METHODOLOGY AND SPECIFICATIONS GUIDE

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ARGUS GAS FREIGHT

Contents:

LAST UPDATED: APRIL 2026

The most up-to-date Argus Gas Freight methodology is available on www.argusmedia.com

Methodology overview

Methodology rationale

Argus strives to construct methodologies that reflect the way the market trades. Argus aims to produce price assessments which are reliable and representative indicators of commodity market values and are free from distortion. As a result, the specific currencies, volume units, locations and other particulars of an assessment are determined by industry conventions.

In the freight markets, Argus publishes physical market prices in the open market as laid out in the specifications and methodology guide. Argus uses the trading period deemed by Argus to be most appropriate, in consultation with industry, to capture market liquidity. In order to be included in the assessment process, deals must meet the minimum volume, delivery, timing and specification requirements in our methodology. In illiquid markets, and in other cases where deemed appropriate, Argus assesses the range within which product could have traded by applying a strict process outlined later in this methodology.

Survey process

Argus price assessments are informed by information received from a wide cross section of market participants, including producers, consumers and intermediaries. Argus reporters engage with the industry by proactively polling participants for market data. Argus will contact and accept market data from all credible market sources including front and back office of market participants and brokers. Argus will also receive market data from electronic trading platforms and directly from the back offices of market participants. Argus will accept market data by telephone, instant messenger, email or other means.

Argus encourages all sources of market data to submit all market data to which they are a party that falls within the Argus stated methodological criteria for the relevant assessment. Argus encourages all sources of market data to submit transaction data from back office functions.

Throughout all markets, Argus is constantly seeking to increase the number of companies willing to provide market data. Reporters are mentored and held accountable for expanding their pool of contacts. The number of entities providing market data can vary significantly from day to day based on market conditions.

For certain price assessments identified by local management, if more than 50pc of the market data involved in arriving at a price assessment is sourced from a single party the supervising editor will engage in an analysis of the market data with the primary reporter to ensure that the quality and integrity of the assessment has not been affected.

Market data usage

In each market, Argus uses the methodological approach deemed to be the most reliable and representative for that market. Argus will utilise various types of market data in its methodologies, to include:

- Transactions
- Bids and offers
- Other market information, to include spread values between grades, locations, timings, and many other data.

In many markets, the relevant methodology will assign a relatively higher importance to transactions over bids and offers, and a relatively higher importance to bids and offers over other market information. Certain markets however will exist for which such a hierarchy would produce unreliable and non-representative price assessments, and so the methodology must assign a different relative importance in order to ensure the quality and integrity of the price assessment. And even in markets for which the hierarchy normally applies, certain market situations will at times emerge for which the strict hierarchy would produce non-representative prices, requiring Argus to adapt in order to publish representative prices.

Verification of transaction data

Reporters carefully analyse all data submitted to the price assessment process. These data include transactions, bids, offers, volumes, counterparties, specifications and any other information that contributes materially to the determination of price. This high level of care described applies regardless of the methodology employed. Specific to transactions, bids, and offers, reporters seek to verify the price, the volume, the specifications, location basis, and counterparty. In some transactional average methodologies, reporters also examine the full array of transactions to match counterparties and arrive at a list of unique transactions. In some transactional average methodologies, full details of the transactions verified are published electronically and are accessible by subscribers. The deals are also published in the daily report.

Several tests are applied by reporters in all markets to transactional data to determine if it should be subjected to further scrutiny. If a transaction has been identified as failing such a test, it will receive further scrutiny. For assessments used to settle derivatives and for many other assessments, Argus has established internal procedures that involve escalation of inquiry within the source's company and escalating review within Argus management. Should this process determine that a transaction should be excluded from the price assessment process, the supervising editor will initiate approval and, if necessary, documentation procedures.

Primary tests applied by reporters

- Transactions not transacted at arm's length, including deals between related parties or affiliates.
- Transaction prices that deviate significantly from the mean of all transactions submitted for that day.
- Transaction prices that fall outside of the generally observed lows and highs that operated throughout the trading day.
- Transactions that are suspected to be a leg of another transaction or in some way contingent on an unknown transaction.
- Single deal volumes that significantly exceed the typical transaction volume for that market.
- Transaction details that are identified by other market participants as being for any reason potentially anomalous and perceived by Argus to be as such.

- Transaction details that are reported by one counterparty differently than the other counterparty.
- Any transaction details that appear to the reporter to be illogical or to stray from the norms of trading behaviour. This could include but is not limited to divergent specifications, unusual delivery location and counterparties not typically seen.
- Transactions that involve the same counterparties, the same price and delivery dates are checked to see that they are separate deals and not one deal duplicated in Argus records.

Secondary tests applied by editors for transactions identified for further scrutiny

Transaction tests

- The impact of linkage of the deal to possible other transactions such as contingent legs, exchanges, options, swaps, or other derivative instruments. This will include a review of transactions in markets that the reporter may not be covering.
- The nature of disagreement between counterparties on transactional details.
- The possibility that a deal is directly linked to an offsetting transaction that is not publicly known, for example a "wash trade" which has the purpose of influencing the published price.
- The impact of non-market factors on price or volume, including distressed delivery, credit issues, scheduling issues, demurrage, or containment.

