



# **Methodology and Specifications Guide SGX LNG Index Group**

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## Introduction

The SGX LNG Index Group ("Sling") is an initiative by Energy Market Company ("EMC") and Singapore Exchange Limited ("SGX") for spot Liquidified Natural Gas ("LNG") price discovery. It is a benchmark based on participants' expert assessments of LNG cargo value.

Participants provide Assessments for the upcoming 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> Assessment Periods on the day of determination based on the value of an LNG cargo at a specific location for delivery. These Assessments are determined with regard to the International Organisation of Securities Commissions ("IOSCO") Principles for Financial Benchmarks ("PFB") and are then used to calculate the Sling index value. Participants who are invited to contribute to the index must be active in the physical LNG market.

This document details how the Sling is determined and governed as well as the specifications of Sling indices.

Unless otherwise defined, all terms used in this document shall have the meanings ascribed to them under the "Terminology" section.

## IOSCO Compliance

The IOSCO is the international body that brings together the world's securities regulators, and is recognised as the global standard setter for the securities sector. The IOSCO develops, implements and promotes adherence to internationally recognised standards for securities regulation, with different standards for different uses.

To ensure a benchmark of integrity and of the highest standard, EMC voluntarily aims to ensure alignment of its procedures, principles and policies with the IOSCO PFB in all aspects of the Sling where applicable.

## Index Determination

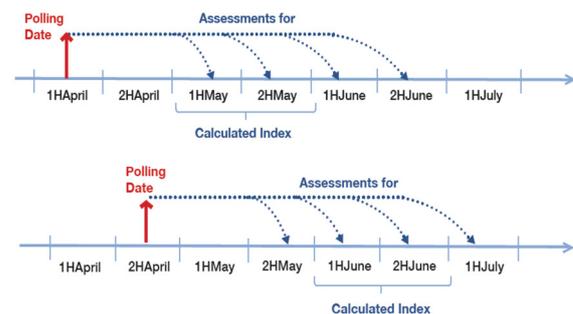
With the aim of having the Sling index as fair, transparent and objective as possible, editorial intervention by EMC is excluded. The Sling index is automatically calculated through an algorithm based on Participants' Assessments of a fair mid-price of an LNG cargo.

The determination process:

1. For every determination day, Participants provide their Assessments via secure upload.

2. The Sling indices and prices are calculated based on the group of Assessments with outliers consisting of the top and bottom 15% (rounded to the nearest whole) Assessments removed, followed by a trimming of any outliers that are out of the range by +/-10% under specific circumstances.

A Sling index in respect of a calendar month is calculated based on the simple average of Assessments for the first and second Assessment Periods (H1 and H2) of the calendar month. Please refer to the diagram below for an illustrative example.



## Assessment Methodology

The determination of the index is based on Assessments from Participants following a hierarchy of data as recommended by IOSCO. The index methodology allows the weightage to naturally move towards physical trades as the market develops.

Sling Assessments are to be formed based on and in the sequence of the following hierarchy for data:

1. **Verbatim arms-length transactions of an LNG cargo concluded by the Participants that are based in the specified location.** These transactions were concluded for a cargo of acceptable specifications with delivery in the period being assessed.
2. **Arms-length transactions of an LNG cargo concluded by the Participants in a related market.** These transactions could differ geographically and are adjusted for relevance to the specified location.
3. **Observed transactions of an LNG cargo concluded by third parties in the specified location.** These transactions are not concluded directly by the Participant but are observed and submitted verbatim.
4. **Executable quotes given or received or observed by the Participants.** These are actual bids and offers in the market for cargoes in the specified location.

#### 5. Other market information or expert judgment.

This constitutes all other information such as transactions of differing volumes or timeframes or other observed information in relation to the market which cannot be submitted verbatim, but can be used to evaluate an assessment of cargoes in the specified location.

### Error Resolution Process

The Sling is recalculated in the unlikely event of errors or distortions occurring that are deemed significant. EMC will notify stakeholders of such recalculations through appropriate media.

Where an inaccuracy is identified, EMC will follow the steps below:

- If the inaccuracy is identified before the dissemination of the Sling, EMC may decide at its own discretion to delay the dissemination of the Sling and wait for the correction of the inaccuracy; or EMC may decide at its own discretion to issue a preliminary determination, followed by the final determination later.
- If the inaccuracy is identified after the dissemination of the Sling and proven to be material (as determined by EMC at its own discretion), EMC will inform stakeholders through appropriate media, correct the inaccuracy, and re-issue the corrected Sling.

