



argusmedia.com

Energy and commodity price benchmarking and market insights

London, Houston, Washington, New York, Portland, Calgary, Santiago, Bogota, Rio de Janeiro, Singapore, Beijing, Tokyo, Sydney, Dubai, Moscow, Astana, Kiev, Porto and Johannesburg

Illuminating the markets

Crude Pricing and Indexation

Denver, Colorado

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18 June 2012

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

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
 - Avoid a “one size fits all” approach
 - Where possible reflect existing market structures and trading practices
- Argus believes liquidity and transparency lead to accuracy
 - Argus has a robust process for assessing market prices in the absence of active trading

Basic methodologies

- Daily volume weighted average of deals done
 - Example: US Gulf coast domestic crude pricing
 - Differentials to WTI are averaged with volume weighting
 - Differentials applied to Nymex settlement price
- Daily assessment of low/high range
 - Examples: Bakken Clearbrook, West African delivered USGC
 - Trade is too illiquid to use daily VWA
 - 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

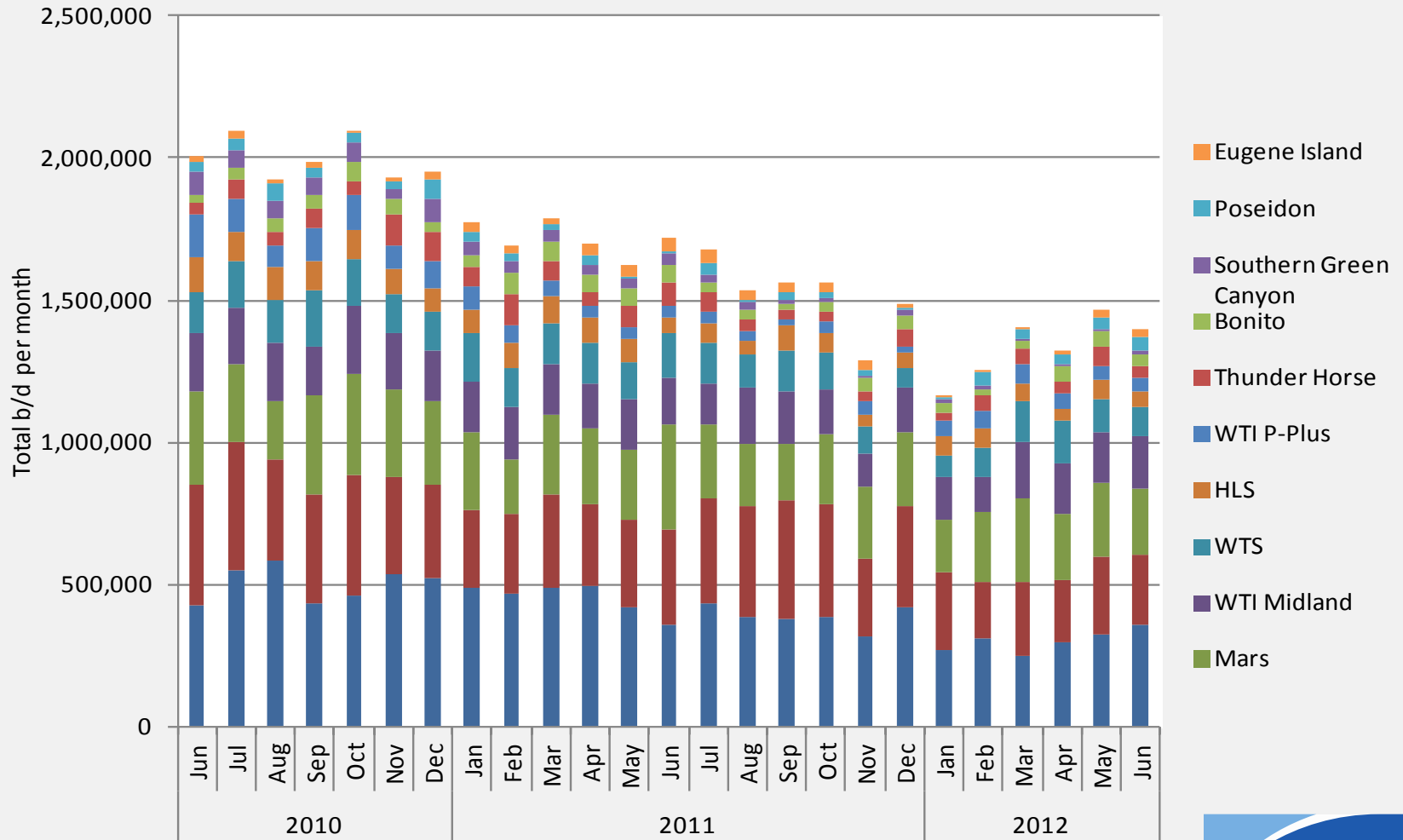
- Differential price is volume-weighted average of all deals over entire trading day
 - All qualifying deals are counted regardless of volume
 - Counterparties are validated and duplicates netted out
 - Aggregate volume minimum must be met, or price defaults to mean of low and high
- Differential averages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



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:

$$\begin{aligned} & \text{Average Nymex Settles in Delivery Month} \\ & \quad + \\ & \text{Argus Trade Month Average differential} \end{aligned}$$

Or price could just equal:

- The average of Argus Trade Month price (Argus outright prices)
- The average of Argus daily price during delivery month

Other pricing formulas in contracts

Another way to calculate price is:

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

And finally:

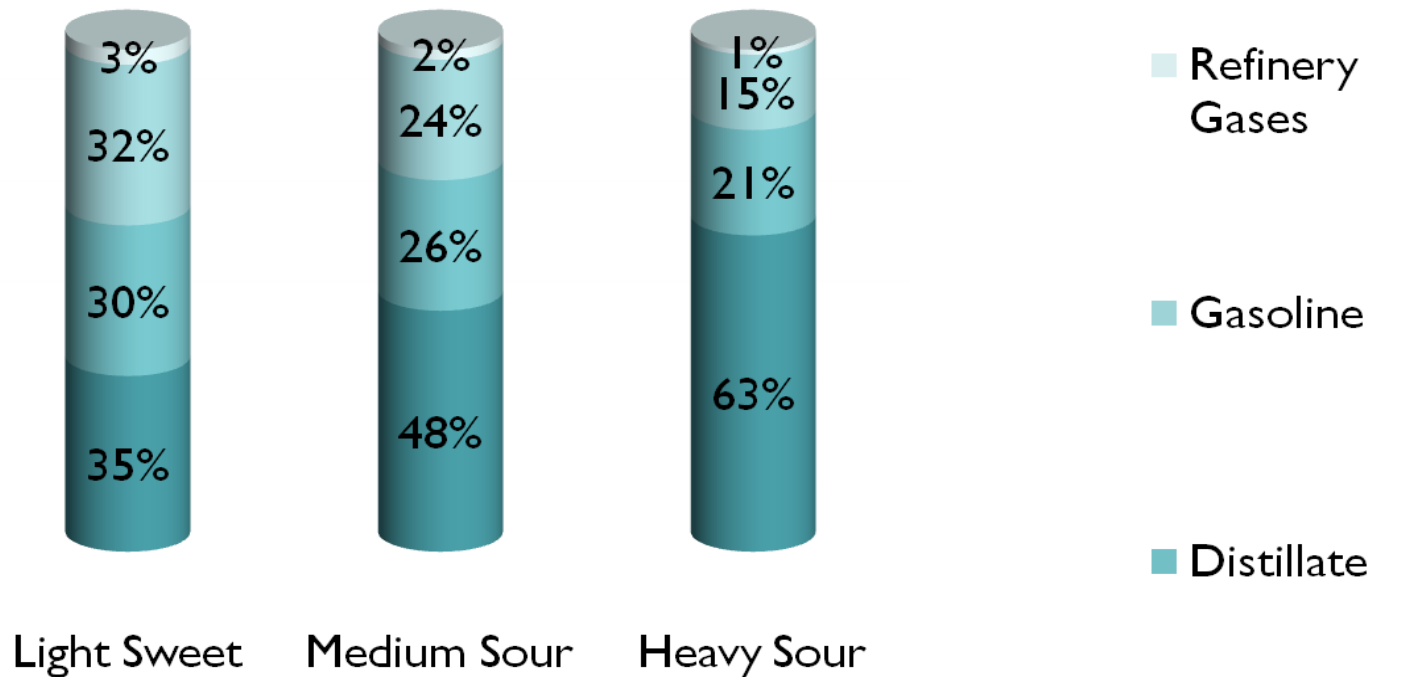
Average daily WTI Posting during delivery month
+
Argus P+ trade month average
+
Argus Trade Month Average differential

