

MACROCOSM

Crack Spreads Point North for Crude Prices

Tuesday, February 7, 2023

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Perfect storm: resurgent demand, crippled refinery capacity, a ban on Russian diesel.

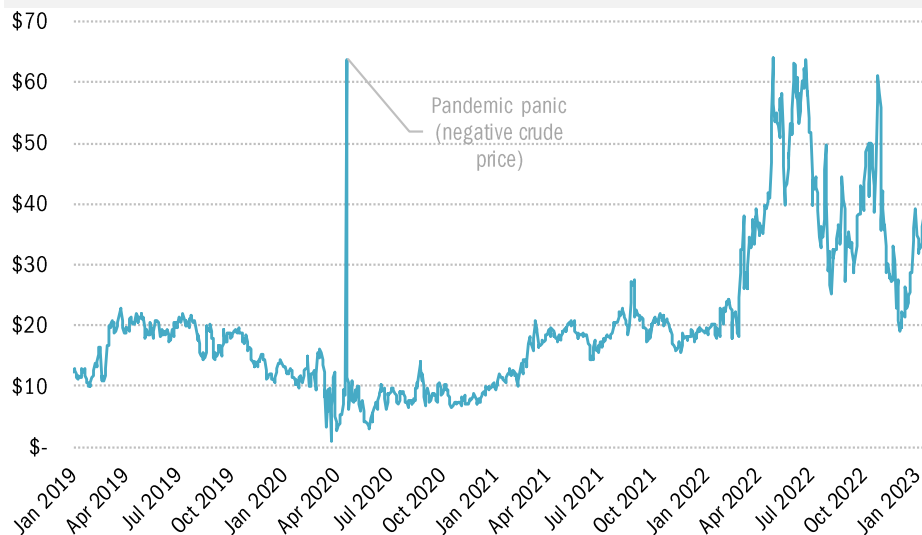
Since a post-Ukraine war low of \$19.69 on December 7, 2022, US refinery crack spreads¹ have rebounded to average \$35.80 so far in 2023 (please see chart below). We do not see crack spreads materially weaker in 2023 from an all-time high on an annual average basis of \$37.63 in 2022 (please see the chart on the following page).

- Why? The carbon-conscious West has reduced its refining capacity to a point where it will struggle to sate global incremental liquids fuel demand growth, led by China, as Russia faces a [February 5 European import ban](#) and a [diesel fuel price cap of \\$100/barrel](#).
- That cap is below where Russian diesel had already averaged so far in 2023 this year when it was leaked to the press on January 27.
- The ban and cap should be harder for Russia to evade than those

Update to strategic view

OIL: Crack spreads – the margins earned by refiners of crude oil into products – have widened again as we approach the advent of a European ban and price cap on Russian refined products. The product ban will be harder for Russia to evade than the previous crude ban, for lack of a similarly scaled shadow fleet. The product price cap has been set above prevailing prices, while the crude ban was set below. So it was costless to be virtuous and observe the crude ban, but Western allies will struggle to make the sacrifices to observe the product ban. European refinery capacity has been in decline for decades, and growing capacity elsewhere faces challenges. As demand grows, set against constrained capacity and attractive margins, it's a set-up for higher crude prices. With relatively low input costs, US refiners are in a sweet spot as low-cost producers and exporters.

Crack spread (USD per barrel)

