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Changes in Key Oil and Gas Benchmark Prices: Evolution of U.S. physical crude oil indexes

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September 2020



illuminating the markets

Market Reporting
Consulting
Events

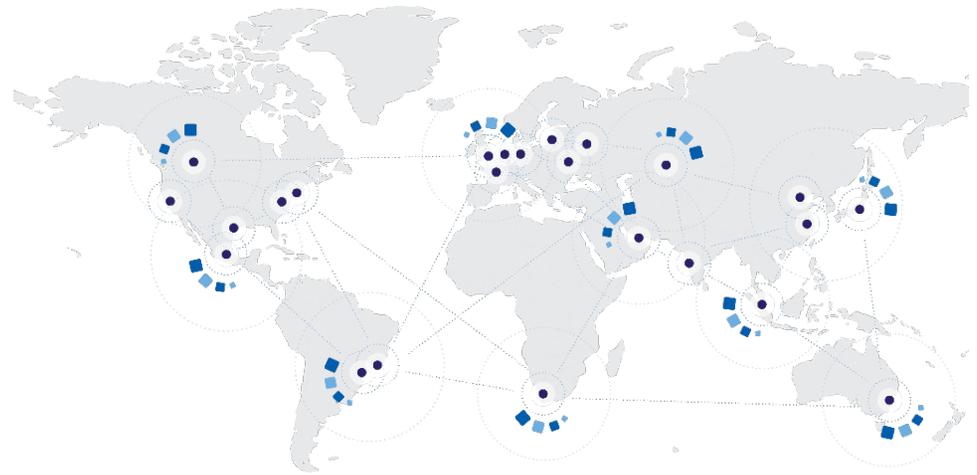
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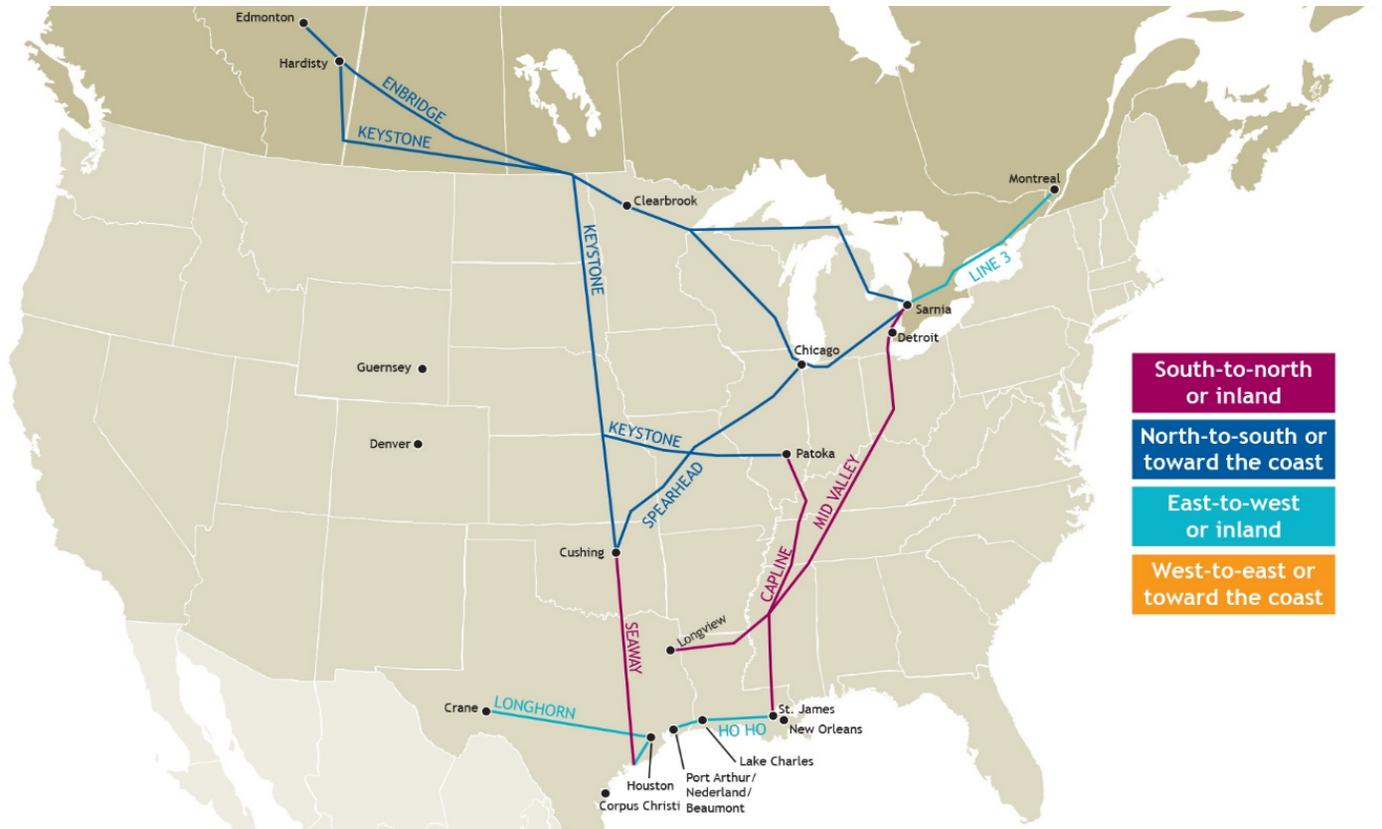
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Agenda