Calculating a netback value to the field

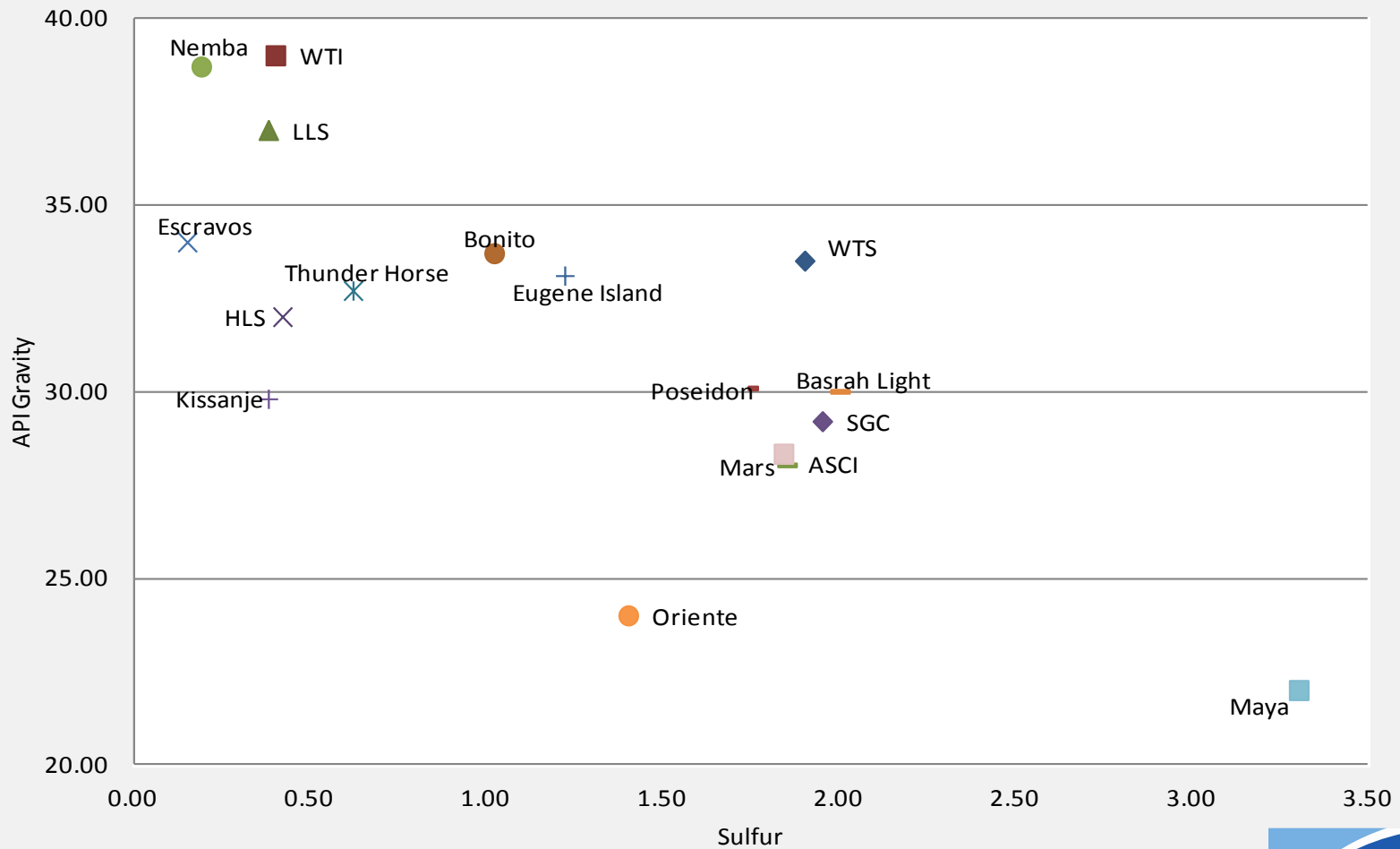
- Price = Average Nymex Settles in Delivery Month + Argus Trade Month Average differential + Quality differential - Transportation Costs
- Example:
 - Nymex settles at \$100/bl + \$12.50/bl for LLS + \$2 for Eagle Ford
 - Eagle Ford price at a given location = \$114.50/bl
- Netback will be:
 - Eagle 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



Crudes by quality



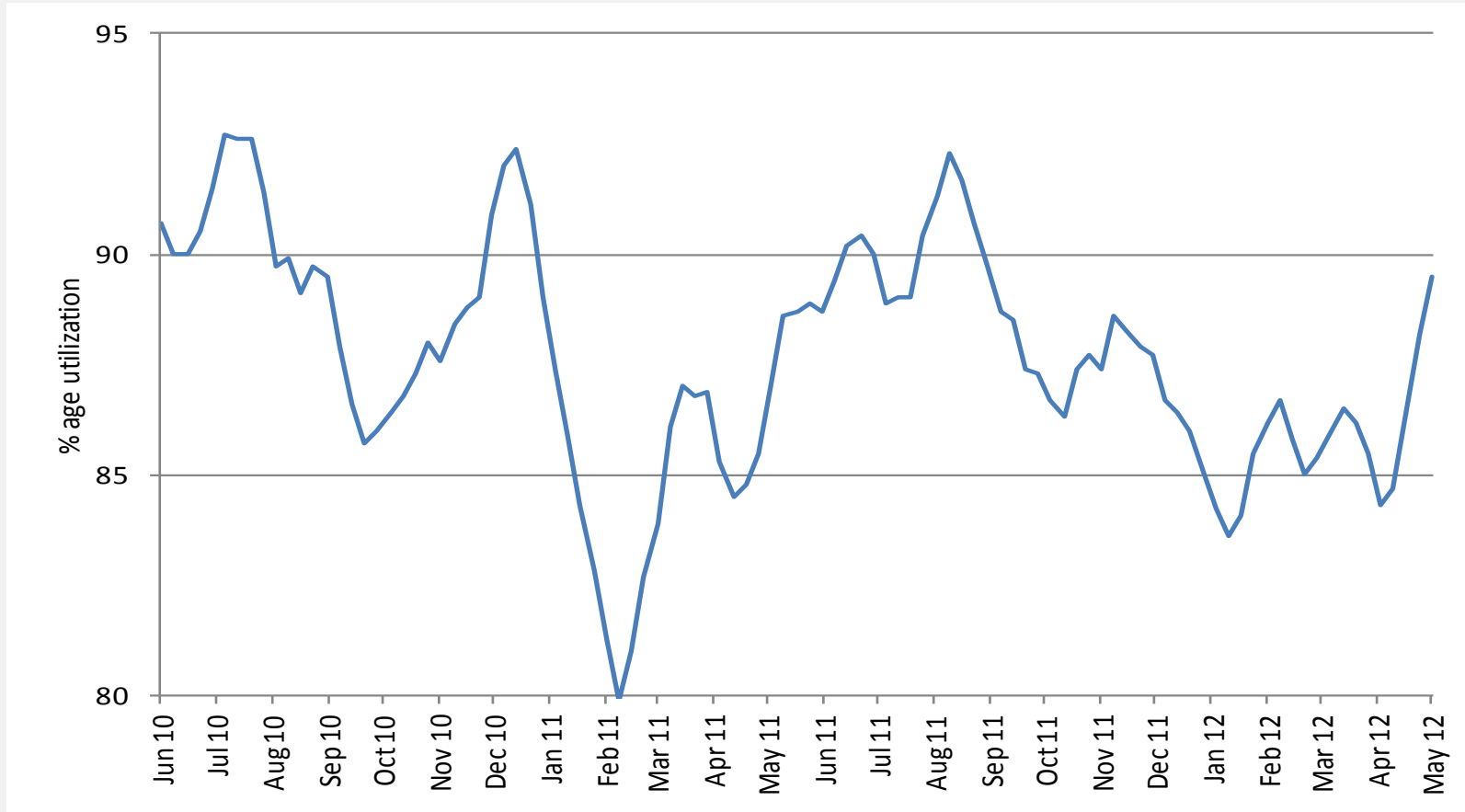
What does this have to do with price?

