



LPG Assessment Methodology

Updated Nov 22, 2018

1. Add a description of a way to calculate Arabian Light crude for Calorific Values

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Relevance of Rim Assessment Methodology

The purpose of all price assessments in reports issued by Rim Intelligence is to provide an indication to energy market players as to the levels at which transactions can take place so that trades can be done with high transparency and at reasonable prices. To achieve this purpose, we have set up “General Procedures for Price Assessment” as follows, and “Price Assessment Methodology” for each report. Detailed in the “General Procedures for Price Assessment” and “Price Assessment Methodology” for each report are processes and standards that we deem are necessary to achieve the above purpose. By following these processes and standards in making price assessments, we consider our Assessment Methodology to be appropriate.

Chapter 1: General Procedures for Price Assessment

Article 1: Purpose of price assessment

The purpose of all price assessments in our reports is to provide an indication to energy market players as to the levels at which transactions can take place so that trades can be done with high transparency and at reasonable prices.

Article 2: Conducting price assessment

To achieve the purpose outlined in Article 1, we have set up the following guidelines in our “General Procedures for Price Assessment”, and “Price Assessment Methodology” for each report. We follow these guidelines in making price assessments.

- Trades considered for price assessment
- Assessment window
- Priority in price assessment
- Selection of players providing market information
- Method of information gathering
- Establishment and role of supervisors
- Selection of supervisors
- Maintaining quality of review by supervisors
- Maintaining consistency in price assessment
- Reliability and adequacy of market information
- Making Assessment Methodology available
- Regular reviews of Assessment Methodology
- Amendments to Assessment Methodology
- Changes/Amendments to price assessment
- Quantity
- Reasons for using specific units for quantity (barrel etc.)

Article 3: Trades considered for price assessment

For each price index, our price assessment is based on quantities, delivery period and areas with the most liquidity. Further, details such as the value and quantity on which the assessment is based, market information which is used as a reference, and other platforms such as the Rim Trading Board and specific markets including trades carried out in Exchanges are included in the methodology of each report.

Article 4: Assessment window

For each price index, the time window considered appropriate for our price assessment is that which is deemed to be the most convenient and effective during trading hours in Asia, including Japan.

Article 5: Priority in price assessment

For each price index, among traded prices in transactions that take place between agreed parties or in other markets, bids and offers, the priority as to which price is considered first for assessment is determined and details are given in the methodology of each report.

Article 6: Selection of players providing market information

When selecting players to obtain information from, we take into account the quantity handled and the amount of influence on the market, without any bias towards buyers or sellers. We gather market information from many players including Majors, oil and gas producers, oil companies, traders, dealers and end-users. Each report team determines that there is no bias in the players it obtains information from in terms of area and the type of information they have. Should the player be deemed biased, the reporter and team leader may, after obtaining approval from the president, remove him from the list of players providing market information.

Article 7: Method of information gathering

Our reporters possess suitable quality and skill from a fair and neutral standpoint. Reporters carry out information gathering mainly by telephone but also by email and chat. To ensure the credibility of the player from whom information is gathered, the reporter will call the player's company directly to confirm that the player is indeed working for that company.

Article 8: Establishment and role of supervisor

Two or more supervisors are assigned to each report. Before each report is issued, at least one of the supervisors checks if the price assessment and its basis are in line with the Assessment Methodology and to ensure that consistency is maintained.

Article 9: Selection of supervisors

The supervisor has knowledge and experience in the product and market for which price assessment is conducted. The selection of supervisors requires approval from the board of directors. The supervisor is not involved in price assessment and writing of commentary for the report of which he is in charge.

Article 10: Maintaining quality of review by supervisors

For reports for which the supervisor is not the president, the president conducts regular spot checks to maintain the quality of the supervisor's review. After a spot check, a proof of the spot check will be kept.

Article 11: Maintaining consistency in price assessment

Besides reviews by supervisors, assessment simulation is conducted regularly to maintain consistency among reporters in price assessment.

Article 12: Reliability and adequacy of market information

Each reporter performing price assessment determines whether a trade was done by the parties involved and whether the information was suspicious or unusual by checking with the relevant parties and other multiple parties, with further investigation carried out if necessary. If unusual market information regarding a trade by parties involved or suspicious information is found, additional information gathering will be carried out before making a judgment as to whether or not to remove the information for consideration for price assessment. Major issues are to be reported promptly to the supervisor and the president. Of these, important professional judgments will be recorded in each report team's information gathering memo, assessment process sheet etc. If it is necessary to check whether the information provided is suspicious, we may consider obtaining information from the back office.

For certain markets with low liquidity, market information for price assessment may be obtained from a single source. Even in such a situation, we follow processes detailed in our Assessment Methodology to determine if such market information can be used for price assessment. We do not disregard the information in making price assessment merely because it is obtained from a single source.

Players giving market information are expected to provide all relevant information that meets the conditions for price assessment stated in our Assessment Methodology, which is published on our website.

Article 13: Making our Assessment Methodology available

The Assessment Methodology approved by two or more members of the board of directors is published on our website, whereby external market players involved in trading, players providing market information and our subscribers can access.

Article 14: Regular reviews of Assessment Methodology

Our Assessment Methodology is reviewed at least once a year (during the board of directors' meeting held in October) or when substantial changes have taken place in the market. After each review, we may consider making amendments to our Assessment Methodology if deemed necessary. When reviewing our Assessment Methodology, we may consider views obtained from external market players and our subscribers.

Article 15: Amendments to Assessment Methodology

If amendments to our Assessment Methodology that affect the price assessment process are deemed necessary, discussions are conducted within each report team and amendments are submitted to two or more members of the board of directors for approval. After the amendments are approved by two or more members of the board of directors, a notice of the amendments and the effective date will be placed in our reports in principle one month before, but at least two weeks prior to the effective date.