Source tests

- The credibility of the explanation provided for the outlying nature of the transaction.
- The track record of the source. Sources will be deemed more credible if they
  - Regularly provide transaction data with few errors.
  - Provide data by Argus' established deadline.
  - Quickly respond to queries from Argus reporters.
  - Have staff designated to respond to such queries.
- How close the information receipt is to the deadline for information, and the impact of that proximity on the validation process.

Assessment guidelines

When insufficient, inadequate, or no transaction information exists, or when Argus concludes that a transaction based methodology will not produce representative prices, Argus reporters will make an assessment of market value by applying intelligent judgment based on a broad array of factual market information. Reporters must use a high degree of care in gathering and validating all market data used in determining price assessments, a degree of care equal to that applying to gathering and validating transactions. The information used to form an assessment could include deals done, bids, offers, tenders, spread trades, exchange trades, fundamental supply and demand information and other inputs.

The assessment process employing judgment is rigorous, replicable, and uses widely accepted valuation metrics. These valuation metrics mirror the process used by physical commodity traders to internally assess value prior to entering the market with a bid or offer. Applying these valuation metrics along with sound judgment significantly narrows the band within which a commodity can be assessed, and greatly increases the accuracy and consistency of the price series. The application of judgment is conducted jointly with the supervising editor, in order to be sure that guidelines below are being followed. Valuation metrics include the following:

Relative value transactions

Frequently transactions occur which instead of being an outright purchase or sale of a single commodity, are instead exchanges of commodities. Such transactions allow reporters to value less liquid markets against more liquid ones and establish a strong basis for the exercise of judgment.

- Exchange one commodity for a different commodity in the same market at a negotiated value.
- Exchange delivery dates for the same commodity at a negotiated value.
- Exchange a commodity in one location for the same commodity at another location at a negotiated value.

Bids and offers

If a sufficient number of bids and offers populate the market, then in most cases the highest bid and the lowest offer can be assumed to define the boundaries between which a deal could be transacted.

Comparative metrics

The relative values between compared commodities are readily discussed in the market and can be discovered through dialogue with market participants. These discussions are the precursor to negotiation and conclusion of transactions.

- Comparison to the same commodity in another market centre.
- Comparison to a more actively traded but slightly different specification commodity in the same market centre.
- Comparison to the same commodity traded for a different delivery timing.
- Comparison to the commodity's primary feedstock or primary derived product(s).
- Comparison to trade in the same commodity but in a different modality (as in barge versus oceangoing vessel) or in a different total volume (as in full cargo load versus partial cargo load).

Volume minimums and transaction data thresholds

Argus typically does not establish thresholds strictly on the basis of a count of transactions, as this could lead to unreliable and non-representative assessments and because of the varying transportation infrastructure found in all commodity markets. Instead, minimum volumes are typically established which may apply to each transaction accepted, to the aggregate of transactions, to transactions which set a low or high assessment or to other volumetrically relevant parameters.

For price assessments used to settle derivatives, Argus will seek to establish minimum transaction data thresholds and when no such

threshold can be established Argus will explain the reasons. These thresholds will often reflect the minimum volumes necessary to produce a transaction-based methodology, but may also establish minimum deal parameters for use by a methodology that is based primarily on judgment.

Should no transaction threshold exist, or should submitted data fall below this methodology's stated transaction data threshold for any reason, Argus will follow the procedures outlined elsewhere in this document regarding the exercise of judgment in the price assessment process.

Transparency

Argus values transparency in energy markets. As a result, where available, we publish lists of deals in our reports that include price, basis, counterparty and volume information. The deal tables allow subscribers to cross check and verify the deals against the prices. Argus feels transparency and openness is vital to developing confidence in the price assessment process.

Swaps and forwards markets

Argus publishes forward assessments for numerous markets. These include forward market contracts that can allow physical delivery and swaps contracts that swap a fixed price for the average of a floating published price. Argus looks at forward swaps to inform physical assessments but places primary emphasis on the physical markets.

Publications and price data

LPG Freight rates are published in the Argus Gas Freight report. Subsets of these prices appear in other Argus market reports and newsletters in various forms. The price data are available independent of the text-based report in electronic files that can feed into various databases. These price data are also supplied through various third-party data integrators. The Argus website also provides access to prices, reports and news with various web-based tools. All Argus prices are kept in a historical database and available for purchase. Contact your local Argus office for information.

A publication schedule is available at www.argusmedia.com

Corrections to assessments

Argus will on occasion publish corrections to price assessments after the publication date. We will correct errors that arise from clerical mistakes, calculation errors, or a misapplication of our stated methodology. Argus will not retroactively assess markets based on new information learned after the assessments are published. We make our best effort to assess markets based on the information we gather during the trading day assessed.

