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ARGUS AMMONIA

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The most up-to-date Argus Ammonia 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 ammonia 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 weekly 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

Ammonia prices are published in the Argus Ammonia 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 publishes the Argus Ammonia report once a week on a Thursday evening in the UK (London time). The report contains a variety of prices and market commentary on international bulk shipments of anhydrous ammonia.

Publication frequency and assessment timing

The weekly report is published 51 weeks of the year. The report is not published for one week during the Christmas holiday period in the UK in late December. A publication schedule is available at www.argusmedia.com

Specific pricing references in the US (US Gulf domestic barge, Tampa cfr and US Gulf) are assessed in London (after consulta-

tion with the Argus Houston office) and included in the Argus North American Fertilizer report which is published from Argus' Houston office on a Thursday (CST).

Argus also provides market updates which provide real-time deals, pricing information and other market news affecting fertilizer supply, demand and pricing. These are produced on an ad hoc basis. There is no minimum number of daily updates, and the frequency reflects market liquidity and the timing of other market events. These are sent as email alerts to subscribers and also appear on the Argus Direct website.

Price assessments reflect the last seven days of business, with information gathered Friday morning through to Thursday at 5pm (London time). While all information and trades are taken into account, in periods of high volatility, assessments are weighed towards trading activity later in the week or at the end of the Thursday of the assessment.

General methodology

The Argus editorial fertilizer team consists of specialised and highly experienced editors based in the UK who work closely with our global network of correspondents in Singapore, Beijing, Delhi, Houston, Moscow and other parts of the world to produce weekly market reports.

The team surveys a wide variety of market participants during the course of the week, from traders to producers to buyers as well as other analysts. As regards pricing, editors work to confirm business that has been done, as well as firm bids and offers. The goal is to cross check transactions with all participants wherever possible.

Assessing price ranges

Ammonia prices are assessed in various regions, countries and within countries on a free on board (fob) basis in the main export regions and on a cost and freight (cfr) basis in the main destination markets. Deals, bids and offers must be considered repeatable to be reflected in the assessments.

The report seeks to determine price ranges in which transactions are taking place or in which transactions could have taken place between a willing buyer and seller. In markets that periodically lack liquidity, Argus may assess price ranges based on judgement, in view of market discussions with buyers and sellers.

The assessment are achievable prices given prices paid in end user markets, and appropriate netbacks from the latest deals (using fixtures or indicative freight rates), balanced against a seller's order book and propensity to sell.

When there is sufficient liquidity and deals data is deemed reliable and representative, the price range will be defined on the low and the high end of confirmed deals concluded throughout the trading week. These deals must meet the minimum volumes and strict delivery timescales, as well as specifications as laid down in this

methodology. Wherever possible, Argus seeks to validate all deals from buyers and sellers.

Information on transactions, bids and offers that lie outside the specifications of timing, size, location and quality may be used in assessing price ranges, but data on deals that lie within these specifications is given most weight.

Where there has been no discoverable business in a week for a specific pricing point, prices are usually held at the previous week's range. However, in the absence of verified high or low deals, Argus also reserves the right to make an assessment of the range based on what deals could have been achieved within that time frame based on market fundamentals.

Distressed trades and disruptions to trade

From time to time, Argus may report on deals which we define as 'distressed cargoes'. These are either cargoes that are sold below the prevailing market price in order to make a quick sale or reflect the sale of damaged or off-specification goods.

Argus may also report on trades that involve an unusually high freight payment by one of the counterparties related to delays in the issuance of letters of credit, a sudden change to the destination port, or the inclusion in the contract of an unusual timing requirement. Argus reserves the right to exclude such transactions from its assessment process.

If trade is disrupted from a specific pricing point because of prolonged production outages, export bans, or other reasons it is omitted from regional price points, or assessed in relation to prices in similar regions.

Spot and formula pricing

Spot pricing refers to specific cargoes sold that are scheduled to load within 40 days of the sale being agreed. These prices are cash prices, i.e. net of any credit.

Formula pricing is an arrangement where a buyer and seller agree in advance on the price to be paid for a product delivered in the future, based upon a pre-determined calculation, sometimes utilising published prices. Given that the exact nature of the calculation or the agreement between the parties is private and confidential, and if the deal is considered a one-off (i.e. not repeatable) then calculated netbacks are not used in formulation of a spot price range.

However, if a buyer and seller use this method of pricing for multiple transactions on a specific trade route, then the editor may use the deal in formulating a spot price range using current known cfr levels, domestic prices in the destination country and indicative freight rates.

Units

All prices are assessed in US \$/tonne (t), apart from the US domestic barge reference, which is priced in US \$/short ton (st).

Lot and cargo sizes

For international trade, the minimum lot size used for consideration and inclusion in the relevant price range is 5,000 tonnes of ammonia. The exception is prices quoted in the US domestic market for which the price is indicative of one barge, assumed to be carrying a minimum of 1,500st, with no set maximum number of barges. There may be occasions when a barge is loaded with less quantity for reasons of low draft levels, but this will be explained fully in the text.

Ammonia is explosive and needs to be refrigerated for safe storage and transportation. Accordingly, LPG tankers are used for its transportation and costs are usually higher than for other fertilizers. There are predominantly two vessel sizes used for transporting ammonia deepsea: 23,400t cargoes and 40,000t cargoes.

Products and specifications

Anyhydrous ammonia is a liquid bulk fertilizer containing a minimum 99.5pc ammonia and maximum 0.5pc water/moisture content by weight while maximum mass concentration of oil is 10ppm. Ammonia is fully refrigerated at about -33°C. It is produced through a chemical reaction between water, hydrogen and methane. This reaction requires a large amount of energy which is typically provided in the form of natural gas.

