Naoetsu to Japan; Samcheok to South Korea; OLT Toscana to Italy; Tangshan, Qingdao, Hainan and Dongguan to China

26 May 2015	FOB reload	Barcelona and Bilbao added to other regional ports; Reganosa renamed Ferrol
30 October 2014	Charter rates	Adds breakdown of vessel type by TFDE and Steam. Changes Mid-term assessments to global, removing separate Atlantic and Pacific assessments.
30 October 2014	FOB assessments	FOB calculated assessments use TFDE shipping costs.
30 October 2014	Brazil DES	Basis port changed to Guanabara from Pecem
15 December 2013	n/a	Adds section: Latest Global LNG Tenders.
15 December 2013	US Gulf DES	Basis port changed from Sabine Pass to Freeport.
15 December 2013	US Gulf FOB reload	Basis port changed from Sabine Pass to Freeport.
15 December 2013	DES China	Ningbo and Zhuhai added as other ports considered.
15 December 2013	DES India	Basis port changed from Hazira to Dahej. Kochi and Dabhol added as other ports considered.
5 December 2013	Assessments	Adds section: PRICE ASSESSMENTS – Data used key
30 October 2013	Spain FOB Reload	Added.
30 October	N/A	Adds detail.
29 May 2013	FOB Assessments	Trinidad, Australia and Nigeria changed to bid/offer transaction-based from model-based.
29 May 2013	FOB Nigeria	Name changed to FOB West Africa. Angola added as additional load port. Basis port unchanged at Bonny Island.
29 May 2013	DES Singapore	Added.
29 May 2013	DES Thailand	Added.
29 May 2013	DES US East	Removed.
29 May 2013	Prompt Charter Rates	Chartering period changes from 2 months to 90 days.
29 May 2013	Mid-term Charter Rates	Added.
29 May 2013	Long-term Charter Rates	Moved to sister publication GLM and specifications changed.
29 May 2013	Charter Rates	Vessel size range narrowed and build date cut off instituted.

## Price Assessments

### Definitions

#### DES Assessments

All ICIS spot DES assessments give a single value for the named region. This represents the price most likely to

transact. The value relates to a specific delivery point within the named region. This delivery point will typically be the most active spot cargo receiving terminal in that region.

Deals and pricing information for other LNG receiving terminals within that region may be accounted for in the final assessment, but may be assessed at a differential to the key discharge port, dependent on market valuations of the price at these ports and shipping costs between these ports and the basis port if relevant. Details of which basis port and other regional ports are used for each assessment are provided in the table above.

DES assessments do not take into account the cost of regasification, blending or transport into the domestic network from the LNG import terminal.

Lean and rich quality cargoes are taken into account in the assessments. No premiums or discounts are applied for varying quality as there are no consistent patterns determining relative value attributed to different specifications. For example, different buyers within the same market may have different preferences for rich or lean cargoes.

Cargo sizes included in the assessment range from 30,000m<sup>3</sup> of LNG up to 266,000m<sup>3</sup> (Q-Max category). Partial cargoes within this volume range will also be taken into account.

Cargoes purchased primarily for technical requirements are not used in the assessment process. This includes cargoes purchased for commissioning, cool down and to meet operational requirements at regasification facilities. Two calendar months are assessed. The assessments roll on the 16th of the calendar month. For example, on 16 January, the two front months roll from February and March, to March and April. Where 16 January falls on Saturday or Sunday, the assessments roll on the following Monday.

EAX Spread – this value is a calculation, subtracting the published EAX for that day from the published DES Assessment for the same day.

NBP Spread – this value is a calculation, subtracting the latest published ICIS Heren NBP assessment from each published DES Assessment. The benchmark ICIS Heren NBP assessment is published in the original trading unit (p/th) in sister publication European Spot Gas Markets. The original assessment is converted into \$/MMBtu for publication in LMD, using Bloomberg's FX rates, which are modelled by ICIS into a forward curve that is applied to the precise contract delivery period.