- The changing nature of physical indexes in the US
- Relationship with Nymex and the emergence of key secondary benchmarks
- April 20 and the fallout from negative pricing
- New index solutions



Until 2010, U.S. network designed to move imports inland



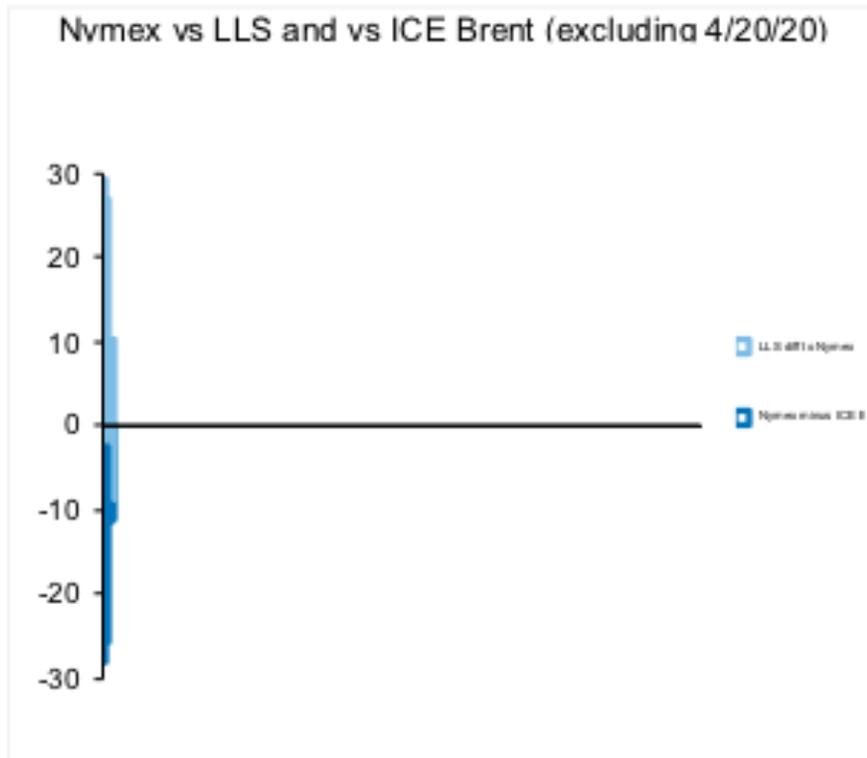
- South-to-north or inland
- North-to-south or toward the coast
- East-to-west or inland
- West-to-east or toward the coast



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2007-2011: Cushing falls below Brent