Ethics and compliance

Argus operates according to the best practices in the publishing field, and maintains thorough compliance procedures throughout the firm. We want to be seen as a preferred provider by our subscribers, who are held to equally high standards, while at the same time maintaining our editorial integrity and independence. Argus has a strict ethics policy that applies to all staff. The policy can be found on our website at www.argusmedia.com. Included in this policy are restrictions against staff trading in any energy commodity or energy related stocks, and guidelines for accepting gifts. Argus also has strict policies regarding central archiving of email and instant messenger communication, maintenance and archiving of notes, and archiving of spreadsheets and deal lists used in the price assessment process. Argus publishes prices that report and reflect prevailing levels for open-market arms length transactions (please see the Argus Global Compliance Policy for a detailed definition of arms length).

Consistency in the assessment process

Argus recognises the need to have judgment consistently applied by reporters covering separate markets, and by reporters replacing existing reporters in the assessment process. In order to ensure this consistency, Argus has developed a programme of training and oversight of reporters. This programme includes:

- A global price reporting manual describing among other things the guidelines for the exercise of judgment
- Cross-training of staff between markets to ensure proper holiday and sick leave backup. Editors that float between markets to monitor staff application of best practices
- Experienced editors overseeing reporting teams are involved in daily mentoring and assisting in the application of judgment for illiquid markets
- Editors are required to sign-off on all price assessments each day, thus ensuring the consistent application of judgment.

Review of methodology

The overriding objective of any methodology is to produce price assessments which are reliable and representative indicators of commodity market values and are free from distortion. As a result, Argus editors and reporters are regularly examining our methodologies and are in regular dialogue with the industry in order to ensure that the methodologies are representative of the market being assessed. This process is integral with reporting on a given market. In addition to this ongoing review of methodology, Argus conducts reviews of all of its methodologies and methodology documents on at least an annual basis.

Argus market report editors and management will periodically and as merited initiate reviews of market coverage based on a qualitative analysis that includes measurements of liquidity, visibility of market data, consistency of market data, quality of market data and industry usage of the assessments. Report editors will review:

- Appropriateness of the methodology of existing assessments
- Termination of existing assessments
- Initiation of new assessments.

The report editor will initiate an informal process to examine viability. This process includes:

- Informal discussions with market participants
- Informal discussions with other stakeholders
- Internal review of market data

Should changes, terminations, or initiations be merited, the report editor will submit an internal proposal to management for review and approval. Should changes or terminations of existing assessments be approved, then formal procedures for external consultation are begun.

Changes to methodology

Formal proposals to change methodologies typically emerge out of the ongoing process of internal and external review of the methodologies. Formal procedures for external consultation regarding material changes to existing methodologies will be initiated with an announcement of the proposed change published in the relevant Argus report. This announcement will include:

- Details on the proposed change and the rationale
- Method for submitting comments with a deadline for submissions
- For prices used in derivatives, notice that all formal comments will be published after the given consultation period unless submitter requests confidentiality.

Argus will provide sufficient opportunity for stakeholders to analyse and comment on changes, but will not allow the time needed to follow these procedures to create a situation wherein unrepresentative or false prices are published, markets are disrupted, or market participants are put at unnecessary risk. Argus will engage with industry throughout this process in order to gain acceptance of proposed changes to methodology. Argus cannot however guarantee universal acceptance and will act for the good order of the market and ensure the continued integrity of its price assessments as an overriding objective.

Following the consultation period, Argus management will commence an internal review and decide on the methodology change. This will be followed by an announcement of the decision, which will be published in the relevant Argus report and include a date for implementation. For prices used in derivatives, publication of stakeholders' formal comments that are not subject to confidentiality and Argus' response to those comments will also take place.

Introduction

Argus Gas Freight is a daily market report that publishes prices and market commentary on the international shipping spot market for Ammonia and LPG.

Assessments are of typical and repeatable freight rates discussed in the market. The assessed prices are based on prices from the open spot market whenever possible. Argus Gas Freight assessments are of the prices at which vessels have been fixed and could be fixed. A fixture does not need to be concluded with subjects lifted in order for a rate to be taken into account when making an assessment. Offers of and bids for tonnage and discussed market levels will also be considered for inclusion in the assessment if deemed to be representative of an achievable market rate.

Argus assessments are of the prevailing market rate within the parameters defined in this document.

Rates are based on fixtures and market discussion for forward periods specified below. Argus takes into account liquidity outside this period and market structure.

Argus does not independently calculate or include an allowance for low-sulphur fuel costs within the Baltic and North Sea, North America and Caribbean Emissions Control Areas (ECAs). If the market in a given sector evolves to incorporate an allowance for increased fuel costs within the ECA as a convention, Argus will exercise its discretion in assessing the prevailing spot price.

Argus market specialists conduct comprehensive daily surveys of key industry participants to collect trade information and gauge prevailing market sentiment. Argus price assessments for Argus Gas Freight include market information gathered on fixtures and daily bid/ask spreads for each route under standardised specifications and under the general terms and conditions employed for the standard contracts in common use.

The market surveys are balanced in their approach and are conducted by well-trained specialists who are part of a dedicated team responsible for the Argus Gas Freight report.

The Argus methodology relies on a common sense approach and informed analysis of all market data. The market surveys involve more than 30 market participants contacted by telephone or electronically. Market participants each day include ship owners, oil company charterers and ship brokers. The information is verified and analysed. The approach is methodical and standardised and the assessments are tested against the views of other market participants. Argus Gas Freight does not use the Baltic Exchange for its freight assessments.