## REGIONAL INDICES

Regional Indices are provided daily for six regions, for two front months:

East Asia (EAX)

South America (SAX)

Mediterranean (MDX)

Middle East and North Africa (MENAX)

NW Europe (NEX)

Iberia (IBX)

The EAX is calculated using an arithmetic average of the day's DES front month and second month ahead assessments for Japan, South Korea, Taiwan and China.

The SAX is calculated using an arithmetic average of the day's DES front month and second month ahead assessments for Argentina, Brazil and Chile.

The MDX is calculated using an arithmetic average of the day's DES front month and second month ahead assessments for Greece, Italy and Turkey.

The MENAX is calculated using an arithmetic average of the day's DES front month and second month ahead assessments for Kuwait, Dubai and Egypt.

The NEX is calculated using an arithmetic average of the day's DES front month assessments for Britain, Netherlands, Belgium and France.

The IBX is calculated using an arithmetic average of the day's DES front month and second month ahead assessments for Spain and Portugal.

The front two calendar months will be published. The indices roll on the 16th of the calendar month. For example, on 16 January, the two front months roll from February and March, to March and April. Where 16 January falls on Saturday or Sunday, the indices roll on the following Monday.

## ASIA HALF-MONTH INPUTS

Half month assessments are provided for the four individual DES markets of East Asia (Japan, South Korea, China and Taiwan), the EAX and India, in addition to the full two months.

The half-month inputs roll on the 16th of the calendar month and the first working day of the calendar month. Where the 16th falls on Saturday or Sunday, the assessments roll on the following Monday.

Five half-month contracts are assessed for the second, third, fourth, fifth and sixth half months ahead. For example,

on 16 January, the half-month contracts quoted will be as follows:

H2 February

H1 March

H2 March

H1 April

H2 April

Full-month assessments for these markets will be equal to the average of the two component half-month assessments.

## CHARTER RATE ASSESSMENTS

ICIS assesses on a daily basis both Prompt- and Mid-term charter rates for LNG vessels.

Prompt is defined as fixtures for a chartering period of up to 90 days, with delivery taken within 40 days of the transaction date.

Mid-term is defined as fixtures for a chartering period of between 90 days and 365 days, with delivery taken within 40 days of the transaction date.

Atlantic and Pacific basin rates are assessed for the prompt with a global assessment for the mid-term. Atlantic is defined as west of the Suez Canal and Pacific as east of the Suez Canal.

Long-term charter rates are assessed weekly and published in sister publication *Global LNG Markets (GLM)*.

ICIS has separate assessments for tri-fuel diesel electric (TFDE) and steam turbine LNG carriers to factor in the different economics of voyage cost across the global fleet.

The capacity of vessels included in the assessments is restricted to 125,000-177,000 cubic metres of LNG. Fixtures for vessels outside of this size range may be reflected in the assessment, but may be adjusted to take into account size-related premiums or discounts. Only vessels built in or after 1990 will be considered for the purposes of these assessments.

As with ICIS commodity assessments, charter rate assessments are based on information gathered and verified from a wide range of market participants, with deal, bid and offer information taking precedence.

## FOB ASSESSMENTS

ICIS assesses spot FOB value at the world's eight major LNG-producing locations.

Assessments for Middle East, North Africa, Far East,

Northeast Asia and Northern Europe are calculated using a model that builds incremental forward curves for the world's 23 busiest spot cargo receiving terminals, using ICIS DES assessments. The model then maps sailing times from a 20–40 day FOB loading window onto this forward DES curve to determine potential market prices at destination. The cost of shipping for this voyage is then deducted from the final market price. ICIS takes TFDE voyage economics as the reference to calculate FOB assessments.