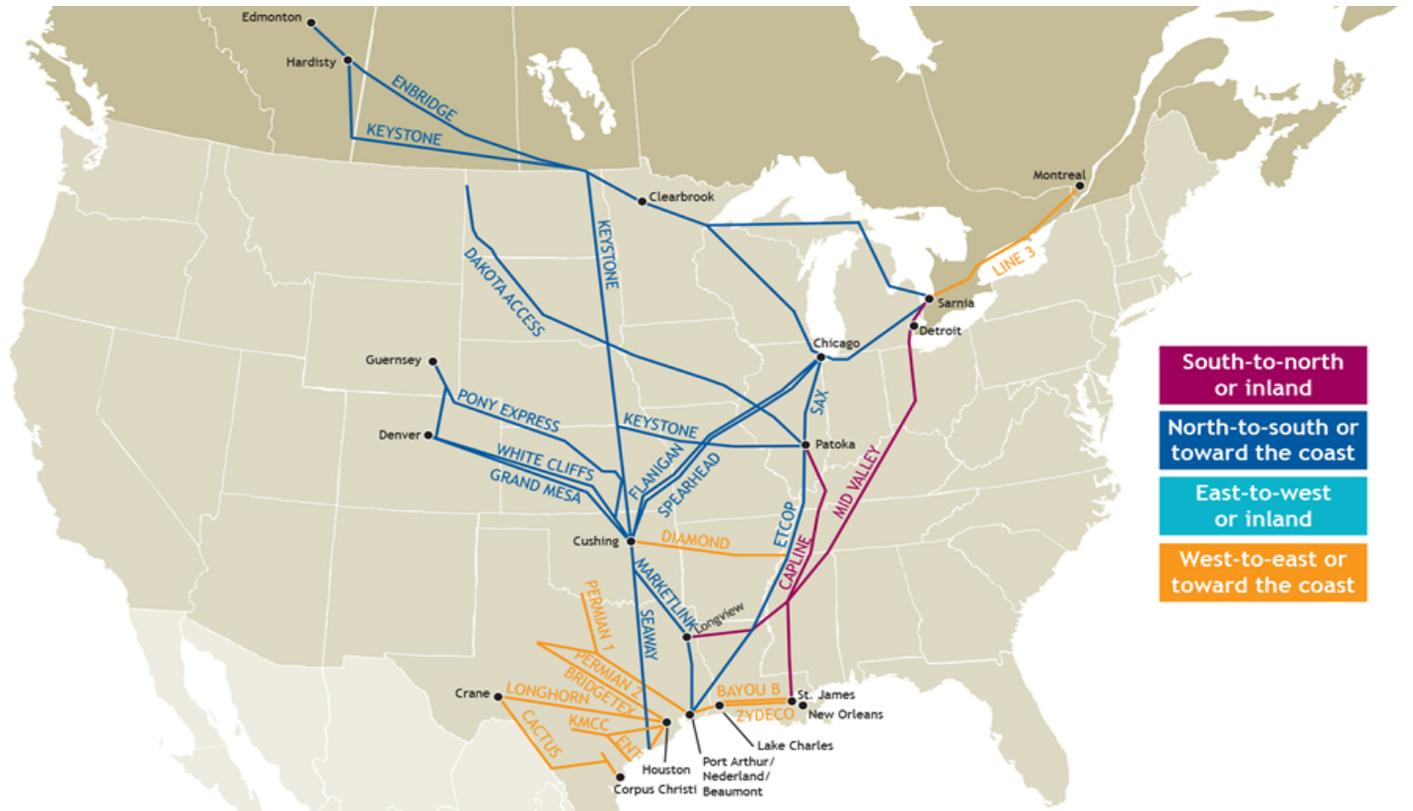


- Nymex-Brent relationship inverts under weight of Canadian and Rockies barrels at Cushing
- USGC offshore grades part of Atlantic market and tend to move in line with Brent
- Saudis, Kuwait, Iraq adopt Argus Sour Crude Index based on basket of medium sour USGC grades, including Mars
- U.S. becomes secondary

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By 2018, new lines built to move shale crude to USGC



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Price formation in US crude oil spot markets

$$\begin{aligned} &\text{Differential (premium/discount) for crude grade} \\ &+ \\ &\text{Nymex Month 1 Settlement price} \\ &= \\ &\text{Outright price} \end{aligned}$$



Secondary benchmarks emerge for US physical crude

**WTI Midland –
“Upstream benchmark”**
40-44 API | <0.2% S
Basis: Midland area terminals
Delivery: Houston,
Corpus Christi, Cushing

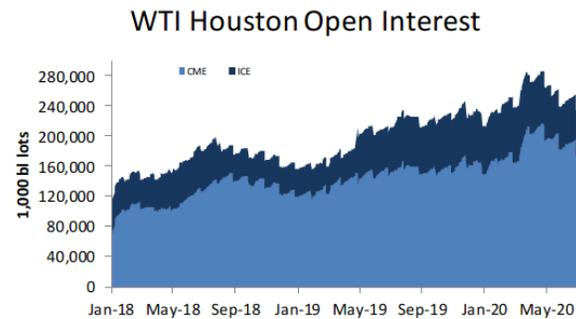
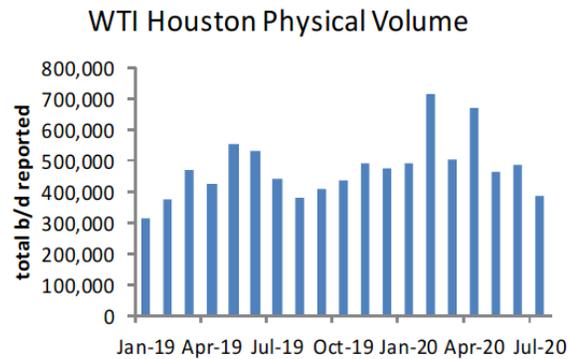
WTI Houston - “Light-sweet benchmark”
40-44 API | <0.2% S
Basis: Magellan East Houston (MEH)
Delivery: Houston refineries, Louisiana
(via pipe), exports

**Mars -
“Medium-sour benchmark”**
29.6 API | 1.81% S
Basis: Clovelly, LA
Delivery: Louisiana refineries, exports,
imports of medium sour (ASCI)

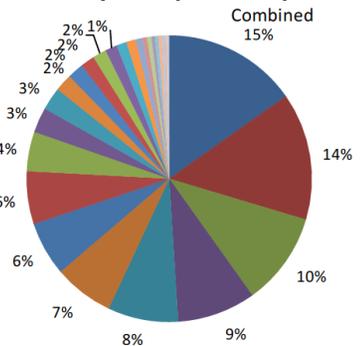
LLS - “Waning light sweet benchmark”
38.4 API | 0.39% S
Basis: St James, LA
Delivery: Louisiana refineries, exports



Argus WTI Houston (MEH)



