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No Easy Way Out — Changes to Global Refining Industry Fueled by Pandemic, Economics

Reductions in capacity, combined actions of Russia and China, potential U.S. export ban, headwinds to investment cloud the future



- U.S. Refinery Shutdowns Play Key Role in Products Squeeze, High Prices
- Global Refining Capacity (Excluding China) Cut by 3 MMb/d Since 2020
- Changes in Russia, China Have Had Big Impact on Refined Product Shortage
- Potential U.S. Export Ban Would Add Wider Complications
- Global Refining Capacity Should Grow, But U.S. Gains Likely Negligible

1. Introduction

The high cost of gasoline and diesel and their impact on inflation and the global economy has been a major market development this year, with the blame typically being cast on politicians, oil producers and policies intended to limit development of traditional energy resources and encourage decarbonization — and sometimes all of the above. Prices have retreated in recent weeks amid lower consumer demand and worries about the state of the global economy, but long-term concerns about global refining capacity and the possibility of another price spike remain.

In its highly publicized June 15 letter to U.S. oil executives, the Biden administration demanded refiners reactivate lost capacity and increase production, an acknowledgement that consumer demand had outstripped refining capacity. And although we tend to focus on the U.S. refining picture, refined products trade globally, just like crude oil, and international refinery closures ultimately have the same effect on the worldwide market as domestic shutdowns.

Most refining-capacity reductions in recent years — in the U.S. and elsewhere — were driven by the same forces, namely, poor economics resulting from the pandemic-driven demand plunge in 2020 and 2021 as well as expectations that margins would take a long time to recover post-COVID. (We should note that refinery profitability has been high this summer and remains strong despite the recent price decreases.) Of course, worries that the energy transition and policies to that end would suppress demand in the long-term also played a key role, as did some fundamental competitiveness issues at individual facilities. Here are some of the key issues we discuss in this report.

U.S. Refinery Shutdowns

Prior to 2019, the U.S. refining industry had been in a growth phase, adding about 3.5 million barrels per day (MMb/d) of refining capacity since 1995. Over that period, U.S. plants evolved into the most competitive facilities in the world and the country became the largest exporter of refined products — a necessary step since domestic demand growth was slowing due to demographic factors, improved fuel efficiency, and policies encouraging a shift away from fossil fuels.

The refining-capacity growth trend wasn't universal across the U.S., with some regions faring much better than others. PADD 3 (Gulf Coast) saw the lion's share of capacity growth, adding about 3 MMb/d since 1995 as it benefited from ready access to growing export markets, primarily in Latin America. Inland refiners in PADD 2 (Midcontinent) and PADD 4 (Rocky Mountains) also added capacity as they benefited from the boom in light oil production from shale plays. On the other hand, crude-supply challenges, a tougher regulatory environment, and generally higher costs resulted in capacity declines for both PADDs 1 and 5 (East and West coasts, respectively). East Coast facilities were particularly hard hit as the Atlantic Basin (those countries that trade via the Atlantic Ocean) is an extremely competitive market, with external supply options from the Gulf Coast, Europe and even the Middle East resulting in a number of refinery closures and a net loss of more than 700 Mb/d of capacity through 2019.

The tide began to turn against refinery expansion by the end of the 2010s as the push for the energy transition gathered steam. In addition, bearish market trends, changing crude-supply dynamics, and competitive challenges (domestic and international) led refiners across the U.S. to comb through their assets for possible consolidation, conversion to biofuels production, or even total plant closure. Facilities on the East and West coasts continued to feel the most pressure, but even plants operating in previously attractive market environments started to feel the heat.

While more economically driven capacity reductions would have surely come over time, it was the seismic shift in demand for refined products following the COVID-related lockdowns in 2020 that drastically accelerated those decisions. As the refining industry bled "red ink," multiple refiners took steps that have resulted in the reduction of more than 1.1 MMb/d of crude processing capacity (including one Atlantic Canada refinery) over the last couple of years. Combined with the shutdown of the Philadelphia Energy Solutions (PES) complex in Philadelphia after a 2019 fire, this resulted in crude refining capacity losses totaling almost 1.4 MMb/d in North America. If a couple of major planned shutdowns scheduled over the next two years are included, total crude capacity loss is close to 1.8 MMb/d over the 2019-24 period.

Global Changes

Unlike the situation in the U.S., Europe has experienced a long-term decline in refining capacity due to sluggish demand and decreased competitiveness. Since 1980, the continent's refining capacity (excluding Turkey and the Commonwealth of Independent States, or CIS, which includes eight countries that, along with Russia, used to be part of the USSR) has fallen by almost 8 MMb/d. Most recently, Europe lost about 3 MMb/d of refinery capacity from 2006 through 2017 (dashed

red box) before a brief “European Spring,” inspired by lower crude costs and a bump in demand, which led to a few years of higher margins.

The good times came to an abrupt end with the COVID-related lockdowns, and since the beginning of 2020, Europe has lost an additional 800 Mb/d of refining capacity through complete and partial closures. The bearish demand environment in Europe in recent years has been a major factor in the long-term trend there, with slower economic growth also playing an important role. Another key factor has been the earlier and more aggressive moves that European governments — and ultimately even energy companies — have made on climate-change initiatives, which discourage petroleum demand and carbon-intensive industrial activity, like refining.

Where Are Things Headed?

The global outlook for further capacity additions after 2023 remains murky at best. Investment in new capacity was curtailed in 2020 and 2021 due to poor refining margins and increasing fears of peak demand. While refining margins were strong globally in the second quarter of 2022, they have fallen significantly since then. Crack spreads remain at historically wide levels, but high energy costs are eating into the profits of most European and Asian refiners, meaning realized margins for most of those refiners are not particularly strong in the current environment (except for those purchasing discounted Russian crude).

Looking ahead, North American refiners should continue to benefit from cost-advantaged access to U.S. and Canadian crude oil, low natural gas and electricity costs (at least compared with Europe), a comparatively friendly regulatory environment, and growing Latin American demand, allowing refining capacity to tick upward by 2024.

While new capacity being added over the next few years may keep global refining margins in check, headline crack spreads are likely to remain relatively wide. As detailed in this new report, unless global demand growth comes in well below our forecasts, we appear to be set for a period of tight global refinery capacity and strong refining margins in the second half of the decade.

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