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ARGUS NORTH AMERICAN ELECTRICITY FORWARD CURVES

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The most up-to-date Argus North American Electricity Forward Curves methodology is available on www.argusmedia.com

Introduction

Argus North American Electricity Forward Curves deliver daily assessments of forward electricity prices and heat rates at more than 50 locations across North America.

Argus forward curves provide an independent view of forward prices, informed by a variety of data sources for both liquid and illiquid markets. Argus forward curves are not intended to be “predictive” and do not represent a forecast of what electricity will be worth in future physical prompt markets.

Definitions and curve length

Argus assesses forward physical electricity markets at some locations and forward financial markets (swap futures) at others (see Table 3).

For both physical and financial assessments, the base period assessed is the calendar month, and Argus assesses multi-month periods (e.g. quarterly, seasonal) as an average of the constituent monthly assessments, weighted according to the number of peak, off-peak, RTC, 2*16, or 7*8 hours over the entire period.

Forward physical prices reflect the market’s valuation of a standard quantity of firm physical electricity delivered during predefined hours (see Table 1) over the course of a month or multi-month period (see Table 2). Forward financial prices reflect the market price of a swap future that will settle against the monthly average of:

- the location’s day-ahead market clearing price
- the locational marginal price (LMP)
- the average of realtime LMPs for the appropriate hours

For physical delivery points and financial settlement details, see Table 3.

Timing

Assessments reflect prices at the close of CME’s Henry Hub futures primary trading session, normally 14:30 EST.

Source data

Argus uses transactions, bids and offers, locational spreads and time spreads to derive forward prices. Market information is gathered from numerous sources, including brokers, traders, and mid-

and back offices of energy companies. Information that Argus cannot validate may be excluded from the assessment process. Transactions executed, bids placed, and offers made after the Nymex close are not considered for that day’s assessments.

Means of assessment:

Argus assesses each market at the midpoint of an end-of-day bid-offer spreads where possible. If the bid-offer spread is unusually wide by historic standards, Argus may assess the market elsewhere within the bid-offer range. If no bid-offer spread exists, Argus may base its assessment on the latest validated transaction. Argus may ignore transactions if they fall outside the bid-offer range prevailing at the Nymex close, are above a prevailing offer, or are below a prevailing bid.

In the absence of bid, offer, and transactional data, Argus will assess the market on the basis of its relationship to a more liquid market, so long as that relationship shows a historical r2 correlation of over 90pc. Relationships are rechecked for a 90pc r2 correlation at least every two weeks. Argus may assess the illiquid market by:

- Applying the historic spread between the two markets to its assessment of the liquid market
- Applying the liquid market’s day-on-day change to the price at which it assessed the illiquid market on the previous Nymex business day
- Applying a day-on-day change inferred from liquid market’s heat rate (for heat rate calculations, see below)

Heat rates

Please see the [Argus North American Heat Rate Forward Curves methodology](#).

Currency and units of assessment:

Electricity assessments are made in US dollars per megawatt hour (MWh), unless otherwise specified.

Updates to methodology

Argus methodologies are constantly updated and revised. The latest available methodology (which may supersede the one you are reading) is available at www.argusmedia.com.

Table 1: Hours assessed

Assessment	System operator									
	FRCC	ISO-NE	MISO	NYISO	PJM	SERC	SPP	VACAR	ERCOT	WSPP
On Peak	07:00-2300, Monday-Friday, except NERC holidays								06:00-22:00, Monday-Friday, except NERC holidays	06:00-22:00, Monday-Saturday, except NERC holidays
Off Peak	00:00-07:00 and 23:00-24:00, Monday-Friday; 00:00-24:00, Saturday-Sunday, 00:00-24:00 NERC holidays								00:00-06:00 and 22:00-24:00, Monday - Friday; 00:00-24:00, Saturday-Sunday; 00:00-24:00 NERC holidays	00:00-06:00 and 22:00-24:00, Monday - Saturday; 00:00-24:00, Sunday; 00:00-24:00 NERC holidays
RTC	00:00-24:00									
2x16	06:00-22:00 Saturday-Sunday									
7x8	00:00-06:00 and 22:00-24:00, Monday-Sunday									

Table 2: Periods assessed

Duration (inclusive)	Number of periods assessed	Earliest period assessed
	84	Month after current month
	6/7	Year after current year
	24	Quarter after current quarter
1 January – last day February	6	Next season
1 March – 30 April	6	Next season
1 July – 31 August	6	Next season

**longer-term curves are available in Argus North American Electricity Long-Term Forward Curves*

Table 3: Locations, price types, delivery points and corresponding natural gas markets