These guidelines are not definitive and nor intended as binding rules that determine the steps EMC will take when an inaccuracy is identified. EMC has the right to consult market participants in complex cases on the appropriate course of action, which may include the decisions on whether to redo the determination and/or the dissemination.

### Sling Participation

The Sling is based on Participants submitting Assessments to determine an index value. The Participant pool consists of a broad group of market players to ensure that any Sling Assessment is as representative of actual market conditions as possible. The Participant list will be kept confidential at all times.

### Participant Criteria

In order for any entity to be a Sling Participant and contribute Assessments towards the determination of an index value, they must first fulfil following criteria:

- The entity must be actively involved in Liquefied Natural Gas such as a major consumer, trader or producer.
- The company must be able to provide fair transactional Assessments for a physical LNG Cargo as defined by the Index Specifications on Page 3.
- The entity must accept, sign and abide by conditions laid out in any relevant documents. (Policies and Code of Conduct).

Any entity that fulfils the above criteria is welcome to apply to be a Sling Participant. Actual acceptance as a Participant however, is still subject to EMC's approval.

EMC will endeavour to ensure the Participant group maintains a balanced composition of buyers, sellers/producers and traders.

Participants will be able to view the anonymised Assessments from all other Participants as well as the aggregate composition and broad geographic location of all other Participants.

### Governance

To ensure a fair, credible and transparent governance process for the Sling, EMC has separated the oversight and administration functions. Ongoing operations of the Sling index including routine benchmark determination and dissemination performed by the Sling administration team, while oversight of all policy and governance aspects of the Sling will be performed by the Index Governance Committee ("IGC"), which consists of senior EMC and SGX personnel.

### Index Oversight

The responsibilities of the IGC include:

- Approval of all Sling policies and documentation.
- Determine benchmark definition and methodology.
- Regular reviews of relevant processes and policies.
- Review of suspected manipulation and breaches of the Code of Conduct.
- Review, challenge and pass judgement on the above mentioned articles.

## Industry Involvement

To facilitate industry involvement the Sling Index Advisory Committee (“IAC”) will be formed from LNG market stakeholders as an external committee to provide advice and/or recommendations to the IGC.

## Integrity and Quality of Index

EMC monitors the changes of the Sling from period to period, and will compare it to historically observed changes. If there are any notable anomalous occurrences, EMC will check whether there is an explanation for such a change. If no reasonable explanation can be identified, EMC will investigate the change and will publish any findings.

EMC continuously gathers feedback from the LNG market to determine any enhancements to the Sling. EMC will consider the necessity of such changes and effect all required changes through a defined change process.

EMC has established a queries, complaints and appeals process, additional information on this can be found in the Sling Queries, Complaints and Appeals Policy. As a member of the SGX group of companies, EMC is subject to the SGX Whistleblowing Policy.

Documents and additional details can be found in on the Sling website at [www.emcsg.com/Sling](http://www.emcsg.com/Sling).

## Methodology Evolution

From time to time, based on stakeholder input or otherwise, EMC may make changes to the Sling policies and methodology processes or any other rules pertaining to the Sling. It will notify stakeholders of such changes through appropriate media such email or other correspondence with an appropriate lead time.

Stakeholders and industry may be consulted with regards to benchmark evolution or proposed changes, allowing for sufficient consultation period time depending on the complexity of the proposed change. The IAC may be required to provide its advice and/or recommendation on the proposed change to the IGC.

The index methodology will be reviewed at least every 12 months in light of previous benchmark performance, and this will include consultation on any proposed changes.

## Dissemination

Publishing of the Sling is automatic, via the EMC website and/or email.

EMC offers different levels of subscription services for the Sling:

**Participants** - Available only to contributing index Participants, which includes access to all historical data including anonymised distribution plots of the submissions.

**Secure Subscribers** - Secure login access to all historical data, consisting of the index values and computed half monthly prices.

**General Subscribers** - Email with the most recent index value and half monthly prices following Index Determination.

## Index Specifications

These are the indices currently determined under the Sling umbrella.

### Singapore Sling

The Index is intended to be an Asia-Pacific hub price without consideration for the conditions of any specific LNG destination, origination or re-load terminal.

