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Argus White Paper: Argus Sour Crude Index™ (ASCI™)

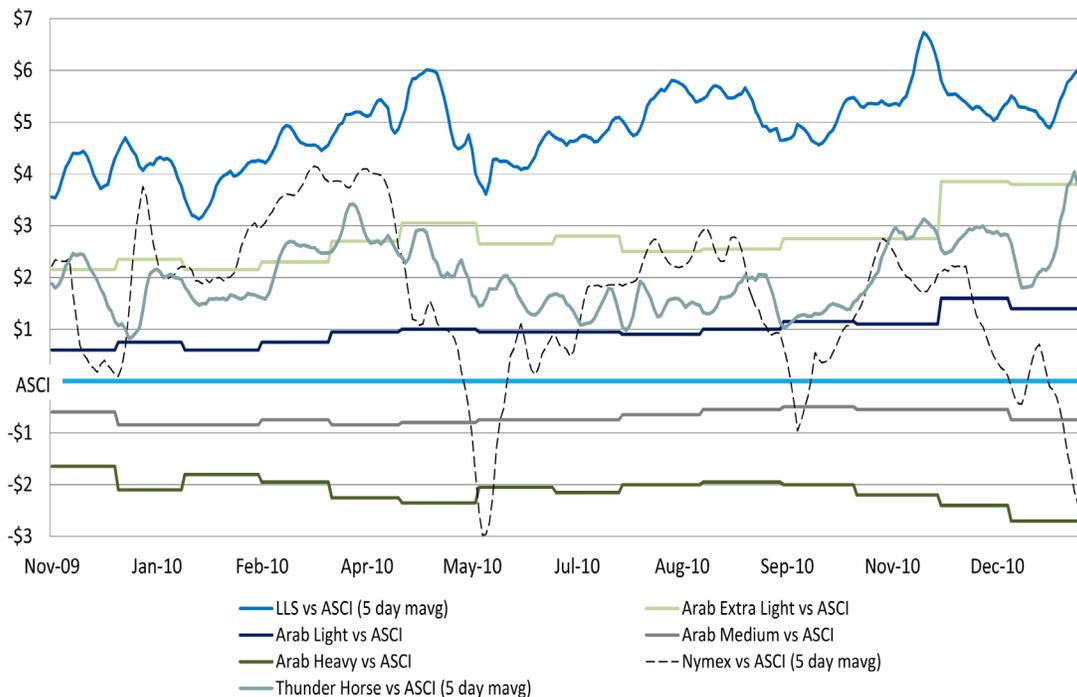
The *ASCI* price represents the daily value of US Gulf coast medium sour crude, based on physical spot market transactions. This new benchmark primarily serves buyers and sellers of crude exported to the US who need a broader index of US sour crude value for use in long-term contracts. The *ASCI* price may also be used for spot trading of waterborne crude in the region and for pricing US domestic crude contracts.

Saudi Aramco, Kuwait Petroleum and Iraq's Somo use the *ASCI* price for exports to the US. The contracts use an *ASCI* base price with monthly adjustment factors applied. Crudes priced against the *ASCI* benchmark include Arab Extra Light, Arab Light, Arab Medium, Arab Heavy, Kuwait Export Blend, Basrah Light and Kirkuk.

Interest in a US sour crude marker is directly connected to the dramatic growth in production from offshore fields in the Gulf of Mexico. This expansion has boosted spot market trading volumes and has focused attention on the US Gulf as a center of price discovery. This index includes the value of three blended crude streams that are seeing some of the greatest increases in production flows and spot trade.

The daily *ASCI* price is the volume-weighted average of all deals done for three grades of crude combined: Mars, Poseidon and Southern Green Canyon (SGC). The three grades trade actively, have a wide array of buyers and sellers participating in the spot market, are blends of multiple fields transported on three separate pipelines and move to both the Louisiana and Texas refining markets.

SAUDI AND US CRUDE VERSUS THE ASCI PRICE



Petroleum

illuminating the markets

The ASCI price calculation

A separate document describes the *ASCI* methodology in detail, and is available at www.argusmedia.com/methodology. In summary, the *ASCI* price is calculated as follows, and is shown in an example on this page.

