

## What is the CMA Nymex price?

Calendar Month Average (CMA) Nymex as published in the Argus daily reports is a projected price that is calculated by the Chicago Mercantile Exchange (CME) for a forward month by using the Nymex light sweet crude futures settlement prices for the futures contracts that will be prompt at the time of delivery.

In the US, both term and spot crude markets rely on the actively traded Nymex light sweet crude futures price. Although the Nymex price is referred to as “Nymex WTI Crude Oil futures (CL)”, multiple light grades are deliverable into the benchmark contract including WTI among others. The quality that is prescribed for futures contracts that actually go to physical delivery is a common stream blend of domestic crude called Domestic Sweet Blend (DSW). Argus assessment names for DSW crude prices at Cushing, Oklahoma, have retained the historical name of WTI.

The Chicago Mercantile Exchange (CME) rules specify that deliverable domestic crudes into the CL contract will be between 37-42°API gravity with less than 0.42pc sulfur content. In addition, the rules establish maximum values for viscosity, Reid vapor pressure, basic sediment, water and impurity levels and pour point. Most CL futures contracts do not go to physical delivery. Of the total number of contracts traded in 2017 on the CME, less than 5pc resulted in physical delivered.

In the physical crude market, nearly all US pipeline crude pricing contracts use the prompt-month Nymex light sweet crude futures settlement prices during the time of delivery as a component. Often the contracts use the average of all Nymex settlement prices during the entire delivery month, which is the Nymex Calendar Month Average (CMA). But during any given calendar month, prompt futures settlements are for delivery in one or two months forward, not for current delivery.

Additionally, most physical spot crude volumes are sold well in advance of delivery, with US pipeline transactions considered to be in the prompt-trade month between the 26th day two months before the delivery month and the 25th of the month prior to the delivery month (so, for example, crude for July delivery would trade prompt from the 26th of May to the 25th of June).

### Calculating the CMA:

Using August 2018 as the delivery month, the actual calculation of the CMA Nymex as carried out by the CME, which uses only trade (business) days, would be based on the final average of the futures prices listed below:

AUGUST							2018
MON	TUE	WED	THU	FRI	SAT	SUN	
30	31	1	2	3	4	5	
6	7	8	9	10	11	12	
13	14	15	16	17	18	19	
20	21	22	23	24	25	26	
27	28	29	30	31	1	2	

■ September Contract Settle  
■ October Contract Settle

In this example, since Nymex expiry is on 21 August then the September Nymex contract, which will be the front month contract until that day (or about 2/3 of the delivery month) is used in the average calculation. After the September contract expires on 21 August, the October contract becomes the prompt month and so it is used for the remainder of August in the calculation (or roughly 1/3 of the delivery month).

As the daily CMA Nymex price is published prior to the month of delivery, its calculation uses settlement prices for the second and third month CL futures prices at the time of publication.

As an example, using settlement prices for 10 July 2018 to illustrate this point, the August CMA calculation on that day was as follows:

AUGUST							2018
MON	TUE	WED	THU	FRI	SAT	SUN	
30	31	1	2	3	4	5	
		72.56	72.56	72.56			
6	7	8	9	10	11	12	
72.56	72.56	72.56	72.56	72.56			
13	14	15	16	17	18	19	
72.56	72.56	72.56	72.56	72.56			
20	21	22	23	24	25	26	
72.56	72.56	70.62	70.62	70.62			
27	28	29	30	31	1	2	
70.62	70.62	70.62	70.62	70.62			

Using the numbers in the previous example, another approach to the calculation that is commonly used to approximate the CMA value would look as follows:

Estimated August CMA Nymex

$$= (2/3 \times \text{Sep settle of } 72.56) + (1/3 \times \text{Oct settle of } 70.62) = 71.91$$