Shipping costs for TFDE and steam vessels from all eight producing regions to all 23 destinations are calculated using ICIS proprietary charter rate assessments, bunker and fuel costs, boil-off, port charges and Suez charges where relevant. ICIS bases its FOB assessments on the highest TFDE netback value achievable. The charter rate used in this calculation is the average of the prompt charter rate assessment for Atlantic and Pacific TFDE markets. All costs are assumed for a round-trip voyage.

The following assumptions are made in the assessment of shipping costs for TFDE vessels:

Parameter	Unit	TFDE
Ship size	Cubic metres	160,000
Tonnage	Deadweight tonnes	85,000
Speed	Knots	20
Boil off	% per day	0.10
Fuel consumption	Tonnes per day	123

If FOB trading liquidity shows sustained growth, ICIS will consult the industry on how trading information should be taken into account in assessing these loading points.

This process has been undertaken for Australia, Trinidad, the US Gulf and Nigeria. As a result ICIS assesses value for these loading locations on the basis of transactions, bid/offer information, tender information and other relevant pricing information. This includes the existing netback values calculated by ICIS and described above.

In anticipation of the potential for increased spot trade from the Angola LNG plant, ICIS renamed the Nigeria assessment West Africa on 29 May 2013.

## FOB RELOAD ASSESSMENTS

### General definition

The assessments represent the cost of a cargo reloaded from an LNG terminal on the day of publication and loaded

during the delivery windows specified below.

The assessments represent the loading of a full cargo, although partial cargoes can be taken into consideration. Small-scale reloads are not taken into consideration for these assessments as they tend to be priced according to different economic considerations. Small-scale is defined for the purpose of this methodology as any full cargo below 80,000cbm in size.

ICIS does not deduct the fixed or variable costs of reloading the cargo in its assessment, nor does it deduct other costs including booking fees for the slot, port fees and flaring costs. The published assessment therefore reflects the agreed market price of the cargo only, and does not attempt to separate costs from the agreed transaction price.

ICIS does not reflect in-tank trades in these assessments.

## **Spain**

The period assessed is for loading from 15 to 45 days from the day of the assessment. The ICIS Spain FOB reload assessment provides a single value for the region with the Sagunto LNG terminal as the basis port. This represents the price most likely to transact. Sagunto is the most active FOB cargo reloading terminal in that region.

Deals and pricing information for other LNG terminals within Spain and Portugal may be accounted for in the final assessment, but may be assessed at a differential to the Sagunto terminal, dependent on market valuations of the price at these ports and shipping costs between these ports and the basis port if relevant. Other regional ports considered are the Sines LNG terminal in Portugal as well as the Huelva, Cartagena and Reganosa terminals in Spain.

## Northwest Europe

ICIS assesses the cost of a cargo reloaded from Northwest Europe which covers the receiving terminals at Zeebrugge in Belgium, Gate in the Netherlands and Grain in the UK.

The period assessed is for loading at any point during the following calendar month.

The assessments roll on the first working day of the calendar month. For example, on 1 January, assessments roll from January to February.

## OTHER DATA - Definitions

### ASIA SPOT BIDS AND OFFERS

Firm, verifiable bids and offers for the Asia markets are published daily. This information represents prices available to the market on the day of publication, to the best knowledge of ICIS' market reporters after the day's investigation and analysis. If reporters have reason to consider bids and offers are not firm, they will not appear in the publication. Bid and offer information is a key part of the assessment process, along with deals done, price evidence from surrounding markets and other fundamental data.

### LATEST GLOBAL SPOT TRANSACTIONS

The five latest spot transactions discovered and verified by ICIS will be displayed daily.

The full list of spot DES and FOB trades for all locations will continue to appear in the weekly publication Global LNG Markets and is available via FTP.

Details on the transaction's timing, price levels and location may be added at a later date as ICIS discovers and verifies this information.