The question being posed to participants who assess is: **“What are your half monthly assessments of a fair mid-price for LNG cargoes on the waters in the vicinity of Singapore which could go into any Asian port on this assessment day?”**

Item	Details
Index Name	Singapore Sling
Description	<p>The Singapore Sling is a spot index based on Participants’ assessment of a fair mid-price for LNG cargoes as defined below.</p> <ul style="list-style-type: none"> <li>On the waters in the vicinity of Singapore which could go into any port</li> <li>Within the relevant Assessment Periods</li> <li>Cargo size between 135,000 m<sup>3</sup> and 175,000 m<sup>3</sup></li> <li>Includes both lean and rich cargoes</li> </ul> <p>There shall be no inclusion of other costs such as the local terminal charges. Adjustments of transaction prices to a Sling Assessment should include the freight cost from origin to Singapore or exclude the freight cost from Singapore to destination,</p>

	where relevant.
Assessment Periods (AP)	<p>Assessments are made for 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> half-calendar months, from the day of determination</p> <p>A Assessment Period constitutes either the 1<sup>st</sup> - 15<sup>th</sup> (H1) or the 16<sup>th</sup> - last day (H2) of the relevant month.</p> <p>E.g. Assessments made between: 1st to 15th of July 2014 (1<sup>st</sup> AP) are: H1 August 2014 (3<sup>rd</sup> AP), H2 August 2014 (4<sup>th</sup> AP), H1 September 2014 (5<sup>th</sup> AP), H2 September 2014 (6<sup>th</sup> AP)</p>
Index Determination	<p>The index is calculated for the first full calendar month of Assessments as the arithmetic mean of its Assessment Period prices.</p> <p>The Assessment Period price is formed from the arithmetic mean of the set of Assessments received for the Assessment Period of the particular year, less the top and bottom 15% (rounded to the nearest whole), followed by a trimming of any outliers that are out of the range by +/-10% under specific circumstances.</p> <p>E.g. : <b>Index value determined between:</b> 1st to 15th of July 2014 (1<sup>st</sup> HM) <b>Has Assessments from:</b> H1 Aug 2014 to H2 Sep 2014 (3<sup>rd</sup> to 6<sup>th</sup> AP) <b>The index is calculated for:</b> August <b>From the trimmed average of:</b> H1 Aug 2014 &amp; H2 Aug 2014 (3<sup>rd</sup> &amp; 4<sup>th</sup> AP)</p>
Index Resolution	The index is calculated to the fourth decimal place and rounded to the nearest third decimal place.
Determination Frequency	<p>Prior to 16 June 2016, the index was published on the first business day of the week.</p> <p>With effect from 16th June 2016, the determination of the index is done twice weekly on every Monday and Thursday. If the day of determination is a public holiday in Singapore, the calculation will take place on the following day; if the following day is also a public holiday, then there will be no determination for the half week.</p>
Dissemination Time	By 8:00 PM Singapore time (GMT+8) on the relevant Singapore business day.

## North Asia Sling

The question being posed to participants who assess is: ***“What are your assessments of a fair mid-price for LNG cargoes delivered ex-ship (“DES”) to all ports in Japan, Korea, Taiwan and China on this assessment day?”***

Item	Details
Index Name	North Asia Sling
Description	<p>The North Asia Sling is a spot index based on Participants’ assessment of a fair mid-price for LNG cargoes as defined below.</p> <ul style="list-style-type: none"> <li>Delivered ex-ship (“DES”) to all ports in Japan, Korea, Taiwan and China</li> <li>Within the relevant Assessment Periods</li> <li>Cargo size between 135,000 m3 and 175,000 m3</li> <li>Includes both lean and rich cargoes</li> </ul>
Assessment periods	<p>Assessments are made for 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> half-calendar months, from the day of determination</p> <p>A Assessment Period constitutes either the 1<sup>st</sup> - 15<sup>th</sup> (H1) or the 16<sup>th</sup> - last day (H2) of the relevant month.</p> <p>E.g. Assessments made between: 1st to 15th of July 2014 (1<sup>st</sup> AP) are: H1 August 2014 (3<sup>rd</sup> AP), H2 August 2014 (4<sup>th</sup> AP), H1 September 2014 (5<sup>th</sup> AP), H2 September 2014 (6<sup>th</sup> AP)</p>
Index Determination	<p>The index is calculated for the first full calendar month of Assessments as the arithmetic mean of its Assessment Period prices.</p> <p>The Assessment Period price is formed from the arithmetic mean of the set of Assessments received for the Assessment Period of the particular year, less the top and bottom 15% (rounded to the nearest whole), followed by a trimming of any outliers that are out of the range by +/-10% under specific circumstances.</p> <p>E.g. : <b>Index value determined between:</b></p>