After the amendments are approved by two or more members of the board of directors, the Assessment Methodology with the amendments reflected has to be approved by two or more members of the board of directors by the effective date.

When making amendments to our Assessment Methodology that affect the price assessment process, we accept inquiries regarding such amendments from external market players and our subscribers. These inquiries are, in principle, published in our reports or on our website, but if the party making the inquiries requests us not to do so, we may not disclose the details for confidentiality reasons.

For amendments to our Assessment Methodology that do not affect the price assessment process, after approval by two or more members of the board of directors, the amendments will be announced in our reports and effected promptly.

Article 16: Changes/Amendments to price assessment

Price assessments in our reports will not be amended after they are published, except for typing and spelling mistakes.

Chapter 2 Price Assessment Methodology for LPG Report

Price Assessment Principle

Purpose of price assessment:

The purpose of price assessment is to reflect the actual market for liquified petroleum gas (LPG) of propane and butane in which standard spot buying and selling take place on the day of publication.

Definition of price:

Even if no transactions take place, the value of a commodity may change. The price reflects the changing values of a commodity. The value of a commodity may change depending on supply/demand, production costs, the situation in other markets, and players' perspectives.

Assessment method:

Price assessment basically takes into account information on deals done, bids/offers and supply/demand situation obtained on the day of publication. Top priority is given to the latest deals done and bid/offer levels within the assessment window. In the absence of deals, bids and offers, buying and selling indications are used as a reference.

Values of commodities are determined by competition among sellers and buyers. Higher bids to be closer to market values than lower bids, and lower offers are considered to be closer to market values than higher offers.

Standard conditions such as cargo volume, loading or delivery period, quality and payment period are taken into account in price assessment.

The price of propane or butane may be assessed based on the price of the other.

Time window:

A month is divided into two half-months:

First half (H1): first 15 days of the month

Second half (H2): all days after the 15th of the month

Quantity unit:

Rim understands metric ton (written as mt) is widely used as standard quantity unit in LPG industry. Nevertheless, gallon is also used as standard price unit in the US trades.

**Refrigerated Cargoes
FOB Middle East Spot Prices**

Rim assesses FOB Middle East spot refrigerated LPG prices on a fixed price basis and a floating price basis. All prices are assessed based on information collected in the course of market research by Rim reporters each business day.

Structure of the FOB Middle East LPG Market

Rim understands that the FOB Middle East LPG market is structured with three groups of business parties: Producers, Traders and Importers. Rim assesses FOB Middle East LPG prices at which a standard spot transaction could take place.

Rim defines a standard FOB Middle East LPG spot market transaction as follows:

Case 1	A producer sells an LPG cargo to a trader on a spot basis.
Case 2	A producer sells an LPG cargo to an importer on a spot basis.
Case 3	A trader sells an LPG cargo to another trader or an importer on a spot basis.
Case 4	An importer sells an LPG cargo to another importer or a trader on a spot basis.

Rim defines the three business parties in the FOB Middle East market as follows:

Producer	A company that produces and exports LPG.
Trader	A company that buys and resells LPG cargoes in the international market.
Importer	A company that buys and sells LPG cargoes in the international market and also sells in the domestic market.

Assessment Window	Rim's assessment window for FOB Middle East spot LPG prices closes at 19:00 Tokyo time on the day of publication.
Price Unit	FOB Middle East spot LPG prices and premiums are in \$/mt.
Floating Price Basis	The premiums or discounts for cargoes to be loaded in the current month are to Saudi Aramco's monthly contract prices (CP). The premiums or discounts for cargoes to be loaded in the next month are to the values Rim expects Saudi Aramco's monthly CP for the month to be at. If the next month's CP settled by the end of the month, the premium or discounts are to Saudi Aramco's fixed CP.
Time Window	If publication is in the first half of the month, assessment is for the current month and next month. If publication is in the second half of the month, assessment is for the next month and the month after next.
Standard Size	FOB Middle East spot LPG prices are for 10,000 to 46,000mt lots, which Rim considers standard. Values for contracts for smaller or larger volumes may also be considered.
Loading Port	FOB Middle East spot LPG prices are for cargoes to be transacted on an FOB basis for loading at main export ports in Middle East countries, such as Saudi Arabia, Kuwait, Abu Dhabi, Qatar and Iran.
Quality Specifications	FOB Middle East spot propane prices are for cargoes with

	<p>propane of which quality is equivalent to SAMAREC A-140 specifications, issued by Saudi Aramco, containing minimum 95% propane and maximum 4% butane, with maximum 0.1% olefin content.</p> <p>FOB Middle East spot butane prices are for cargoes with butane of which quality is equivalent to SAMAREC A-160 specifications, issued by Saudi Aramco, containing maximum 2% propane, maximum 29% isobutane and minimum 68% normal butane, with maximum 0.1% olefin content.</p>
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The Expected CP

Rim assesses values of the expectation of Saudi Aramco's Contract Prices (CP) for the forward months. All values are assessed based on information collected in the course of market research and assessment of Saudi CP Swaps by Rim reporters each business day.