- **Index differential:** Argus collects and confirms all spot trades done for Mars, Poseidon and SGC during the entire trading day, and creates a single average differential price weighted by the individual volume of each deal.
- **WTI:** Argus uses the Nymex settlement as the fixed price basis for the *ASCI* benchmark during the trade month prior to Nymex expiry, and uses the WTI cash Cushing market value for the days following Nymex expiry, which is also linked to the Nymex settlement price. This is known as the *WTI Formula Basis*.

- **Index price:** The weighted-average index differential is added to the *WTI Formula Basis* price to arrive at the final index price.

The combined trade in the three crudes must meet a volume minimum each day, or the *index differential* defaults to a proportional assessment formula. Details of this structure are in the methodology document, as are provisions for maintaining the index during stream disruptions such as those caused by hurricanes.

Date	Crude	Trade Month	Basis	Differential Price (\$/b)	Volume (b/d)	Daily Wtd Avg (diff)
20-Dec-10	Mars	Jan	Jan WTI	0.45	1,000	0.02
20-Dec-10	Mars	Jan	Jan WTI	0.30	1,000	0.01
20-Dec-10	Mars	Jan	Jan WTI	0.30	2,000	0.02
20-Dec-10	Mars	Jan	Jan WTI	0.35	1,000	0.01
20-Dec-10	Mars	Jan	Jan WTI	0.35	1,000	0.01
20-Dec-10	Mars	Jan	Jan WTI	0.40	1,000	0.01
20-Dec-10	Mars	Jan	Jan WTI	0.40	1,000	0.01
20-Dec-10	Mars	Jan	Jan WTI	0.40	1,000	0.01
20-Dec-10	Mars	Jan	Jan WTI	0.40	1,000	0.01
20-Dec-10	Mars	Jan	Jan WTI	0.40	1,000	0.01
20-Dec-10	Mars	Jan	Jan WTI	0.25	1,000	0.01
20-Dec-10	Mars	Jan	Jan WTI	0.40	2,000	0.03
20-Dec-10	Mars	Jan	Jan WTI	0.45	1,000	0.02
20-Dec-10	Mars	Jan	Jan WTI	0.45	2,000	0.03
20-Dec-10	Mars	Jan	Jan WTI	0.40	2,000	0.03
20-Dec-10	Poseidon	Jan	Jan WTI	-0.50	1,000	-0.02
20-Dec-10	Poseidon	Jan	Jan WTI	-0.50	1,000	-0.02
20-Dec-10	Poseidon	Jan	Jan WTI	-0.35	1,000	-0.01
20-Dec-10	Poseidon	Jan	Jan WTI	-0.20	1,000	-0.01
20-Dec-10	SGC	Jan	Jan WTI	-1.10	1,000	-0.04
20-Dec-10	SGC	Jan	Jan WTI	-1.20	1,000	-0.04
20-Dec-10	SGC	Jan	Jan WTI	-1.20	2,800	-0.13
Total Volume:					26,800	
ASCI Differential:						-0.01
January WTI Formula Basis:						88.81
ASCI Price:						88.80

The US markets in the context of global markets

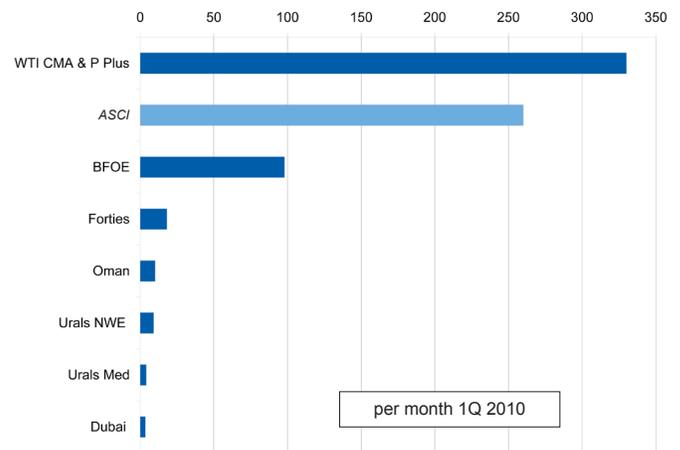
The US crude market trades more actively and with greater participant diversity than any other crude market in the world. Globally, companies rely on published benchmarks as indexes for term contracts, internal pricing, and for taxation and royalty purposes. Many of these markets are based on little spot trade and are dominated by only a few traders. Trades in the US pipeline crude markets are for small volumes, typically around 30,000 bl per trade, compared with trades of 500,000 bl for cargoes of crude in a waterborne market. As a result, a greater number of companies can find the credit and physical storage to participate in the US market. Active trade for smaller volumes also means more moments in time when price is discovered through open negotiation, and therefore more price visibility. This breadth makes the US markets healthier, less able to be manipulated, and more able to accept the growth that may come with increased production and indexation.