Diversity of participation



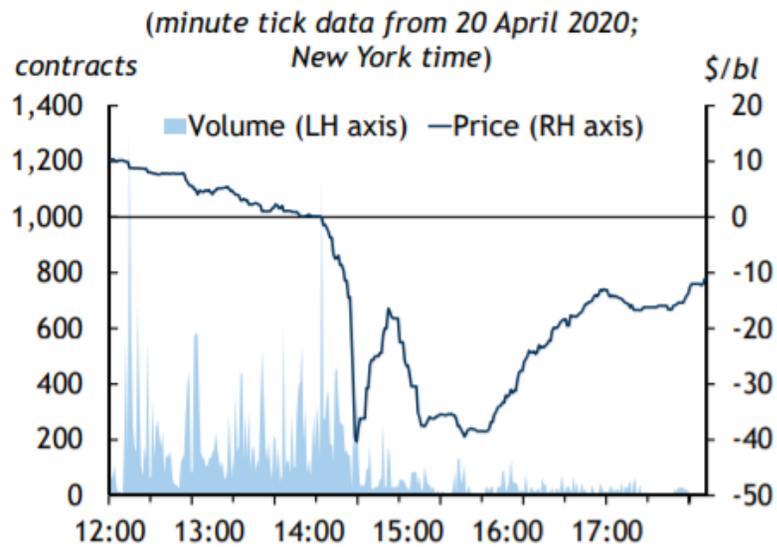
- Reported spot trade volume > 400,000 b/d
- Financial open interest 250mn bl
- Used to cost USGC cargoes, sometimes as a basis
- Written into contracts by buyers in Japan and Taiwan