Assessment Window	Rim's assessment window for values of the expected CP closes at 19:00 Tokyo time on the day of publication.
Price Unit	Values of the expected CP are in \$/mt on an FOB Middle East basis.
Time Window	If publication is in the first half of the month, assessment is for the next month, the month after next. If publication is in the second half of the month, assessment is for the next month, the month after next and the month that is 3 months ahead. (However, if the next month CP was settled, assessment is for the month after next, the month that is 3months ahead until the month of publish date changes).
Loading Port	Main export ports in Saudi Arabia.
Quality Specifications	FOB Middle East spot propane prices are for cargoes with propane of which quality is equivalent to SAMAREC A-140 specifications, issued by Saudi Aramco, containing minimum 95% propane and maximum 4% butane, with maximum 0.1% olefin content. FOB Middle East spot butane prices are for cargoes with butane of which quality is equivalent to SAMAREC A-160 specifications, issued by Saudi Aramco, containing maximum 2% propane, maximum 29% isobutane and minimum 68% normal butane, with maximum 0.1% olefin content.

Saudi CP Swaps

Rim assesses values of Saudi LPG CP swaps for propane for the forward months. The assessments are taken into account for Rim's expectations for Saudi Aramco's next month contract prices. All values are assessed based on information collected in the course of market research by Rim reporters each business day.

Structure of the CP Saudi CP Swaps Market

Rim understands that Saudi CP swaps market is structured with four groups of business parties: Financial Institutes, LPG Traders, LPG Importers and LPG producers. Rim assesses values of Saudi CP swaps at which a standard transaction could take place through "over-the-counter" method of trade.

Rim defines the four business parties in the CP swaps market as follows:

Importer	A company that imports LPG and resells into the domestic wholesale market and trades Saudi CP swaps to hedge risks associated with physical purchases of LPG.
Trader	A company that trades LPG cargoes in the international market as its main trading item and trades Saudi CP swaps to hedge risks associated with physical purchases of LPG.
Financial Institute	A company that trades derivative products based on LPG values as one of its trading items.
Producer	A company that produces and exports LPG.

Assessment Window	Rim's assessment window for values of Saudi CP swaps closes at 19:00 Tokyo time on the day of publication.
Price Unit	Values of Saudi CP swaps are in \$/mt on an FOB Middle East basis.
Time Window	Assessment is for the next month, the month after next and the month that is 3 months ahead. (However, if the next month CP was settled, assessment is for the month after next, the month that is 3 months ahead and the month that is 4 months ahead until the month of publish date changes).
Standard Size	Values of Saudi CP swaps are for a contract for 1,000-5,000mt, which Rim considers standard. Values for contracts for smaller or larger volumes may also be considered.

CFR Japan Spot Prices

Rim assesses CFR Japan spot refrigerated LPG prices on a fixed price basis and a floating price basis. All prices are assessed based on information collected in the course of market research by Rim reporters each business day.

Rim indicates the yen figure of CFR Japan spot LPG prices based on the following formula:

Refrigerated cargo price in yen/mt =
 (\$/mt price) x (yen/\$)+ (Add Tax)*

*Changes in tax will be reflected in the formula above. Such changes will be announced in our reports beforehand.

Structure of the CFR Japan LPG Market

Rim understands that the CFR Japan LPG market is structured with four groups of business parties: Producers, Traders, Asian Importers and Japanese importers.

Rim defines a standard CFR Japan LPG spot market transaction as follows:

Case 1	A producer sells an LPG cargo to a Japanese LPG importer on a spot basis.
Case 2	A producer sells an LPG cargo to a trader on a spot basis.
Case 3	A trader sells an LPG cargo to a Japanese LPG importer on a spot basis.
Case 4	An Asian LPG importer sells an LPG cargo to a Japanese LPG importer on a spot basis.
Case 5	A trader or an Asian LPG importer sells an LPG cargo to another trader.

Rim defines the four business parties in the CFR Japan market as follows:

Producer	A company that produces and exports LPG.
Trader	A company that buys and sells LPG cargoes in the international market.
Asian Importer	A company of Japan, South Korea, China or Taiwan that buys and sells LPG cargoes in the international market and also sells in the domestic market.
Japanese Importer	A company of Japan that buys and sells LPG cargoes in the international market and sells in the domestic market.

Assessment Window	Rim's assessment window for CFR Japan spot LPG prices closes at 19:00 Tokyo time on the day of publication.
Price Unit	CFR Japan spot LPG prices and premiums are in \$/mt.
Floating Price Basis	The premiums or discounts for cargoes to be delivered in the next month are to the values Rim expects Saudi Aramco's monthly contract prices (CP) for the month to be at. If the next month's CP settled by the end of the month, the premium or discounts are to Saudi Aramco's fixed CP.
Time Window	If publication is in the first half of the month, assessment is for the first half and second half of the next month and the first half of the month after next. If publication is in the second half of the month, assessment is for the second half of the next month and the first half and

	<p>second half of the month after next.</p> <p>*CFR Japan Naphtha prices are for the open-spec naphtha contracts for delivery to Japan (published in Asia Products Reports of Rim Intelligence). If publication is in the first half of the month, assessment is for the second half of the next month. If publication is in the second half of the month, assessment is for the first half of the month after next.</p>
Standard Size	CFR Japan spot LPG prices are for 20,000 to 46,000mt lots, which Rim considers standard. Values for contracts for smaller or larger volumes may also be considered.
Delivery Port	CFR Japan spot LPG prices are for cargoes to be transacted on a CFR basis for delivery to primary import terminals in Japan.
Quality Specifications	<p>CFR Japan spot propane prices are for cargoes with propane of which quality is equivalent to SAMAREC A-140 specifications, issued by Saudi Aramco, containing minimum 95% propane and maximum 4% butane, with maximum 0.1% olefin content.</p> <p>CFR Japan spot butane prices are for cargoes with butane of which quality is equivalent to SAMAREC A-160 specifications, issued by Saudi Aramco, containing maximum 2% propane, maximum 29% isobutane and minimum 68% normal butane, with maximum 0.1% olefin content.</p>

Japan Index

This is calculated based on the average of the first two prices of Rim's CFR Japan prices.

