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ARGUS US ELECTRICITY

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The most up-to-date Argus US Electricity methodology is available on www.argusmedia.com

Introduction

Argus Media operates a price reporting service that is recognized throughout the world for its impartial, reliable and accurate coverage of key energy commodity markets. Argus prices are used extensively in gas and power indexation in Europe, and globally for crude oil and products, as well as other markets such as coal and emissions.

Argus US electricity prices are based on daily survey data received from the non-commercial departments of market participants. Day-ahead peak and off peak volume-weighted price indexes and assessments are compiled based on this data. Argus publishes the total volume of trades reported, the number of transactions, the high price, low price, and the volume weighted average price where sufficient data exists.

In low-liquidity markets when insufficient data is received to support a volume weighted index calculation (less than three trades of 25MW minimum each are received) a clearly marked price assessment is made. The Argus assessment is an intelligent range of trade within the timeframes set out in more detail below. Volume and number of trades are left blank when an assessment is made.

Markets covered

The Argus US electricity service covers 20 major US traded bulk power markets providing daily peak and off-peak price indexes for next-day power derived from reported transactions.

The markets for which daily price indexes or assessments are published include:

East: NY Zone G; PJM West; NE Pool

ERCOT: Houston; North; South; West

Midwest: Cinergy; Northern Illinois; PJM AEP-Dayton

Southeast: Entergy; Southern

West: California-Oregon Border (COB); Four Corners; Mead; Mid-C (Mid-Columbia); Mona; NP 15; Palo Verde; SP 15

Survey method and verification

Argus US peak and off peak electricity price indexes are based on data submitted daily to Argus voluntarily by the risk-management divisions or non-commercial departments of market participants.

Argus currently only incorporates physical trade data reported directly to it by market participants for the volume-weighted averages. Argus indexes do not include financial transactions

or information obtained separately from commodity exchanges, except in the NY Zone-G and California markets where financial contracts provide an indicative value for nodal day-ahead power across the ISO region.

Argus reserves the right to exclude deals from the range of trade should a transaction fall well outside the channel of trade, defined as outside two standard deviations from the mean, or raises other concerns. In these situations, Argus applies an outlier procedure, reviewed below, which is based on consistent statistical measurement.

All data submitted is treated confidentially and used only to establish the index or form a market price assessment. The Argus electricity index procedures are audited at least annually by the company's global compliance officer. Argus publishes prices that report and reflect prevailing levels for open-market arm's length transactions (please see the Argus Global Compliance Policy for a detailed definition of arm's length).

Assessments

In low-liquidity markets, Argus publishes assessments based on an intelligent range of trade. Argus assesses the range within which electricity did or could have traded, based on actual deals and bids and offers throughout the trading day for next-day power, historical price relationships and other market conditions.

Assessments are clearly identifiable from volume-weighted average indexes. The volume and number of trades will be blank where an assessment is made.

During the course of the day Argus contacts a variety of market participants in each region by phone. Data obtained through phone contact is used exclusively for assessments at illiquid points and to obtain information regarding daily activity in the bulk electricity market, as well as fundamental information such as generation outages and other daily events that affect the market. Price information gleaned from these phone conversations is not included in the volume-weighted indexes, although it is used to help verify the bid/offer spreads reported in the non-volume weighted daily price assessments.

For markets in which physical trading is organized and managed by an Independent System Operator (ISO) or Regional Transmission Operator (RTO), Argus also consults day-ahead hourly prices from day-ahead trading settlements published by the ISO/RTO after the conclusion of normal trading. By means of averaging the hourly prices for the standard 16-hour peak and 8-hour off-peak periods, that data is used to formulate an approximation of the value of standard peak and off-peak contracts. Those approximations are used in concert with other available market information to arrive at an accurate price for those contracts for a given trading day.

The assessments represent the mean at which electricity traded or could have traded that day at each location for next day power for any business activity conducted up until 2:30 pm Eastern Prevailing Time (EPT).

Index calculation method

Argus publishes US electricity prices for firm, pre-scheduled day-ahead markets. A list of trading locations for which indexes may be published has been included below. The list is updated periodically to reflect liquidity changes at these key hubs. An index will only be published when three trades each of 25MW or more are received for a hub location.

Argus publishes the range low price, high price, volume-weighted average price, the volume, the number of transactions and the change from the previous day. The volume is expressed in MW and the prices in \$/MWh.

Only firm deals greater than 25MW are included in each index. Firm delivery means that a contract for liquidated damages in the event of non-performance is in place. Swaps, contracts for difference, and derivative-linked deals are not included except in the NY Zone-G and California markets where financial contracts provide an indicative value for nodal day-ahead power across the ISO region.