65pc of the Mexican Maya crude export formula to the Americas

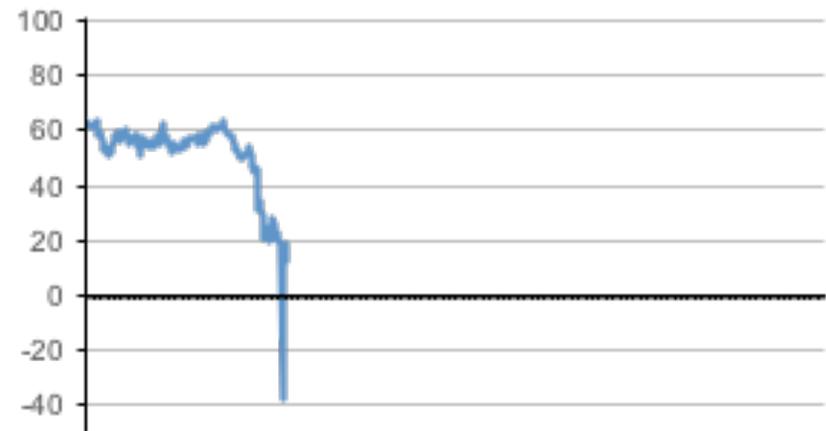


Responses to April 20, 2020

Nymex May WTI crude futures

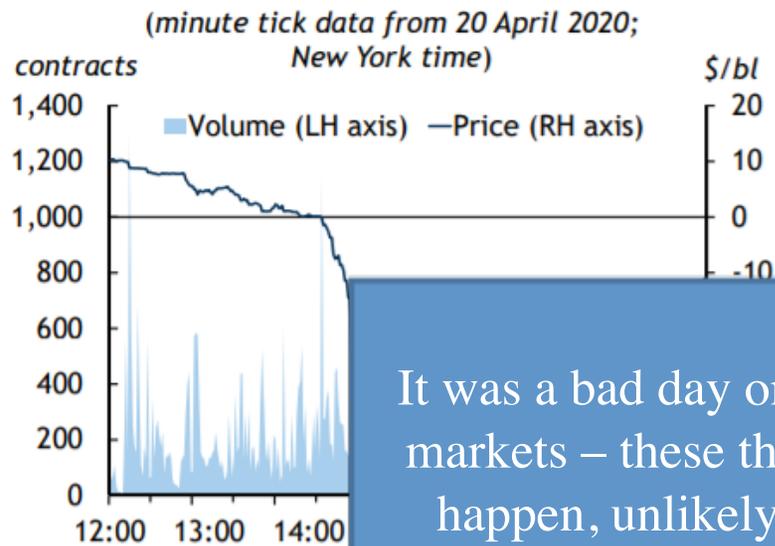


Nymex light sweet crude settlement price



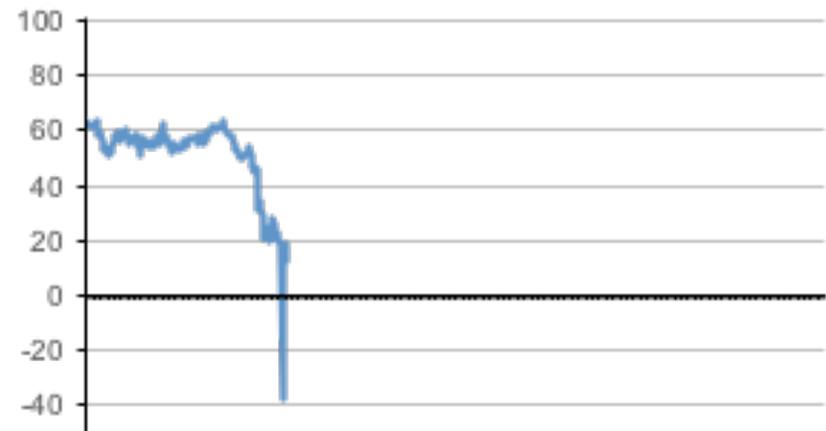
Responses to April 20, 2020

Nymex May WTI crude futures



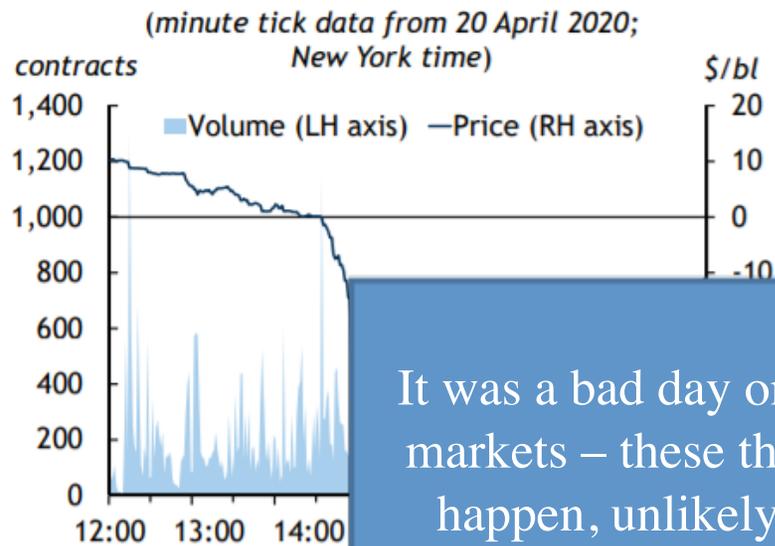
It was a bad day on the markets – these things happen, unlikely to ever happen again

Nymex light sweet crude settlement price



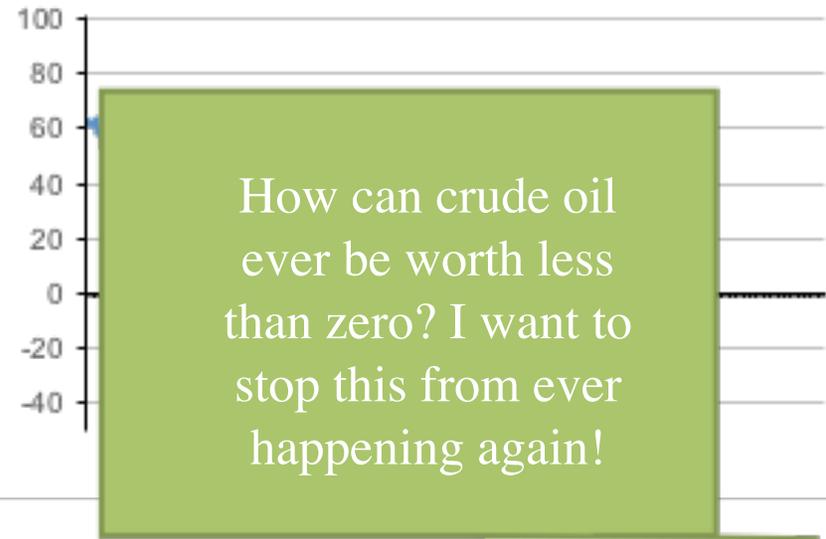
Responses to April 20, 2020

Nymex May WTI crude futures



It was a bad day on the markets – these things happen, unlikely to ever happen again

Nymex light sweet crude settlement price



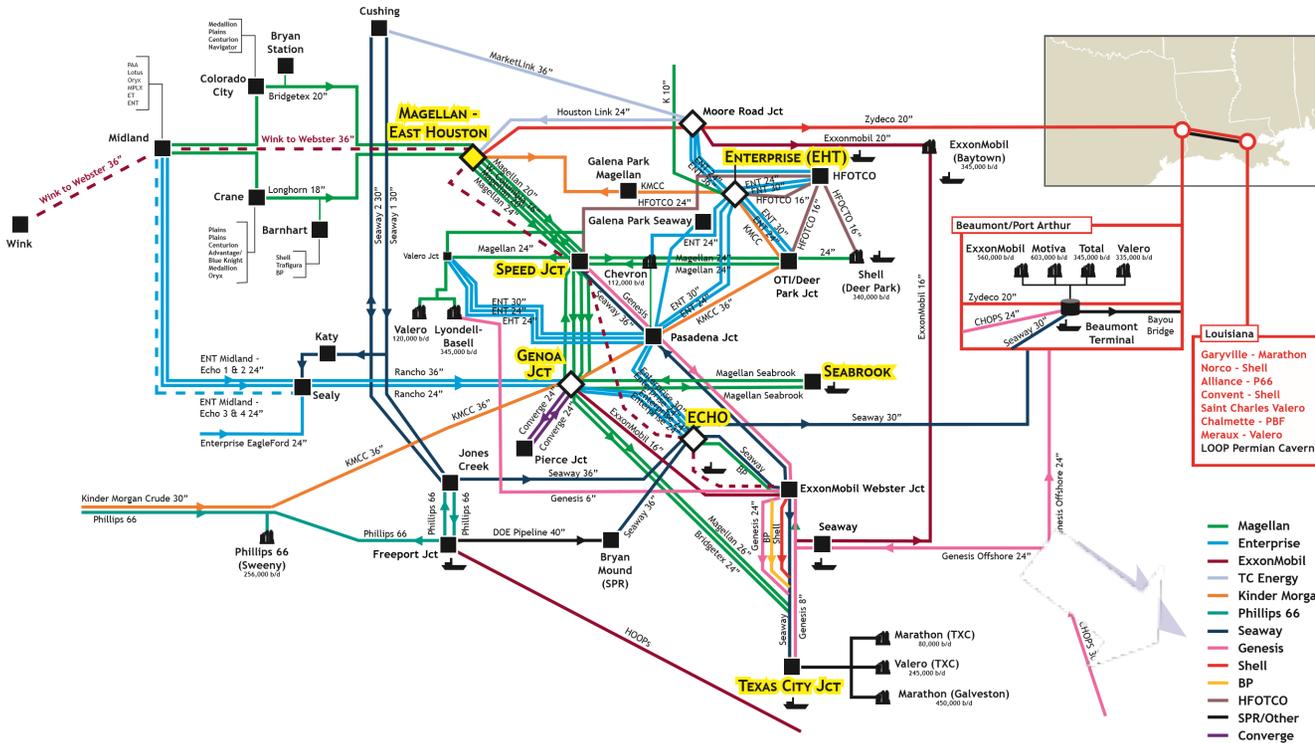
Argus AGS: An evolution of the USGC market for WTI

