METHODOLOGY AND SPECIFICATIONS GUIDE

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ARGUS EUROPEAN NATURAL GAS

Contents:

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The most up-to-date Argus European Natural Gas 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 European natural gas 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.

Minimum transaction thresholds

Assessment	Transaction minimum volume
NCG front-month	5 MWh/h
TTF front-month	5 MWh/h

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

Argus European natural gas prices are published in the Argus European Natural Gas 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.

Assessment methodology

Argus assesses the value of natural gas contracts at 16.30 UK time each working day, with the exception of Turkey and Ukraine. For Turkey, Argus assesses the value of natural gas contracts at 12:00 local time each working day. For Ukraine, assessments are the prevailing market price on the day of assessment, without a specific timestamp.

These assessments are published as a best bid and offer, the midpoint of which represents the assessment of the contract's value at the timestamp.

Argus takes into consideration trade, bids, offers and other market information to inform its assessments. This information can include trades, bids and offers made before or after the timestamp.

On the final working day preceding 25 December and 1 January, the assessment timestamp for all markets except Turkey is 12:00 UK time. For Turkey, the assessment timestamp remains 12:00 local time on those days. For Ukraine, market information is gathered on the day of assessment and the published price is the prevailing market price that day.

Argus may refer to differentials against more-liquid markets, or to temporal spreads between contracts in the same market, to assess the price prevailing for that contract at the timestamp. Argus may also refer to trading activity over the course of the day, before or after the timestamp, to inform its assessment of prices prevailing at the timestamp.

In the event that there is no market in a contract on a given day, Argus will assess the fair value of the contract on the basis of the greatest consensus of market participants.

Argus assesses the price of gas for contracts delivering over a number of days, months, quarters, seasons and years. Within a given market, these prices are assessed consistently, wherein the price assessment for a given contract will be consistent with the average price assessments for its component parts, less any required rounding, and vice versa. For example, a seasonal contract is delivered over two quarters or six months. The price assessment for the seasonal contract will be equal to the average of the assessments for the two component quarters and the six component months, and vice versa.

Argus exercises its editorial judgment — with due regard to all available sources of information — to exclude data not representative of prices prevailing at the timestamp.

Prices are assessed to three decimal places. In line with market practice, decimals end with the digit 0 or 5.

Effective dates and holidays

All assessments, except for Ukraine, follow the UK public holiday publication calendar. Ukrainian prices are not assessed on Ukrainian or UK public holidays. A publication schedule is available at www.argusmedia.com

Day-ahead assessments cover the next working day after the day of publication.

Weekend assessments cover the next weekend after the day of publication, except when a UK public holiday falls in the middle of a week, when the weekend price published between the weekend and the public holiday will refer to the public holiday(s).

Week-ahead assessments cover the working days of the week starting from the Monday following publication, in line with the Gregorian calendar. Should a public holiday fall during the normal working week, the assessment will correspond to the week's working days excluding the public holiday.

Current month assessments are, until the final days of a month, analogous to a balance-of the-month assessment — that is, a contract that runs from the period beyond (but not including) the contract adjacent to within day, be it day ahead or weekend, until the end of the month. However, when the over-the-counter balance-of-the-month contract expires, the Argus current month contract picks up the remainder of contracts within that month. For example, on a month's penultimate trading day, current month will equal day ahead (or Saturday, if falling on a Friday). On the final day of the month, current month will be the within-day price at the timestamp.

Monthly assessments roll on the first day of the month.

Quarterly assessments roll on the first day of each quarter.

Each quarter consists of January-March, April-June, July-September and October-December.

Calendar year and gas year assessments roll on the first day of each year.

Markets covered

National Balancing Point (NBP)
Location: UK
Unit: assessed in p/th and published in p/th, €/MWh, $/mn Btu
Contracts assessed:
Day ahead
Weekend
Week ahead
Current month
Six months forward
21 quarters and 11 seasons forward
Three calendar years forward (January-December)
Four gas years forward (October-September)

Zeebrugge hub
Location: Belgium
Unit: assessed in p/th and published in p/th and €/MWh
Contracts assessed:
Day ahead
Weekend
Current month
Five months forward
21 quarters and 11 seasons forward
Three calendar years forward (January-December)
Four gas years forward (October-September)

Zeebrugge Trading Point (ZTP)
Location: Belgium
Unit: €/MWh
Contracts assessed:
Day ahead
Weekend
Three months forward
Four quarters and five seasons forward
Three calendar years forward (January-December)

Point d'Echange de Gaz (Peg)
Location: France
Unit: €/MWh
Contracts assessed:
Day ahead
Weekend
Three months forward
Three quarters forward
Three seasons forward
One calendar year forward (January-December)
Note: Argus publishes a weekend Peg price on Fridays and on the final business day preceding a UK public holiday (*see p8*).