Factors including but not limited to vessel age (often from 15 years and older for certain vessel classes and in certain markets), the last cargo carried, an absence of Sire certificate, recent dry docking, non-standard cargoes and positioning considerations may affect the agreed rate. Argus will, where possible, remove discounts or premiums from rates considered for inclusion in an assessment, following discussion with the market.

Information from the survey is verified as best possible and archived in databases.

Assessments are of prevailing market levels at the end of the trading day or week as specified in the tables below.

Regional freight data will become available at the close of business in Asia, Europe-Africa, and the Americas.

Exchange rates

Exchange rates are as of 4pm London time on the day of publication or the latest available on UK holidays.

LPG

LPG freight rates are assessed and published in $/t.

VLGC Houston-Chiba propane (Panama)
The cost of shipping propane from Houston to Chiba, Japan via Panama on a refrigerated Very Large Gas Carrier (VLGC).

VLGC Houston-Flushing propane
The cost of shipping propane from Houston to Flushing, in the Netherlands, on a refrigerated Very Large Gas Carrier (VLGC).

VLGC Ras Tanura-Chiba
The cost of shipping LPG from Ras Tanura in the Mideast Gulf to Chiba, Japan on a refrigerated very large gas carrier (VLGC) size cargoes contracted for loading in 10-53 days

VLGC Ras Tanura-India (Ras Tanura-Chiba basis)
The cost of shipping LPG from Ras Tanura in the Mideast Gulf to India on a refrigerated very large gas carrier (VLGC). Cargoes contracted for loading in 15-30 days forward of assessment date. The rate is assessed and published on a Ras Tanura-Chiba basis — the amount that a standard Ras Tanura to Chiba voyage would cost, if using the same time charter equivalent (TCE) as the market rate for shipments into India.

VLGC Houston-India split propane/butane
The cost of shipping LPG from Houston to India on a refrigerated very large gas carrier (VLGC). Cargoes contracted for loading in 30-45 days forward of assessment date. The rate is assessed and published on a Houston-Chiba basis — the amount that a standard Houston to Chiba voyage would cost, if using the same time charter equivalent (TCE) as the market rate for shipments into India.

1,800t Tees-Lisbon
The cost of shipping from Tees, UK, to Lisbon, Portugal on an 1,800t pressurised LPG carrier contracted on the day of publication

1,800t Tees-ARA
The cost of shipping from Tees, UK, to ARA (Amsterdam-Rotterdam-Antwerp), on an 1,800t pressurised LPG carrier contracted on the day of publication

2,800t Tees-ARA
The cost of shipping from Tees, UK, to ARA (Amsterdam-Rotterdam-Antwerp), on an 2,800t pressurised LPG carrier contracted on the day of publication

4,000t Tees-Mohammedia butane
The cost of shipping from Tees, UK, to Mohammedia, Morocco a 4,000t butane cargo loading in 5-15 days

Delays, demurrage and canal auctions

Turkish straights delays
Delays, in number of days, are assessed for northbound and southbound transits of the Turkish straights (the Bosporus and Dardanelles).

See the Argus Tanker Freight methodology.

Panama Canal wait times and auctions
Northbound and southbound wait times are assessed in number of days wait for:

- Neopanamax locks for vessels with a beam exceeding 107ft
- Panamax locks for vessels with a 91-107ft beam

Auction prices paid by shippers to reserve a transit slot when pre-booked slots are unavailable are published weekly on Monday for:

- Panamax locks
- Neopanamax locks

See the Argus Tanker Freight methodology.

Carbon costs

Argus Gas Freight publishes the cost of CO_2 emissions credits under the EU Emissions Trading System (EU ETS) for LPG routes beginning and/or ending at EU ports. The cost is calculated for one-way and round-trip voyages using the following formula: Carbon cost ($) = voyage CO_2 emissions (t) x CO_2 emissions allowance price ($/t).

CO_2 emissions costs are published as lumpsums and in $/t for all routes, and in $/bl for crude routes.

For routes beginning and ending at EU ports, all CO_2 emissions are assumed to require permits and are included in the calculation. For routes beginning or ending at EU ports, half of the CO_2 emissions are assumed to require permits and are included in the calculation.

EU ETS phase in
Shipping's inclusion in the EU ETS is being phased in over several years. Accordingly, Argus calculates costs for 40pc of voyage carbon emissions requiring permits to the end of 2024, 70pc in 2025 and 100pc thereafter.

CO_2 emissions price
The CO_2 price is the Argus assessment of the December-delivery EU ETS allowance price converted to US dollars/t. See the Argus Carbon methodology.

Assumptions
Voyage CO_2 emissions are based on the type and amount of fuel consumed on each voyage, which varies depending on ship operation and whether at sea, within Emissions Control Areas (ECAs) or at port.

Vessel speeds, loading and unloading times, preferences for or against canal transits, and other components of the calculations are the same as those assumed in other calculated freight rates for LPG.