If publication is in the first half of the month, assessment is the average for the first half and second half of the next month.

If publication is in the second half of the month, assessment is the average for the second half of the next month and the first half month of the month after next.

CFR China Spot Prices

Rim assesses CFR China spot refrigerated LPG prices on a fixed price basis and a floating price basis. All prices are assessed based on information collected in the course of market research by Rim reporters each business day.

Rim indicates the Yuan figure of CFR China spot LPG prices based on the following formula:

Refrigerated cargo price in Yuan/mt =
 $[(\$/\text{mt price}) + (\text{Import tax}) + (\text{Value Add Tax})] * \text{x (Yuan/\$)}$

*Changes in taxes will be reflected in the formula above. Such changes will be announced in our reports beforehand.

Structure of the CFR China LPG Market

Rim understands that the CFR China refrigerated LPG market is structured with four groups of business parties: Producers, Traders, Asian Importers and Chinese importers.

Rim defines a standard CFR China LPG spot market transaction as follows:

Case 1	A producer sells an LPG cargo to a Chinese LPG importer on a spot basis.
Case 2	A producer sells an LPG cargo to a trader on a spot basis.
Case 3	A trader sells an LPG cargo to a Chinese LPG importer on a spot basis.
Case 4	An Asian LPG importer sells an LPG cargo to a Chinese LPG importer on a spot basis.
Case 5	A trader or an Asian LPG importer sells an LPG cargo to another trader

Rim defines the four business parties in the CFR China LPG market as follows:

Producer	A company that produces and exports LPG.
Trader	A company that buys and sells LPG cargoes in the international market.
Asian Importer	A company of Japan, South Korea, China or Taiwan that buys and sells LPG cargoes in the international market and also sells in the domestic market.
Chinese Importer	A company of China that buys and sells LPG cargoes in the international market and also sells in the domestic market.

Assessment Window	Rim's assessment window for CFR China spot refrigerated LPG cargo prices closes at 19:00 Tokyo time on the day of publication.
Price Unit	CFR China spot refrigerated LPG cargo prices and premiums are in \$/mt.
Floating Price Basis	The premiums or discounts for cargoes to be delivered in the next month are to the values Rim expects Saudi Aramco's monthly contract prices (CP) for the month to be at. If the next month's CP settled by the end of the month, the premium or discounts are to Saudi Aramco's fixed CP.
Time Window	If publication is in the first half of the month, assessment is for the first half and second half of the next month.

	If publication is in the second half of the month, assessment is for the second half of the next month and the first half of the month after next.
Standard Size	CFR China spot refrigerated LPG cargo prices are for 20,000 to 46,000mt lots, which Rim considers standard. Values for contracts for smaller or larger volumes may also be considered.
Delivery Port	CFR China spot refrigerated LPG cargo prices are for cargoes to be transacted on a CFR basis for delivery to primary import terminals in China.
Quality Specifications	CFR China spot refrigerated propane prices are for cargoes with propane of which quality is equivalent to SAMAREC A-140 specifications, issued by Saudi Aramco, containing minimum 95% propane and maximum 4% butane, with maximum 0.1% olefin content. CFR China spot refrigerated butane prices are for cargoes with butane of which quality is equivalent to SAMAREC A-160 specifications, issued by Saudi Aramco, containing maximum 2% propane, maximum 29% isobutane and minimum 68% normal butane, with maximum 0.1% olefin content.

China Index

This is calculated based on the average of the two prices of Rim's CFR China prices.

If publication is in the first half of the month, assessment is the average for the first half and second half of the next month.

If publication is in the second half of the month, assessment is the average for the second half of the next month and the first half the month after next.

Rim Asia Index

The Rim Asia Index is calculated by taking the average of 4 quotations.

4 quotations:

If publication is in the first half of the month, assessment is for the first half and the second half of the next month in both CFR Japan and CFR China prices.

If publication is in the second half of the month, assessment is for the second half of the next month and the first half of the month after next in both CFR Japan and CFR China prices.

CFR Far East Propane Swaps

Rim assesses values of CFR Far East propane swaps for the forward months. All values are assessed based on information collected in the course of market research by Rim reporters each business day.

Structure of CFR Far East Propane Swaps Market

Rim understands that the CFR Far East propane swaps market is structured with groups of business parties: financial institutes, traders, importers and producers. Rim assesses values of CFR Far East propane swaps at which a standard transaction could take place through “over-the-counter” method of trade.

Rim defines the four business parties in the CFR Far East propane swaps market as follows:

Importer	A company that imports LPG and resells into the domestic wholesale market and trades CFR Far East propane swaps to hedge risks associated with physical purchases of LPG.
Trader	A company that trades LPG cargoes in the international market as its main trading item and trades CFR Far East propane swaps to hedge risks associated with physical purchases of LPG.
Financial Institute	A company that trades derivative products based on LPG values as one of its trading items.
Producer	A company that produces and exports LPG.

Assessment Window	Rim's assessment window for values of CFR Far East propane swaps closes at 19:00 Tokyo time on the day of publication.
Price Unit	Values of CFR Far East propane swaps are in \$/mt on a CFR Far East basis.
Time Window	If publication is in the first half of the month, assessment is for the current month and next month. If publication is in the second half of the month, assessment is for the next month and the month after next.
Standard Size	Values of CFR Far East propane swaps are for a contract for 1,000-5,000mt, which Rim considers standard. Values for contracts for smaller or larger volumes may also be considered.

