Energy and commodity price benchmarking and market insights


Illuminating the markets
Crude Pricing and Indexation
Denver, Colorado

Gus Vasquez
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Who is Argus?

- Report prices in all world markets for
  - Refined products
  - Crude
  - NGL & LPG
  - Coal and coke
  - Gas
  - Power
  - Fertilizers
  - Emissions
- Over 400 staff globally with numerous offices
- Rapid growth in spot and term contract indexation, swaps market indexation

Illuminating the markets
Why Argus?

• Argus is now a standard benchmark for trade in
  - US domestic and import crude oil
  - US gasoline, diesel, and jet fuel

• Argus reports the market the way that it trades and believes liquidity and transparency lead to accuracy

• Argus prices for US crude are volume-weighted averages of trades throughout the entire trading day

• Argus Sour Crude Index (ASCI)
  - Used to price both long-haul and short-haul foreign crudes

• Argus LLS
  - Used to price Bakken and Eagle Ford
Argus approach to price discovery

• Provide representative, verifiable, and consistent price discovery by monitoring arms-length market activity

• Consult with industry and wider stakeholders to ensure appropriateness of methodologies
  o Avoid a “one size fits all” approach
  o Where possible reflect existing market structures and trading practices

• Argus believes liquidity and transparency lead to accuracy
  o Argus has a robust process for assessing market prices in the absence of active trading
Basic methodologies

• Daily volume weighted average of deals done
  o Example: US Gulf coast domestic crude pricing
  o Differentials to WTI are averaged with volume weighting
  o Differentials applied to Nymex settlement price

• Daily assessment of low/high range
  o Examples: Bakken Clearbrook, West African delivered USGC
  o Trade is too illiquid to use daily VWA
  o All VWAs default to a low/high range when liquidity is low
Basic methodologies

- Assessed bid/ask range at a moment in time
  - Forward curves
- Monthly weighted averages of deals done
  - Example: WCS Canada
    - Based on monthly average pricing common in the market
- Calculated indices
Volume-weighted averages

• Differential price is volume-weighted average of all deals over entire trading day
  ○ All qualifying deals are counted regardless of volume
  ○ Counterparties are validated and duplicates netted out
  ○ Aggregate volume minimum must be met, or price defaults to mean of low and high

• Differential averages are applied to Nymex settlement price
  ○ During 3 days after expiry, applied to WTI Cushing price, which is a volume-weighted average of “roll” trades, which are applied to the prompt month Nymex settlement price
Index pricing
The spot markets are healthy

• The spot market at the Gulf coast - when all deals are considered - is deep and broad
• A ready well of deals exists for price formation even if WTI-related transactions decline
• The use of LLS and Mars as secondary benchmarks is growing and offers several possibilities to the marketplace
  ◦ Argus continues to monitor the Gulf coast market for signs of foundational change
• Healthy indices lead to confidence in derivatives markets
Spot trade activity

Total b/d per month

- Eugene Island
- Poseidon
- Southern Green Canyon
- Bonito
- Thunder Horse
- WTI P-Plus
- HLS
- WTS
- WTI Midland
- Mars
Contract pricing formulas

One popular way to get to a final price is:

CMA (Nymex settles during delivery month)
+
Average diff to CMA based on settles during Nymex trade month *(Argus diff to CMA monthly average)*
+
Argus trade month average differential for crude grade
+/-
Transportation and quality adjustments
Other pricing formulas in contracts

Price can also be calculated in the following way:

Average Nymex Settles in Delivery Month
+
Argus Trade Month Average differential

Or price could just equal:

• The average of Argus Trade Month price (Argus outright prices)
• The average of Argus daily price during delivery month
Another way to calculate price is:

Average Nymex Settles in Nymex prompt month
+ Argus Trade Month Average differential

And finally:

Average daily WTI Posting during delivery month
+ Argus P+ trade month average
+ Argus Trade Month Average differential
Calculating a netback value to the field

- Price = Average Nymex Settles in Delivery Month + Argus Trade Month Average differential + Quality differential - Transportation Costs

- Example:
  - Nymex settles at $100/bl + $12.50/bl for LLS + $2 for Eagle Ford
  - Eagle Ford price at a given location = $114.50/bl

- Netback will be:
  - Eagle Ford at $114.50/bl - $10/bl for transportation to St James
  - Final Eagle Ford Price at the field = $104.50/bl
Value vs. price
Examples of refinery yields