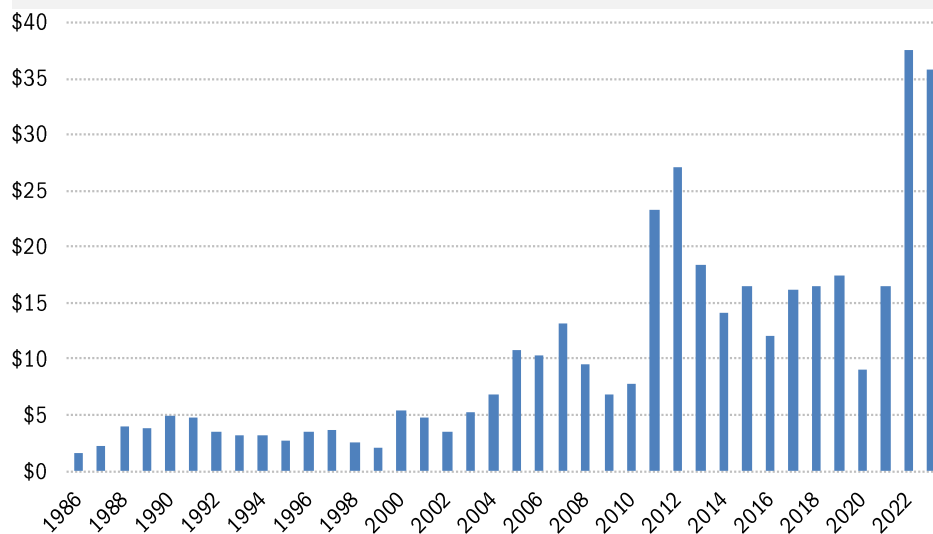


Source: EIA, TrendMacro calculations

[\[Strategy dashboard\]](#)

¹ Refinery crack spreads – the margin refiners earn when processing a barrel of oil into fuels – is calculated as: $\text{crack spread} = ((2 * \text{gasoline\$}) + (1 * \text{diesel\$}) - (3 * \text{crude oil\$})) / 3$. Long term calculation uses heating oil instead of diesel because reliable diesel data doesn't begin until 2006.

Crack spread (USD per barrel)



Source: EIA, TrendMacro calculations

applied to Russian crude oil back on December 5, due to the lack of a shadow shipping fleet for refined product (see [“Surprises of 2023 Volume 2: Oil Demand, With or Without EVs”](#) January 11, 2023).

- Middle Eastern and Asian and even African refineries must ramp up production to offset an unknown loss of fuel volumes from sanctioned Russian supply – which should keep crack spreads elevated in 2023.
- US and European refineries were taken off-line in 2020 and 2021 ostensibly to deal with [demand destruction brought on by the pandemic](#). Reopening capacity has been delayed by plans to convert refiners to biofuels production. Those plans had already been rolled out [prior to the global pandemic in energy-poor Europe](#). Then [new president Joseph R. Biden Jr. recklessly forced a fossil-fuel rich U.S. to follow suit](#). Now Western leaders believe that future electric vehicles sales will lower future fuel demand as the transportation sector switches to electrification – but good luck with that (again, see [“Surprises of 2023 Volume 2: Oil Demand, With or Without EVs”](#)).
- *The problem is that global fuel demand is rising faster than electric vehicle sales can offset.* President Biden utilized the US Strategic Petroleum Reserve to lower crude costs to refiners prior to the mid-term congressional elections. They then passed on the cost savings in the form of lower gasoline and diesel prices to consumers. Currently and to the end of his administration, we think Biden will tolerate higher fuel prices (although not without the occasional [barbs about price-gouging](#)) to influence more new car buyers to purchase electric vehicles with the \$7,500 per vehicle subsidy in his [Inflation Reduction Act](#).
- *So we think Biden will not use SPR volumes, which are already severely depleted, to lower refinery acquisition feedstock costs this*

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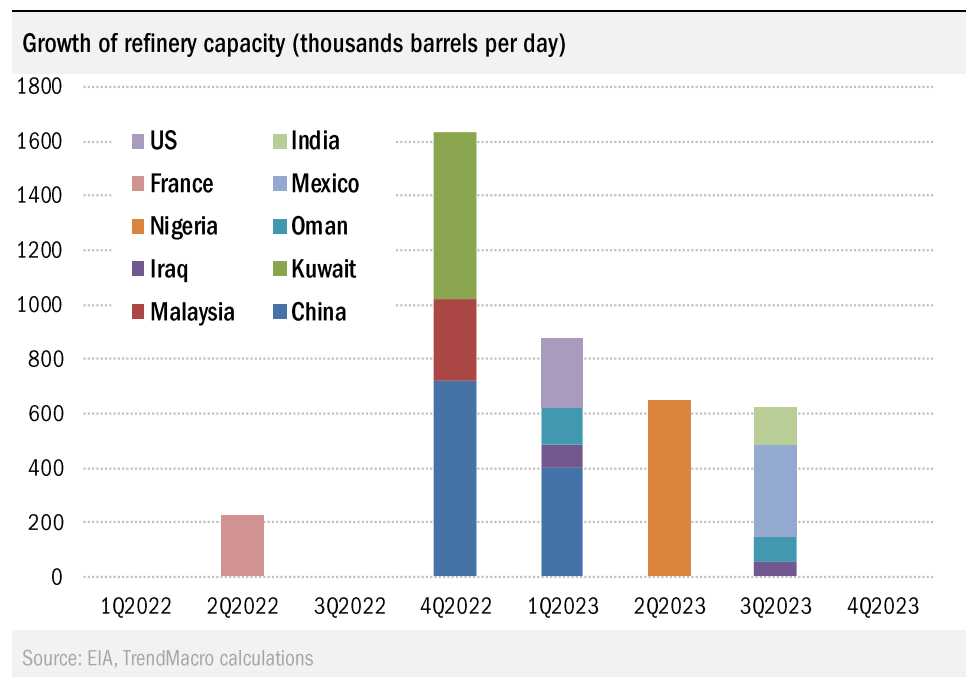
year. Indeed, his commitment to replenish the stockpile at about \$70 per barrel puts a floor under WTI prices (again, see [“Surprises of 2023 Volume 2: Oil Demand, With or Without EVs”](#)).