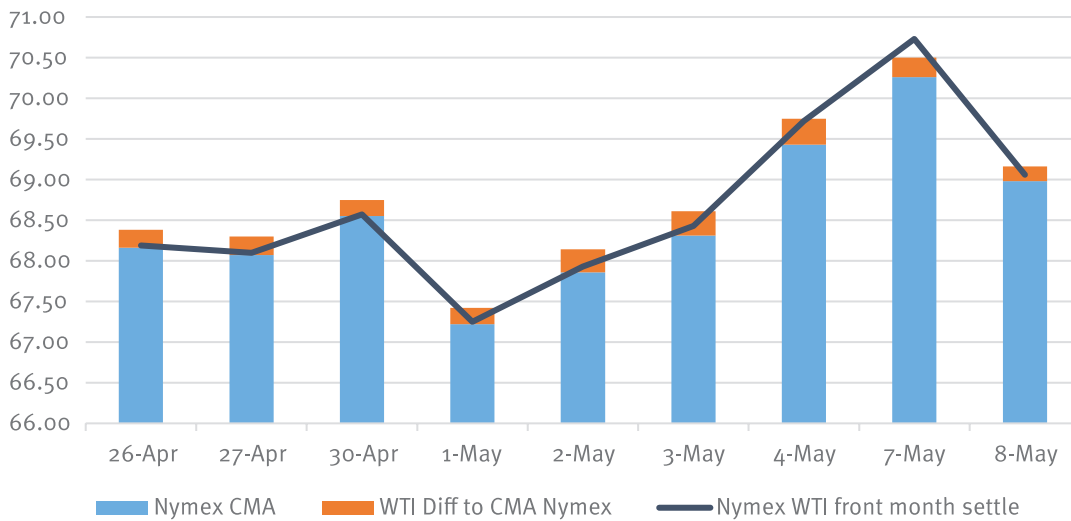
As with most months, the approximated calculation in this example will yield a slightly different value than the CMA Nymex calculation averaging all working days in the month of delivery, which uses actual percentages. Argus uses its published CMA Nymex price to calculate Canadian

and shale oil Bakken outright prices as the spot market for Canadian grades is traded at differentials to CMA Nymex WTI. The Argus code for the daily projected Nymex CMA is PA0010005. The final, actual calendar month average of all the Nymex CL settlements during any given calendar month is not published by Argus.

### What is the Argus WTI Diff to CMA Nymex?

The Argus WTI Differential to Calendar Month Average (Diff to CMA) Nymex is an adjustment factor used in pricing contracts and in spot deals to align the light sweet crude futures contract prices with current physical delivery values.

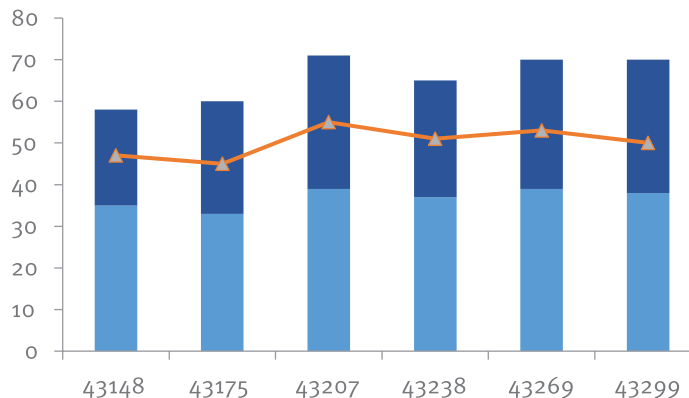
CMA + DIFF TO CMA VS NYMEX SETTLE



DSW-quality crude is often traded in the physical spot market in Cushing, at a differential to the CMA Nymex price. This number is intended to convert the Nymex light sweet crude futures prices that will exist during the physical delivery month to the physical value of DSW delivered at Cushing at the time that trades are done.

The Argus WTI diff to CMA assessment reflects actual spot trades reported each day, but traders in the spot market look to intermonth spreads in the futures markets today to value the differential or adjustment factor for WTI to CMA Nymex. This adjustment, also known as the diff to CMA, is often used in pricing formulas.

WTI DIFF TO CMA PARTICIPANTS



## Argus White Paper

During the month of delivery about 2/3 of the settlement prices averaged into the CMA Nymex will be for one month in the future (see CMA section above), so one can estimate that the WTI differential to CMA is about 2/3 of the spread between the delivery month and one month after delivery month. The remaining 1/3 of the differential reflects the spread between the desired WTI delivery month and two months in the future because during the last roughly 1/3 of the delivery month the settlement prices will be for two months after the delivery month. In this way, the level of backwardation or contango in the market at the time of the transaction can be applied to the futures settlement prices during the month of delivery.