### KEY OIL AND GAS PRICES

#### ICIS Heren NBP

The Day-ahead, Weekend and two front-month values are midpoints of the original NBP bid-offer assessments carried in the daily ICIS publication European Spot Gas Markets (ESGM). The original assessments are in p/th. The original assessments are converted into \$/MMBtu for publication in LMD, using Bloomberg's FX rates, which are modelled by ICIS

into a forward curve that is applied to the precise contract delivery period.

The assessments carried in LMD are the latest published values.

Please see the ESGM methodology document for a full description of how these prices are assessed.

#### ICIS Heren TTF

The Day-ahead, Weekend and two front-month values are midpoints of the original TTF bid-offer assessments carried in ESGM. The original assessments are in EUR/MWh. The original assessments are converted into \$/MMBtu for publication in LMD, using Bloomberg's FX rates, which are modelled by ICIS into a forward curve that is applied to the precise contract delivery period.

The assessments carried in LMD are the latest published values.

Please see the ESGM methodology document for a full description of how these prices are assessed.

#### ICIS Heren Zeebrugge

The two front-month values are midpoints of the original Zeebrugge bid-offer assessments carried in ESGM. The original assessments are in p/th. The original assessments are converted into \$/MMBtu for publication in LMD, using Bloomberg's FX rates, which are modelled by ICIS into a forward curve that is applied to the precise contract delivery period.

The assessments carried in LMD are the latest published values.

Please see the ESGM methodology document [embed link here] for a full description of how these prices are assessed.

#### ICIS Heren Japan Import

The two front-month values are ICIS assessments of the average price of LNG imported into Japan from long-term contractual suppliers for these periods.

These are calculated assessments, made using historical Japan customs-cleared (JCC) data and forward oil price data.

The assessment formula takes into account the historical weighted average price of LNG from Middle East and Asia-Pacific nations, which sell the majority of LNG into Japan under long-term contract.

These assessments roll on the first working day of each new calendar month. They will be published in every issue of LMD.

### Latest published JCC

The JCC figure is the monthly average price of crude oil imported by Japan from all sources, which is calculated by the Japanese finance ministry before the end of the following calendar month.

The full calendar of publication dates is available on the Japanese customs website:  
[http://www.customs.go.jp/toukei/calendar/calend\\_e.htm](http://www.customs.go.jp/toukei/calendar/calend_e.htm)

### NYMEX Henry Hub

The two front-month values are the futures settlement prices from the NYMEX exchange (NG contract) on the day prior to publication of LMD.

### ICIS Brent

This is the midpoint of the bid-offer spread published daily by ICIS in its World Crude Report. The contract assesses Dated BFOE (Brent/Forties/Oseberg/Ekofisk) at the time of the Intercontinental Exchange (ICE) close in London (at 19:30).

North Sea grades are assessed for a 10–25-day forward trading period, with the BFOE marker set at the level of the lowest of the four constituent grades (Brent, Forties, Oseberg and Ekofisk).

For full details on the methodology used for these assessments please consult the methodology document for the World Crude Report. [embed link here]

### NYMEX WTI

The two front-month values are the futures settlement prices from the NYMEX exchange on the day prior to publication of LMD.

## AVAILABLE FIXTURES

This table displays vessels available for chartering on a short-term basis. It provides the vessel name, the company with effective control of the vessel (current charterer), the length of time the vessel will be available for (Availability Window) and the dates (Period). It also gives the size of the vessel, its location and the state of its tanks (warm, cold or inert).

All information is discovered and verified by ICIS market reporters. Please see *LNG Edge* to view the list.

## BUNKERS: SPOT DELIVERED PRICES

This table reproduces the assessments made by publishing company Ship and Bunker on a daily basis.

For a full description of the methodology used by Ship and Bunker please consult its website:

<http://shipandbunker.com/>

## LATEST GLOBAL LNG TENDERS

This table contains primary data gathered by ICIS market reporters. It aims to give an up-to-date list of all the latest cargo tenders in one place for easy reference. It includes buy and sell tenders on both an FOB and DES basis. The table shows the status of tenders, including whether they are open, closed, awarded or cancelled.