The history of US crack spreads can be broken up into three phases (please again see the chart on the previous page):

- The first phase is prior to the advent of US shale production. The US refining sector was a price-taker on crude and refined oil with expensive natural gas. Refined product exports still nearly tripled from 1986 to 2008 from 586,000 to 1.6 million barrels per day, while total refining capacity rose from 15.5 to 17.7 million. Three quarters of the refining capacity increase was built for the expanding export market.
- During the same period, [Europe lost about 1 million barrels per day](#) in refining capacity. The US WTI crack spread averaged only \$5 per barrel in a tough global market.
- The second phase coincides with the advent of US shale from 2009 to 2019. US refined product exports more than doubled from 1.6 to 3.3 million barrels per day in 2019. Refining capacity rose from 17.7 to 18.8 million. US refiners offset lower fuel demand at home, due to the constantly improving US fuel economy of its domestic fleet and exported more gasoline and diesel abroad.
- How? US prices for natural gas plummeted with shale production and WTI crude cost, compared to the global benchmark Brent. US refinery outputs became vastly more competitive and still saw their crack spread triple to \$16. During this period, Europe lost [2.2 million barrels per day](#) in refining capacity.
- The third phase was kicked off by the West's move to decarbonize their economies. Then demand contracted because of the pandemic. Then came the uncertainty of fuel supply initiated by the Russian invasion of Ukraine.
- While the average price of WTI is similar to prices paid from 2009 to 2019, the crack spread has increased to average \$21 per barrel over the past three years. The question is: how long will these historically high spreads last?
- Since 2019, US refined product exports were basically flat, while refining capacity fell by about 1 million barrels per day. These figures suggest that the US is continuing to capture global fuel market share while domestic demand falls. Europe during the same timeframe [lost slightly more than a half-million barrels](#) of refining capacity.

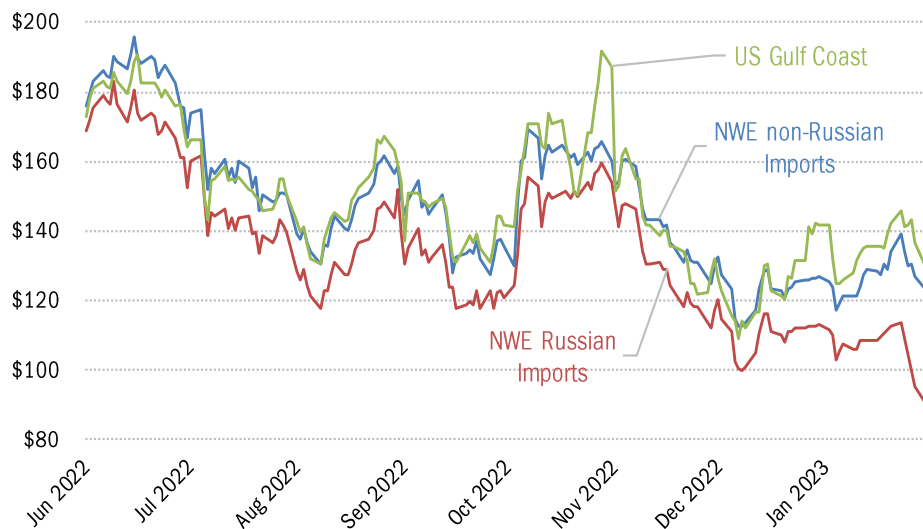
So where is all the refining capacity going to come from to supply 2023's increased demand if not the US or Europe? The [Energy Information Agency says](#) 1.75 million barrels per day of additional refinery capacity from the Middle East and Asia came online in 2022, but at the end of the year total global refinery capacity only [expanded by 1 million](#). That additional capacity was constrained by loss of 750,000 barrels of throughput capacity from downsized or permanently closed facilities and those transitioned to biofuels. Most of the net added capacity came online in the fourth quarter of 2022. For 2023, the [EIA](#) projects 2.1 million barrels