- **The Argus AGS Marker:** An outright volume-weighted index of Midland-quality WTI traded at the Gulf coast
- **The Argus AGS index:** The same Midland-quality WTI trades at the Gulf coast, but entered to the index as differentials to the Nymex light sweet settlement price

	Timing	Basis	Diff low	Diff high	Diff weighted average	Diff MTD weighted average	Low	High	Weighted average	MTD Weighted Average
<u>Argus AGS Marker</u>	Sep						42.69	42.84	42.72	42.05
<u>Argus AGS</u>	Sep	Sep WTI	+0.45	+0.60	+0.48	+0.55	42.69	42.84	42.72	
WTI Houston	Sep	Sep WTI	+0.70	+0.85	+0.70	+0.79	42.94	43.09	42.94	
WTI Houston	Oct	Oct WTI	+0.85	+0.95	+0.90	+0.92	43.37	43.47	43.42	
WTI Midland	Sep	Sep WTI	-0.05	0.00	-0.02	+0.03	42.19	42.24	42.22	
WTI Midland	Oct	Oct WTI	+0.05	+0.15	+0.10	+0.09	42.57	42.67	42.62	



Midland WTI now trades at multiple Houston locations



No single location can represent all of Midland WTI at Houston



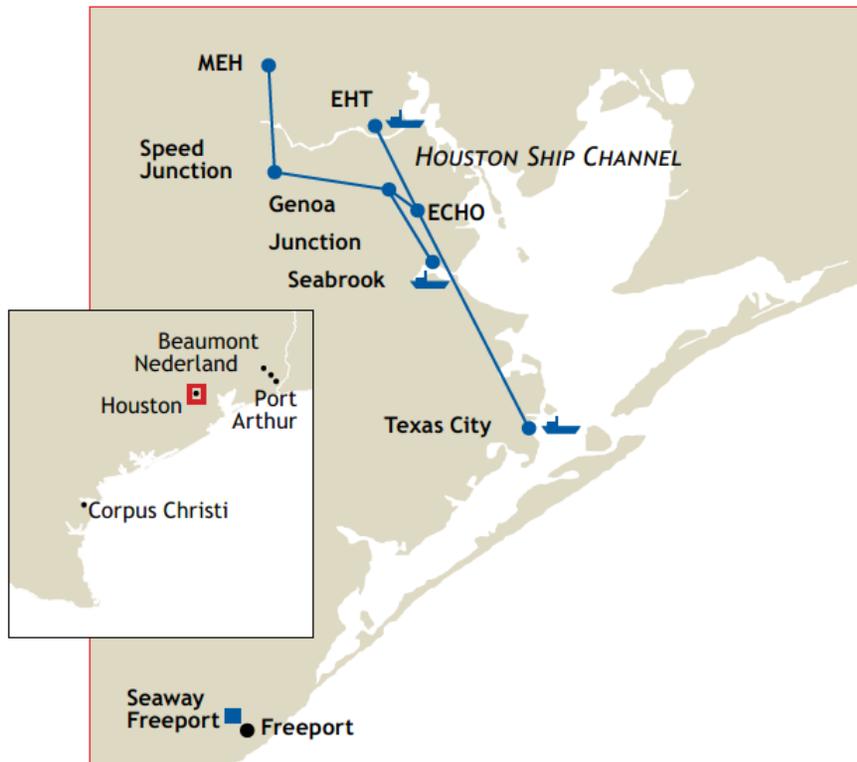
Midland-quality WTI at Houston end '21 ('000 b/d)