For a history of this data and more data surrounding these tenders, please see *LNG Edge* or access the raw data via the FTP service.

Please note that where ICIS has confirmed the winners or price following a tender award, this information will appear in the deals table published in weekly publication *Global LNG Markets* and on the FTP service.

## PRICE ASSESSMENTS – Guidelines for the exercise of judgement

ICIS gives priority to the highest confirmed bid and the lowest confirmed offer in its assessment process

ICIS also discovers transaction information across all markets that it assesses. This transaction information is used as supporting evidence to establish market value.

Where a firm bid and offer have been established, the ICIS assessment price will be in between the highest firm bid and the lowest firm offer. The published price does not always represent the midpoint of this bid/offer spread, however, and ICIS uses its knowledge of market direction and market length/tightness to determine value in all instances where the firm bid/offer spread is more than 10 US cents wide and there is no confirmed transaction.

For example, if price information from other countries or cargo availability on the global market indicate a rising market, the ICIS assessment will typically be closer to the

offer than to the bid. In extremely tight markets where the reporter has identified real physical demand, the assessment may even match the offer.

In the same example, but where a particular location assessed by ICIS may have no urgent demand and only opportunistic bids, the ICIS assessment for that country will still be closer to the offer price than the bid price as there is demand in neighbouring regions competing for supply. The buying region assessed would not be able to secure a cargo at its bid price unless and until demand in other buying regions had been met by available offers.

Where no confirmed transaction or bid and offer information is available at the time ICIS assesses the market, it will use other types of market information to assess value.

The most regular forms of alternative market information used are the value of alternative fuels, the cost of the commodity in competing markets, and the cost of gas available via alternatives to the LNG spot market.

The cost of commodity in competing markets may be used where ICIS has established a prevailing market relationship between delivery points and has firm market information on one of those points. The prevailing price differential between those two points will be applied to assess the price of the less liquid point. Firm market information from an actively traded point may also be used to calculate a netback or net forwards price as a guide to assess the less liquid point.

The alternatives to the LNG spot market typically include pipeline supplies, domestic traded hubs or mid- to long-term LNG contracts.

For example, a firm and verifiable bid may not be available from a potential spot LNG buyer. If this buyer has access to gas from a long-term contract and typically comes onto the spot market when they can source below this contract price, ICIS will make an assumption that the bid level cannot be above the long-term contract price, unless reporters have evidence of a real need for additional gas on top of contracted quantities. The need for additional gas is typically discovered through spot market negotiations, at which point ICIS market reporters have bid and offer information to use as an assessment basis.

## PRICE ASSESSMENTS – Data used key

For each assessment published in LMD, ICIS gives a concise description of which type of market data was used

to form the assessment. This is done using a standardised key code. A single letter published alongside the assessment denotes the type of information used as the primary basis for the assessment. Any other type of information ICIS may have gathered for that assessment can be considered as supporting and of secondary importance in the formation of the assessment.

The definition of the key is as follows:

B – Bid/offer      T – Transaction  
S – Spread        F – Fundamentals  
I – Interpolation/extrapolation

## PRICE ASSESSMENTS – Exclusion of data

In line with its Editorial Standards policy, ICIS reporters actively seek to identify anomalous market information and exclude it from the assessment process. For LNG market assessments, this is done by the daily information gathering and verification process carried out by reporters, whereby market transaction, bid and offer information is confirmed and verified by multiple sources. The context of ICIS reporters' knowledge of the fundamental supply/demand situation on a given market is also used to verify transaction data that appears to be anomalous but may be done at a price level explained by changes in the physical market.

In assessing LNG markets, ICIS takes into consideration only arm's length transactions between non-affiliated parties.