Other crude markets do not compare well on the same metrics (see charts). *ASCI* component trade is seven times larger than Dubai, almost double the size of the Urals market, and over 2.5 times the size of North Sea BFOE. The spot trade in the three *ASCI* components combined regularly exceeds 50pc of their combined production, a level that few other crude spot markets around the world can claim.

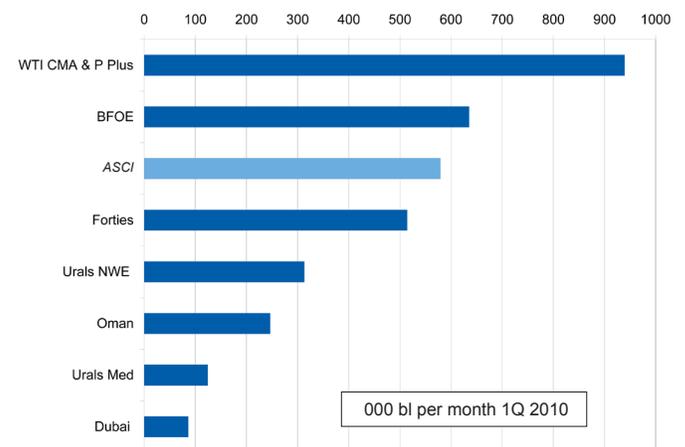
The *ASCI* crude grades have over three times the number of sellers and buyers as the BFOE market, its nearest rival in terms of participant diversity. In the first quarter of 2010, the top three sellers of *ASCI* crudes comprised 38pc of the trade and the top three buyers 43pc. During the same period, the top three sellers of Oman sold 80pc of the volume, and the top three sellers of Urals in the Mediterranean sold 85pc.

The only market that comes close to rivaling *ASCI* for diversity and trade volume is WTI itself. The *ASCI* component grades trade at differentials to WTI, and the WTI Nymex price is the fixed price basis for the index. Thus, the *ASCI* benchmark combines two of the deepest and broadest markets in the world, WTI and the US Gulf coast sour crude complex.

NUMBER OF SPOT TRADES



SPOT TRADE VOLUME



The US Gulf coast versus the US midcontinent

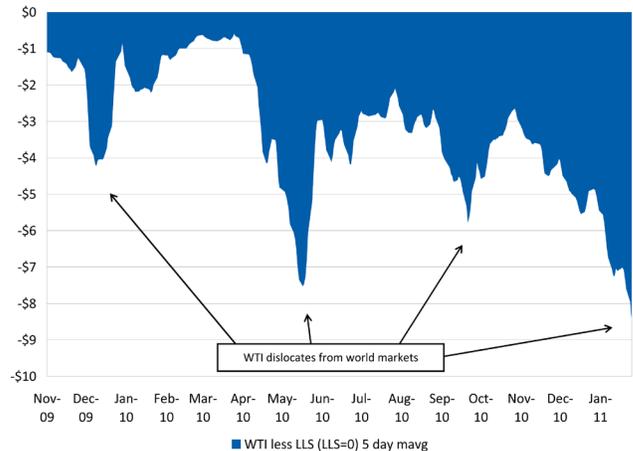
The need for a price benchmark on the US Gulf coast has grown as the price of WTI increasingly reflects only US midcontinent fundamentals. Because of rising imports from Canada and an inability for crude to leave the midcontinent, WTI prices often fall well below the value of comparable crudes on the world market. Domestic crude at the US Gulf coast however remains responsive to global crude values because it competes with imports. The spread between midcontinent light (WTI) and US Gulf coast light (LLS) reveals these WTI inversions dramatically (see top chart).

The *ASCI* price tracks global sour crude prices because its components compete with sour crude imports. During these WTI inversions, WTI will fall to parity or even a discount to the *ASCI* price (see bottom chart). This does not mean WTI is not a useful financial hedging tool, but it does mean that the Gulf coast and the midcontinent are responding to different fundamentals and the basis risk between them must be dealt with. For long-haul Mideast Gulf producers, the means of dealing with this basis risk was to switch term contract pricing from WTI to the *ASCI* benchmark.