- **Light Sweet**
  - Refinery Gases: 3%
  - Gasoline: 32%
  - Distillate: 30%
  - Heavy Fuel & Other: 35%

- **Medium Sour**
  - Refinery Gases: 2%
  - Gasoline: 24%
  - Distillate: 26%
  - Heavy Fuel & Other: 48%

- **Heavy Sour**
  - Refinery Gases: 1%
  - Gasoline: 15%
  - Distillate: 21%
  - Heavy Fuel & Other: 63%
Crudes by quality

API Gravity vs Sulfur plot for various crudes:
- Nemba
- WTI
- LLS
- Escravos
- Thunder Horse
- Bonito
- Eugene Island
- WTS
- HLS
- Poseidon
- Basrah Light
- SGC
- Mars
- ASCI
- Oriente
- Maya

Illuminating the markets
What does this have to do with price?

- The goal of refining is to turn crude oil into higher value products
- With necessary equipment, a complex refinery can buy low value crude and turn into high value product
- Crude price is a function of
  - Refinery demand (equipment in each refinery varies and product slate changes seasonally)
  - Current value of products
  - Crude supply
  - Transportation constraints
Demand side factors affecting price

- Refinery outages
  - Planned maintenance
  - Unplanned outage
- Seasonality
  - Summer is gasoline season
  - Winter is about heating oil
- Refinery margins
  - Margins determined by product and oil prices
  - Weak margins may force refiners to cut runs
- Product export opportunities
4-Week Avg USGC utilization of operable capacity
Supply side factors affecting price

- Field or platform maintenance
- Transportation disruptions
  - Pipeline issues
  - Bottlenecks or new infrastructure coming on line
- Regional oversupply
  - The Cushing disconnect
- Import fluctuations
- Increase or decrease in production
  - Natural field decline
  - New plays coming on
Break in flow disrupts stream

Pipeline Break

Increased Supply  Decreased Supply  Refiner pays more for other options
US domestic production forecasts

Source: EIA

Illuminating the markets
Waterborne sweet crude imports into USGC

Source: EIA

Net Loss: 1.015mn b/d supply

1,680,000 b/d: Sep 2010

665,450 b/d: Feb 2012

665,450 b/d: Feb 2012
The WTI/Brent inversion

- A bottleneck at Cushing pushed WTI to discounts against Brent beginning in 2007
- WTI has been unable to return to its historic premium over Brent
- Persistent crude over-supply in the Chicago area depressed WTI values as Cushing stocks rose
  - Canadian crude inflows exacerbated supply
The WTI/Brent inversion

- Once crude reached Cushing, it could previously only move north to the Midwest or go into storage.
- Now, with the Seaway Pipeline reversal, crude can also move from Cushing to the USGC.
  - Pipeline was reversed around mid-May.
  - Initially moving 150,000 b/d.
- US domestic differentials to WTI are constructed using:
  - The Brent/WTI spread.
  - The value relative to other domestic grades.
  - Increasingly, the value of grades versus LLS and the value of LLS versus Brent.
LLS relationship to Brent and WTI
WTI inversion effect on spot market liquidity

• WTI’s dislocation from Gulf coast increased the basis risk embedded in Gulf coast differential
• Discouraged spot transactions versus WTI for Gulf coast grades
• Encouraged increased trade against non-WTI pricing references - especially at the Gulf coast
  o The Argus methodology is currently a volume weighted average only of deals done at a differential to WTI
  o In illiquid markets, Argus will make an assessment based on other information, such as conversion or box trades
• Encouraged growth in LLS swaps transactions
Mars differential to WTI
LLS differential to WTI
Ratio LLS-WTI:Brent-WTI, 1:30 CST
Secondary benchmarks
What makes a good benchmark?

• Diverse participants
• Active physical trade and transparency
• Flexible infrastructure
• Evergreen production lifespan
• Reacts to local fundamentals
• Reacts to global waterborne fundamentals
• Provide a stable value that differentials can be predictably set against
• Supported by a strong financial market with a sound regulatory structure
What is LLS?