Expected CIF Japan Values

Rim assesses values of the expectation of Japan import prices for general uses on a CIF basis. All assessments are based on calculation by formula including yen/dollar exchange rates and the expected CP or the settled CP and information collected in the course of market research conducted by Rim reporters each business day.

Assessment Window	Rim's assessment window for Expected CIF Japan prices closes at 19:00 Tokyo time on the day of publication.
Time Window	<p>If publication is in the first half of the month, assessment is for the current month, the previous month, the two months before* and the three months before*.</p> <p>If publication is in the second half of the month, assessment is for the next month, the current month, the previous month* and the two months before*.</p> <p>*If values are announced, the assessment is no longer expected values and is noted definite values.</p>
Price Unit	Prices are in Yen/mt. Rim understands that Yen/mt is widely used as standard price unit in LPG industry in Japan.

The calculation of the expected CIF values is based on the following formula. Propane and butane were individually calculated.

$(\text{Weighed Average of the CP}^* + \text{Freight costs}^{**}) \times \text{yen/dollar exchange rates}$

* Weighed Average of the CP differs if assessment is for:

The next month: $(\text{The expected CP for next month} \times 1/3) + (\text{The CP for the current month} \times 2/3)$

The current month: $(\text{The CP for current month} \times 1/3) + (\text{The CP for the previous month} \times 2/3)$

The previous month: $(\text{The CP for previous month} \times 1/3) + (\text{The CP for the two months before} \times 2/3)$

**Freight costs consist of following formula:

$[\text{Time-charter costs} \times (\text{Term import costs} / \text{Whole import costs})] + [\text{Spot freight costs} \times (\text{Spot import costs} / \text{Whole import costs})]$

FOB US Gulf Coast Spot Prices

Rim assesses FOB US Gulf Coast (USGC) spot refrigerated LPG prices for propane on a fixed price basis and a floating price basis. All prices are assessed based on information collected in the course of market research by Rim reporters each business day.

Structure of the FOB USGC LPG Market

Rim understands that the FOB USGC LPG market is structured with three groups of business parties: Suppliers, Traders and Importers. Rim assesses FOB USGC LPG prices at which a standard spot transaction could take place.

Rim defines a standard FOB USGC LPG spot market transaction as follows:

Case 1	A supplier sells an LPG cargo to a trader on a spot basis.
Case 2	A supplier sells an LPG cargo to an importer on a spot basis.
Case 3	A trader sells an LPG cargo to another trader or an importer on a spot basis.
Case 4	An importer sells an LPG cargo to another importer or a trader on a spot basis.

Rim defines the three business parties in the FOB USGC market as follows:

Supplier	A company that supplies and exports LPG.
Trader	A company that buys and sells LPG cargoes in the international market.
Importer	A company that buys and sells LPG cargoes in the international market and also sells in the domestic market.

Assessment Window	Rim's assessment window for FOB USGC spot LPG prices closes at 19:00 Tokyo time on the day of publication.
Price Unit	FOB USGC spot LPG prices and premiums are in \$/mt and cts/gallon. Rim understands that cts/gallon is widely used as standard price unit in LPG industry in the United States.
Floating Price Basis	If publication is in the first half of the month, the premiums or discounts for cargoes to be loaded in the current month are to Mont Belvieu quotations of the current month. The premiums or discounts for cargoes to be loaded in the next month are to Mont Belvieu quotations of the next month. If publication is in the second half of the month, the premiums or discounts for cargoes to be loaded in the next month are to Mont Belvieu quotations of the next month. The premiums or discounts for cargoes to be loaded in the month after next are to Mont Belvieu quotations of the month after next.
Time Window	If publication is in the first half of the month, assessment is for the current month and next month. If publication is in the second half of the month, assessment is for the next month and the month after next.
Standard Size	FOB USGC spot LPG prices are for 10,000 to 46,000mt lots, which Rim considers standard. Values for contracts for smaller or larger volumes may also be considered.
Loading Port	FOB USGC spot LPG prices are for cargoes to be transacted on an FOB basis for loading at main export ports in the US

	Gulf Coast such as Houston.
Quality Specifications	FOB USGC spot prices are for cargoes of which quality is equivalent to Enterprise or Targa specifications.

Mont Belvieu Swaps

Rim assesses values of Mont Belvieu swaps for propane for the forward months. All values are assessed based on information collected in the course of market research by Rim reporters each business day.

Structure of Mont Belvieu Swaps Market

Rim understands that the Mont Belvieu swaps market is structured with groups of business parties: financial institutes, traders, importers and suppliers. Rim assesses values of Mont Belvieu swaps at which a standard transaction could take place through “over-the-counter” method of trade.

Rim defines the four business parties in Mont Belvieu swaps market as follows:

Importer	A company that imports LPG and resells into the domestic wholesale market and trades Mont Belvieu swaps to hedge risks associated with physical purchases of LPG.
Trader	A company that trades LPG cargoes in the international market as its main trading item and trades Mont Belvieu swaps to hedge risks associated with physical purchases of LPG.
Financial Institute	A company that trades derivative products based on LPG values as one of its trading items.
Supplier	A company that supplies LPG.

Assessment Window	Rim’s assessment window for values of Mont Belvieu swaps closes at 19:00 Tokyo time on the day of publication.
Price Unit	Values of Mont Belvieu swaps are in \$/mt and in cts/gallon on a FOB US Gulf Coast basis. Rim understands that cts/gallon is widely used as standard price unit in LPG industry in the United States.
Time Window	If publication is in the first half of the month, assessment is for the current month, the next month and the month after next. If publication is in the second half of the month, assessment is for the current month, the next month, the month after next and the month that is 3 months ahead.
Standard Size	Values of Mont Belvieu swaps are for a contract for 42,000 gallon, which Rim considers standard. Values for contracts for smaller or larger volumes may also be considered.