- 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

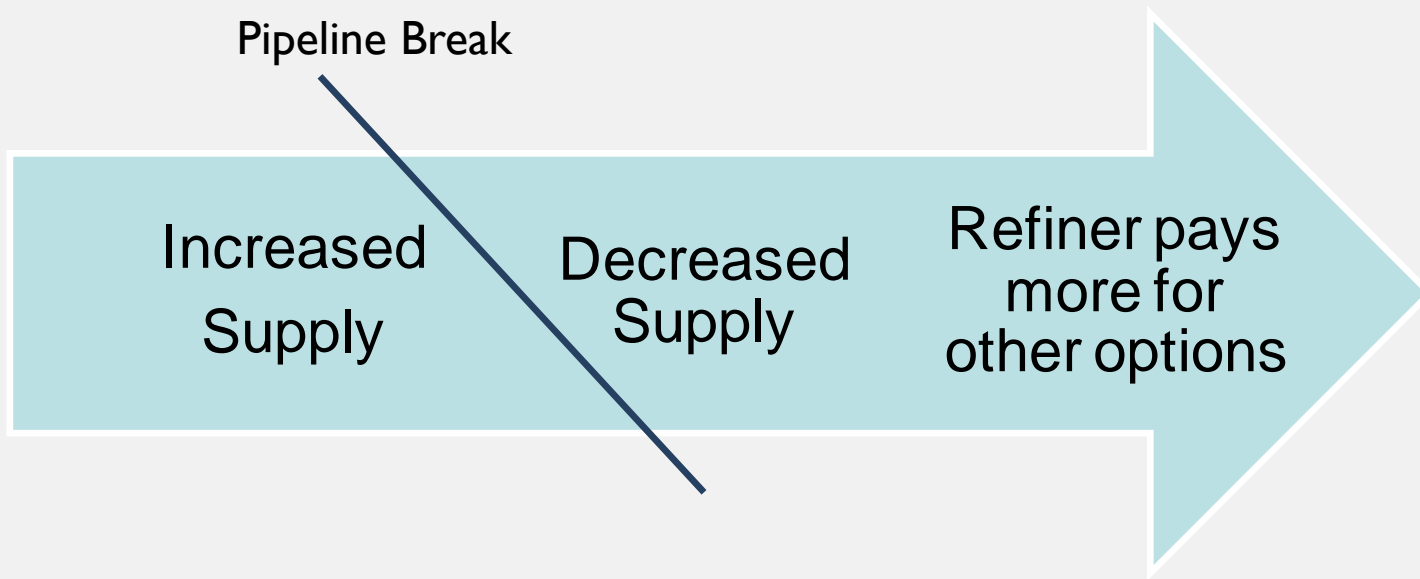
4-Week Avg USGC utilization of operable capacity