• Light Louisiana Sweet is a blended stream
• Capline defines LLS as any crude oil stream that has:
  o Between 34-41° API
  o Sulfur content of no more than 0.40pc
  o Total Acid Number (TAN) of no higher than 0.70
• Increasingly the blending of west African crudes into LLS is being displaced by the blending of shale crude
  o Bakken (arrives by rail) and Eagle Ford (arrives by barge)
  o A strong supply profile going forward
• Because of its location and supply flexibility, LLS price is well correlated to Atlantic basin crude prices
The current role of LLS

- LLS is already used as a benchmark with US domestic light grades being discussed on an LLS basis
  - Bakken
  - Eagle Ford
  - West Texas
- Foreign lights coming into US Gulf coast have been offered at an LLS-related price
- Valero, Marathon and others use LLS in financials to calculate product margins
- Swaps activity on LLS is rising sharply
  - Open interest is 50% higher than a year ago
LLS Blending and Supply

• In general, any crude that arrives at St James can be blended to LLS specs. Economics determine the mix.

• Domestic grades normally used:
  o Any grade from USGC production
  o Bakken (arrives by rail) and Eagle Ford (arrives by barge)

• Foreign grades commonly used:
  o Venezuelan (used as base and blended with condensate)
  o West African
  o Saharan Blend

• Because LLS is a blended grade, the forward supply profile is strong - unlike that for the North Sea.
LLS buyers and sellers

LLS Sellers

LLS Buyers

Illuminating the markets
ASCI offers a robust alternative benchmark

- Gulf coast buyers of Latin American crude are using ASCI and/or Argus Mars as the basis for their purchases.
- US domestic producers have signed deals on ASCI as a way of capturing generic Gulf coast sour values.
  - Also internal pricing purposes.
- ASCI can be used with an adjustment factor to price term crude on either an fob or cif basis.
- As a combination of three medium sour streams, ASCI removes any concerns over hurricane disruption.
- ASCI has a proven three-year record.
  - Around 1.8mn b/d of imported crude price on ASCI.
ASCI buyers and sellers

ASCI Sellers

ASCI Buyers
Infrastructure
Overview of infrastructure issues

- Production increases are currently outpacing the ability to move barrels to market
- Current planned projects would provide greater take-away capacity than total production
  - Not all proposed projects will come to fruition
- Railing, trucking and barging are providing short to medium term solutions
Overview of infrastructure issues

- Once pipeline projects are completed, crude valuations and market dynamics will change
- Challenges remain for producers as finding buyers becomes increasingly difficult
- Light sweet imports should continue to drop and eventually even disappear altogether
Pipeline Expansions, New Builds and Reversals
Storage Expansions
# Projects Completion Schedule

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*Project has been completed  **Pending regulatory approval
Enterprise / Enbridge Seaway pipeline

**Capacity:** 400,000 b/d

**Route:** Cushing, Oklahoma to Freeport, Texas

**Operational:** June 2012

- Pipeline was reversed to take crude to USGC
- Currently shipping 150,000 b/d, ramp up to 400,000 b/d by 1Q13
- Includes lateral pipes to ECHO terminal and from ECHO to Beaumont/Port Arthur
- Twin line of 450,000 b/d by 2014
LLS differential to WTI

Illuminating the markets
TransCanada Keystone XL Pipeline

Capacity: 830,000 b/d
Route: Hardisty, Alberta to Port Arthur, Texas
Operational: early 2015
- Expected to ship 2/3 heavy crude
- A bill was approved by Energy Committee in early February. Pipeline permission process will continue.
- Companies committed to 380,000 b/d through take-or-pay contracts from Canada to USGC
Enbridge’s Flanagan South Pipeline Project

**Capacity:** 585,000 b/d

**Route:** Flanagan, Illinois to Cushing, Oklahoma

**Operational:** mid-2014

- Generally adjacent to Enbridge’s Spearhead pipeline
- Initial open season Oct 2011
- A second binding open season ended in February
- Capacity is fully contracted except from mandatory 10pc required by federal regulators

Source: Enbridge
Conclusions
Conclusions

- Crude value and price diverge depending on market fundamentals
  - And price also varies from one region to another
- The relationship between similar crudes, competing against each other for a limited amount of buyers in a given region, can determine price
  - Benchmarking
- Quality differences can determine a grade’s value relative to its competitors, all things being equal
Conclusions

• Transportation costs can make a crude uncompetitive in certain regions but more attractive in others
• Contract pricing takes into account index pricing, quality differences and transportation
• Quickly changing infrastructure and production levels are adding uncertainty to the future of prices, especially for lighter grades
Any questions?