A way to estimate the physical DSW diff to CMA Nymex value is:

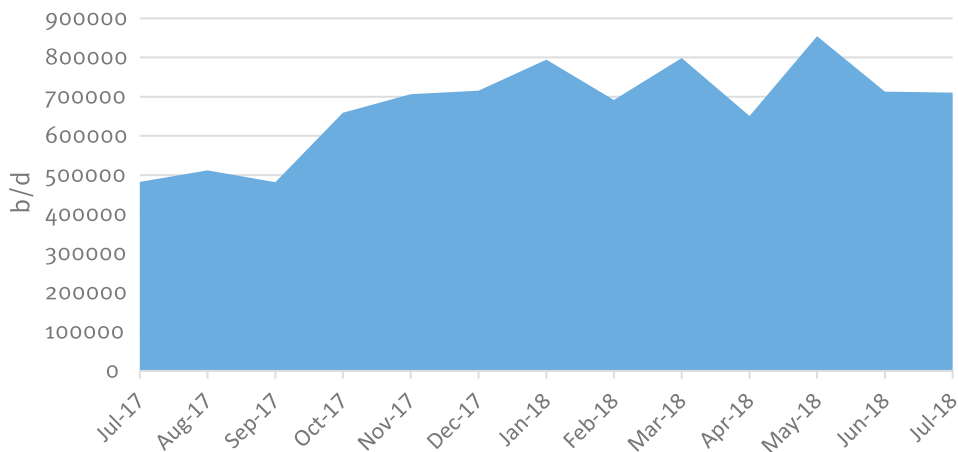
$$\frac{2}{3} (\text{Month 1} - \text{Month 2}) + \frac{1}{3} (\text{Month 1} - \text{Month 3})$$

Using the example in the CMA section above this formula would then look as below:

$$\text{Aug Diff to CMA} = \frac{2}{3} (\text{Sep-Oct}) + \frac{1}{3} (\text{Sep-Nov})$$

Crude oil traders look to these spread indications over the day when trading WTI as a differential to the CMA Nymex. And then physical, negotiated transactions are reported to Argus. The Argus WTI diff to CMA Nymex assessment is a volume-weighted average of reported spot trades done over the entire day, reflecting the changing levels of backwardation and contango in the market, and the buying and selling interest at those levels.

WTI DIFF TO CMA REPORTED SPOT VOLUMES



## What might a term contract look like?

A common contract pricing formula for January crude deliveries of Light Louisiana Sweet (LLS) crude may look as follows:

$$\text{Aug LLS Price} = \text{Aug Nymex Calendar Month Average (CMA) (Daily Nymex Settlement prices between Aug 1-31, 2018)} + \text{Aug trade month average of Argus WTI Diff to CMA (average of daily price assessments during Aug trade month between 26-Jun 25 Jul, 2018)} + \text{Aug trade month average Argus LLS diff (average of daily price assessments during Aug trade month between 26-Jun 25 Jul, 2018)}$$

So while the final Argus WTI Diff to CMA trade month average is an arithmetic average of daily prices calculated during the trade month period that is finished prior to delivery (in this example, the August 2018 trade month occurring during June and July, 2018), it is applied in the pricing formula to the final average of the Aug CMA Nymex settlements between 1-31 August, 2018. By doing this, counterparties ensure that the value at which volumes were priced at the time of trading resembles as closely as possible the value of the same barrels at the time of delivery, a period which can be as much as five weeks for barrels traded at the beginning of a trade month.

Pricing formulas for different crude grades may also include additional adjustments not shown in this general example, such as for transportation or quality.



### Contact Information

**Houston office:**  
2929 Allen Parkway  
Houston, Texas 77019  
Tel: +1 713 968 0000 Fax: +1 713 622 2991  
Email: [moreinfo@argusmedia.com](mailto:moreinfo@argusmedia.com)

**Calgary office:**  
144 — 4th Avenue SW, Suite 1600  
Calgary, AB, Canada T2P 3N4  
Tel: +1 403 695 1799  
Email: [calgary@argusmedia.com](mailto:calgary@argusmedia.com)

**Business Development:**  
Daniel Massey  
President, Argus Media, Inc.  
[daniel.massey@argusmedia.com](mailto:daniel.massey@argusmedia.com)

**Commercial:**  
[sales@argusmedia.com](mailto:sales@argusmedia.com)