VLGC Freight Rates

Rim assesses Very Large Gas Carrier (VLGC) freight rates for refrigerated cargoes for the following routes, based on one-port loading and one-port discharge

The price of a-h may be assessed based on the price of other from a-h:

- a. Ras Tanura-Far East
- b. Algeria-Far East
- c. Northwest Europe-Far East
- d. Yanbu-Mediterranean
- e. Algeria-Northwest Europe
- f. Algeria-US Gulf Coast
- g. US Gulf Coast-Far East
- h. US Gulf Coast-Northwest Europe

All values are assessed based on information collected in the course of market research by Rim reporters each business day.

Standard Size	Standard vessel size used in the assessment is 44,000 to 46,000mt. Values for contracts for smaller or larger volumes may also be considered.
Assessment Window	Closes at 19:00 Tokyo time on the day of publication
Price Assessment	VLGC Freight prices are assessed on a fixed price basis.
Price Unit	Prices are in \$/mt.
Time Window	10 to 60 days ahead of the publication day

Term/Spot Combined Freight Rates

This assessment for a standard VLGC vessel for the Middle East -Japan route, based on one-port loading and one-port discharge. It takes into account both (1) time-chartered vessels including the companies' own ships, and (2) spot vessels in an appropriate weightage. The number of voyage days for (1) includes voyage days from Ras Tanura to Japan, loading/discharge time, time for taking bunkers and sea margin. Bunker and port costs are also considered for (1).

Standard Size	Standard vessel size used in the assessment is 44,000 to 46,000mt. Values for contracts for smaller or larger volumes may also be considered.
Assessment Window	Closes at 19:00 Tokyo time on the day of publication
Price Assessment	VLGC Freight prices are assessed on a fixed price basis.
Price Unit	Prices are in \$/mt.

Pressurized Cargoes

FOB South China Spot Prices

Assessment Window	Rim's assessment window for FOB South China spot LPG prices closes at 19:00 Tokyo time on the day of publication.
Price Assessment	FOB South China cargoes are assessed for mixed propane and butane on a fixed price basis. The ratio of propane and butane is 50:50.
Price Unit	Prices are in \$/mt.
Time Window	If publication is in the first half of the month, assessment is for the second half of the current months and the first half of the next month. If publication is in the second half of the month, assessment is for the first half and second half of the next month.
Standard Size	Standard cargo size used in the assessment is 1,000-2,500mt. Values for contracts for smaller or larger volumes may also be considered.
Loading Port	FOB South China prices are based on loading from ports in South China.
Quality Specification	As per Saudi Aramco's standard specification for propane and butane.

FOB Southeast Asia Spot Prices

Assessment Window	Rim's assessment window for FOB Southeast Asia spot LPG prices closes at 19:00 Tokyo time on the day of publication.
Price Assessment	FOB Southeast Asia cargoes are assessed for mixed propane and butane on a fixed price basis and as a premium/discount to the CP. The ratio of propane and butane is 30:70.
Price Unit	Prices and premiums/discounts are in \$/mt.
Floating Price Basis	If publication is in the first half of the month, the premiums or discounts for cargoes to be loaded in the current month are to Saudi Aramco's monthly contract prices (CP). The premiums or discounts for cargoes to be loaded in the next month are to the values Rim expects Saudi Aramco's monthly CP for the month to be at. If publication is in the second half of the month, the premiums or discounts for cargoes to be loaded in the next month are to the values Rim expects Saudi Aramco's monthly CP for the month to be at. If the next month's CP settled by the end of the month, the premium or discounts are to Saudi Aramco's fixed CP.
Time Window	If publication is in the first half of the month, assessment is for the second half of the current months and the first half of the next month. If publication is in the second half of the month, assessment is for the first half and second half of the next month.
Standard Size	Standard cargo size used in the assessment is 1,000-2,500mt. Values for contracts for smaller or larger volumes may also be considered.
Loading Port	FOB Southeast Asia prices are based on loading from ports in Southeast Asia, including Singapore, Malaysia and Thailand.
Quality Specification	As per Saudi Aramco's standard specification for propane and butane.

CFR Vietnam Spot Prices

Assessment Window	Rim's assessment window for CFR Vietnam spot LPG prices closes at 19:00 Tokyo time on the day of publication.
Price Assessment	CFR Vietnam cargoes are assessed for mixed propane and butane on a fixed price basis and as a premium/discount to the CP. The ratio of propane and butane is 30:70.
Price Unit	Prices and premiums/discounts are in \$/mt.
Floating Price Basis	If publication is in the first half of the month, the premiums or discounts for cargoes to be loaded in the current month are to Saudi Aramco's monthly contract prices (CP). The premiums or discounts for cargoes to be loaded in the next month are to the values Rim expects Saudi Aramco's monthly CP for the month to be at. If publication is in the second half of the month, the premiums or discounts for cargoes to be loaded in the next month are to the values Rim expects Saudi Aramco's monthly CP for the month to be at. If the next month's CP settled by the end of the month, the premium or discounts are to Saudi Aramco's fixed CP.
Time Window	If publication is in the first half of the month, assessment is for the second half of the current months and the first half of the next month. If publication is in the second half of the month, assessment is for the first half and second half of the next month.
Standard Size	Standard cargo size used in the assessment is 1,000-2,500mt Values for contracts for smaller or larger volumes may also be considered.
Delivery Port	CFR Vietnam prices are based on delivery to ports in North and South Vietnam, with Haiphong and Ho Chi Minh City as the main port of discharge.
Quality Specification	As per Saudi Aramco's standard specification for propane and butane.