Title Transfer Facility (TTF)
Location: Netherlands
Unit: assessed in €/MWh and published in p/th, €/MWh, $/mn Btu
Contracts assessed:
Day ahead
Weekend
Week ahead
Current month
Six months forward
10 quarters and 10 seasons forward
Four calendar years forward (January-December)
Four gas years forward (October-September)

Germany VTP (Trading Hub Europe)
Location: Germany
Unit: €/MWh
Contracts assessed:
Day ahead
Weekend
Current month
Six months forward
Nine quarters and five seasons forward
Four calendar years forward (January-December)
Two gas years forward (October-September)

In anticipation of the October 2021 merger of the Gaspool and NCG market areas, coverage of Germany VTP prices is being introduced in phases. New forward periods will be added no later than the first publication date on which the start of delivery for a given contracts is on or after 1 October 2021. For example, Argus will begin publication of a third forward quarter no later than 4 January 2021, when the delivery period of that contract will be the fourth calendar quarter of 2021. The introduction of associated volatilities and basis prices will follow a similar schedule.

Gaspool (formerly BEB)

Location: Germany
Unit: €/MWh
Contracts assessed:
Day ahead
Weekend
Current month
Six months forward
Nine quarters and five seasons forward
Four calendar years forward (January-December)
Two gas years forward (October-September)

Netconnect Germany (NCG) (formerly EGT)

Location: Germany
Unit: €/MWh
Contracts assessed:
Day ahead
Weekend
Current month
Six months forward
Nine quarters and five seasons forward
Four calendar years forward (January-December)
Two gas years forward (October-September)

Austria VTP (formerly Baumgarten)

Location: Austria
Unit: €/MWh
Contracts assessed:
Day ahead
Weekend
Current month
Three months forward
Two quarters forward
Four seasons forward
Two calendar years forward (January-December)
Note: Argus publishes a weekend Austria VTP price on Fridays and on the final business day preceding a UK public holiday

Punto di Scambio Virtuale (PSV)

Location: Italy
Unit: €/MWh
Contracts assessed:
Day ahead
Weekend
Current month
Three months forward
Four quarters forward
Two seasons forward
Two calendar years forward (January-December)
Note: Argus publishes a weekend PSV price on Fridays and on the final business day preceding a UK public holiday

Czech Republic VTP

Location: Czech Republic
Unit: €/MWh
Contracts assessed:
Day-ahead

Weekend
Two months forward
Two quarters forward
One season forward
One calendar year forward (January-December)
Note: Argus publishes a weekend Czech Republic VTP price on Fridays and on the final business day preceding a UK public holiday

Turkey

Location: Turkey
Unit: assessed in TL/'000m³ and published in TL/'000m³, $/'000m³ and $/mn Btu
The conversion of Turkish gas prices to $/mn Btu uses the assumption stipulated in the country's network code of a gross calorific value of 9,155 kcal/m³.
Contracts assessed:
Day ahead

PVB (formerly AOC)

Location: Spain
Unit: €/MWh
Contracts assessed:
Two months forward
Two quarters forward
One season forward
One calendar year forward (January-December)

Slovak VTP (SK VTP)

Location: Slovakia
Unit: €/MWh
Contracts assessed:
Day ahead
One month forward

Magyar Gazkiegyenlíto Pont (MGP)

Location: Hungary
Unit: €/MWh
Contracts assessed:
Day ahead
One month forward

Ukraine

Location: Ukraine
Unit: assessed in Ukrainian hryvnia/'000m³ and published in $/'000m³ and €/MWh
Currency conversions are done using the National Bank of Ukraine exchange rate and a volume to energy conversion of 10.47kWh/m³.
Contracts assessed:
Month ahead
Payment terms: separate price assessments are published for trade done on a pre-payment basis and for trade done on a gradual-payment basis
VAT: two sets of assessments are published for each currency/unit pair and payment terms — including VAT and excluding VAT

Basis

Midpoint basis differentials are published for the following markets:

Zeebrugge-NBP (p/th, €/MWh)
ZTP-TTF (€/MWh)
ZTP-Zeebrugge (€/MWh)
ZTP-Germany VTP (Trading Hub Europe) (€/MWh)
TTF-Zeebrugge (€/MWh)
Gaspool-TTF (€/MWh)
NCG-Gaspool (€/MWh)
NCG-TTF (€/MWh)
Germany VTP (Trading Hub Europe)-TTF (€/MWh)
Germany VTP (Trading Hub Europe)-NCG (€/MWh)
Germany VTP (Trading Hub Europe)-Gaspool (€/MWh)
Peg-Zeebrugge (€/MWh)
Peg-TTF (€/MWh)
NBP-TTF ($/mn Btu)
Austria VTP-NCG (€/MWh)
Austria VTP-PSV (€/MWh)
Austria VTP-Germany VTP (Trading Hub Europe) (€/MWh)
PSV-TTF (€/MWh)
PSV-NCG (€/MWh)
PSV-Germany VTP (Trading Hub Europe) (€/MWh)
Czech Republic VTP-NCG (€/MWh)
Czech Republic VTP-Austria VTP (€/MWh)
Slovak VTP-NCG (€/MWh)
Slovak VTP-Austria VTP (€/MWh)
MGP-NCG (€/MWh)
MGP-Austria VTP (€/MWh)
Ukraine-MGP (ex-VAT, €/MWh)
Ukraine-Slovak VTP (ex-VAT, €/MWh)

Everyday prices

Everyday prices are the price of gas for delivery on each calendar day, even those on which Argus European Natural Gas is not published. For working days during the month, the assessment for the day-ahead contract delivering that day is included in the series. For weekends and holidays, the weekend assessment for those periods, published immediately before the start of delivery is included in the series.

Everyday prices are published as part of the Argus European Natural Gas data service.

Everyday prices are published for:

- Austria VTP
- Czech Republic VTP
- Gaspool
- MGP
- NBP (p/th)
- NBP (€/MWh)
- NCG
- Peg
- PSV
- TTF
- Zeebrugge

Conversions

Unless specified above, currency conversions are calculated using the relevant period on the appropriate exchange rate curve also published in the Argus European Natural Gas report with a 16:30 London timestamp.

On the final working day preceding 25 December and 1 January, the exchange rate timestamp is 11:00 London time.

Exchange rates are expressed to five decimal places, and converted assessments are rounded to three decimal places using normal rounding from 0.0005 upwards.

Energy conversions use the factors 1 therm = 0.1mn Btu = 29.3071 KWh = 0.1055 GJ

Indexes

Argus monthly buy-sell indexes

These indexes are a running monthly average of the end-of-day bid-offer assessments reported in the Argus European Natural Gas report.

Indexes are published for each of:

- NBP: day-ahead, current month and front month (NBP day-ahead and front month indexes are referred to as the "Argus day ahead" and Argus front month" index in the printed report)
- Zeebrugge: day-ahead, current month and front month
- ZTP: day-ahead and front month
- TTF: day-ahead and front month
- Gaspool: day-ahead and front month
- NCG: day-ahead and front month
- Germany VTP (Trading Hub Europe): front month
- Peg: day-ahead and front month
- Austria VTP: day-ahead and front month
- PSV: day-ahead and front month
- PVB: front month
- Czech Republic VTP: day-ahead and front month
- Turkey: day-ahead
- Slovak VTP: day-ahead and front month
- MGP: day-ahead and front month

The average includes values for the days on which the report was published during the current month. The final indexes should be taken as those published on the last UK working day of the month.

For example, the NBP front-month index on the first publication date of the month is equal to the midpoint of the bid-offer assessment for the NBP front-month contract published that day. On the second publication day of the month, the index is equal to the average of the midpoints of the bid-offer assessments for the NBP front-month contract published on the first and second publication day of the month.

Volume-weighted average indexes

Argus publishes a series of volume-weighted average price indexes.

The indexes are the volume-weighted average of trade reported by Argus that meets the specifications below.

Outliers and duplicates

Argus scrutinises all trades before including them in any index or assessment and may exclude trades that are not considered repeatable or representative of the market at the time.

Trades excluded from the index calculation are databased and flagged as excluded.

Two parties reporting otherwise identical trades will be assumed to be counterparties to the same deal, unless Argus is able to confirm otherwise.

Rounding

All volume-weighted average indexes are rounded to three decimal places.

All-day indexes

All-day indexes include trades completed between 6am and 5pm London time, inclusive. For guidance, trades completed at precisely 5:00:00pm are included in the index and those completed at 5:00:01pm are not.