	<p>1st to 15th of July 2014 (1<sup>st</sup> HM)  <b>Has Assessments from:</b>  H1 Aug 2014 to H2 Sep 2014 (3<sup>rd</sup> to 6<sup>th</sup> AP)  <b>The index is calculated for:</b>  August  <b>From the trimmed average of:</b>  H1 Aug 2014 &amp; H2 Aug 2014 (3<sup>rd</sup> &amp; 4<sup>th</sup> AP)</p>
Index Resolution	The index is calculated to the fourth decimal place and rounded to the nearest third decimal place.
Determination Frequency	<p>Prior to 16 June 2016, the index was published on the first business day of the week.</p> <p>With effect from 16th June 2016, the determination of the index is done twice weekly on every Monday and Thursday. If the day of determination is a public holiday in Singapore, the calculation will take place on the following day; if the following day is also a public holiday, then there will be no determination for the half week.</p>
Dissemination Time	By 8:00 PM Singapore time (GMT+8) on the relevant Singapore business day.

## Dubai/Kuwait/India Sling

The question being posed to participants who assess is: ***“What are your assessments of a fair mid-price for LNG cargoes delivered ex-ship (“DES”) to the designated ports in Dubai, Kuwait, India on this assessment day?”***

Item	Details
Index Name	Dubai/Kuwait/India (DKI) Sling
Description	<p>The DKI Sling is a spot index based on Participants' assessment of a fair mid-price for LNG cargoes as defined below.</p> <ul style="list-style-type: none"> <li>Delivered ex-ship (“DES”) to the designated ports in Dubai, Kuwait, India</li> <li>Within the relevant Assessment Periods</li> <li>Cargo size between 138,000 m3 and 170,000 m3</li> <li>LNG shall be delivered on [DES/DAP/DAT] basis as per Incoterms [2000/2010]</li> <li>The temperature of the LNG on each cargo at the Discharge Port shall not be warmer than minus 159 degree Celsius.</li> <li>There shall be no solids or any other impurities in the LNG</li> </ul> <p>For more details, refer to Annex A for the</p>

Assessment periods	<p>quoting specifications.</p> <p>Assessments are made for 3<sup>rd</sup>, 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> half-calendar months, from the day of determination</p> <p>A Assessment Period constitutes either the 1<sup>st</sup> - 15<sup>th</sup> (H1) or the 16<sup>th</sup> - last day (H2) of the relevant month.</p> <p>E.g.  Assessments made between:  1st to 15th of July 2014 (1<sup>st</sup> AP) are:  H1 August 2014 (3<sup>rd</sup> AP),  H2 August 2014 (4<sup>th</sup> AP),  H1 September 2014 (5<sup>th</sup> AP),  H2 September 2014 (6<sup>th</sup> AP)</p>
Index Determination	<p>The index is calculated for the first full calendar month of Assessments as the arithmetic mean of its Assessment Period prices.</p> <p>The Assessment Period price is formed from the arithmetic mean of the set of Assessments received for the Assessment Period of the particular year, less the top and bottom 15% (rounded to the nearest whole), followed by a trimming of any outliers that are out of the range by +/-10% under specific circumstances.</p> <p>E.g. :  <b>Index value determined between:</b>  1st to 15th of July 2014 (1<sup>st</sup> HM)  <b>Has Assessments from:</b>  H1 Aug 2014 to H2 Sep 2014 (3<sup>rd</sup> to 6<sup>th</sup> AP)  <b>The index is calculated for:</b>  August  <b>From the trimmed average of:</b>  H1 Aug 2014 &amp; H2 Aug 2014 (3<sup>rd</sup> &amp; 4<sup>th</sup> AP)</p>
Index Resolution	The index is calculated to the fourth decimal place and rounded to the nearest third decimal place.
Determination Frequency	<p>Prior to 16 June 2016, the index was published on the first business day of the week.</p> <p>With effect from 16th June 2016, the determination of the index is done twice weekly on every Monday and Thursday. If the day of determination is a public holiday in Singapore, the calculation will take place on the following day; if the following day is also a public holiday, then there will be no determination for the half week.</p>
Dissemination Time	By 8:00 PM Singapore time (GMT+8) on the relevant Singapore business day.

## Annex A

### Quoting Specifications for DK1 Sling (LNG Delivered Ex-Ship to Dubai Kuwait India). Developed in collaboration with Tullett Prebon.

**Contract:** The sale and purchase of the LNG shall be governed by the Master Sale and Purchase Agreement for Spot LNG signed between the Parties

**Product:**  
Liquefied Natural Gas

**Delivery Term:**  
LNG shall be delivered on [DES/DAP/DAT] basis as per Incoterms [2000/2010].

**Discharge Port:**  
Buyer will nominate the Base Discharge Port no later than 45 days prior to the start of the 5 Day Delivery Window.