per day of new refinery capacity will come online, with the majority of it in the Middle East and Asia, starting or reaching full capacity by mid-year (please see the chart below).



- First, we doubt that all of the 2.1 million barrels per day of new and expanded capacity does come online this year. There are three refineries that probably will not come on-line this year in Mexico, Nigeria and Iraq, delaying more than 1 million barrels of incremental capacity.
- Second, the EU ban on Russian fuel exports and a global price cap on Russian diesel is a known unknown in regards to refinery volumes lost, but we think that the combined effect of these sanctions will lower Russian refining by more than 1 million barrels per day.
- [2.5 million barrels per day](#) of refined products were exported from Russia in 2022 with slightly more than half going to Europe. Russia's refining sector had about [6.8 million barrels capacity](#) in 2021. The loss of EU diesel exports equates to 18% of Russian refining output (1.25 million barrels per day). Russia will need to find a new home for its diesel starting on February 5 and face a \$100 price cap, to boot.
- Unlike the G7 price cap on Russian crude – which was set *above* the level where the Russian benchmark Urals blend was actually trading – the diesel price cap was set *below* the market in January in the Northwest European market (please see the chart on the following page). While Russian diesel export prices fell to \$18 in a week, we think that the price cap of \$100 will eventually require importing countries to take sides. In other words, with the crude cap, no nation has ever been put to the test of its willingness to make sacrifices in order to punish Russia. The diesel cap will not permit such costless acts of virtue. It's not clear what market disruptions would arise from non-conformity by a canonical

Diesel price (USD per barrel)



Source: EIA, Bloomberg, TrendMacro calculations

Western ally.

- [Reports out of Russia](#) at the end of last year were too optimistic about the impact on refining: government sources predicted only 5% to 7% of capacity would be affected (equal to about 500,000 barrels per day) by the EU refined product export ban and G7 price cap on diesel. A recent [Reuters](#) report suggests that Russia will idle refinery capacity by 900,000 barrels this year. [Others see](#) refinery throughput capacity declining by only 200,000 barrels given the deftness with which Russian crude oil overcame the December 5 European import ban and G7 price cap. Again, we see over 1 million barrels per day of idled Russian refinery capacity in 2023.
- Coupled with the lack of a "shadow fleet" to ferry diesel volumes to non-European markets (especially Latin America), there could be a short-term impact on crack spreads as distillate products get stranded at Russian ports or on ships at sea looking for a home. This would allow US refiners to capture a higher margin. US Gulf Coast diesel prices have moved higher than those in NWE since December 21 (again, please see the chart above).
- Rising or high crack spreads usually signal crude oil demand strength, which is in line with our crude oil price forecast to rise above \$100 in 2023. This is anchored by our belief that the US will not slip into a recession (see, among many, ["Video: What you're not hearing about the recession signal in temporary payrolls"](#) January 30, 2023). Given our estimate that global liquids demand growth will be 2.5 million barrels per day, the rosy estimate of 2.1 million barrels in refinery additions in 2023 doesn't match expected global crude oil demand growth.

Bottom line

Crack spreads – the margins earned by refiners of crude oil into products – have widened again as we approach the advent of a European ban and price cap on Russian refined products. The product ban will be harder for Russia to evade than the previous crude ban, for lack of a similarly scaled shadow fleet. The product price cap has been set above prevailing prices, while the crude ban was set below. So it was costless to be virtuous and observe the crude ban, but Western allies will struggle to make the sacrifices to observe the product ban. As demand grows, set against constrained capacity and attractive margins, it's a set-up for higher crude prices. European refinery capacity has been in decline for decades, and growing capacity elsewhere faces challenges. With relatively low input costs, US refiners are in a sweet spot as low-cost producers and exporters. ▶