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ENERGY ARGUS PETROLEUM COKE

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The most up-to-date Energy Argus Petroleum Coke methodology is available on www.argusmedia.com

Introduction

Energy Argus Petroleum Coke is a monthly market report that covers the international markets for petroleum coke. It is one of the leading reports covering markets for petroleum coke and is widely used in pricing of petroleum coke by industry.

The *Energy Argus Petroleum Coke* report contains a variety of price assessments of spot market activity in petroleum coke trade. Spot activity is defined as transactions or negotiations during the month assessed for delivery within the next 90 days.

Assessment process

In illiquid markets, Argus pricing represents an intelligent assessment of the range within which petroleum coke could have traded during the entire trading period. Such assessments are based on bids and offers, price movements for similar commodities, and extensive polling of market participants. 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).

We base our assessments on a market consensus of the commodity value. Argus considers spot transactions and negotiations at the market in question (as in fob US Gulf coast and US west coast), delivered prices netted back for freight, contract renegotiations and estimates of market participants.

Argus will accept information over the phone, via instant messenger, via email, or by other means. Argus strives to verify all deal prices, counterparties, and volumes. Argus reserves the right to exclude deals from the assessment process in some circumstances when those transactions are unrepresentative of the market or cannot be verified.

Forward loading or delivery dates will be considered up to 90 days from the end of the month assessed. Prices for volumes loading or delivering in those 90 days that were negotiated prior to the month assessed will not be considered in the assessment, as they reflect historical not current market fundamentals. Prices for contracts negotiated in the month assessed but for delivery over a term that spans beyond the next 90 days will not be considered in the assessment.

Argus reflects intelligent index values for the grades assessed: where specifications of actual trades differ from the index, we will seek a market consensus as to how to adjust the traded value to properly inform the index specification. Where actual trades are not available, we will assess the value of the grade by seeking a consensus of participants and considering other correlative

markets. Where a range is assessed for a particular grade, it reflects the range of trade for that grade in the month assessed. If there is no trade, it reflects the range within which a willing buyer and seller could have traded during the assessment month. Our survey includes producers, electricity generators, marketers/traders, heavy industry end users and other market participants.

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- or transportation-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.

Corrections policy

Argus will on occasion publish corrections to price assessments after the publication date. We will correct errors that arise from clerical mistakes, calculation error, misreported trade information from sources, or a misapplication of our stated methodology. Argus reviews corrections for material effect on price data and the amount of time that has elapsed from the date of published price data before deciding whether to issue a correction. Argus will not retroactively assess markets based on information learned after the assessments are published.

Confidentiality

Argus asks for details of counterparties from contacts in order to validate deals. But Argus does not publish counterparty names for transactions. Many companies have existing confidentiality agreements with counterparties and can only reveal deals to pricing services like Argus if confidentiality is maintained.

Maintaining confidentiality allows Argus to gather more information and create more robust assessments of the range of trade. Argus is willing to sign confidentiality agreements where necessary in order to facilitate deals reporting.

Commodity specifications

Petroleum coke

Argus produces a range of indexes for the key producing, trading and consuming regions of the US Gulf and west coasts, South America, Europe and Asia. Of these, US Gulf coast is the most significant trading hub and Argus produces indexes for four coke benchmarks in the region. On the US west coast, Argus publishes two benchmarks, for 3.0pc and 4.5pc sulphur. Argus benchmarks allow users to adjust for quality variances in supply contracts, sulphur and HGI. Of the two, sulphur has the most significant price impact and the 4.5pc-over-6.5pc spread can be used to construct discounting mechanisms for sulphur, while the HGI spread can similarly be used.

Argus' delivered coke prices to Europe and to Brazil are produced by adding the relevant coke price to the monthly-average coke freight rate for the route in question from the US Gulf coast. Petroleum coke markets in the Atlantic basin are typically indexed to US Gulf coast coke prices and this calculated value for delivered coke has proved to be a representative value for those deliveries. In the Pacific basin, China and India have been a distinct set of assessments from the traditional US originations and these markets are assessed individually, with independent local price discovery each month.

Coal and coke freight rates

Energy Argus Petroleum Coke publishes indexes of petroleum coke and coal freight rates for a variety of key dry bulk routes. These supramax coke routes include the US Gulf to Brazil; Northwest Europe; and the Spanish Mediterranean and Venezuela to Northwest Europe. The US west coast to Japan is assessed for panamax vessels and handymax coal routes from Colombia's Puerto Bolivar to Northwest Europe, the US Gulf coast and US east coast are also published each month.

Coke and coal freight markets

Route	Vessel type	Typical cargo size
USGC to ARA	Supramax	45,000-50,000 dwt
Venezuela to ARA	Supramax	45,000-50,000 dwt
USGC to Mediterranean	Supramax	45,000-50,000 dwt
USGC to Brazil	Supramax	45,000-50,000 dwt
USWC to Japan	Panamax	60,000-70,000 dwt
Puerto Bolivar to ARA	Handymax	up to 60,000 dwt
Puerto Bolivar to USGC	Handymax	up to 60,000 dwt
Puerto Bolivar to USEC	Handymax	up to 60,000 dwt

Coal-to-coke Btu comparisons

Delivered prices are compared on a US \$ per mmBtu basis and as a percent of coal on a Btu basis. The Btu value of coke in the calculation is 14,200 Btu/lb, with a metric tonne containing 2,204.62 pounds. The Btu value of coal is 11,300 Btu/lb.