All-day indexes are published for:
- NBP day-ahead, weekend, month-ahead (p/th)
- TTF day-ahead, weekend, month-ahead (€/MWh)
- NCG day-ahead, weekend, month-ahead (€/MWh)
- Gaspool day-ahead, weekend, month-ahead (€/MWh)
- Peg day-ahead, weekend, month-ahead (€/MWh)
- Austria VTP day-ahead, weekend, month-ahead (€/MWh)
- PSV day-ahead, weekend, month-ahead (€/MWh)

Weekend all-day volume-weighted average indexes are published on Fridays, or the last publication date immediately preceding a weekend or public holiday. The definition of weekend trade follows the same logic as the production of weekend price assessments. Weekend assessments cover the next weekend after the day of publication, except when a UK public holiday falls in the middle of a week, when the weekend price published between the weekend and the public holiday will refer to the public holiday(s).

The day-ahead and weekend index series can be combined to provide a volume-weighted average of trade for each day in the calendar year.

Month-to-date indexes

Month-to-date indexes include trades completed between 6am and 5pm London time on publication days. For guidance, trades completed at precisely 5:00:00pm are included in the index and those completed at 5:00:01pm are not. The final indexes should be taken as those published on the last UK working day of the month.

Month-to-date indexes are published for:
- NBP day-ahead, month-ahead (p/th)
- TTF day-ahead, month-ahead (€/MWh)
- NCG day-ahead, month-ahead (€/MWh)
- Gaspool day-ahead, month-ahead (€/MWh)
- Peg day-ahead, month-ahead (€/MWh)
- Austria VTP day-ahead, month-ahead (€/MWh)
- PSV day-ahead, month-ahead (€/MWh)

Holiday timing

On the last publication date before 25 December and 1 January, all-day indexes include trades completed between 6am and noon London time, inclusive. For guidance, trades completed at precisely 12:00:00 are included in the index and those completed at 12:00:01 are not.

Fall-back methodologies in the absence of trade data

If no index-relevant trades are accepted for inclusion in a given volume-weighted average, Argus will publish the midpoint of the corresponding market price assessment as the index.

Contributing to Argus volume-weighted average indexes

Argus is constantly seeking to increase the number of companies willing to provide market data. Please contact eng@argusmedia.com for more information about contributing market information to the assessment and index formation process.

Argus within-day index

The Argus within-day index is the volume-weighted average price of all within-day NBP deals recorded in Argus European Natural Gas on the day of publication.

Argus current-month volume-weighted average prices

Argus current-month volume-weighted average prices are running, volume-weighted monthly averages of the deals recorded in Argus European Natural Gas for the current month during the current month. Indexes are produced for the NBP and Zeebrugge markets. The Zeebrugge average includes deals done at both the Zeebrugge hub and the Zeebrugge flange. The indexes are recorded in p/th, but the Zeebrugge index is also converted into €/MWh and €/GJ.

Volatility

For most Argus European Natural Gas price assessments Argus publishes an annualised historic volatility measure showing the variation of that price series over time.

Volatility is calculated as the square root of the population variance of the 20 logarithmic differences of the prices published on two consecutive days over a period of 21 trading days. The volatility is annualised by multiplying by the square root of 252, a standard measure of the number of trading days in a year, and multiplied by 100 to express the resulting figure as a percentage.

$$x_n = ln\,Price_{day\,n} - ln\,Price_{day\,n-1}$$

$$Volatility = 100 * \sqrt{252 * var(\{x_1, x_2 \ldots x_{20}\})}$$

Forward timing example on 19 May 2014

Reference month	m1	m2	m3	m4	m5	m6	m7	m8	m9	FX
Apr 14 (historic)	Mar 14	Feb 14	Jan 14	Dec 13	Nov 13	Oct 13	Sep 13	Aug 13	Jul 13	April 2014 ECB average
May 14	Apr 14	Mar 14	Feb 14	Jan 14	Dec 13	Nov 13	Oct 13	Sep 13	Aug 13	May-to-date ECB average
Jun 14	May 14	Apr 14	Mar 14	Feb 14	Jan 14	Dec 13	Nov 13	Oct 13	Sep 13	Latest June forward rate (Argus)
Jul 14	Jun 14	May 14	Apr 14	Mar 14	Feb 14	Jan 14	Dec 13	Nov 13	Oct 13	Latest July forward rate (Argus)
Aug 14	Jul 14	Jun 14	May 14	Apr 14	Mar 14	Feb 14	Jan 14	Dec 13	Nov 13	Latest August forward rate (Argus)

Key		Monthly average (historic)
		Month-to-date average
		Latest Argus assessment

Argus Brent 901 index

The Argus Brent 901 index is an average of Argus North Sea forward crude oil price assessments calculated to reflect the crude oil price references common in long-term gas supply contracts.

