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1. Who we are

Headquartered in London, Quantum Commodity Intelligence is an independent price reporting agency that offers an impartial, robust price reporting service dedicated to providing transparency in the energy and environmental markets.

Our management team's experience is rooted in more than 100 years of experience in establishing commodity benchmarks for the world's leading index providers in the crude oil, refined oil products, petrochemical, biofuels, carbon, environmental certificates and agriculture sectors.

2. General principles

Quantum aims to provide accurate, reliable and accessible price assessments to aid the energy transition.

Quantum adheres to a set of key principles when assessing data that falls within the parameters of the methodology.

Those are:

- to reflect trades, transacted at arms-length adjusted for a given time;
- in the absence of trade, to reflect bids and offers that are shown to be market value;
- in the absence of physical data, to reflect prices in relation to liquid derivatives; and
- to ensure data is verifiable and provided by recognised sources.

In all markets, Quantum seeks to establish assessments through reported trades, or bids and offers, that have been conducted on an open and transparent trading platform.

The reporting of the data must come from a trusted market source, such as a broker or a trader, that has been vetted and approved by Quantum.

For more established physical commodities, Quantum uses similar methodologies to existing guardians of financially-settled derivatives to provide commodity assessments that reflect market convention that has developed over the past 30 years. Quantum's assessments are not guaranteed to be identical to those published by other benchmark providers as information received will differ and the methodology is not identical.

For established financially-settled derivative assessments, Quantum assesses financial derivatives that settle against a benchmark provider, such as S&P Global Platts in the case of refined oil products.

For less-established commodities where no standardisation exists, such as environmental certificates or commodities, Quantum has worked with the industry and drawn on the experience of its management team to provide a robust methodology to determine fair value.

3. Objective of this document

Quantum applies an industry-standard methodology for assessing all commodity asset classes. The objective of this document is to set out in detail the three types of processes that Quantum uses to arrive at its end of day price for the different commodity classes it assesses. This document should be read in conjunction with the factsheet.

4. Types of assessments

Quantum provides two different types of assessments for the commodities it assesses:

- Spot; and
- Time defined.

In the case of spot assessments, each assessment will have a defined period for loading or delivering the given commodity in question. The period is defined as one wide enough to attract enough market interest, but narrow enough to provide a clear value. The period is also defined so as to avoid assessments being skewed by consideration of distressed or deferred cargoes. For many established commodities, these are determined by market convention.

In the case of time-defined assessments, these are either given as a static period or at one point in the future. In the former, these can typically be found in financial swaps assessments for oil and refined oil products, where a swap is settled against an average set of price assessments from an index provider, or for the latter in the case of carbon markets where a delivery point is for one day in the future.

For each assessment published by Quantum, the delivery or loading terms will clearly be defined on the assessment page in question. In all cases, balmo represents the value of a

commodity for the remainder of the existing month in question, M+1 represents the next month. So, for example, December 25 balmo would represent December and M+1 January.

5. Types of market information

Quantum recognises each market trades in its own way and receives bids and offers reflecting that convention and translates that into a flat price value represented in currency/unit.

Market information considered generally comes in two forms:

- flat price where the information is communicated in a currency per unit and the information is fixed, such as \$/mt, or
- floating versus another liquid commodity.

The latter is often found in highly volatile markets, such as refined products and biofuels, which can trade at a differential to crude oil gasoil futures, an OTC swap or a five-day period of swaps calculated by using two swap contracts assuming a linear structure. Floating trade indications can also be communicated and considered when they are a factor or percentage to the underlying commodity or at a flat price differential.

Both types of data are captured and stored in our data processes, with the most relevant bid, offer or trade information shared as part of the final publication process as part of daily commentaries.

6. Processes

Quantum uses three different types of assessment processes to determine fair market value:

- Timestamped;
- Volume-weighted average; and
- Fair Value.

Details of which are listed below

a) Timestamped

Many of the commodities that Quantum assesses are highly liquid and the value of which is dependent upon other instruments that can be very volatile. One example is refined oil products and crude futures. As such, to provide a fair market value, Quantum timestamps many of its prices to a minute of trade in a given day. To timestamp prices, Quantum follows four key principles:

- Verification
- Normalisation

- Repeatability
- Prevailing value

Verification

Quantum makes every effort to verify market information, such as bids, offers, trades and value indications to ensure that the information in question is open to the market, executable by the majority of the market and all trades are done at an arm's length. Quantum recognises the challenge of verifying information individually and undertakes to do so with all price submitters to validate the information is correct. This may be done electronically and by telephone.