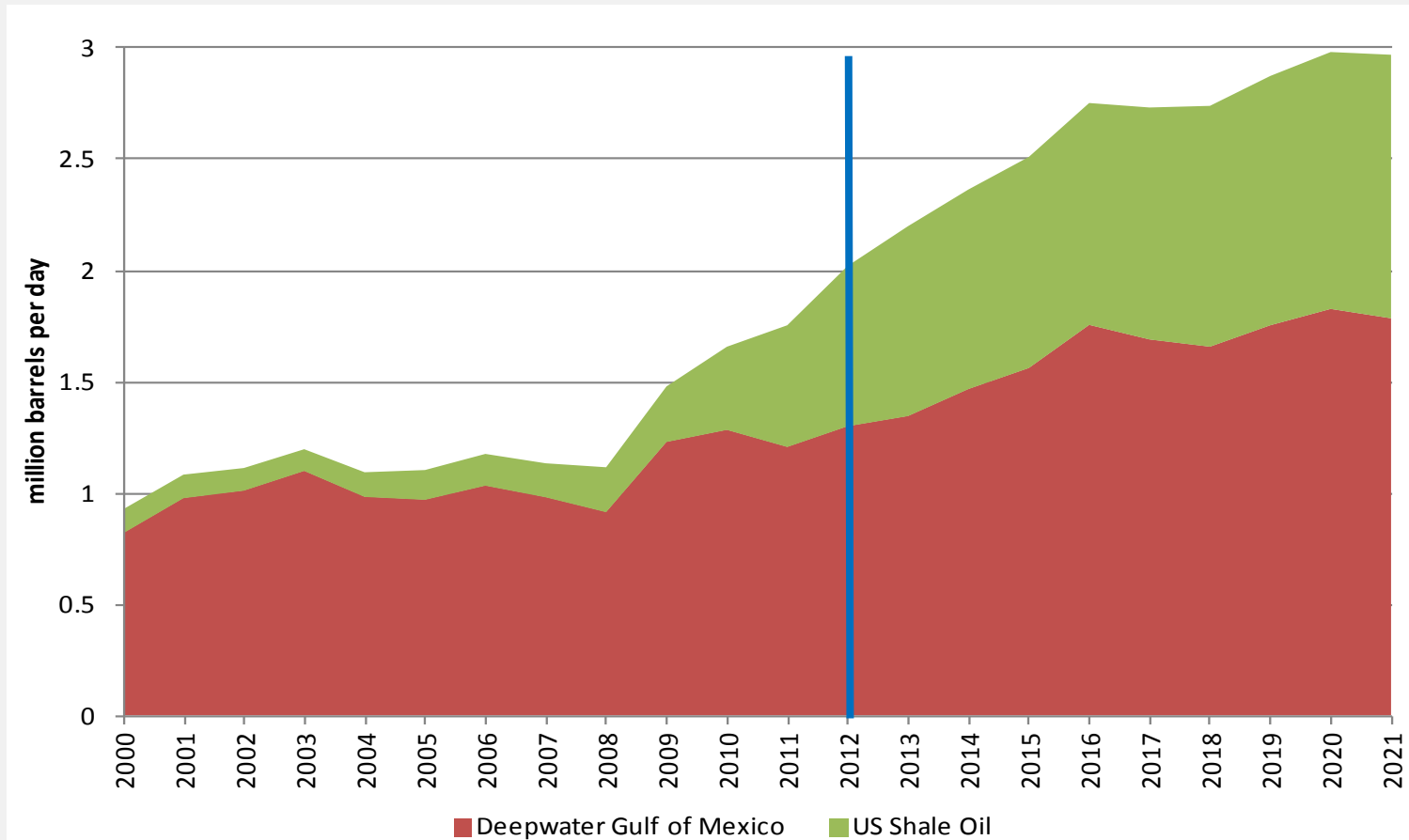
Supply side factors affecting price

- 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



US domestic production forecasts

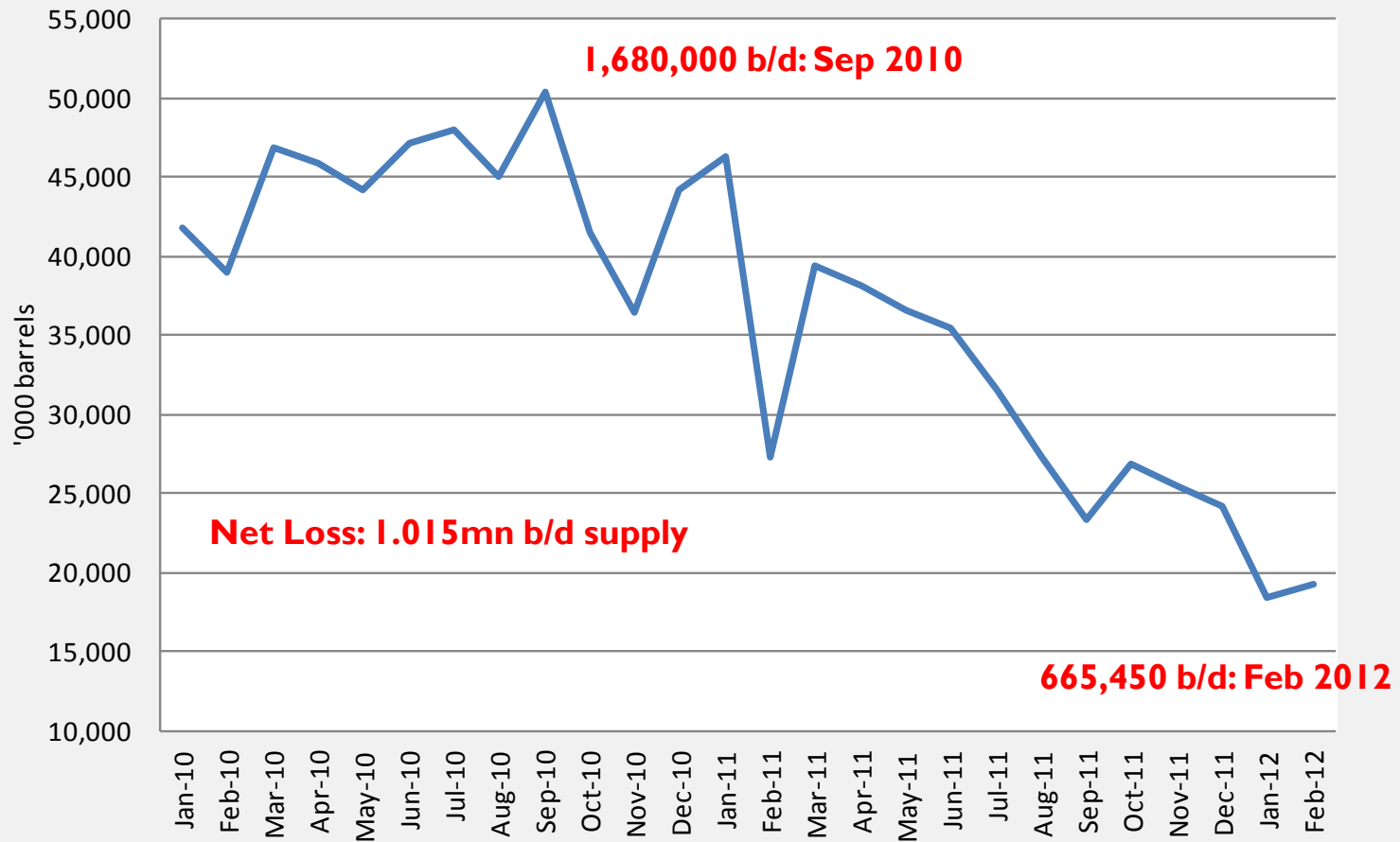


Source: EIA

Illuminating the markets



Waterborne sweet crude imports into USGC



Source: EIA

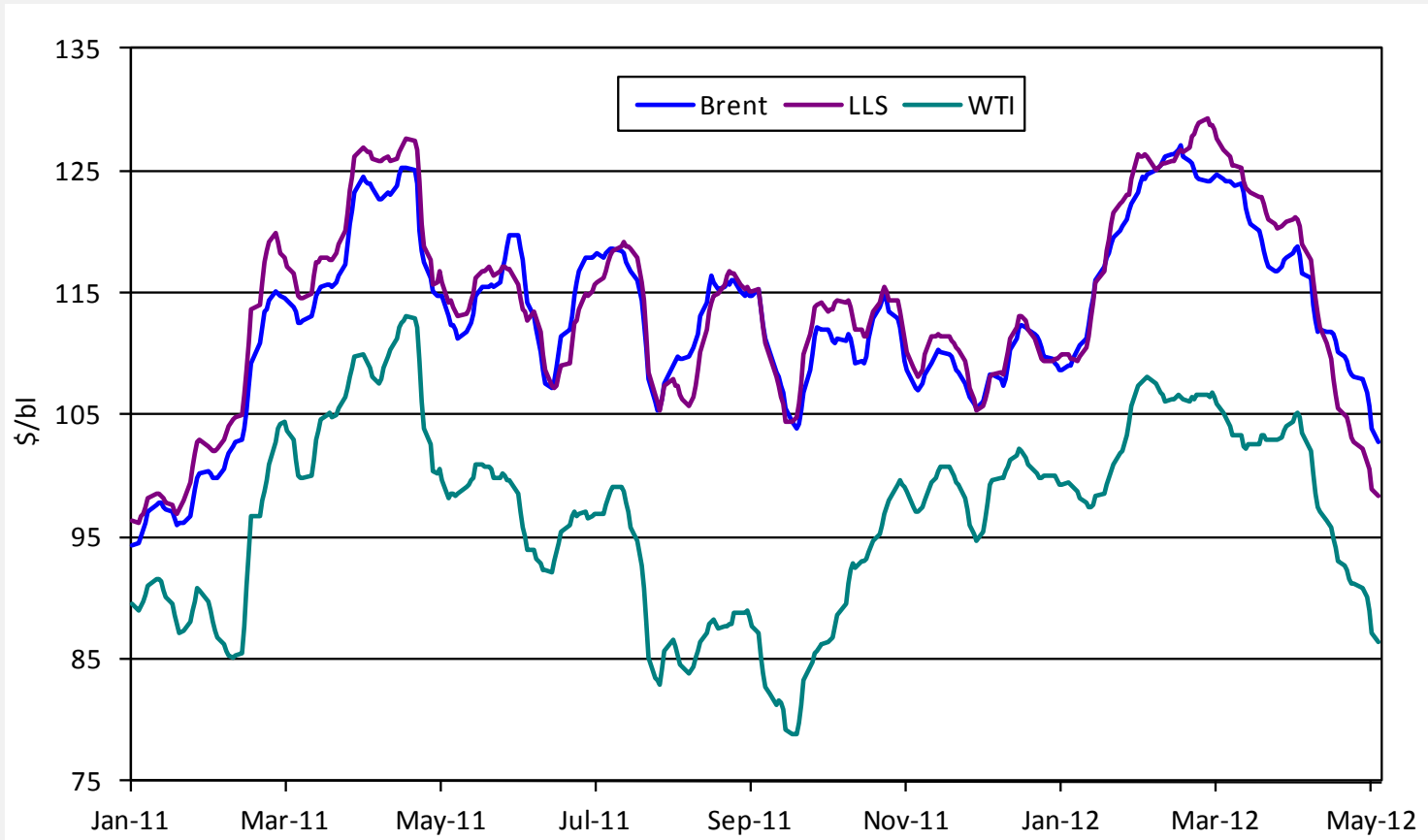
The WTI/Brent inversion

- 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

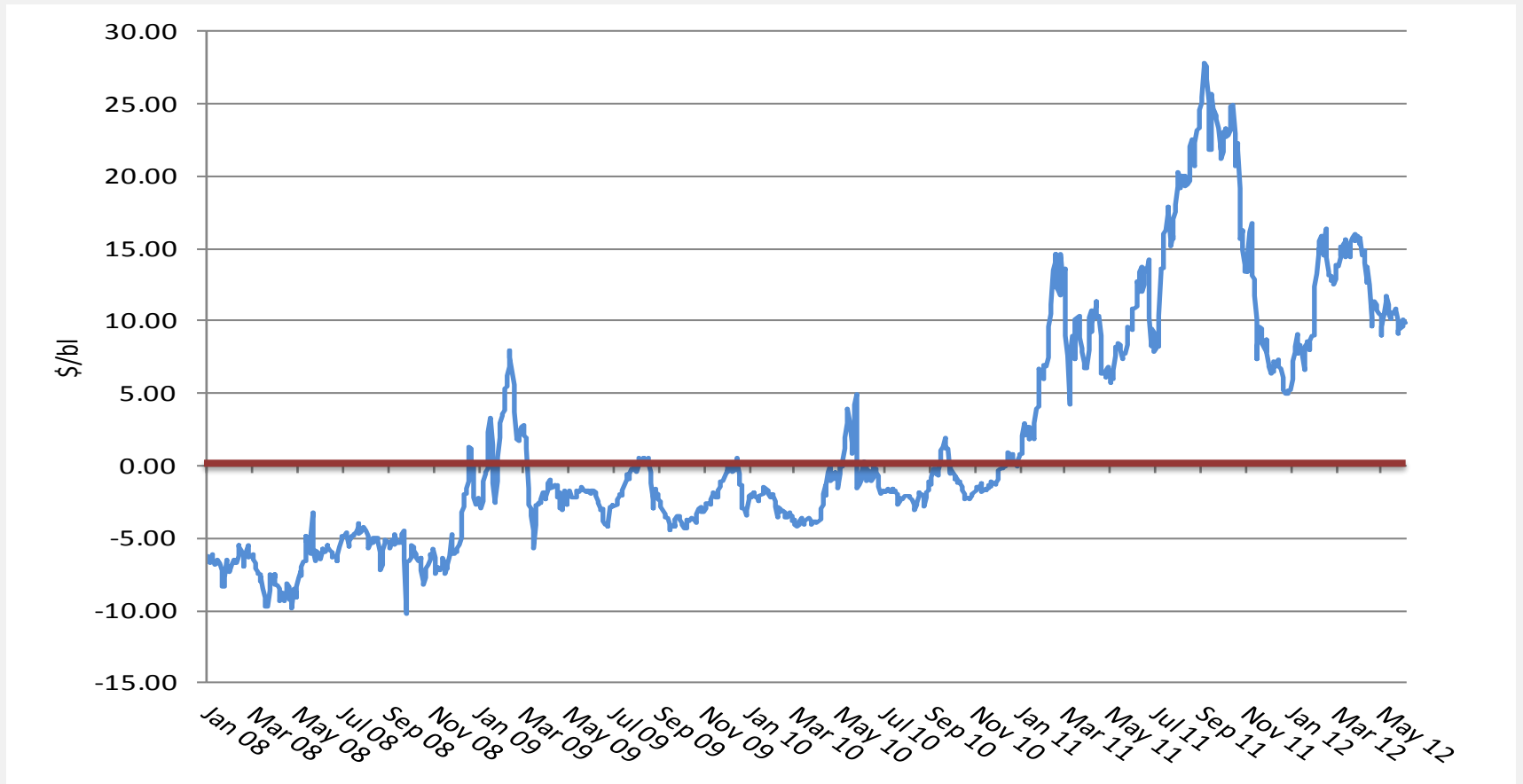
LLS relationship to Brent and WTI



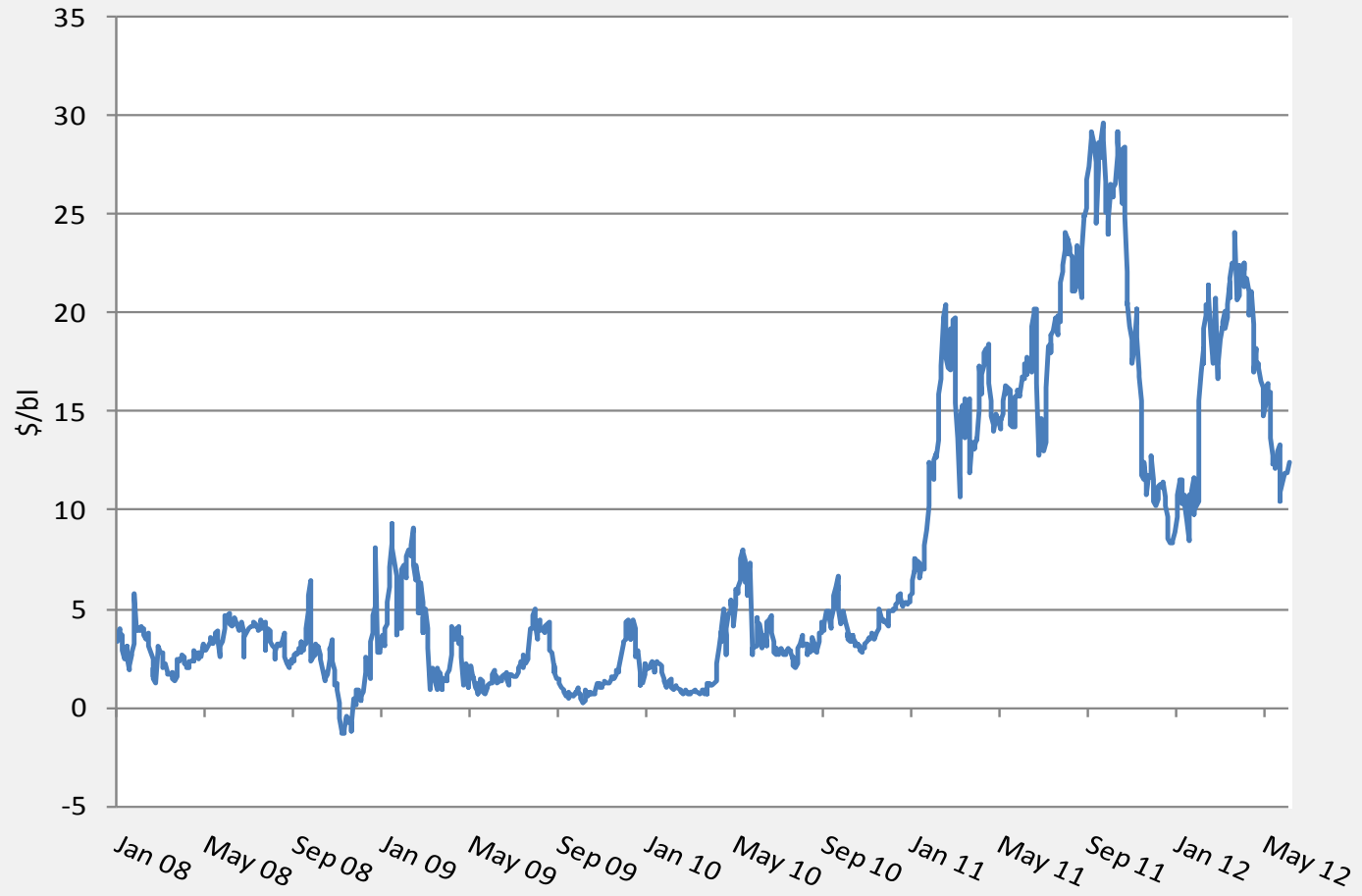
WTI inversion effect on spot market liquidity

- 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