Argus assumes the following CO_2 emissions per tonne of fuel burned:

- HSFO: 3.114t CO_2/t fuel
- LSFO: 3.114t CO_2/t fuel
- MGO: 3.206t CO_2/t fuel

All assumptions are under continual review and are updated at least once a year.

Routes covered - LPG

- Rotterdam-Lagos 22,300t MGC
- Mongstad-Flushing 22,000t MGC
- Houston-Flushing 21,700t MGC
- Houston-Flushing 46,200t VLGC

VLGC calculated rates

Argus publishes a series of daily calculated rates for very-large gas carriers (VLGCs) on routes that do not have sufficient spot liquidity to support a daily assessment.

Rates for these routes are derived from one of four VLGC spot rate assessments, converted to a Time Charter Equivalent (TCE), using the basic formula: TCE ($/day) = (Voyage rate ($/t) x Cargo size (t) - Costs ($))/Voyage duration. This TCE is then used to calculate rates for other routes, reversing the calculation with costs and duration corresponding to the target route:

Assumptions

All routes are assumed to be round voyages with a laden leg and a ballast leg back to the port of origin, with the exception of Marcus Hook to Flushing in which the ship is assumed to ballast to Houston after discharge. Cargo size is the maximum permissible under a 44,000t +/- 5pc contract. Sea margin of 5pc and a 1.25pc broker commission are factored into the calculation. Address commission is not included.

Vessels are assumed to bunker before the laden leg of the journey, and to use 0.5pc sulphur bunker fuel oil, or 0.1pc sulphur marine gasoil (MGO) in sulphur emissions control areas (SECA) around western Europe and North America. A small additional MGO consumption is included to power auxiliary systems on board the vessel. The bunker price used for each route is the Argus assessment for the loading port, or nearest bunkering hub, for example, Fujairah for voyages starting in Ras Tanura. The Bonny-Chiba rate assumes a Fujairah bunker price.

Vessels on the Houston-Chiba (Panama), Houston-Chiba/Ulsan, Houston-Ningbo and Houston-Quintero routes are assumed to transit the Panama Canal on the ballast and laden legs, with associated costs included in the calculation. A fixed transit time of 1 day is assumed for transit and waiting time for a vessel that has pre-booked transit through the canal. Pre-booking costs are included. Houston-Tanjung Sekong rates are for the specified route and include assumed canal transit costs, where appropriate. The Ras Tanura-Chiba/Ulsan, Ras Tanura-New Mangalore, Ras Tanura-New Mangalore and Haldia, Ras Tanura-Ningbo, Ras Tanura-Visakhapatnam, Ras Tanura-Visakhapatnam and Haldia and Ras Tanura-Vung Tau routes include Additional War Risk Premium (AWRP) of $60,000. The Bonny-Chiba route include AWRP of $46,000.

Unless noted, all routes assume a single load/discharge. 6 hours Notice of Readiness per port is also included. Sea margin of 5pc is factored into the calculation for each route. The following port costs and timings are assumed, based on discussions with market participants and observations from vessel tracking data.

Port fees are reviewed annually and updated on 1 April.

VLGC TCEs

The VLGC TCE rates described above for Ras Tanura-Chiba, Houston-Chiba, and Houston-Flushing are published as standalone values in dollars per day.

VLGC demurrage

Argus publishes a $/day VLGC demurrage rate for the Atlantic basin calculated as the sum of the Houston-Flushing TCE and the cost of bunkers associated with idling the vessel on the high seas.

VLGC routes for 46,200t cargoes

Load port	Discharge port	Assessment used for calculation
Bahia Blanca	Chiba (via Cape)	Ras Tanura-Chiba
Bonny	Chiba	Ras Tanura-Chiba + $3/t*
Houston	Chiba/Ulsan	Houston-Chiba (Panama)
Houston	Quintero (via Panama)	Houston-Chiba (Panama)
Houston	San Pedro, Dominican Republic	Houston-Flushing
Houston	Suape	Houston-Flushing
Houston	Suape and Santos	Houston-Flushing
Houston	Mohammedia (Morocco)	Houston-Flushing
Houston	Tanjung Sekong (via Cape)	Houston-Chiba (Panama)
Houston	Tanjung Sekong (via Panama)	Houston-Chiba (Panama)
Houston	Visakhapatnam and Haldia	Houston-India (basis Houston-Chiba via Panama)
Houston	Ningbo	Houston-Chiba (Panama)
Marcus Hook	Flushing	Houston-Flushing
Prince Rupert	Chiba	Ras Tanura-Chiba
Ras Tanura	Chiba/Ulsan	Ras Tanura-Chiba
Ras Tanura	New Mangalore	Ras Tanura-India (basis RT-Chiba)
Ras Tanura	New Mangalore and Haldia	Ras Tanura-India (basis RT-Chiba)
Ras Tanura	Visakhapatnam	Ras Tanura-India (basis RT-Chiba)
Ras Tanura	Visakhapatnam and Haldia	Ras Tanura-India (basis RT-Chiba)
Ras Tanura	Vung Tau	Ras Tanura-Chiba
Ras Tanura	Ningbo	Ras Tanura-Chiba