Ammonia is predominantly used for downstream production of fertilizers, for direct fertilizer application on crops and for non-fertilizer, industrial use.

Please note that some industrial users sometimes require less moisture and oil content, but this cannot always be guaranteed by suppliers.

Price guide — how prices are defined

Fob

Baltic

Assessed based on spot sales out of Ventspils (on the Baltic Sea) and Sillamae (on the Gulf of Finland/Baltic Sea).

Pivdenny

Assessed based on spot sales, or by using netbacks on cfr shipments to major importing markets such as Europe and north Africa.

North Africa

Assessed based on spot sales from Algeria and netbacks from destination markets.

Middle East

Trade in Iranian material may be considered for inclusion in the assessment if done at prices representative of the region.

US Gulf (domestic barge)

See Ammonia Nola barge fob in the [Argus North American Fertilizer methodology](#).

Caribbean/US Gulf

Assessed based on spot sales out of Trinidad and Tobago, Venezuela and the US Gulf. Where no new spot business has been concluded, the assessment will include netbacks from various destination markets.

Caribbean (Tampa netback)

Calculated as the cfr Tampa price assessment less an assessed freight rate for a 23,000-40,000t vessel travelling between Trinidad and Tobago and Tampa.

Southeast Asia and Australia spot

Assessed based on spot sales out of Indonesia, Malaysia and Australia. In the absence of new spot activity, the price is assessed based on information on spot trades done for delivery to east Asia and India.

Southeast Asia and Australia contract

Assessed based on the latest contract sales out of Indonesia, Malaysia and Australia. In the absence of new activity, the prices are assessed using information on contracts agreed for delivery to east Asia and India.

Cfr

Northwest Europe

The northwest Europe price is reported independently as two separate prices. The duty unpaid price is of material subject to import duty that has not been paid at the time of trade. The duty paid/duty free price is of material either not subject to import duty or of material for which the import duty has been paid.

Both prices are assessed on spot/contract business where available; otherwise these are assessed using a combination of fob prices and freight rates from Pivdenny, the Baltic and the Caribbean.

North Africa

Assessed based on spot/contract business where available or using a combination of fob prices and freight rates.

India

Assessed based on spot/contract business where available. The contracts are either between producers and end-users or between a trader and the end-user. Prices are agreed under formula, many of which are based on published Middle East fob prices plus freight, and agreed with credit terms of 30-180 days.

In the absence of spot business, active netbacks from the Middle East and Indonesia are included.

East Asia (excluding Taiwan)

Assessed based on spot/contract business and/or a combination of fob prices and freight rates. The range includes all east Asian markets apart from Taiwan.

Taiwan

Assessed based on contract or spot business. In the absence of new business, the price is assessed by using a combination of fob prices and freight rates.

China

Assessed based on spot/contract business where available or using a combination of fob prices and freight rates.

Turkey

Assessed based on spot/contract business where available or using a combination of fob prices and freight rates.

Tampa

Assessed on a \$/t cfr Tampa, Florida basis. The price is an assessment of the monthly contract settlement between US phosphate producer Mosaic and its global ammonia supplier Yara for imported ammonia vessels during the designated month of the contract. The price serves as a key benchmark for other supply contracts which link to the monthly settlement for both fertilizer and industrial consumers in the US Gulf and ammonia producers in the Caribbean.

The Tampa price is typically settled a week or two before the new month, and the Argus Ammonia report immediately publishes the price upon confirmation from the counterparties. Occasionally, other spot cargoes are sold into Tampa at a different spot price to the monthly contract price. This price will be included in assessing the range for the Tampa cfr assessment.

US Gulf

See Ammonia US Gulf cfr in the [Argus North American Fertilizer methodology](#).

Freight

Freight rates are assessed as a range and include information collected over the course of the trading week.

Unless noted, assessments are for 23,000t cargoes that will load within 30-40 days. Freight rates are assessed by surveying freight providers and buyers of spot freight, maintaining a balance between types of market participants.

Freight rates are published for:

- Pivdenny-northwest Europe
- Pivdenny-Morocco
- Pivdenny-north Turkey (10,000-15,000t)
- Pivdenny-south Turkey (10,000-15,000t)
- Baltic-northwest Europe
- Ras al Khair-South Korea
- Ras al Khair-west coast India
- Ras al Khair-east coast India
- Middle East-east Coast India (10,000-15,000t)
- Middle East-west Coast India (10,000-15,000t)
- Point Lisas-east Asia
- Point Lisas-US Gulf
- Point Lisas-northwest Europe
- Point Lisas-Morocco
- Indonesia-east Asia

Ammonia cost of production

A cost of production calculation based on a formula using the calculated average for the TTF month ahead gas price and factoring in additional processing and operations costs. This calculation is reviewed annually.

Natural gas prices

Henry Hub (\$/mn Btu)

A weekly average of closing prices for Henry Hub day-ahead gas published in Argus Natural Gas Americas. The Henry Hub is one of the main pricing points for natural gas in the US market. See the [Argus Natural Gas Americas methodology](#) for more information.

TTF month ahead (\$/mn Btu)

A weekly average of closing prices for TTF front-month gas published in Argus European Natural Gas. The TTF is one of the main pricing points for natural gas in northwest Europe. See the [Argus European Natural Gas methodology](#) for more information.

Marine fuel equivalent prices

Argus Ammonia includes the cfr northwest Europe (duty unpaid) spot ammonia price converted to \$/mn Btu and \$/t MGO and \$/t VLSFO marine-fuel equivalents for comparison with the price of conventional bunker fuels.

See the [Argus Marine Fuels methodology](#).