 - The Argus methodology is currently a volume weighted average only of deals done at a differential to WTI
 - In illiquid markets, Argus will make an assessment based on other information, such as conversion or box trades
- Encouraged growth in LLS swaps transactions

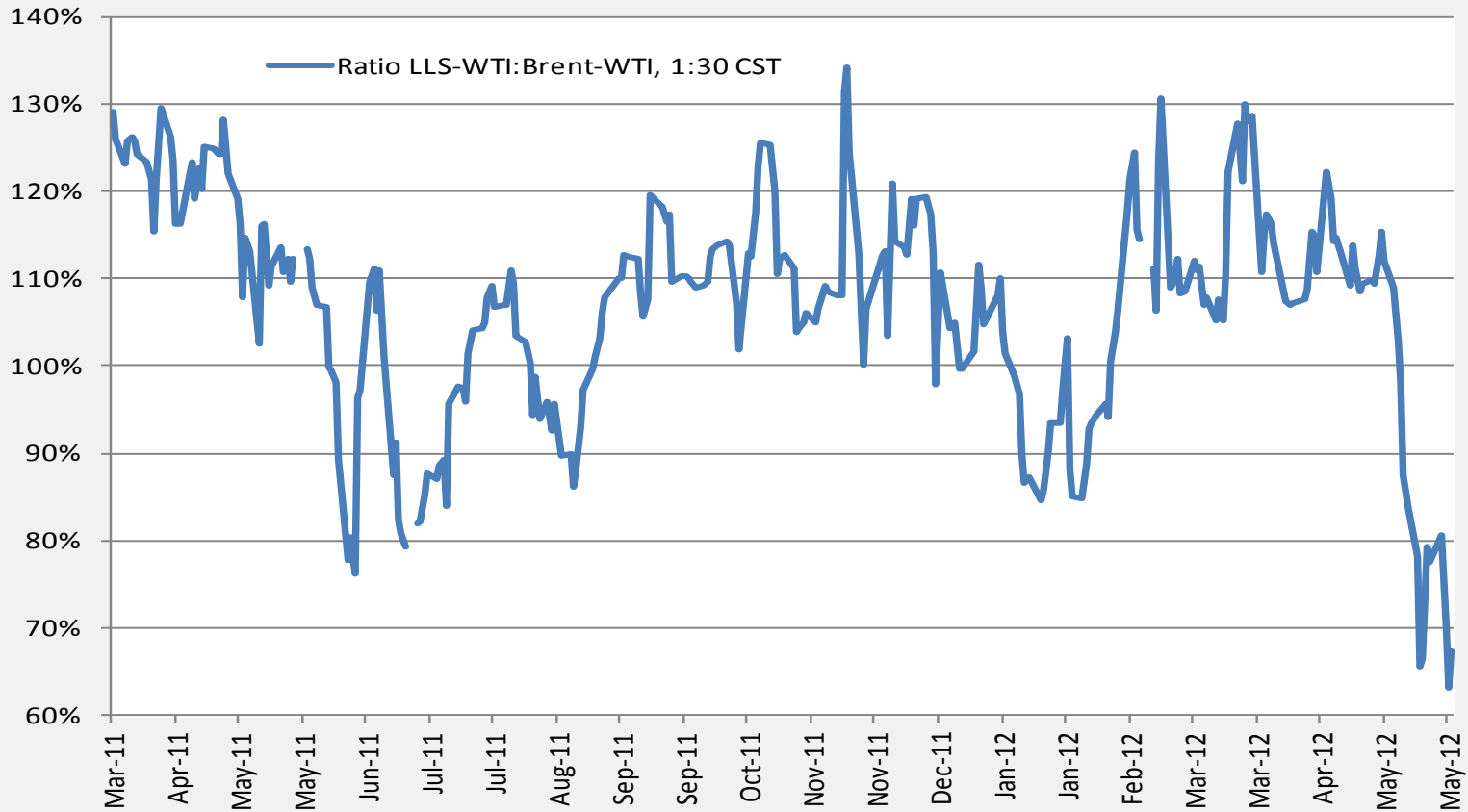
Mars differential to WTI



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:
 - Between 34-41° API
 - Sulfur content of no more than 0.40pc
 - 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
 - Bakken (arrives by rail) and Eagle Ford (arrives by barge)
 - 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