**premium reviewed annually*

VLGC specification

Term	Value
Deadweight tonnage (DWT)	55,000
Gross tonnage	46,750
Net register tonnage (NRT)	17,000
Length (m)	224.5
Beam (m)	36
Speed (knots)	16
Laden bunker fuel consumption (t/day)	48
Ballast bunker fuel consumption (t/day)	46
Bunker fuel consumption in port (t/day)	10.5
Idle bunker fuel consumption (t/day)	6.5
MGO consumption laden (t/day)	0.2
MGO consumption ballast (t/day)	0.2
MGO consumption in port (t/day)	0.25

VLGC port costs and times

Port	Cost	Days loading/ discharging
Bahia Blanca	$201,300	2
Chiba	$60,000	2
Flushing	€75,780	2
Haldia	$90,000	4
Houston	$43,790	2
Marcus Hook	$50,200	2
Mohammedia	MAD 1,210,500	3
New Mangalore	$65,000	3 or 4*
Ningbo	$40,475	2
Prince Rupert	$40,000	2
Quintero	$115,000	2
Ras Tanura	1 SAR/cargo tonne + $17,318	2
San Pedro, Dominican Republic	$48,000	2
Santos	$76,250	1.5
Suape	$86,500	2
Tanjung Sekong	$55,000	2
Ulsan	$31,197	2
Visakhapatnam	$80,000	2
Vung Tau	$40,000	2

Ras Tanura to New Mangalore route assumes three-day discharge at New Mangalore. Ras Tanura to New Mangalore + Haldia assumes four-day discharge at New Mangalore and Haldia (eight days total). The Bonny-Chiba route does not include port costs at Bonny

LGC calculated rates

Argus publishes daily calculated rates for large-sized gas carriers (LGCs) on routes that do not have sufficient spot liquidity to support a daily assessment. Rates for these routes are derived from the weekly Argus LGC period charter rate assessment with bunkering and port costs added.

Assumptions

All routes are assumed to be round voyages with a ballast and laden leg. Cargo size is 40,000 tonnes.

Vessels are assumed to bunker before the laden leg of the journey, and to use 0.5pc sulphur bunker fuel oil, or 0.1pc sulphur marine gasoil (MGO) in sulphur emissions control areas (SECA) around western Europe and North America. A small additional MGO consumption is included to power auxiliary systems on board the vessel. The bunker price used for each route is the Argus assessment for the loading port, or nearest bunkering hub, for example, Houston for voyages starting in Point Lisas.

All routes assume a single load/discharge, with the exception of Luwuk to Caojing and Ulsan, which assumes a split discharge at two terminals and Luwuk to Caojing, Ulsan and Taichung, which assumes a split discharge at three terminals. Additional towage costs within the port are factored in. All routes include 6 hours Notice of Readiness per port and 12 hours bunkering per round voyage.

The following port costs and timings are assumed, based on discussions with market participants and observations from vessel tracking data. Port fees are reviewed annually and updated on 1 April.

LGC specification

Deadweight tonnage (DWT)	43,000
Gross tonnage	37,000
Net register tonnage (NRT)	14,000
Length (m)	200
Beam (m)	33
Speed (knots)	16
Laden bunker fuel consumption (t/day)	35
Ballast bunker fuel consumption (t/day)	33
Bunker fuel consumption in port (t/day)	7
MGO consumption laden (t/day)	0.2
MGO consumption ballast (t/day)	0.2
MGO consumption in port (t/day)	0.2

LGC routes and cargo sizes

Route	Cargo size (t)
Ammonia	
Luwuk to Caojing and Ulsan	40,000
Luwuk to Taichung, Caojing and Ulsan	40,000
Point Lisas to Jorf Lasfar	40,000
Texas City to Jorf Lasfar	40,000

LGC port costs and times

Port	Cost	Days loading/ discharging
Caojing	$33,700	2
Jorf Lasfar	$33,700	2
Luwuk	$21,650	1
Point Lisas	$42,500	2
Taichung	$10,150	2
Texas City	$15,200	1
Ulsan	$22,000	2

MGC calculated rates

Argus publishes daily calculated rates for medium-sized gas carriers (MGCs) on routes that do not have sufficient spot liquidity to support a daily assessment. Rates for these routes are derived from the weekly Argus MGC period charter rate assessment with bunkering and port costs added.

Assumptions

All routes are assumed to be round voyages with a ballast and laden leg. Cargo size is 98pc of a 38,000m^3 gas carrier converted to tonnes based on the stated composition of the cargo.

Vessels are assumed to bunker before the laden leg of the journey, and to use 0.5pc sulphur bunker fuel oil, or 0.1pc sulphur marine gasoil (MGO) in sulphur emissions control areas (SECA) around western Europe and North America. A small additional MGO consumption is included to power auxiliary systems on board the vessel. The bunker price used for each route is the Argus assessment for the loading port, or nearest bunkering hub, for example, Fujairah for voyages starting in Ras Tanura.

Vessels on the Houston-Pisco and Callao route are assumed to transit the Panama Canal via the Panama Canal's Panamax Locks, with associated costs included in the calculation. A fixed transit time of 2 days is assumed, one day in transit and one day of waiting time for a vessel that has pre-booked transit through the canal. Pre booking costs are included. The Ras Tanura to New Mangalore route includes Additional War Risk Premium (AWRP) of $12,500. The Houston to Lagos and Rotterdam to Lagos routes include a cost of $74,750 for armed guards during the vessel's discharge in Lagos and for one day either side.