ICIS does not accept bids or offers that are not firm. Any bid or offer which is demonstrably not firm will be disregarded and further bids or offers from the same counterparty may also be disregarded. For example, if a company indicates to the market that it is bidding or offering at a certain price and volume but ICIS can confirm that it later refused to transact when that bid was hit or offer lifted, it will not use that company's bid/offer information.

ICIS also excludes from its assessment process transactions where ICIS reporters have reasonable grounds to doubt the transaction is representative of typical market behaviour: for example, where a deal is concluded disregarding the best bid or offer on the market; where there is evidence that a market participant has disclosed only part of its market activity to ICIS; or where a transaction lies outside the prevailing range of typical market activity as established through other market evidence.

ICIS actively seeks to verify the time at which reported transactions took place. If such verification cannot be obtained, ICIS may exclude the transaction information.

ICIS records instances of anomalous data and reviews these instances on a regular basis with a view to determining if a pattern exists.

Where market reporters have concerns over the behaviour of a market participant, this will be escalated using the ICIS Escalation Process for Compliance and Regulatory Issues. This can be found in the company's Compliance Manual.

## PRICE ASSESSMENTS – Types of market information used and collection process

ICIS gathers market information primarily via telephone, instant messenger and e-mail. Market information includes bids, offers and deals done by sources or seen/heard by sources. ICIS reporters also investigate the reasons for market price movements and cross-check information received against market fundamentals data.

Information is typically gathered between 09:00 and 16:30 Singapore time on the day the assessment is published, and between 9:00 and 18:00 London time and 9:00 and 18:00 Houston time on the day prior to the assessment. ICIS may disregard information received after 16:30 Singapore time for the purposes of assessment on that day.

ICIS will never use information received after assessments have been published to retroactively correct an assessment.

## PRICE ASSESSMENTS – Transaction data threshold

ICIS does not impose a minimum transaction data threshold on its assessment process.

Alongside its role in assessing the more active and mature markets, ICIS plays a role in bringing price transparency to new markets where trading and market information can be sporadic, which is a characteristic of the LNG market. Such markets are not conducive to minimum data thresholds.

In the absence of both transaction and bid/offer information, ICIS procedures are described above in the "Exercise of Judgement" section.

## PRICE ASSESSMENTS - Verification of sources

ICIS verifies sources are active participants in the LNG industry by canvassing known LNG traders and brokers to verify that a potential source is a bona fide industry participant that they are able to do business with. Criteria for inclusion of a potential source as an industry participant may include: history of physical trading activity; chartering or sub-chartering an LNG carrier; participation in LNG supply tenders; access to LNG infrastructure; activity on the paper market; or participation in trade as a facilitator of transactions (broker/consultant).

In addition, ICIS reporters use the indicators contained in the section entitled Validation Checks on Sources from the company's Data Standards Policy. This policy can be read in full in the ICIS Compliance Manual.

## PRICE ASSESSMENTS – Definitions of periods

**Front Months:** Two front calendar months are assessed. The assessments roll on the 16th of the calendar month. For example, on 16 January, the two front months roll from February and March, to March and April. Where 16 January falls on Saturday or Sunday, the assessments roll on the following Monday.

**Half-month assessments:** Half-month assessments are provided for the four individual DES markets of East Asia (Japan, South Korea, China and Taiwan), the EAX and India, in addition to the full two months. The half-month inputs roll on the 16th of the calendar month and the first working day of the calendar month. Where the 16th falls on Saturday or Sunday, the assessments roll on the following Monday. Five half month contracts are assessed, for the second, third, fourth, fifth and sixth half months ahead. For example, on 16 January, the half month contracts quoted will be as follows:

H2 February  
H1 March

H2 March  
H1 April  
H2 April

Full month assessments for these markets will be equal to the average of the two component half-month assessments.

**FOB Assessment:** The FOB assessments are made on the basis of a loading window rolling 20 to 40 days ahead of the publication date.

**Prompt Charter Rate Assessment:** Prompt is defined as fixtures for a chartering period of up to 90 days, with delivery taken within 40 days of the transaction date.