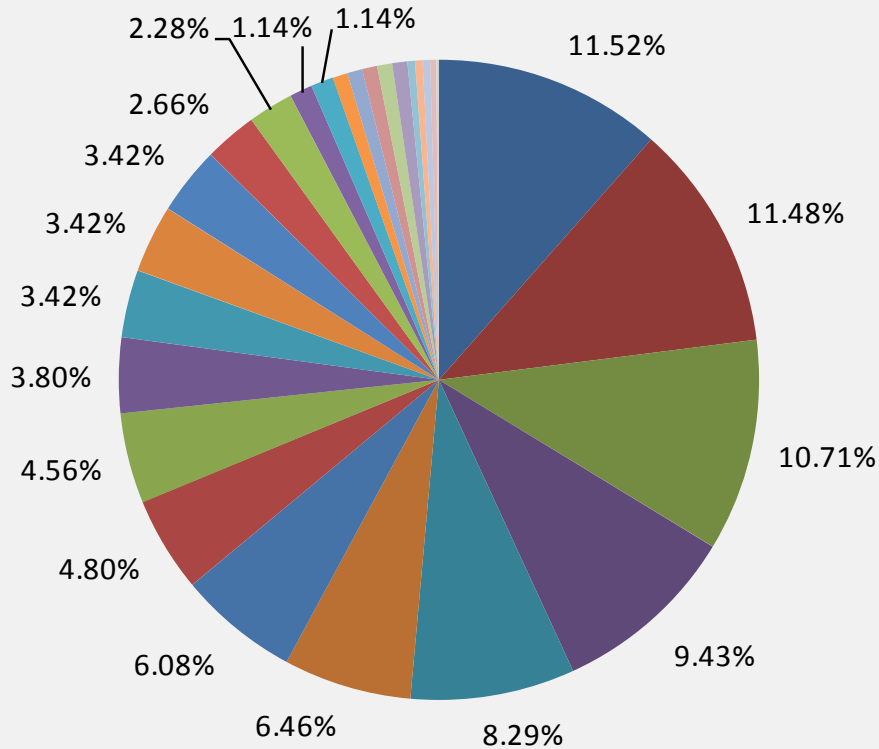
- LLS is already used as a benchmark with US domestic light grades being discussed on an LLS basis
 - Bakken
 - Eagle Ford
 - West Texas
- Foreign lights coming into US Gulf coast have been offered at an LLS-related price
- Valero, Marathon and others use LLS in financials to calculate product margins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

LLS Blending and Supply

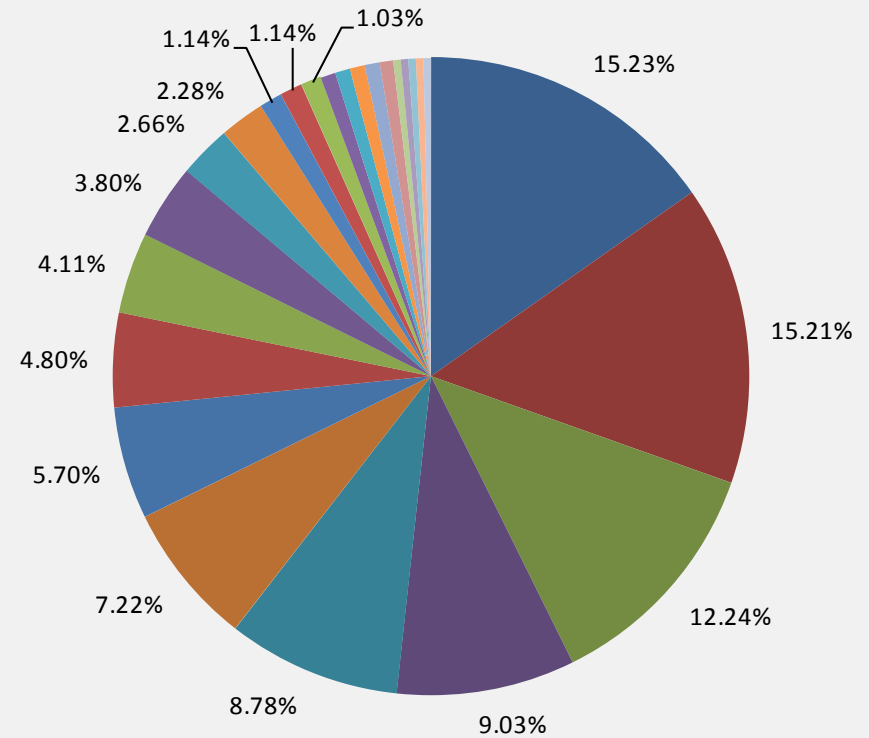
- In general, any crude that arrives at St James can be blended to LLS specs. Economics determine the mix
- Domestic grades normally used:
 - Any grade from USGC production
 - Bakken (arrives by rail) and Eagle Ford (arrives by barge)
- Foreign grades commonly used:
 - Venezuelan (used as base and blended with condensate)
 - West African
 - 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