Pressurized Freight Rates
Singapore-Ho Chi Minh

Pressurized freight assessment is based on a standard vessel size of 1,000-2,500mt for loading at one port in Singapore and discharging at one port in South Vietnam, with Ho Chi Minh City considered as the main port of discharge. All values are assessed based on information collected in the course of market research by Rim reporters each business day. Values for contracts for smaller or larger volumes may also be considered.

Assessment Window	Closes at 19:00 Tokyo time on the day of publication
Price Assessment	Prices are assessed on a fixed price basis.
Price Unit	Prices are in \$/mt
Time Window	10 to 45 days ahead of the publication day

South China-Haiphong

Pressurized freight assessment for this route is based on a standard vessel size of 1,000-2,500mt for loading at one port in South China and discharging at one port in Haiphong considered as the main port of discharge. All values are assessed based on information collected in the course of market research by Rim reporters each business day. Values for contracts for smaller or larger volumes may also be considered.

Assessment Window	Closes at 19:00 Tokyo time on the day of publication
Price Assessment	Prices are assessed on a fixed price basis.
Price Unit	Prices are in \$/mt
Time Window	10 to 45 days ahead of the publication day

China Domestic Wholesale Prices

Rim assesses wholesale spot LPG prices for imported and refined material in seven markets in South China, four markets in East China, three markets in North China and three markets in Northeast China. All assessments are based on information collected in the course of market research conducted by Rim reporters each business day. Refineries' posted prices for refined material are also used as a reference for the price assessment.

Assessment Area for China Domestic Wholesale Prices

Each four Area are composed by the markets as follows.

South China: East Guangdong, Shenzhen, Guangzhou, Zhuhai, Western Guangdong, Guangxi, and Hainan

East China: Jiangsu, Shanghai, Zhejiang and Fujian

North China: Northeast China, Southeast China and Shandong

Northeast China (different from Northeast China in North China market): Dalian, West Liaoning and Heilongjiang

Structure of the China Domestic Wholesale LPG Market

Rim understands that the China domestic wholesale LPG markets are structured with three groups of business parties: Importers, Traders, and Endusers/Retailers. Rim assesses China domestic wholesale LPG prices at which a standard spot transaction could take place.

Rim defines a standard China domestic wholesale LPG spot market transaction as follows:

Case 1	An importer sells an LPG cargo to a trader who is buying on behalf of an enduser/retailer on a spot basis.
Case 2	An importer sells an LPG cargo directly to an enduser/retailer on a spot basis.
Case 3	A trader sells an LPG cargo on behalf of an importer to an enduser/retailer on a spot basis.

Rim defines the three business parties in the China domestic wholesale LPG market as follows:

Importer	A company that imports LPG and resells into the domestic wholesale market.
Trader	A company that sells LPG on behalf of an importer and buys LPG on behalf of an enduser/retailer.
Enduser	A company that buys a large lot of LPG to consume in its business operation. Consumers in the household sector are not included in Rim's definition of an enduser.
Retailer	A company that buys a large lot of LPG and resells to consumers in the household and other sectors.

Assessment Window	Rim's assessment window for China Domestic Wholesale LPG Prices closes at 19:00 Tokyo time on the day of publication.
Price assessment	Prices are assessed for mixed propane and butane on a fixed price basis.
Price Unit	China Domestic Wholesale LPG prices are in Yuan/mt on an ex-terminal basis. Rim understands that Yuan/mt is widely used as standard price unit in LPG industry in China.

Time Window	China Domestic Wholesale LPG prices are for cargoes to be loaded within one week from the day of publication.
Standard Size	China Domestic Wholesale LPG prices are for transactions for more than 50mt, which Rim considers standard. Values for contracts for smaller or larger volumes may also be considered.
Loading Port	China Domestic Wholesale LPG prices in South China are for cargoes to be transacted on an ex-terminal basis for loading at refineries, import terminals and secondary terminals in the East Guangdong, Shenzhen, Guangzhou, Zhuhai, Western Guangdong, Guangxi, and Hainan markets. China Domestic Wholesale LPG prices in East China are for cargoes to be transacted on an ex-terminal basis for loading at refineries, import terminals and secondary terminals in the Jiangsu, Shanghai, Zhejiang, and Fujian markets. China Domestic Wholesale LPG prices in North China are for cargoes to be transacted on an ex-terminal basis for loading at refineries in the Northeast China, Southeast China and Shandong markets. China Domestic Wholesale LPG prices in Northeast China are for cargoes to be transacted on an ex-terminal basis for loading at refineries in the Dalian, West Liaoning and Heilongjiang markets.
Quality Specifications	China Domestic Wholesale LPG prices are for cargoes with propane of which quality is equivalent to the SAMAREC A-140 specifications, containing minimum 95% propane and maximum 4% butane, with maximum 0.1% olefin content, and butane of which quality is equivalent to the SAMAREC A-160 specifications, containing maximum 2% propane, maximum 29% isobutane and minimum 68% normal butane, with maximum 0.1% olefin content. The SAMAREC specifications are issued by Saudi Aramco.

China Domestic Wholesale Market: South China Index & East China Index

The purpose of the South China Index and East China index is to provide a clear indication of price movements in the South China and East China domestic wholesale markets, respectively.

South China Index

The South China Index is determined using a weighted average of Rim's assessment of the following regions based on consumption volume by household end-users: East Guangdong, Shenzhen, Guangzhou, Zhuhai, Western Guangdong, Guangxi, Hainan.

East China Index

The East China Index is determined using a weighted average of Rim's assessment of the following regions based on consumption volume by household end-users: Jiangsu, Shanghai, Zhejiang, Fujian.