Atlantic Basin

FOB US Gulf coast

Low sulphur

4.5pc maximum sulphur, 40 minimum Hardgrove Index

4.5pc maximum sulphur, 70 minimum Hardgrove Index

High sulphur

6.5pc maximum sulphur, 40 minimum Hardgrove Index

6.5pc maximum sulphur, 70 minimum Hardgrove Index

Delivered Northwest Europe - ARA

Low sulphur

4.5pc maximum sulphur, 40 minimum Hardgrove Index

4.5pc maximum sulphur, 70 minimum Hardgrove Index

High sulphur

6.5pc maximum sulphur, 40 minimum Hardgrove Index

6.5pc maximum sulphur, 70 minimum Hardgrove Index

Delivered Spanish Mediterranean

Low sulphur

4.5pc maximum sulphur, 40 minimum Hardgrove Index

4.5pc maximum sulphur, 70 minimum Hardgrove Index

High sulphur

6.5pc maximum sulphur, 40 minimum Hardgrove Index

6.5pc maximum sulphur, 70 minimum Hardgrove Index

4.5pc maximum sulphur, 45 minimum Hardgrove Index

Delivered Brazil

Low sulphur

4.5pc maximum sulphur, 40 minimum Hardgrove Index

4.5pc maximum sulphur, 70 minimum Hardgrove Index

High sulphur

6.5pc maximum sulphur, 40 minimum Hardgrove Index

6.5pc maximum sulphur, 70 minimum Hardgrove Index

4.5pc maximum sulphur, 45 minimum Hardgrove Index

Pacific Basin

FOB US west coast

Low sulphur

3.0pc maximum sulphur, 45 minimum Hardgrove Index

Mid sulphur

4.5pc maximum sulphur, 45 minimum Hardgrove Index

Cfr China

Low sulphur

3.0pc maximum sulphur, 45 minimum Hardgrove Index

Mid sulphur

4.5pc maximum sulphur, 45 minimum Hardgrove Index

Cfr India

Low sulphur

4.5pc maximum sulphur, 40 minimum Hardgrove Index

4.5pc maximum sulphur, 70 minimum Hardgrove Index

High sulphur

6.5pc maximum sulphur, 40 minimum Hardgrove Index

6.5pc maximum sulphur, 70 minimum Hardgrove Index

International coal markets						
Basis and location	Energy value	Timing	Sulphur	Delivery basis	Size	Unit
CIF ARA	6,000 kcal	within 90 days	<1pc	NAR	50,000-150,000	Tonne
FOB Richards Bay	6,000 kcal	within 90 days	<1pc	NAR	50,000-150,000	Tonne
FOB Newcastle	6,000 kcal	within 90 days	<1pc	NAR	Panamax	Tonne
CIF Japan	6,700 kcal	within 90 days	<1pc	NAR	Panamax	Tonne
CSX	12,500 Btu	Prompt quarter	<1pc	GAR	Unit train	Short ton
US Central Appalachian Barge	12,000 Btu	Prompt quarter	<1pc	GAR	5 Barges	Short ton
FOB New Orleans	11,300 Btu	within 90 days	3pc typical	GAR	Panamax	Tonne
FOB Hampton Roads	12,000 Btu	within 90 days	<1pc	GAR	Panamax	Tonne

Abbreviations: NAR - Net as received; GAR - Gross as received

Argus calculates the heat value of coke as a percentage of coal for hard coke delivered into the Spanish Mediterranean and north-west Europe. A similar calculation, using an Ohio River barge rate to calculate Cinergy-delivered US Gulf coast coke, is also published.

Coal-implied forward curves

Argus models implied forward curves for petroleum coke on the US Gulf coast and delivered to northwestern Europe. These models are calculated using the coal-to-coke Btu comparisons and applying this heat-value discount to the forward curves for FOB USGC coal and CIF ARA coal.

Coal

Argus publishes price assessments for world coal markets every market-relevant business day in the region assessed. A schedule of publication is available at www.argusmedia.com.

The team contacts a wide cross section of coal market participants and maintains a balanced survey of sellers of physical coal, utility buyers, trading companies and brokers.

Emissions markets	
	Unit
US SO ₂ - Acid Rain	\$/short ton
US SO ₂ - CSAPR Group 1	\$/short ton
US SO ₂ - CSAPR Group 2	\$/short ton
Argus European CO ₂ Index	€/metric tonne

Emissions

Argus publishes price assessments for key market-relevant emissions allowances, including markets for SO₂, NO_x and greenhouse gases. Methodological information on these markets can be found for *Argus Air Daily* and *Argus Global Emissions* at www.argusmedia.com.

Crude and refined products

Argus publishes price assessments and differentials for key crude markets, including coke relevant markets for WTI, Maya and Alaska North Slope crudes. Other prices include the Brent/Dubai and WTI/Maya crude spreads, asphalt, fuel oil and refining margins. Methodologies for these markets can be found at www.argusmedia.com.

Clarksons coke freight rates

Shipbroker Clarksons assesses freight rates for coal and petroleum coke routes around the world and additional information about its methodology is available at www.clarksons.com.