Indexes and assessments are generally of two types: peak energy, delivered during hours ending 7 through 22 (6 am to 10 pm), and off-peak energy, delivered for the first 6 hours of the day as well as hours 23 and 24.

The volume weighted average index price is calculated by taking the sum of the product of price and volume for each transaction and dividing this amount by the total volume transacted at each hub location. In the following where P represents price and V is volume:

$$\text{Index price} = \frac{\text{Sum}(P \times V)}{\text{Sum}(V)}$$

Weekends and Holidays

While the indexes and assessments are generally for next-day power, weekend business is handled differently in the Western Electricity Coordinating Council (WECC) versus the remainder of the North American Electric Reliability Corporation regions.

For areas outside of the WECC, prices are reported for next day power, with the exception of Friday trading representing Monday delivery. Weekends are not consistently included in the spot markets outside of the Western Interconnect.

For the WECC markets, there is a slight difference in weekend methodology. Prices for power flowing Friday and Saturday are reported on Thursday, while prices for power flowing Sunday and Monday are published Friday. In the WECC, the entire day of Sunday, along with the traditional off-peak hours of Monday, are bundled into a single off-peak block of 32 hours.

In the event of government holidays, prices are reported at the earliest day possible, usually the day before the holiday.

Providing data to Argus

Argus requests that data providers submit data from the risk office or non-commercial department separate from the trading floor. Reporting companies should follow the procedures set out below.

- Report complete trade data, advising Argus as soon as possible of any omissions or errors.
- Each transaction should include the delivery location of the trade, date, beginning and ending flow date, volume, price and whether it was a buy or sell transaction. If possible, indicate counterparty and name of trading platform or broker. Argus understands that many contracts prohibit the disclosure of counterparty information.
- Report all fixed-price transactions, including day-ahead, balance of month and forward deals. Include all deals whether or not Argus publishes an index for each hub. Send data to power@argusmedia.com and power@argus.myzen.co.uk.
- Day-ahead deals include all deals done for delivery through the following business day. Day-ahead trade data should be sent to Argus by 4pm EPT daily.
- Include financial as well as physical deals but clearly mark them as such.
- Provide the name and contact information for at least two representatives from the reporting office that can answer questions about the data submitted.

Outliers, corrections and duplicates

Trades that deviate significantly from the median of trades reported for that delivery point are scrutinized by Argus editors and excluded from the index if they are deemed not representative of market conditions at the time of the trade. For index locations with ten daily trades or more, a deviation is considered significant if the price diverges by more than two standard deviations from the mean of trades. Argus reviews possible exclusion of these deals based on skewness and kurtosis distribution characteristics and volumetric parameters. For indexes comprised of fewer than ten daily trades, those trades that fall outside the bid/ask or trading range of the day are subject to possible exclusion. If an error is suspected an attempt is made to contact the data provider for verification.

Argus does accept additional trade data submitted after the cut-off time listed above. Corrections that may have a significant impact on a price point are considered on an individual basis. If Argus learns of an error, its data manager or other senior official will assesses whether the error had an impact on an index or assessment. If correcting the error will not make a significant difference to the published figures, a correction will not be issued. In all cases, Argus should be made aware of any errors in data submitted.

A significant error is deemed to be one that has a price impact greater than 2 percent from the published price that was reported

within one week of the trade date for a liquid trading point. For errors reported later than one week or at less liquid trading points, a senior Argus official or editor will decide whether the error is significant based on other factors including: the absolute price change, whether the error affected the range of the day, how many counterparties are affected and the impact on volume. Errors reported more than one month after the transaction date are not considered without evidence of significant inaccuracies in the Argus data series if the mistake is not rectified.

Because few data contributors provide counterparty information, it is very difficult to match the buy and sell side of a transaction to prevent double counting. Therefore Argus indexes may include both sides of the same transaction. This should not skew the index in any significant way. If the industry starts reporting more information on counterparties or time of transaction, Argus will be in a better position to report volume more representative of actual power flow.

Relationship to industry

Our methodology is developed in consultation with the industry, in order to provide a service that is useful. Argus seeks to report the market in the way it is traded. We do not feel it is our role to change the way industry seeks to trade or hedge. Our goal is to develop indexes that are reliable and consistent enough to

be used as price benchmarks in spot trade and term contracts. Argus editors and managers are available to discuss our methodology and understand the needs of our clients for robust price reporting.

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. This 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 any 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 index formation process.