Calorific Values

Rim indicates the calorific LPG equivalent values of Arabian Light crude based (AL)* on the following formula.

To compare AL and propane : $AL\ price \times 47.39 / 5.78$

To compare AL and butane : $AL\ price \times 46.74 / 5.78$

Coefficient of converting calorific value of AL to propane: 47.39

Coefficient of converting calorific value of AL to butane: 46.74

Coefficient of converting AL unit (barrel) to LPG (mt): 5.78

Rim also indicates comparison of the calorific LPG equivalent values of Arabian Light crude and the current FOB Middle East spot LPG prices** in percent figures.

*Assessed based on a sum of the latest posts of premium/discount by Saudi Aramco and Dubai/Oman for the front month in Physical Crude/Condensate (Middle East) which Rim assesses in Crude/Condensate report each business day.

**The middle price in the FOB Middle East market which Rim assesses each business day. Prices are for cargoes loaded in the current month during current first-half month or in the next month of the current month during current second-half month.

Japan Domestic Spot Prices Ex-Terminal Barge

Principal of Price Assessment

Delivery Form, Loading Point and Assessed Areas

All Japan domestic spot LPG prices for ex-terminal barge are evaluated on the cargoes to be traded at primary storages on an ex-pipe basis (the same as ex-refinery, ex-tank storage). Prices in deals, bids and offers on a delivered basis are to be translated into estimated values referring to actual transportation costs that the prices could be if the deals, bids and offers were on an ex-pipe basis. Loading points in Rim's definitions are the Keihin and Western Japan markets. In Rim's commentary, the area along the Tokyo Bay is called Keihin and also includes Chiba. The Kashima terminal is not located in the Keihin market. However, prices for cargoes to be loaded at the Kashima terminal are customarily regarded equivalent to those to be loaded in the Keihin even though Kashima is not loaded in the Keihin in actuality. Meanwhile, the Western Japan includes Ise Bay (Chukyo), Osaka Bay (Hanshin), Setouchi, and Oita.

Standard Size

Japan domestic spot barge LPG prices are for cargoes larger than 500 mt, which Rim considers standard. Values for contracts for smaller volumes may also be considered.

Price Unit

Japan domestic spot barge LPG prices are in yen/mt on an ex-terminal basis. Rim understands that Yen/mt is widely used as standard price unit in LPG industry in Japan.

Time Window

Japan domestic spot barge LPG prices in the publications released during the period from the first day to the fifth business day from the last day of the month are for cargoes to be loaded in the current month. In the publication released during the period from the fourth business day from the last day of the month to the last day of the month, the prices are for the cargoes to be loaded in the next month.

Assessment Window

Rim's assessment window for Japan domestic spot barge LPG prices closes at 19:00 Tokyo time on the day of publication.

Standard Transaction for Rim Assessment

Spot transactions confirmed by either ends are taken into account. Term contract transactions are not taken into account. Package transactions, location and time swap transactions, barter transactions are referred to as an indicator.

Prices in deals, bids and offers on a delivered basis are to be translated into estimated values that the prices could be if the deals, bids and offers were on an ex-pipe basis. Sales transactions directly to end-users are occasionally completed out of the range in which a standard spot transaction could take place. Therefore, prices for the above transactions are referred to as an indicator.

Quality:

Rim's assessment is for imported liquefied petroleum gas meeting the quality guideline set by the Japan LPG Association. Cargoes to be loaded at refineries might be taken into account reference.

Ex-Terminal Truck

Principal of Price Assessment

Delivery Form, Loading Point and Assessed Areas

All Japan domestic spot LPG prices for ex-terminal truck are for spot cargoes to be traded by lorries at refineries or primary storages on an ex-pipe basis. Prices in deals, bids and offers on a delivered basis are to be translated into estimated values referring transportation costs that the prices could be if the deals, bids and offers were on an ex-pipe basis. Loading points in Rim's definitions are Chiba and Kawasaki for Keihin and Osaka Sakai for Hanshin. Kashima prices may be used as a reference for Keihin while Chukyo, Setouchi, northern Kyushu may be used as a reference for Hanshin.

Standard Size

Japan domestic spot truck LPG prices are for cargoes larger than 100 mt, which Rim considers standard. Values for contracts for smaller volumes may also be considered.

Price Unit

Japan domestic spot truck LPG prices are in Yen/mt on an ex-terminal basis. Rim understands that Yen/mt is widely used as standard price unit in LPG industry in Japan.

Time Window

Japan domestic spot truck LPG prices in the publications released during the period from the first day to the fifth business day from the last day of the month are for cargoes to be loaded in the current month. In the publication released during the period from the fourth business day from the last day of the month to the last day of a month, the prices are for the cargoes to be loaded in the next month.

Assessment Window

Rim's assessment window for Japan domestic spot truck LPG prices closes at 19:00 Tokyo time on the day of publication.

Standard Transaction for Rim Assessment

Spot transactions confirmed by either ends are taken into account. Term contract transactions are not taken into account. Package transactions, location and time swap transactions, barter transactions are referred to as an indicator.

Prices in deals, bids and offers on a delivered basis are to be translated into estimated values that the prices could be if the deals, bids and offers were on an ex-pipe basis. Sales transactions directly to end-users are occasionally completed out of the range in which a standard spot transaction could take place. Therefore, prices for the above transactions are referred to as an indicator.

Prices completed through tenders issued by government institutions are referred to as an indicator.

Package transactions, location and time swap transactions, barter transactions are referred to as an indicator.

Quality:

Rim's assessment is for imported liquefied petroleum gas meeting the quality guideline set by the Japan LPG Association. Cargoes to be loaded at refineries might be taken into account reference.