All routes assume a single load/discharge, except where indicated. Additional towage costs within the port are factored in. All routes include 6 hours Notice of Readiness per port and 12 hours bunkering per round voyage.

The following port costs and timings are assumed, based on discussions with market participants and observations from vessel tracking data. Port fees are reviewed annually and updated on 1 April.

MGC specification	
Deadweight tonnage (DWT)	28,000
Gross tonnage	25,000
Net register tonnage (NRT)	7,500
Length (m)	175
Beam (m)	28
Speed (knots)	16
Laden bunker fuel consumption (t/day)	33
Ballast bunker fuel consumption (t/day)	29
Bunker fuel consumption in port (t/day)	4
MGO consumption laden (t/day)	0.1
MGO consumption ballast (t/day)	0.1
MGO consumption in port (t/day)	0.1

MGC routes and cargo sizes

Route	Cargo	Cargo size (t)
LPG		
Bahia Blanca to Santos	60/40 propane/butane	21,940
Ras Tanura to New Mangalore	50/50 propane/butane	22,000
Marcus Hook to Flushing	Propane	21,700
Mongstad to Flushing	50/50 propane/butane	22,000
Houston to Tuxpan	Propane	21,700
Houston to Suape	Propane	21,700
Houston to Pisco and Callao	75/25 propane/butane	21,900
Houston to Flushing	Propane	21,700
Houston to Lagos	Butane*	22,300
Rotterdam to Lagos	Butane*	22,300
**For Houston-Lagos and Rotterdam-Lagos, a "propane differential", for a 21,700 cargo size and all other variables the same, is also published.*		
Ammonia		
Ras Al-Khair to Kandla	Ammonia	25,300
Ras Al-Khair to Kakinada	Ammonia	25,300
Ras Al-Khair to Ulsan	Ammonia	25,300
Ras Al-Khair to Taichung	Ammonia	25,300
Ras Al-Khair to Antwerp (via Cape)	Ammonia	25,300
Ras Al-Khair to Antwerp (via Suez)	Ammonia	25,300
Ras Al-Khair to Jorf Lasfar (via Cape)	Ammonia	25,300
Ras Al-Khair to Jorf Lasfar (via Suez)	Ammonia	25,300
Ras Al-Khair to Richards Bay	Ammonia	21,000
Point Lisas to Ulsan	Ammonia	25,300
Point Lisas to Houston	Ammonia	25,300
Point Lisas to Antwerp	Ammonia	25,300
Point Lisas to Jorf Lasfar	Ammonia	25,300
Point Lisas to Tampa, Houston and Point Comfort	Ammonia	25,300
Point Lisas to Richards Bay	Ammonia	21,000
Donaldsonville to Ulsan (via Panama)	Ammonia	25,300
Donaldsonville to Ulsan (via Cape)	Ammonia	25,300
Donaldsonville to Niihama (via Panama)	Ammonia	25,300
Donaldsonville to Niihama (via Cape)	Ammonia	25,300
Donaldsonville to Antwerp	Ammonia	25,300
Donaldsonville to Jorf Lasfar	Ammonia	25,300
Bontang to Ulsan	Ammonia	25,300
Bontang to Paradip	Ammonia	25,300
Bontang to Kakinada and Paradip	Ammonia	25,300
Arzew to Antwerp and Tees	Ammonia	25,300

MGC port costs and times

Port	Cost	Days loading/ discharging
Antwerp	$60,000	1.5
Arzew	$26,650	2
Bahia Blanca	$120,900	2
Bontang	$36,700	1.5
Callao	$27,500	1.5
Donaldsonville	$127,400	1.5
Flushing	$35,000	1
Houston	$27,950	1
Jorf Lasfar	$33,600	1.5
Kakinada	$47,500	1.5
Kandla	$43,400	1.5
Lagos	$115,000	4*
Marcus Hook	$45,000	1
Mongstad	$45,000	1
New Mangalore	$34,200	2
Niihama	$36,400	1.5
Paradip	$23,100	1.5
Pisco	$44,470	2
Point Comfort	$42,000	1
Point Lisas	$40,000	1.5
Ras Al Khair	$30,200	1.5
Ras Tanura	1 SAR/cargo tonne + $16,230	1
Richards Bay*		3
Richards Bay (ammonia)	R359,560.24	2
Rotterdam	$40,000	1
Santos	$57,800	2
Suape	$60,000	2
Taichung	$15,000	1.5
Tampa	$23,900	1.5
Tuxpan	$30,000	2
Ulsan	$15,000	1.5

**split discharge at two terminals*

Handysize calculated rates

Argus publishes daily calculated rates for Handysize gas carriers on routes that do not have sufficient spot liquidity to support a daily assessment. Rates for these routes are derived from the weekly Argus Handysize period charter rate assessment with bunkering and port costs added.