Region	Market	Product assessed	Physical power delivers to:	Settles against monthly average of
ERCOT	Houston Load Zone	Physical	See ERCOT nodal protocols, section 3	
	Houston Zone	Physical	ERCOT's Houston Generation Zone	
	North Load Zone	Physical	See ERCOT nodal protocols, section 3	
	North Zone	Physical	ERCOT's North Generation Zone	
	South Zone	Physical	ERCOT's South Generation Zone	
	South Load Zone	Physical	See ERCOT nodal protocols, section 3	
	West Zone	Physical	ERCOT's West Generation Zone	
	West Load Zone	Physical	See ERCOT nodal protocols, section 3	
FRCC	Florida	Physical	FRCC control area	
ISO-NE	Connecticut Zone	Swap future		ISO New England's Connecticut Zone day-ahead LMP
	Massachusetts Hub	Swap future		ISO New England's Mass Hub day-ahead LMP
	Maine Zone	Swap future		ISO New England's Maine Zone day-ahead LMP
	NEMA Zone	Swap future		ISO New England's Northeast Massachusetts day-ahead LMP
	New Hampshire Zone	Swap future		ISO New England's New Hampshire Zone day-ahead LMP
	Rhode Island Zone	Swap future		ISO New England's Rhode Island Zone day-ahead LMP
	SEMA Zone	Swap future		ISO New England's SEMA Zone day-ahead LMP
	WCMA Zone	Swap future		ISO New England's WCMA Zone day-ahead LMP
MISO	Entergy	Physical	Parts of AR, LA, MS, TX	
	Illinois Hub	Physical	Central, Southern, Southwest IL	
	Indiana Hub	Swap future		MISO's Indiana Hub real-time LMP
	Michigan Hub	Physical	Lower MI	
	Minnesota Hub	Physical	Minneapolis and St Paul, MN	
	Arkansas Hub	Physical	Arkansas	
	DEOK Hub	Physical	Duke Energy Ohio Kentucky	
	Louisiana Hub	Physical	Louisiana	
	Texas Hub	Physical	Texas	
NYISO	Zone A	Swap future		NYISO Zone A day-ahead LBMP
	Zone B	Swap future		NYISO Zone B day-ahead LBMP
	Zone C	Swap future		NYISO Zone C day-ahead LBMP
	Zone D	Swap future		NYISO Zone D day-ahead LBMP
	Zone E	Swap future		NYISO Zone E day-ahead LBMP
	Zone F	Swap future		NYISO Zone F day-ahead LBMP
	Zone G	Swap future		NYISO Zone G day-ahead LBMP
	Zone H	Swap future		NYISO Zone H day-ahead LBMP
	Zone I	Swap future		NYISO Zone I day-ahead LBMP
	Zone J	Swap future		NYISO Zone J day-ahead LBMP
	Zone K	Swap future		NYISO Zone K day-ahead LBMP

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Table 3: Locations, price types, delivery points and corresponding natural gas markets

Region	Market	Product assessed	Physical power delivers to:	Settles against monthly average of
PJM	AD Hub	Swap future		PJM's AD Hub real-time LMP
	ATSI Zone	Swap future		PJM's ATSI Zone day-ahead LMP
	BGE Zone	Swap future		PJM's BGE Zone day-ahead LMP
	ComEd Zone	Swap future		PJM ComEd Zone Day-Ahead LMP
	East Hub	Swap future		PJM's East Hub day-ahead LMP
	JCPL Zone	Swap future		PJM's JCPL Zone day-ahead LMP
	Meted Zone	Swap future		PJM's METED Zone day-ahead LMP
	NI Hub	Swap future		PJM's NI Hub real-time LMP
	Peco Zone	Swap future		PJM's PECO Zone day-ahead LMP
	PEPCO Zone	Swap future		PJM's PEPCO Zone day-ahead LMP
	PEPCO DC	Swap future		PJM's PEPCO Zone DC day-ahead LMP
	PEPCO MD	Swap future		PJM's PEPCO Zone MD day-ahead LMP
	PPL Zone	Swap future		PJM's PPL Zone day-ahead LMP
	PSEG Zone	Swap future		PJM's PSEG Zone day-ahead LMP
	West Hub	Swap future		PJM's West Hub real-time LMP
	AECO Zone	Swap future		PJM's AECO Zone day-ahead LMP
	AEP Zone	Swap future		PJM's AEPO Zone day-ahead LMP
	APS Zone	Swap future		PJM's APS Zone day-ahead LMP
	Penelec Zone	Swap future		PJM's Penelec Zone day-ahead LMP
	RECO Zone	Swap future		PJM's RECO Zone day-ahead LMP
Dayton Zone	Swap future		PJM's Dayton Zone day-ahead LMP	
Duquense Zone	Swap future		PJM's Duquense Zone day-ahead LMP	
FE Ohio	Swap future		PJM's FE Ohio day-ahead LMP	
Penn Power	Swap future		PJM's Penn Power day-ahead LMP	
SERC	Southern Hub	Physical	Parts of GA, MS, FL	
SPP	SPP North Hub	Physical	NPPD, OPD, and LES control areas	
	SPP South Hub	Physical	OG&E and AEP control areas	
VACAR	VACAR	Physical	VA, NC, SC	
WSPP	COB	Physical	Captain Jack and Malin substations on CA-OR Intertie	
	Four Corners	Physical	Switchyard of Four Corners power plant in Fruitland, NM	
	Mead	Physical	Switchyard of Hoover Dam, outside Las Vegas, NV	
	Mid Columbia	Physical	Five dams along a 118-mile stretch of Columbia River	
	NP 15	Swap future		CAISO's NP 15 day-ahead LMP
	Palo Verde	Physical	Switchyard at Palo Verde, AZ	
SP 15	Swap future		CAISO's SP 15 day-ahead LMP	

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. If transaction information is submitted in error, and the company submitting informs Argus of the error within 24 hours of the original submission, Argus will make best efforts to correct the price data. After 24 hours, Argus will review both the material effect that the correction will have on the price data and the amount of time that has elapsed from the date of the published price data before deciding whether to issue a correction. After 30 days, data submitters are not expected to file corrections to submitted data.

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).