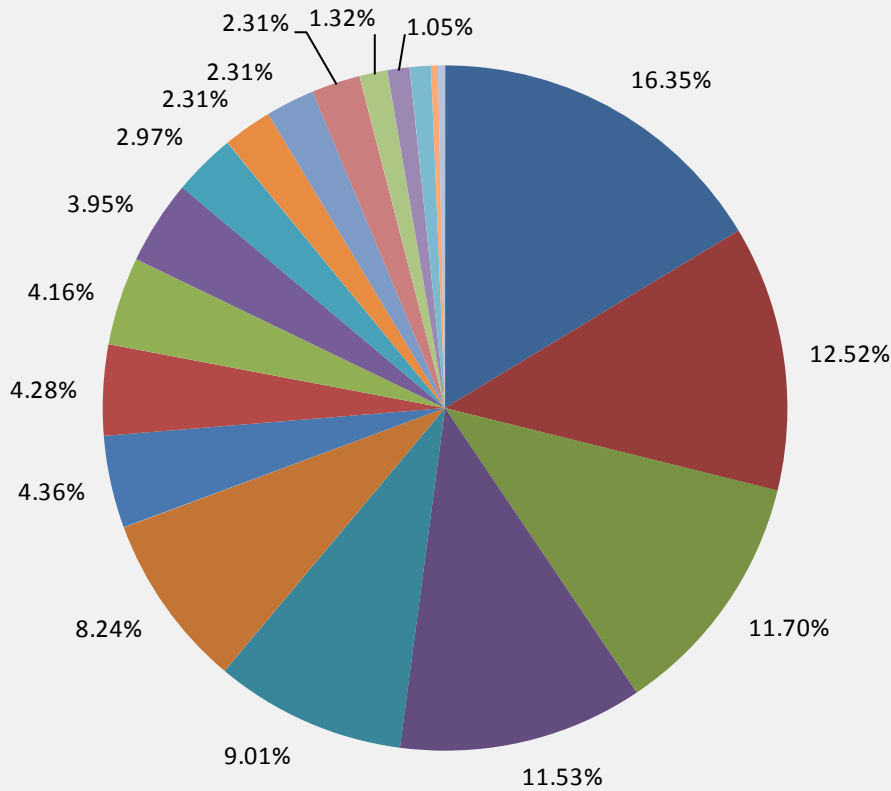


ASCI offers a robust alternative benchmark

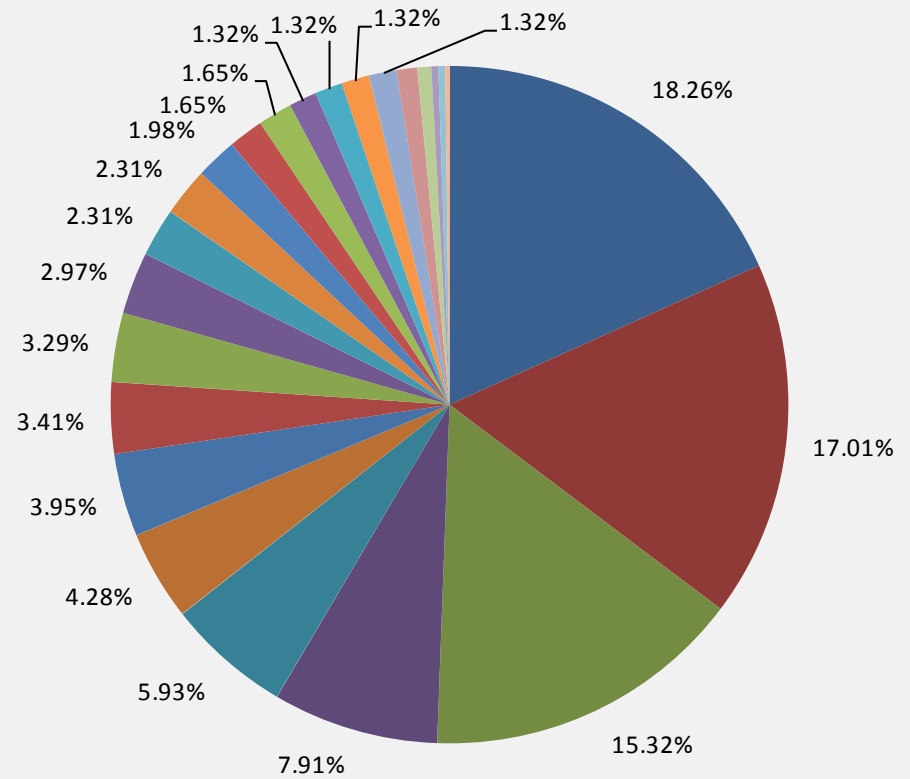
- Gulf coast buyers of Latin American crude are using ASCI and/or Argus Mars as the basis for their purchases
- US domestic producers have signed deals on ASCI as a way of capturing generic Gulf coast sour values
 - Also internal pricing purposes
- ASCI can be used with an adjustment factor to price 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