Calculation

The index is published in €/bl and is calculated as:
The average of monthly averages, rounded to two decimal places, of the daily Argus assessment of North Sea crude for the nine months before the reference month.

For each publication day, the Argus North Sea forward month one assessment will be used, except on the day of expiry of the forward month one assessment, in which case the Argus North Sea forward month two assessment will be used.

The resulting nine-month average is rounded to two decimal places and converted into euros using the average of the €/$ reference rates as published by the European Central Bank during the reference month. The final index value in €/bl is then rounded to two decimal places.

Forward timing

Argus publishes the Argus 901 index for the current month and for three forward months.

For example, on 19 May, Argus would publish index values for May (commonly referred to as "reference month"), June, July and August.

During a reference month, the crude oil component of the index will be fixed, being the average of the nine previous months. The currency exchange component of the calculation will be the evolving average for the month-to-date of the European Central Bank published rates, rounded to four decimal places.

For the first month after the reference month, the crude oil component will include the month-to-date average of the front-month crude prices as described above, along with the final averages of the eight previous months .The currency exchange component of the calculation will be the latest available exchange rate for the reference month, as published by Argus.

Calculation example

For the second and third month after the reference month, the crude oil component will include the month-to-date average of front-month crude prices, as described above, and the latest Argus crude price assessments for the second (and third) month forward, along with the final average for the previous months. The currency exchange component of the calculation will be the latest available exchange rate for the reference month, as published by Argus.

On UK public holidays, a schedule of which is available at www.argusmedia.com, Argus will not publish Argus Brent 901 index values. The European Central Bank exchange rate for the holiday will be used in calculation of subsequent month-to-date exchange rate averages.

If there is no European Central Bank exchange rate available for an Argus publication date, the previous month-to-date exchange rate average will be used.

European long-term contract prices

Turkish long-term contract prices

Argus European Natural Gas also includes assessed prices for key Turkish long-term import contracts from Russia, Iran and Azerbaijan's Shakh Deniz 1.

Argus continually assesses the terms and structures of the long-term contracts and uses Argus assessments of various crude and oil products prices to calculate the long-term import prices. Prices are published daily in TL/'000m^3, $/'000m^3 and $/mn Btu. Prices are published for delivery during the first forward quarter and are republished for the current and two previous quarters for ease of comparison.

European oil-indexed and hybrid contract prices

Argus European Natural Gas contains a series of estimated long-term contract prices based on common oil-indexed and hybrid formulas common to long-term supply contracts.

In addition to the base oil-indexed price series, discounted and hybrid prices are also published for the following discount and market component structures.

Discount
- 5pc discount
- 7.5pc discount
- 10pc discount
- 12.5pc discount
- 15pc discount
- 20pc discount

TTF-based
- Oil index 90pc + 10pc TTF
- Oil index 80pc + 20pc TTF
- Oil index 70pc + 30pc TTF
- Oil index 60pc + 40pc TTF
- Oil index 50pc + 50pc TTF

NCG-based
- Oil index 90pc + 10pc NCG
- Oil index 80pc + 20pc NCG
- Oil index 70pc + 30pc NCG
- Oil index 60pc + 40pc NCG
- Oil index 50pc + 50pc NCG

Austria VTP-based
- Oil index 90pc + 10pc Austria VTP
- Oil index 80pc + 20pc Austria VTP
- Oil index 70pc + 30pc Austria VTP
- Oil index 60pc + 40pc Austria VTP
- Oil index 50pc + 50pc Austria VTP

See the Argus Gas Connections European Long-Term Contract Prices methodology.

Spark spreads

Argus reports the price of traded over-the-counter spark spread markets and publishes calculated spark and dark spreads.

Assessed spark spreads
Assessments are for physically-settled, over-the-counter (OTC) forward UK spark spreads and are the prevailing price at the market close.

See the Argus European Electricity methodology.

Calculated spark and dark spreads
Argus spark and dark spreads provide illustrative information about generation economics.

Published spark and dark spreads are derived from Argus' power, fuel and emissions price assessments and are not an assessment of trade in the over-the-counter spark-spread market.

A full set of spark and dark spreads is published in Argus Direct and is available through Argus data feeds. A limited range of spark and dark spreads is published in the print editions of Argus European Electricity, Argus Coal Daily International, Argus European Natural Gas and Argus European Emissions Markets. See the Argus European Electricity methodology for more details and a full list of published generating margins.