Normalisation

As many indications will not be heard at exactly the time in question, Quantum uses five key principles to normalise market information heard prior to the timestamp in question. Information heard after the timestamp will not be used. Those principles are time, delivery or loading dates, specification of the product, volume, incoterm and location of delivery or loading port. Quantum publishes the exact specification that it assesses for each product on the individual price pages.

Timing - All Quantum's timestamped assessments are either marked at 1630 Singapore time or 1630 London time to reflect market convention. This includes both physical and financial derivative assessments. As such, in illiquid markets where trade information is heard, that may be normalised to reflect 1630 at the location in question. To do so, Quantum typically uses a more liquid OTC or exchange contract to provide a relationship value. In the case of crude oil, this is a crack. Any data relating to prices, such as expressions of buying interest (bid); expressions of selling interest (offer); confirmed trades; tenders; pricing information from related or similar products; freight information and costs; and OTC or exchange-listed forward and futures contracts is collated on a daily basis and may factor in the final, end-of-day assessment.

Laycan - For each commodity, Quantum defines the loading or delivery period for the commodity in question. For European oil and biofuel barges or cargoes, this is typically measured in a minimum and a maximum number of days forward. For carbon assessments, this is typically either immediate delivery or at a given point in time. The purpose of defining the laycan is to achieve a more accurate price that reflects the underlying methodology of each assessment. For cargoes of oil products in Singapore, for example, the laycan is 15-30 days forward for many oil products. Bids, offers and trades will be considered for all the days in the laycan, part days in the laycan, or even outside of the laycan in question. In the latter situation, Quantum may normalise the trade information. For example, in markets where there is strong backwardation or contango, trades for earlier or later parts of the laycan will be normalised to reflect a mid-point of the laycan assuming linear structure.

Specification - Each assessment published by Quantum has its own list of standard specifications to reflect typical grades. Quantum may use trade information outside of this range and normalise it through consultation with market participants.

Quantity- Each commodity trades in a wide volume range, although many are restricted by common vessel size. Each assessment has a defined minimum and maximum quantity that Quantum considers as reflective of market size.

Quantum reserves the right to normalise smaller or larger deals outside of this range to within the specified range.

Incoterms and location - Quantum defines the incoterm of each assessment it produces, including the location of the destination or origin port/s. Quantum refers the right to use trade information from other incoterms and locations for the purposes of its assessments.

Repeatability

Where market data is conflicting, Quantum applies a test of repeatability to determine fair value. As such, firm and transparent bids and offers for a commodity closer to the timestamp will be considered ahead of trades executed earlier in the day. Where two trades for the same volume are executed at the same time, with the same incoterms and at the same location and specification, the editor may use a test of repeatability to determine which one reflects better fair value. Quantum reserves the right to use, production economics, substitution costs, relationship to other commodities as well as market structure to determine that value.

Prevailing value

In some assessments, Quantum uses a concept called “prevailing market value” to determine whether trades reported represent fair value. Conceptually, the prevailing value is the theoretical value of the commodity in the absence of market information, fluctuating with input costs. The prevailing value differs as per assessment. In some cases, it will be the same flat price as per the previous day, while in others it will be in relation to a more liquid commodity. An example of the latter would be in the event of volatile crude prices. The prevailing value for refined oil products in this circumstance would be the previous day’s differential/crack margin to futures or swaps using the current day’s basis price. Only market information that disproves the prevailing value by trading on higher bids or lower offers is used in the assessment process.

b) Volume-weighted average

For certain assessments where established benchmarks have evolved to a higher level of consolidation, standardisation and transparency, Quantum uses a volume-weighted average methodology to assess value.

All information used for volume-weighted assessments is verified by at least two market sources and to be included in the average, all trade data must be divulged, including volume, time of trade and relationship to other more liquid commodities. This provides an additional level of verification.

c) Fair Value

For less-established commodities, Quantum uses a “fair value” assessment process that is synonymous with a survey market.

As trade in newer commodities begins, often there is a lack of liquidity and standardisation, with different specifications or subsets of commodities trading in a wide range. As time evolves, most commodity trade coalesces around standardised contracts that establish a set of trading conditions that include, but are not limited to: a minimum trade volume, specification, delivery, incoterms and credit terms.

Some assessments that Quantum publishes are not yet at this level of market evolution. As such, liquidity is sporadic. To combat this, Quantum surveys the market to evaluate where fair value is, as determined by market participants. In order to achieve its goal of representing fair market, Quantum uses trade data and the normalisation principles as laid out under part a) of this section.