**Mid-term Charter Rate Assessment:** Mid-term is defined as fixtures for a chartering period of between 90 days and 365 days, with delivery taken within 40 days of the transaction date.

**Northwest Europe Reload Assessment:** The period assessed is for loading at any point during the following calendar month. The assessments roll on the first working day of the calendar month. For example, on 1 January, assessments roll from January to February.

**Spain FOB Reload Assessment:** The assessments are made on the basis of a loading window rolling 15 to 45 days ahead of the publication date.

**ICIS NBP:** The two front-month values are midpoints of the original NBP bid-offer assessments carried in ESGM. They are for gas delivered on the British virtual trading hub (NBP) for the relevant calendar months. They roll on the first English working day of each calendar month.

**ICIS Zeebrugge:** The two front-month values are midpoints of the original Zeebrugge bid-offer assessments carried in ESGM. They are for gas delivered on the Belgian Zeebrugge beach hub for the relevant calendar months. They roll on the first English working day of each calendar month.

**ICIS Japan Import:** The two front-month values are ICIS assessments of the average price of LNG imported into Japan from long-term contractual suppliers for these periods. These assessments roll on the first working day of each new calendar month. They will be published in every issue of LMD.

**Latest Publish JCC:** The JCC figure is the monthly average price of crude oil imported by Japan from all sources, which is calculated by the Japanese finance ministry before the end of the following calendar month. The full calendar of publication dates is available on the Japanese customs website

**NYMEX Henry Hub:** The two front-month values are the futures settlement prices from the NYMEX exchange (NG contract) on the day prior to publication of LMD.

**ICIS Brent:** The contract assesses Dated BFOE (Brent/Forties/Oseberg/Ekofisk) at the time of the Intercontinental Exchange (ICE) close in London (at 19:30). North Sea grades are assessed for a 10–25-day forward trading period.

**NYMEX WTI:** The two front-month values are the futures settlement prices from the NYMEX exchange on the day prior to publication of LMD.

## CURRENCY CONVERSIONS

Forward currency rates are calculated using 29 pricing points, sourced from Bloomberg, at 16:30 London time every day. The pricing points used are all of those available: spot, one week ahead, 24 months ahead, and three to five years ahead.

With the exception of the front month, ICIS calculates a smooth curve which provides rates for each day out to five years. From these values, ICIS calculates rates corresponding to the contracts quoted in EDEM.

For the front month, the exact month-ahead currency rate published by Bloomberg at 16:30 London time is used.

## OTHER PRINCIPLES AND GUIDELINES

### Changes to methodology

All markets evolve, and ICIS has a duty to ensure its methodologies for market reporting evolve in step with markets.

ICIS therefore regularly conducts internal reviews of the appropriateness of its methodologies.

Draft changes are then made public and comment requested from industry participants, with a minimum one-month notice period, except where, exceptionally, a force majeure event (natural disaster, war, bankruptcy of a trading exchange etc) makes necessary a shorter notice period.

ICIS is committed to reviewing all comments on proposed methodology changes, but in some cases may find it necessary to alter its methodologies against the wishes of some market participants.

In addition, ICIS has a formal methodology consultation process. The date of the last consultation launched and the expiry date by which the company commits to conducting the next consultation will be published at the top of the methodology document.

Please also refer to the Methodology Consultation Process section of the company's Compliance Manual. This contains detailed flow charts documenting the internal and external review and consultation process.

## Consistency

ICIS achieves consistency between its assessors in exercising their judgement by requiring all assessors to understand and follow this detailed methodology as well as the company's Editorial Standards document. In addition, ICIS employees are required to complete standard training before undertaking the work of a market reporter. Every reporter's work is peer reviewed daily and spot checked by senior management.

Adherence to these processes is documented at every stage.

## Data standards

ICIS has a public Data Standards Policy, which covers the type and quality of information it asks market participants to report.