MEH: Adding new locations in October	
Longhorn	275
Bridgetex	440
ECHO: Killing M2E4	
M2E 1&2	820
M2E3 by October?	450
Webster:	
Wink to Webster (October?)	1,000+
Total	2,985+

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Argus AGS combines Houston pipeline with Texas docks

AGS index pricing locations



AGS combines:

- Trades done at four onshore locations in Houston
- Aframax trades done at dock stretching from Corpus Christi to Beaumont



USGC complexity removed by normalizing locations

Location	Adjustment factor to Echo
MEH	-7¢/bl
Genoa Junction	-10¢/bl
Speed Junction	-20¢/bl
FOB EHT	-25¢/bl
FOB Texas City	-25¢/bl
FOB Seabrook	-25¢/bl
FOB Beaumont/Nederland	-40¢/bl
FOB Corpus Christi	-20¢/bl

-- Effective October
12, 2020

Uses observed spreads between locations to normalize trades to an ECHO basis

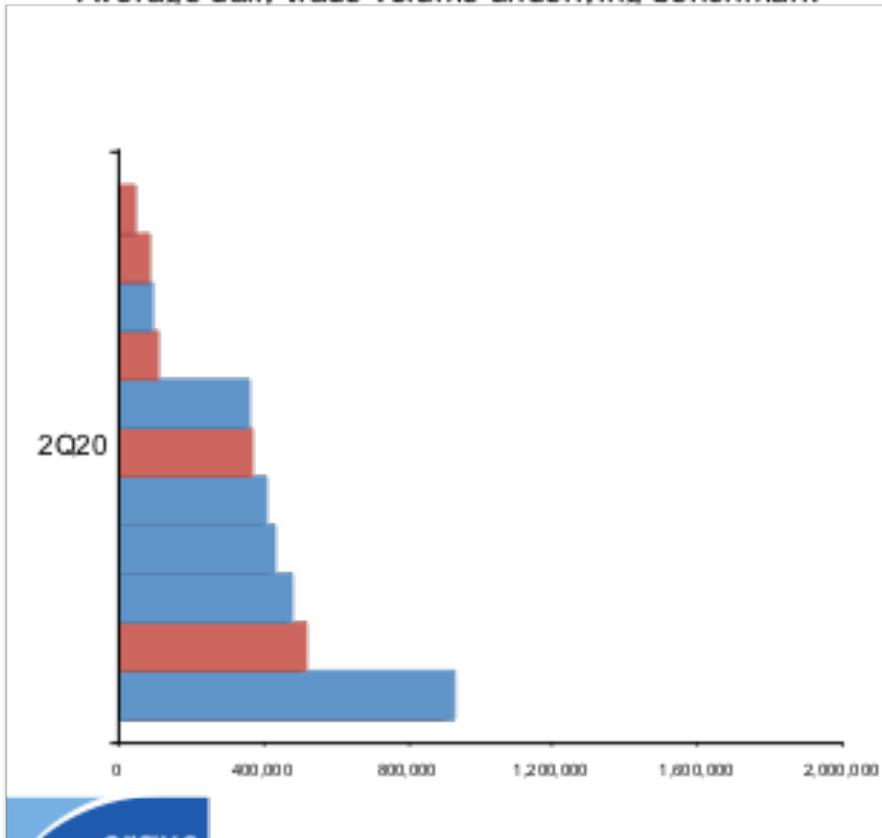
Spreads updated every three months; more frequently as needed with prior notification

Example: A trade done at MEH for \$41.00 would be entered into the combined AGS Marker index as \$40.93