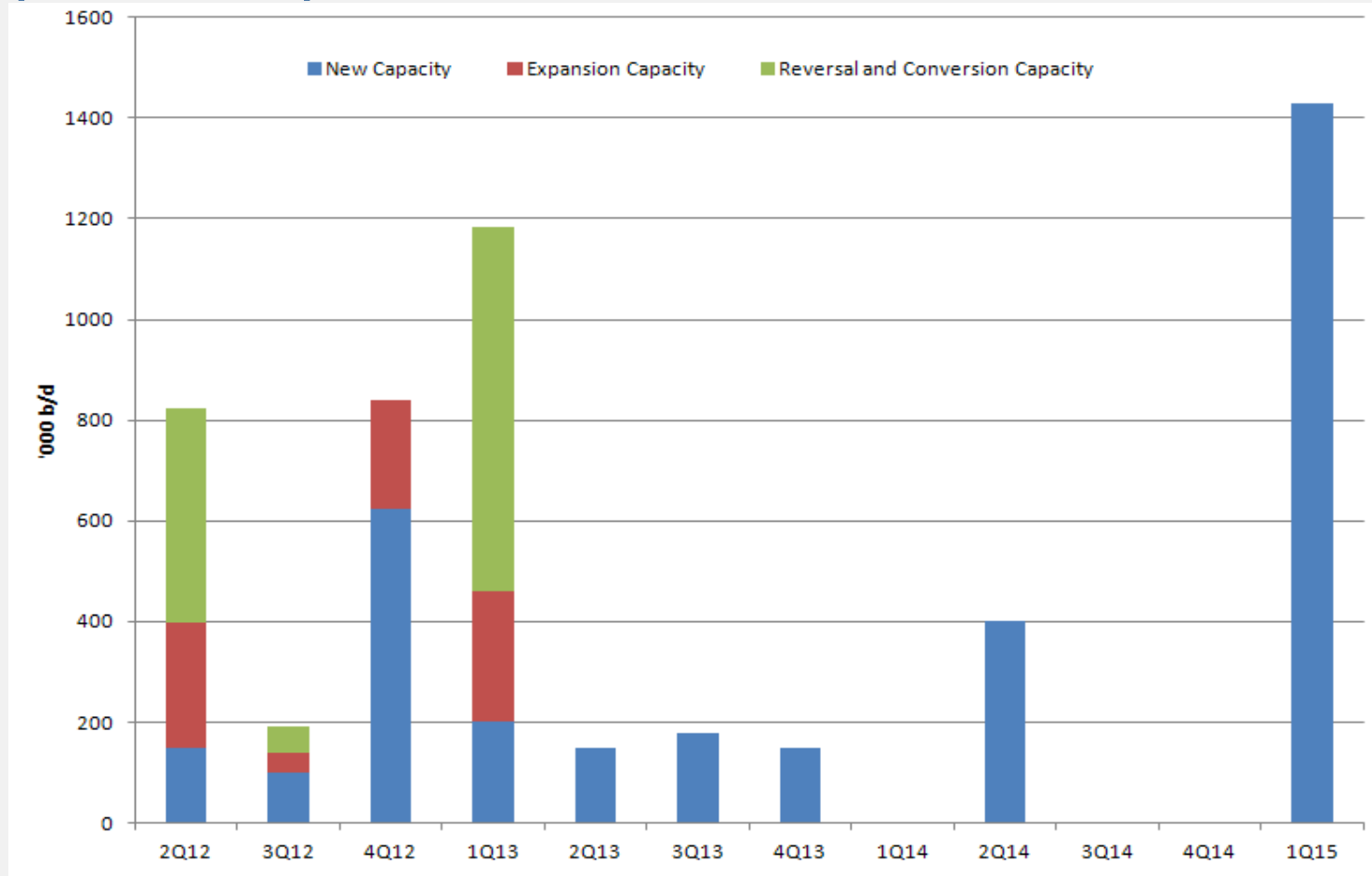
Overview of infrastructure issues

- 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

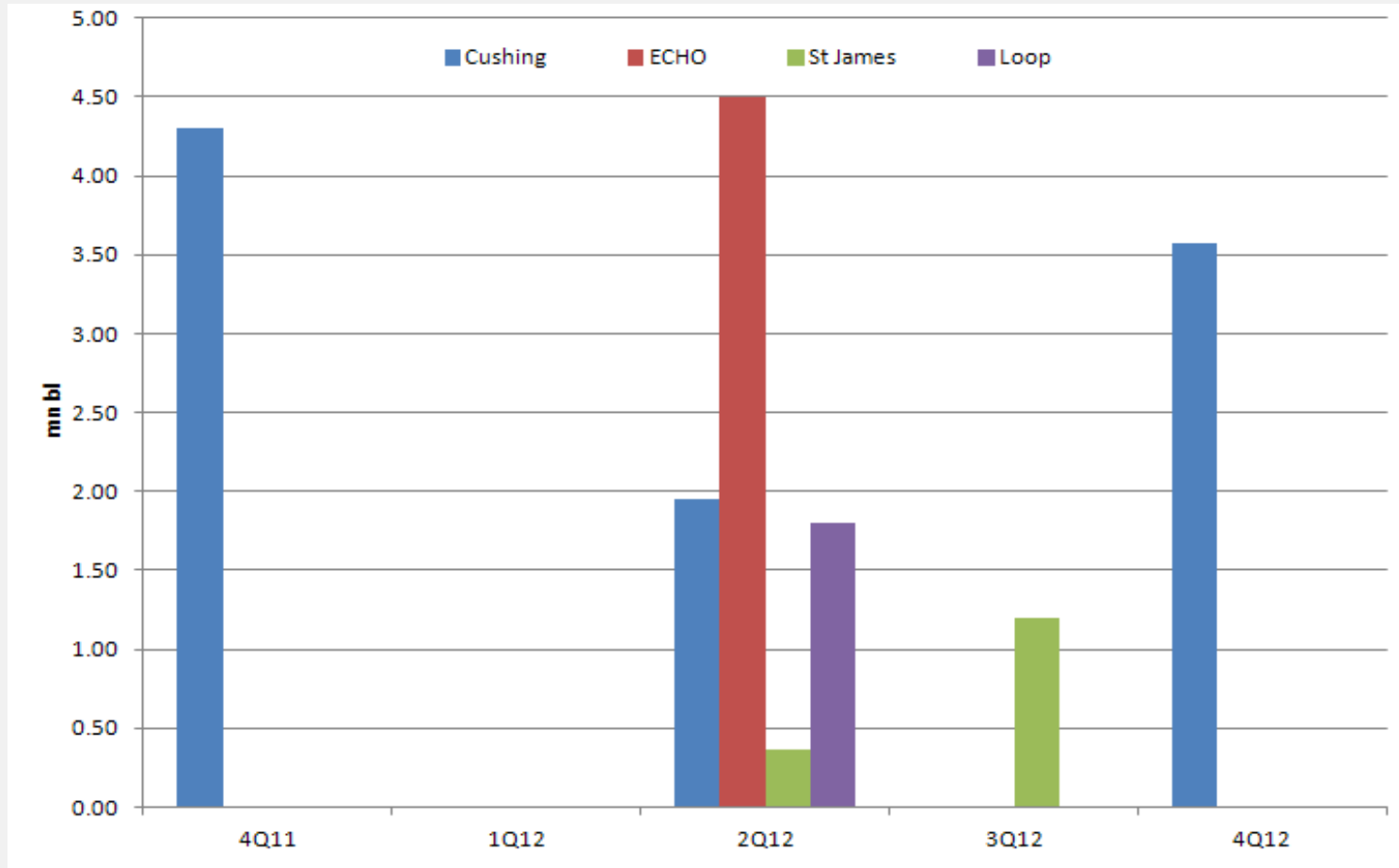
Overview of infrastructure issues

- 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

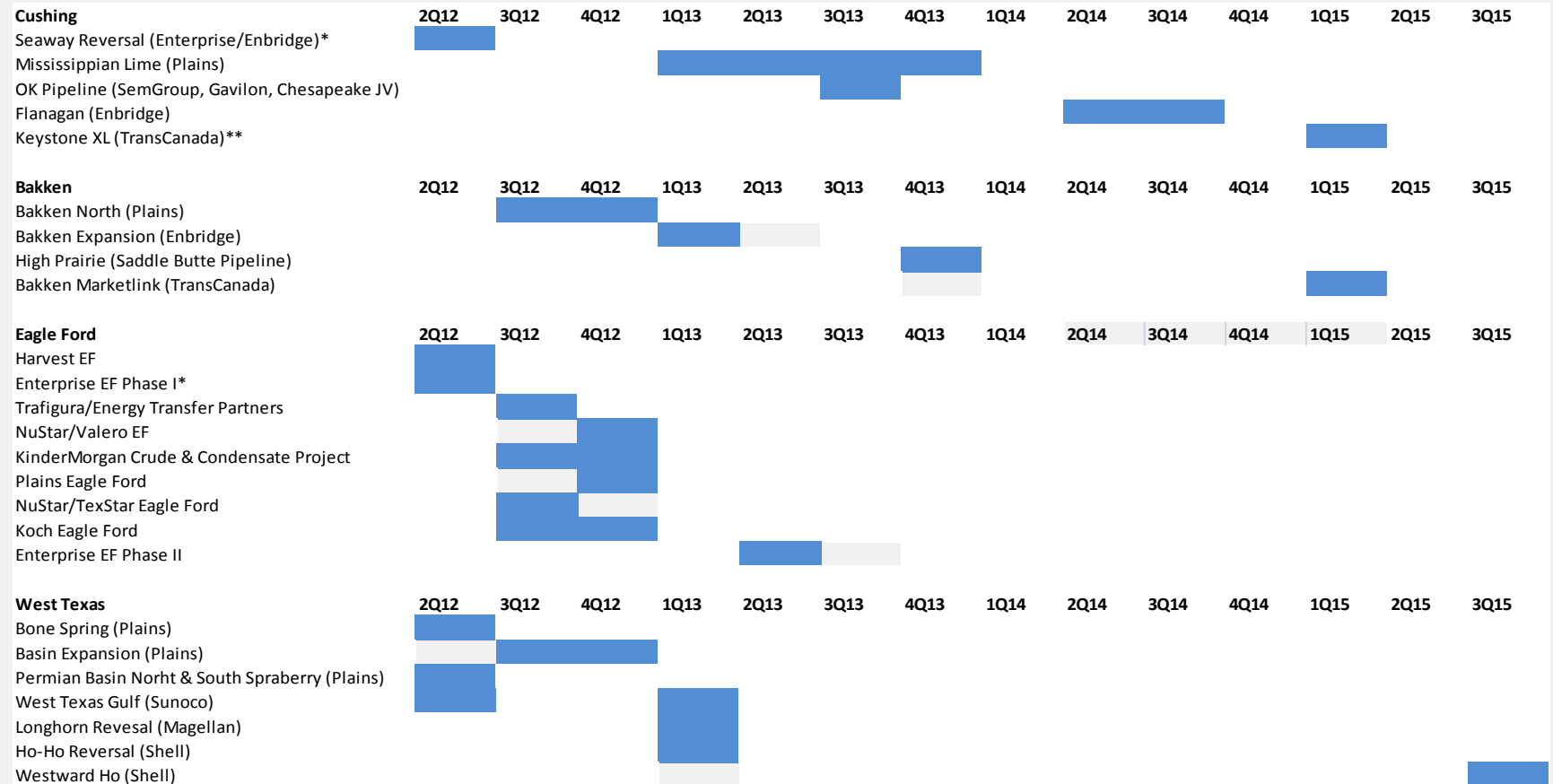
Pipeline Expansions, New Builds and Reversals



Storage Expansions



Projects Completion Schedule



*Project has been completed **Pending regulatory approval

Enterprise / Enbridge Seaway pipeline

Capacity: 400,000 b/d

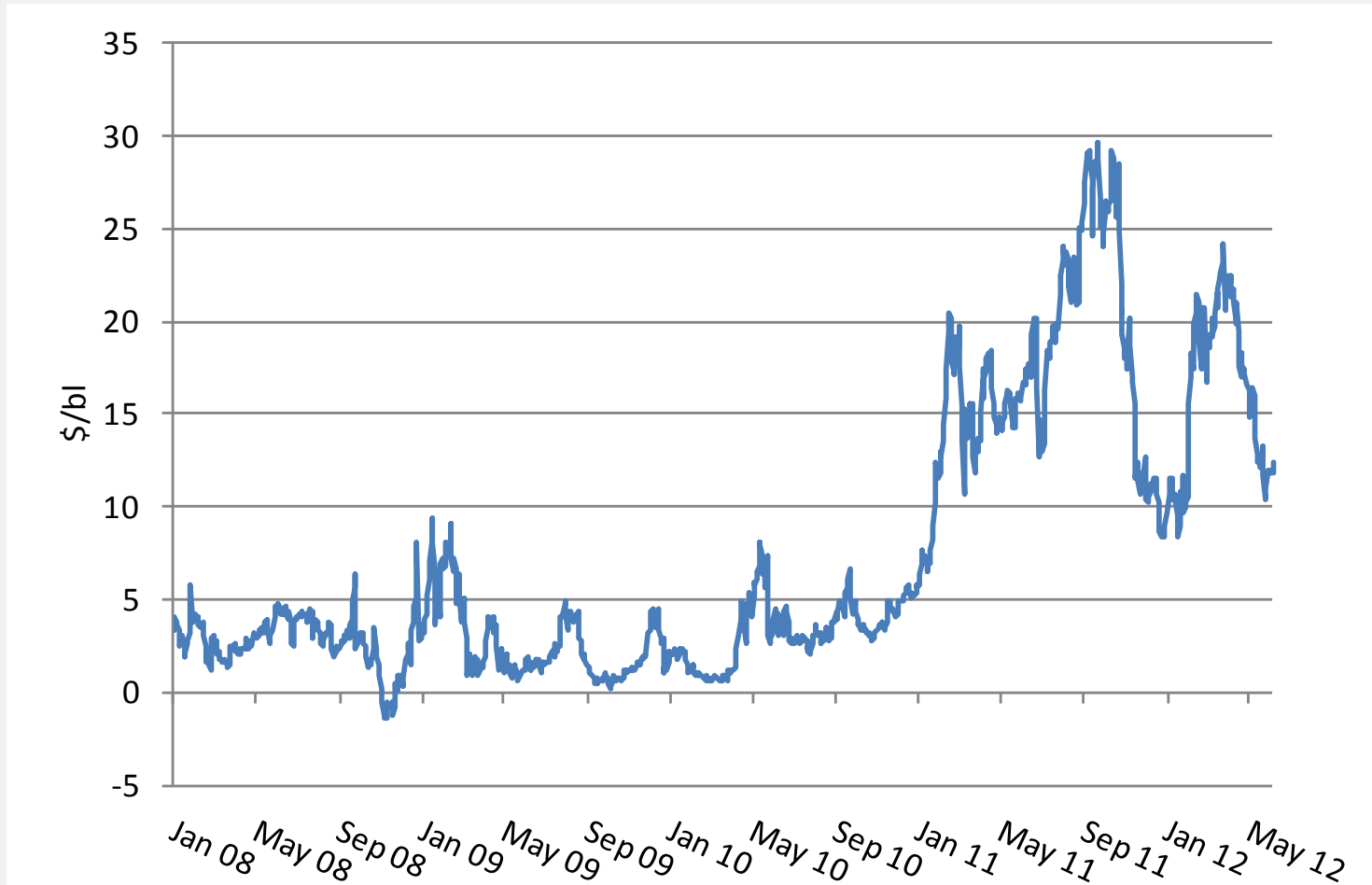
Route: Cushing, Oklahoma to
Freeport, Texas

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



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



Source: Enbridge

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

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?

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