The following principles relate to ICIS LNG market assessments and commentaries:

- Where possible, please allow access to active market traders and allow them to comment on active news stories.
- Where possible, please provide market data from both front and back-office functions.
- Where possible, please provide complete data and not a subsection.
- Flag inter-affiliate transactions.
- Flag sleeve trade.
- Flag spread trades.
- When a source or contact leaves the organisation please contact ICIS to the replacement (ICIS requests that both the source and the organisation contacts them).
- Where information is not validated by the source (i.e. rumour) please indicate as such.

## Key submitter dependency

Because of the sometimes thinly-traded nature of certain LNG markets and the existence of markets where there are a limited pool of active counterparties, ICIS does not employ minimum rules on the number of submitters.

## Market Communication

ICIS communicates with a broad range of market participants – traders, brokers, back-office employees, supply managers, operations personnel and company executives – to obtain market information.

ICIS communicates with participants by telephone, email, instant messenger and face to face. All instant messenger, email communication and notes of any face-to-face communication are archived and details of telephone communication are logged and data-based.

ICIS does not accept instant messenger communication from unknown parties, and reporters are required to verify a market participant's identity prior to using instant message communication.

ICIS does not regard in any way as binding, attempts by market participant companies to restrict ICIS communication with their employees. ICIS has a duty to its subscribers to obtain the maximum possible amount of market information. ICIS treats all communication from market participants as confidential.

ICIS reporters are bound by a Code of Conduct to report to their superiors any coercive or threatening communication from market participants, or any offers of inducements of any kind intended to influence an assessment.

Where improper communication appears to have taken place, ICIS will communicate in the first instance with senior management at the company or companies involved, and if necessary with relevant market authorities.

ICIS expects the highest standards of propriety from all market participants, and regards all communications from market participants as representative of the views of an individual's employer.

ICIS is committed to the highest levels of customer service, and has a formal feedback and complaints policy, which can be viewed here <http://www.icis.com/about/icis-feedback-policy/>.

## Market data verification

ICIS will always make best endeavours to confirm bids, offers and transactions with the relevant party/parties. ICIS attempts to cross-check all market data received from a buy or sell-side participant with a participant's trading

counterparty.

Where both counterparties to a transaction cannot or will not confirm the data, ICIS seeks corroboration from other market sources.

Where transaction or bid/offer information has been received from a trader rather than from a company's back office, ICIS always seeks confirmation from other sources.

Where ICIS has grounds to doubt an item of market data, it may request further evidence that a transaction has taken place, including documentary evidence.

ICIS treats transaction data received from active brokerages as confirmed and treats bid/offer information as firm. This information will be considered in conjunction with other sources during the assessment and index process as described above.

In markets with low liquidity and a low number of counterparties, ICIS may choose to use unconfirmed data, but only in so far as it is aligned with other market information and comes from a source deemed reliable by ICIS based on previous interactions.

### Minimum data threshold

Because of the sometimes thinly-traded nature of the LNG market, ICIS does not have a minimum data threshold for its assessment methodologies in this market. ICIS' LNG methodology is designed to function accurately under all market conditions and to make use of parallel data where no direct transaction or bid/offer data is available.

Parallel data used is typically the price of LNG traded into competing markets and the price of alternative energy supply into the market. Examples of how this parallel data is used can be found in the section "PRICE ASSESSMENTS – Guidelines for the exercise of judgement" above.

### Selection of participants

ICIS' policy on general market data is that it welcomes all information regardless of source or constitution as long as it is provided in good faith as true.

However, only active market participants verified as such by existing active industry participants and verified as a viable business by ICIS investigations will be allowed to contribute price data to ICIS for the purpose of assessing tradable market value under this methodology.

### Units

ICIS assesses LNG markets in the units, which attract the majority of trade. The vast majority of LNG deals are

concluded in US dollars per MMBtu.

### ICIS Contact Details

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