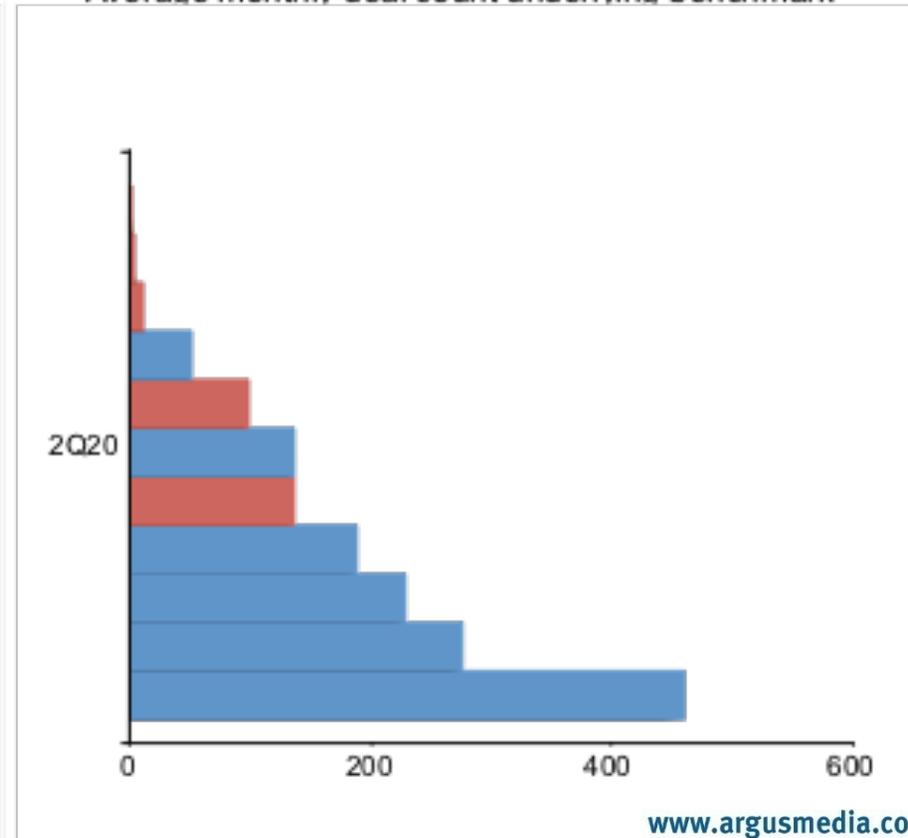


US crude indexes offer unparalleled liquidity & transparency

Average daily trade volume underlying benchmark

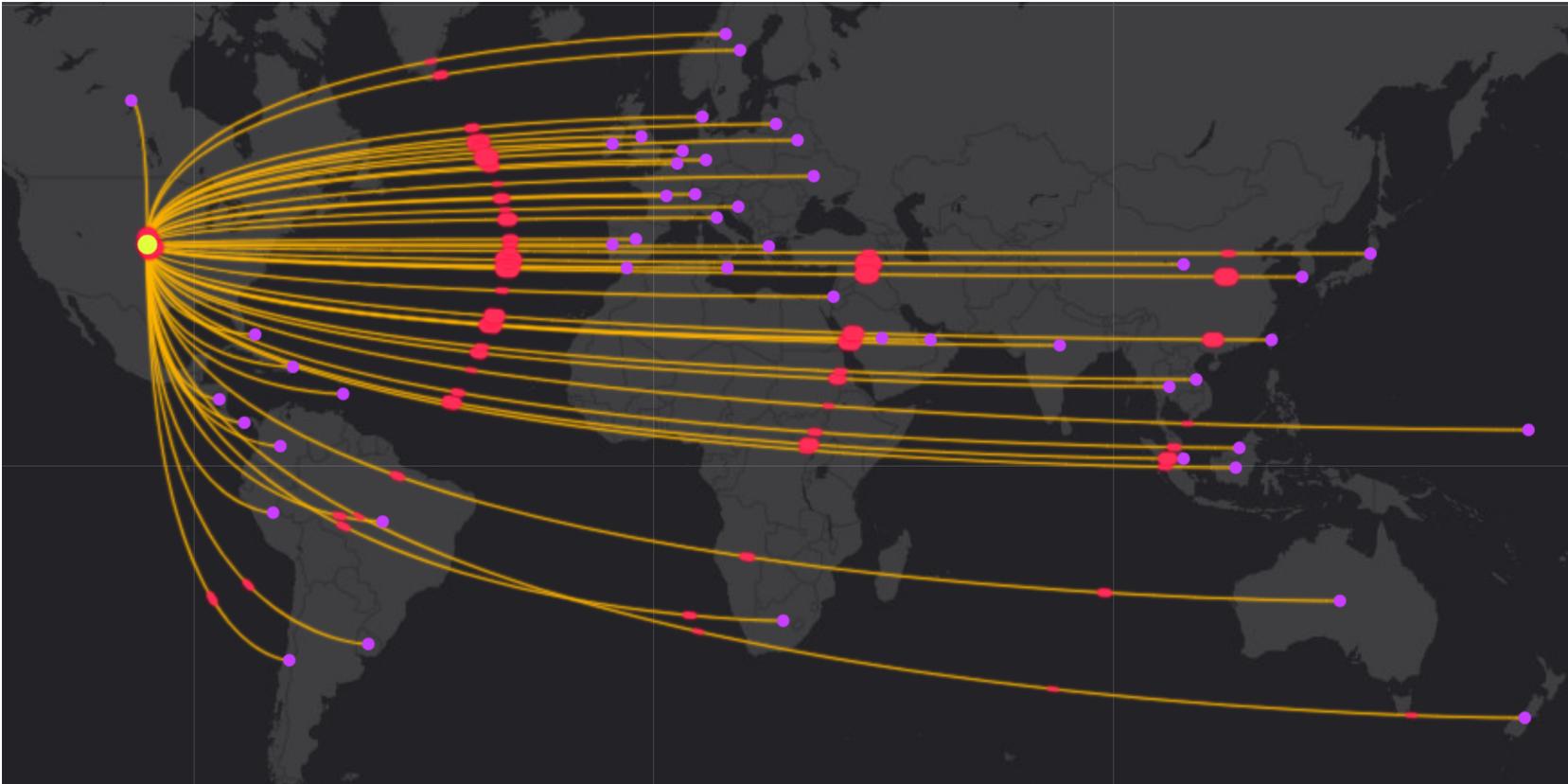


Average monthly deal count underlying benchmark



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Exports give WTI global relevance



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Thank You!