Any questions about Argus indexes and methodology should be addressed to Business Development Manager Caroline Gentry on 202 349 2866 (caroline.gentry@argusmedia.com) or Head of Gas and Power Services David Givens (david.givens@argusmedia.com) on 202 349 2891.

Trading Locations for Argus Daily US Electricity Price Indexes

East Markets

NY Zone-G

Other IDs: Hudson Valley

Details: New York ISO Zone-G hub consists of four sub-regions where power is delivered into New York's Hudson Valley.

Grid operator: New York ISO

Market structure: Nodal LMP

Product(s) assessed: Financial swap settled against NYISO day-ahead market clearing price.

On-peak hours: Hours ending 8 through 23

Off-peak hours: Hours ending 1 through 7 and 24

PJM West

Other IDs: PJM Western Hub, PJM-W, Western

Details: The PJM Western hub pricing point comprises a basket of 115 nodes stretching from Erie, PA to Washington, D.C.

Grid operator: PJM Interconnection

Market structure: Nodal LMP

Product(s) assessed: Firm physical power with liquidated damages

On-peak hours: Hours ending 8 through 23

Off-peak hours: Hours ending 1 through 7 and 24

NE Pool

Other IDs: Massachusetts Hub, Mass Hub, ISO New England Internal Hub

Details: The NE Pool hub pricing point comprises about 30 nodes located in central Massachusetts that represent much of the bilateral power trading that occurs within the six-state New England region.

Grid operator: ISO New England

Market structure: Nodal LMP

Product(s) assessed: Firm physical power with liquidated damages

On-peak hours: Hours ending 8 through 23

Off-peak hours: Hours ending 1 through 7 and 24

Entergy

Other IDs: Into Entergy

Details: The Entergy pricing hub represents power delivered into the Entergy control area, which covers parts of Arkansas, Louisiana, and Mississippi, as well as a portion of eastern Texas not overseen by ERCOT.

Grid operator: Entergy Corp.

Market structure: No organized market

Product(s) assessed: Firm physical power with liquidated damages.

On-peak hours: Hours ending 7 through 22

Off-peak hours: Hours ending 1 through 6 and 23 through 24

Into Southern

Other IDs: Southern, SoCo, Into SoCo

Details: Into Southern consists of power scheduled for delivery into the Southern Company Transmission system either (a) through an interconnection or interface on the Southern Company transmission system border or (b) from a registered source of generation within the Southern Company transmission system. The system spans a portion of the SERC area from Georgia to Mississippi, and extends into the Florida Panhandle.

Grid operator: Southern Company

Market structure: No organized market

Product(s) assessed: Firm physical power with liquidated damages

On-peak hours: Hours ending 7 through 22

Off-peak hours: Hours ending 1 through 6 and 23 through 24

Central Markets

Cinergy

Other IDs: N/A

Details: The Cinergy pricing hub comprises 337 nodes within the portion of the Midwest ISO grid that covers areas of Indiana, northwestern Kentucky, and southwestern Ohio.

Grid operator: Midwest Independent System Operator (MISO)

Market structure: Nodal LMP

Product(s) assessed: Firm physical power with liquidated damages

On-peak hours: Hours ending 8 through 23

Off-peak hours: Hours ending 1 through 7 and 24

Northern Illinois

Other IDs: NI Hub

Details: The PJM Northern Illinois pricing hub comprises 232 nodes located in the Commonwealth Edison control area in northern Illinois.

Grid operator: PJM Interconnection

Market structure: Nodal LMP

Product(s) assessed: Firm physical power with liquidated damages

On-peak hours: Hours ending 8 through 23

Off-peak hours: Hours ending 1 through 7 and 24

AEP Dayton

Other IDs: PJM AD, AD Hub

Details: The PJM AEP Dayton pricing hub comprises 1161 nodes found in the American Electric Power and Dayton Power and Light control areas in Ohio and Michigan.

Grid operator: PJM Interconnection

Market structure: Nodal LMP

Product(s) assessed: Firm physical power with liquidated damages

On-peak hours: Hours ending 8 through 23

Off-peak hours: Hours ending 1 through 7 and 24

ERCOT Houston

Other IDs: Houston

Details: Represents transactions within ERCOT's Houston zone.

Grid operator: Electric Reliability Council of Texas (ERCOT)

Market structure: Zonal

Product(s) assessed: Firm physical power with liquidated damages

On-peak hours: Hours ending 7 through 22

Off-peak hours: Hours ending 1 through 6 and 23 through 24

ERCOT North

Other IDs: North

Details: Represents transactions within ERCOT's North zone.