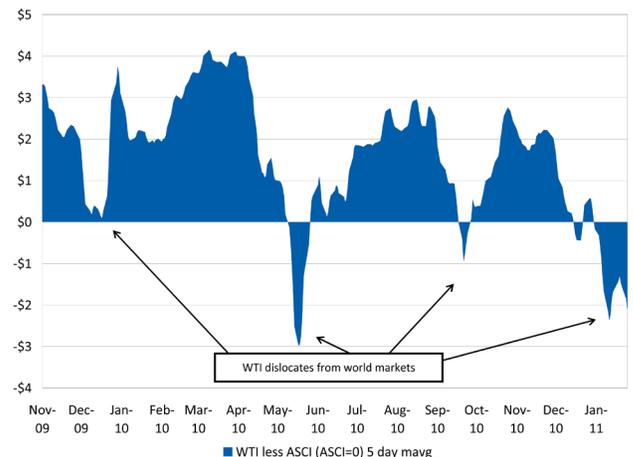
The financial exchanges have also responded to the risks that need to be hedged. Both CME Nymex and Ice have listed futures and swaps contracts based on the *ASCI* price.

Although the US Gulf coast crude grades look volatile when arrayed against WTI, when arrayed against the *ASCI* price history it becomes apparent that their relative values are far less volatile (see chart). The pricing of Saudi Arabian crude relative to the *ASCI* benchmark also mirrors this stability. For US refiners, *ASCI* indexation allows purchases of US domestic crude to be aligned with purchases of imported sour crude. Linking import volumes to trade-month *ASCI* prices limits the difference between import and domestic to quality alone. The spread between midcontinent and Gulf coast, and the effect of backwardation and contango, are essentially neutralized.

WTI VERSUS LLS



WTI VERSUS *ASCI* PRICE



The ASCI pricing mechanism as a broad benchmark

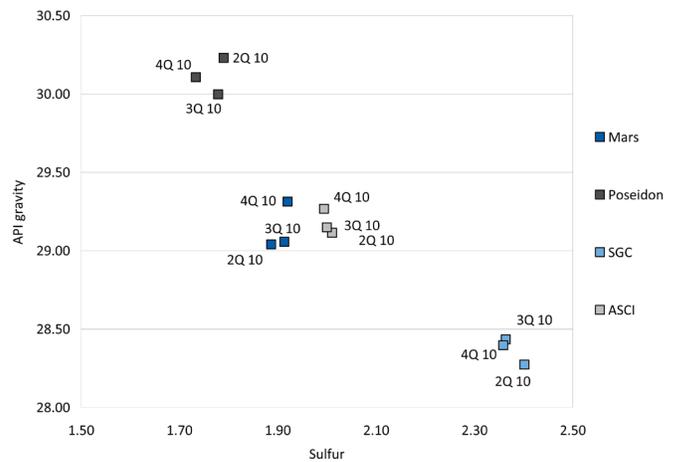
The robust *ASCI* structure, which allows it to respond to both changes in stream quality and changes in trading patterns, has also contributed to its growth as a benchmark. The crude grades that use the *ASCI* pricing mechanism range significantly in quality and yet perceive sufficient stability and depth in the *ASCI* price to establish consistent differentials (see chart). Other regional crude grades could feasibly use the *ASCI* pricing mechanism in a similar way.

The grades marketed as Mars, Poseidon and SGC are actually blends of many fields. As production from these fields rises and falls, or as the quality from the fields fluctuates, the quality of the blended crudes that emerge at the end of the pipeline system changes. The price negotiated for these crudes is based on the stream quality at the time, and so these fluctuations in quality are fully reflected in price. The combination of these crudes into the single *ASCI* price means that the quality of the index is less variable, with changes in one stream’s quality often being offset by another (see chart).

Volumes transported on the three pipelines can also opportunistically switch from one pipeline system to another. This makes for a dynamic infrastructure, and ensures that the marketed blends will not see the same boom and bust cycle that characterizes markets based on single fields with unpredictable life cycles.

Within the context of growing production from the US Gulf of Mexico and the breadth and depth of the US Gulf coast sour crude markets, the *ASCI* benchmark offers a robust tool for pricing and hedging sour crude at one of the world’s key refining centers. The index is built to respond to changes in trade, production, quality and price. As such, it can serve the industry as a useful tool for many years to come.

ASCI QUALITY MATRIX



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