The DK1 Market\*

Market	Country	Port	Terminal
DK1	India	Dahej	Dahej
DK1	India	Dabhol	Dabhol
DK1	India	Kochi	Kochi
DK1	Kuwait	Mina Al-Ahmadi	Mina Al-Ahmadi GasPort
DK1	Dubai	Jebel Ali	FSRU in Jebel Ali

\*subject to change over time

Buyer may nominate an “Alternate Discharge Port” in the DK1 Market as the Base Port no later than thirty (30) Days prior to the start of the first day of the 2 Day DW for the respective cargo, subject to ship-shore-compatibility.

Any incremental shipping costs shall be borne by the Seller. Any shipping savings shall be kept by the Seller.

**Contract Quantity:**  
Buyer and Seller shall agree an Estimated Delivered Quantity, “EDQ”, within the range 3.1 to 3.6 Trillion BTUs at the point of trade.

+/- 5% variance for operational tolerance will then apply to the EDQ.

**Delivery Window:**  
Buyer and Seller shall agree a five (5) Day Delivery Window, the “5 Day DW”, at the point of trade.

No later than thirty-five (35) days prior to the first day of the 5 Day DW, Buyer shall nominate within the 5 Day DW a two (2) Day Delivery Window, the “2 Day DW”. After such nomination the 2 Day DW shall become the Delivery Window.

### Supply Source:

For each Cargo, Seller shall nominate in writing the Supply Source no later than 40 days prior to the beginning of the first Day of the 5 Day Delivery Window.

No later than thirty (30) days prior to the first Day of the 2 Day DW, Seller can nominate alternative Supply Source subject to meeting quality specifications.

Once Seller’s Facilities are specified, the relevant provisions of the Force Majeure clause in the respective MSA shall apply in respect of those Seller’s Facilities.

Seller may nominate an Alternate Loading Port after thirty (30) days prior to the 2 Day Delivery Window subject to meeting the LNG Specification and subject to Buyer’s consent not to be unreasonably withheld.

### LNG Specification:

The LNG Specification for LNG at the Discharge Port is as follows:

The temperature of the LNG on each cargo at the Discharge Port shall not be warmer than minus 159 degree Celsius.

There shall be no solids or any other impurities in the LNG.

Combustion reference temperature of 0°C to be used for the purpose of verifying compliance with the Specification.

	Units	Minimum	Maximum
Nitrogen (N2) %Mol	%	0	1%
Methane (C1) %Mol	%	84%	100%
Ethane (C2)%Mol	%	0	8%
Propane (C3) %Mol	%	0	3%
Butane (C4) %Mol	%	0	2.0%
Pentanes plus (C5+) %Mol	%	0	0.25%
Carbon Dioxide(CO2)	ppm (vol.)	0	55.0
Gross Heating Value	Btu/Scf	1000	1165
Wobbe Index	Btu/Scf	1350	1450
Hydrogen Sulphide	mg/NCM	0	5
Mercaptan Sulphur	mg/NCM	0	7
Total Sulphur	mg/NCM	0	30
Water	ppm (vol.)	0	0.10
Mercury	ng/SCM	0	50

In the event that the final nominated Discharge Port is able to accept a wider specification of LNG, Buyer shall use reasonable endeavours to accept alternative quality specifications.

### LNG Ship:

The LNG Ship shall be nominated no later than 40 days prior to the first day of the applicable Delivery Window.

Seller may nominate a Substitute LNG Ship no later than thirty (30) days prior to the first day of the Delivery Window subject to ship to shore compatibility and terminal acceptance at the nominated Discharge Port or Alternate Discharge Port, as the case may be.

Seller may nominate a Substitute LNG Ship after thirty (30) days prior to the first day of the Delivery Window subject to ship to shore compatibility and terminal acceptance at the nominated Discharge Port or

Alternate Discharge Port, as the case may be, and subject to Buyer's consent, not to be unreasonably withheld.

The LNG Ship shall have a gross volumetric capacity of no less than 138,000m<sup>3</sup> and no greater than 170,000m<sup>3</sup>.

## Terminology

Terms used in this document shall have the following meanings ascribed to them:

**Assessments** – The individual half month evaluations in the specified location.

**Assessment Periods** – 3rd, 4th, 5th and 6th half-calendar months following the day of assessment.

**Index Determination** - The determination of the Sling indices, which are assessed and published on every Assessment day.

**Participants** – Entities (LNG players) that contribute to the Sling index, and which are active in the physical LNG market.