Assumptions

All routes are assumed to be round voyages with a ballast and laden leg. Cargo size is 98pc of a 22,500m³ gas carrier converted to tonnes based on the stated composition of the cargo.

Vessels are assumed to bunker before the laden leg of the journey, and to use 0.5pc sulphur bunker fuel oil, or 0.1pc sulphur marine gasoil (MGO) in sulphur emissions control areas (SECA) around western Europe and North America. A small additional MGO consumption is included to power auxiliary systems on board the vessel. The bunker price used for each route is the Argus assessment for the loading port, or nearest bunkering hub.

All routes assume a single load/discharge. All routes include 6 hours Notice of Readiness per port and 12 hours bunkering per round voyage.

The following port costs and timings are assumed, based on discussions with market participants and observations from vessel tracking data. Port fees are reviewed annually and updated on 1 April.

Handysize routes and cargo sizes

Route	Cargo	Cargo size (t)
Ammonia		
Ras Al-Khair to Kandla	Ammonia	15,000
Ras Al-Khair to Kakinada	Ammonia	15,000
Arzew to Rotterdam	Ammonia	15,000
Bontang to Ulsan	Ammonia	15,000
Point Lisas to Tampa	Ammonia	15,000

Handysize specification

Deadweight tonnage (DWT)	17,250
Gross tonnage	16,750
Net register tonnage (NRT)	5,000
Length (m)	154
Beam (m)	22.5
Speed (knots)	15
Laden bunker fuel consumption (t/day)	33
Ballast bunker fuel consumption (t/day)	29
Bunker fuel consumption in port (t/day)	9
MGO consumption laden (t/day)	0.2
MGO consumption ballast (t/day)	0.2
MGO consumption in port (t/day)	0.2

Handysize port costs and times

Port	Cost	Days loading/ discharging
Arzew	$23,650	1.75
Bontang	$28,350	1.75
Kakinada	$47,500	1.25
Kandla	$27,600	1.25
Point Lisas	$20,000	1.75
Ras Al Khair	$27,700	1.75
Rotterdam	$26,750	1.25
Tampa	$23,900	1.25
Ulsan	$16,500	1.25

Period charter rates

Argus publishes 12-month $/day and $/month charter rates for

- 84,000 m³ VLGC gas carriers
- 59,000 m³ LGC gas carriers
- 38,000m³ MGC gas carriers
- 22,500m³ Handysize gas carriers

Time-charter rates exclude bunker costs, port fees, canal tolls, and other voyage-related fees. Rates are assessed weekly on Monday, or the next publication day if Monday is a UK holiday.

Ammonia

Argus Gas Freight includes ammonia freight rates calculated based on an assessment of 12-month period charter rates. Ammonia freight rates are published in $/t. See the description of MGC and Handysize calculated rates above.

VLEC calculated rates

Argus publishes daily calculated rates for very-large ethane carriers (VLECs). Rates for these routes are derived from a period charter rate assessment with bunkering, port fees and other voyage costs, using the basic formula: Voyage rate ($/t) = [time-charter ($/day) x duration (days) + costs ($)] / cargo size (t)

Assumptions

All routes are assumed to be round voyages with a ballast leg and laden leg. Sea margin of 5pc and a 1.25pc broker commission are factored into the calculation. Address commission is not included.

Vessels are assumed to bunker before the laden leg of the journey, and to use 0.5pc sulphur bunker fuel oil, or 0.1pc sulphur marine gasoil (MGO) in sulphur emissions control areas (SECA) around western Europe and North America. A small additional MGO consumption is included to power auxiliary systems on board the vessel. The bunker price used for each route is the Argus assessment for the loading port, or nearest bunkering hub, for example, Buenos Aires for voyages starting in Punta Colorada.

The Houston-Ningbo via Panama route assumes transit via the Panama Canal with one day of waiting and one day of transit on each leg, with associated costs included in the calculation.

All routes assume a single load/discharge. All routes include 6 hours Notice of Readiness per port. The following port costs and timings are assumed, based on discussions with market participants and observations from vessel tracking data.

Port fees are reviewed annually and updated on 1 April.

VLEC specification

Term	Value
Deadweight tonnage (DWT)	59,000
Gross tonnage	18,260
Net register tonnage (NRT)	57,500
Length (m)	227.5
Beam (m)	36.5
Speed (knots)	16
Laden bunker fuel consumption (t/day)	51
Ballast bunker fuel consumption (t/day)	47
Bunker fuel consumption in port (t/day)	10.5
Idle bunker fuel consumption (t/day)	6.5
MGO consumption laden (t/day)	0.2
MGO consumption ballast (t/day)	0.2
MGO consumption in port (t/day)	0.25

VLEC routes and cargo sizes

Route	Cargo size (t)
Ethane	
Punta Colorada to Ningbo (via Cape of Good Hope)*	50,000
Houston to Ningbo (via Panama)	50,000
Houston to Ningbo (via Cape of Good Hope)	50,000

**The Punta Colorada-Ningbo route uses the load-port fee of the nearby Bahia Blanca port.*

VLEC port costs and times

Port	Cost	Days loading/ discharging
Houston	$59,600	2
Bahia Blanca	$201,300	2
Ningbo	$34,800	2