Grid operator: Electric Reliability Council of Texas (ERCOT)

Market structure: Zonal

Product(s) assessed: Firm physical power with liquidated damages

On-peak hours: Hours ending 7 through 22

Off-peak hours: Hours ending 1 through 6 and 23 through 24

ERCOT South

Other IDs: South

Details: Represents transactions within ERCOT's South zone.

Grid operator: Electric Reliability Council of Texas (ERCOT)

Market structure: Zonal

Product(s) covered: Firm physical power with liquidated damages

On-peak hours: Hours ending 7 through 22

Off-peak hours: Hours ending 1 through 6 and 23 through 24

ERCOT West

Other IDs: West

Details: Represents transactions within ERCOT's West zone.

Grid operator: Electric Reliability Council of Texas (ERCOT)

Market structure: Zonal

Product(s) covered: Firm physical power with liquidated damages

On-peak hours: Hours ending 7 through 22

Off-peak hours: Hours ending 1 through 6 and 23 through 24

Product(s) assessed: Firm physical power with liquidated damages

On-peak hours: Hours ending 7 through 22

Off-peak hours: Hours ending 1 through 6 and 23 through 24

Mead

Other IDs: none

Details: The Mead hub pricing point consists of the switchyard for Hoover Dam, located outside Las Vegas, Nevada.

Grid operator: Various utilities in the region act as balancing authorities

Market structure: No organized market

Product(s) assessed: Firm physical power with liquidated damages

On-peak hours: Hours ending 7 through 22

Off-peak hours: Hours ending 1 through 6 and 23 through 24

Mid-Columbia

Other IDs: Mid-C

Details: Mid-Columbia is a general reference to power trading at five hydroelectric dams along a 118-mile stretch of the Columbia River in the Pacific Northwest. The five dams are operated by the PUDs for Chelan, Douglas, and Grant counties in Washington state.

Grid operator: Various utilities in the region act as balancing authorities

Market structure: No organized market

Product(s) assessed: Firm physical power with liquidated damages

On-peak hours: Hours ending 7 through 22

Off-peak hours: Hours ending 1 through 6 and 23 through 24

Mona

Other IDs: none

Details: The Mona hub pricing point represents a substation in central Utah linked to major generating plants in the area, includ-

West Markets

COB

Other IDs: California-Oregon Border

Details: The COB hub pricing point consists of the Captain Jack and Malin substations on the California-Oregon Intertie, an AC transmission line linking power generation in the Pacific Northwest with the large load centers in California.

Grid operator: Various utilities in the region act as balancing authorities

Market structure: No organized market

Product(s) assessed: Firm physical power with liquidated damages

On-peak hours: Hours ending 7 through 22

Off-peak hours: Hours ending 1 through 6 and 23 through 24

Four Corners

Other IDs: FC

Details: The Four Corners hub pricing point consists of the switchyard of the 2,040MW Four Corners coal-fired generating plant located in Fruitland, New Mexico, in the area where the borders of Arizona, Colorado, New Mexico, and Utah come together.

Grid operator: Various utilities in the region act as balancing authorities

Market structure: No organized market

ing the Intermountain Power Project located in the Great Basin region of western Utah.

Grid operator: Various utilities in the region act as balancing authorities

Market structure: No organized market

Product(s) assessed: Firm physical power with liquidated damages

On-peak hours: Hours ending 7 through 22

Off-peak hours: Hours ending 1 through 6 and 23 through 24

NP-15

Other IDs: North of Path 15, North Path

Details: The NP-15 hub pricing point comprises nodes within CAISO's former northern congestion zone, the area north of the Path 15 AC transmission line.

Grid Operator: California Independent System Operator (CAISO)

Market structure: Nodal LMP

Product(s) assessed: Firm physical power with liquidated damages

On-peak hours: Hours ending 7 through 22

Off-peak hours: Hours ending 1 through 6 and 23 through 24

Palo Verde

Other IDs: PV

Grid operator: Various utilities in the region act as balancing authorities

Market structure: No organized market

Product(s) assessed: Firm physical power with liquidated damages

On-peak hours: Hours ending 7 through 22

Off-peak hours: Hours ending 1 through 6 and 23 through 24

SP-15

Other IDs: South-of-Path 15, South Path

Details: The SP-15 hub pricing point comprises nodes within CAISO's former southern congestion zone, the area south of the Path 15 AC transmission line.

Grid operator: Independent System Operator (CAISO)

Market structure: Nodal LMP

Product(s) assessed: Firm physical power with liquidated damages

On-peak hours: Hours ending 7 through 22

Off-peak hours: Hours ending 1 through 6 and 23 through 24