WHY THE US EXPORTS *AND IMPORTS* CRUDE OIL

This has puzzled your author for years. The US exports an average of 13 million barrels per day and imports an average of 4 million barrels per day. Research identified a key factor: differences in crude oil types produced by US and foreign oil fields, and US refinery tech tailored to specific crude oil types.

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Introduction

The US is the highest-volume exporter of crude oil in the world, more so than even Saudi Arabia. Those who recall the OPEC oil embargo of the late 1970s will realize this is a major change of fortune for the US.

There are 132 oil refineries in the US as of January 2025, according to the US Energy Information Administration.

There are two types of oil and, as a result, two types of refineries. Each US refinery is built to refine only one of those two oil types into gasoline and other hydrocarbon products.

Why both export and import crude oil? The basic issue is a mismatch of crude oil supply and refinery capabilities. It can be called a mismatch of supply and demand. That mismatch is entirely a domestic US issue.

Heavy crude oil came first

The oil type that was first and widely extracted from the land in the US is known now as **heavy crude oil**. It is rich in heavier hydrocarbon molecules and contain a great amount of sulfur.

Because that heavy crude oil type was found first in the US, and for decades was the only type found, many US refineries were built to refine it. That is true of the majority of the 132 refineries in the US.

The growth of those refineries accelerated during World War II, when the US military needed vast amounts of hydrocarbon fuel for airplanes, ships, subs, tanks, and jeeps.

Following the war, US soldiers came home to a booming economy, many job openings, and a desire to buy a car and see the country. Even the auto industry, which built jeeps and tanks during the war, had expanded production capacity. That caused growing demand for gasoline.

Atop that, President Eisenhower decided the US needed an Interstate Defense Highway System, mirroring the Germany highways that Eisenhower has seen. The Interstates became the way to see the US by car, and for many a commuting path.

For more than 30 years, refineries for heavy crude oil were being built at a fast pace in the US.

Light sweet crude came later

The other oil type, **light sweet crude oil**, is less rich in heavy molecules and especially light on sulfur. Compared to the long history of heavy crude oil in the US, light sweet crude is the new kid on the block.

Among other sites in the US, light sweet crude is extracted from oil fields in the West Texas Permian Basin. That impact is easily seen around Midland and Odessa. Drive through those cities on I-20, as I did in January 2000, and a great many operating oil wells can be seen. Also, refineries can be seen that take light sweet crude from nearby oil fields as input and produce gasoline and other hydrocarbon products.

The US light sweet crude refineries are relatively new and compared to heavy crude oil refineries in the US and are still in the minority in the US.

Right now, US oil fields produce much more light sweet crude than can be refined by US refineries built for that oil type. This is why the oil fields sell an average of 13 million barrels a day of light sweet crude oil overseas.

Decline of heavy crude produced by US oil fields

Most refineries are built near oil fields and are built to refine the oil from those nearby oil fields.

As it happens, US oil fields producing heavy crude oil no longer produce at their peak levels. Therefore, the nearby refineries no longer work at full capacity using those nearby oil field sources alone.

The light sweet crude refineries in the US work at full capacity and cannot handle all the light sweet crude produced by nearby oil fields. Those refineries have no way to expand capacity in the short run.

The heavy crude refineries lack supply. The light switch crude refineries are overwhelmed with supply.

The total of US gasoline produced from US oil alone is insufficient to match US demand for gasoline.

Therefore, some heavy crude oil refineries now import Mexican or Canadian heavy crude oil to supplement their sources and make enough gasoline to satisfy US gasoline demand.

US heavy crude oil refineries import an average of 4 million barrels of heavy crude oil per day, primarily from Canada and Mexico. Not all heavy crude oil refineries buy imported crude oil, but some do.

That 4 million barrels enables those importing heavy crude oil refineries to meet US demand for gasoline. The imports of heavy crude oil literally keep down the prices of gasoline.

Why not convert heavy crude refineries to use light sweet crude?

Refinery conversion also costs money and takes a lot of time. Those are not the only barriers.

How can the light sweet crude oil be *delivered* to that distant converted refinery? The refinery would prefer a pipeline, but building those costs even more money, and can be tied up for decades by legitimate concerns about the impact of a pipeline leak.

Water transportation might work if the converted refinery is near a river terminal or an ocean terminal, with short pipelines from the terminal to the refinery. But that makes conversion economical only for a relatively few heavy crude refineries in the US.

Also, until recently, I thought the growing market demand for electric vehicles and pluggable hybrid electric vehicles puts a damper on conversion ideas and financing such ideas.

Why not build more light sweet crude refineries?

Oil refineries are gigantic, so land cost is gigantic, and hardware cost is too. The investment and the time to build are considerable. It is quite possible that some are being built, or planned, but most of those won't become operational anytime soon.

Again, the growing market demand for electric vehicles and pluggable hybrid electric vehicles may decrease demand for gasoline and put a damper on construction and construction financing.

Still, since 13 million barrels a day from US oil fields cannot now be refined in the US, Build Baby Build (light crude refineries) makes a lot more public policy sense than Drill Baby Drill.

Gasoline tank farms and gasoline pipelines

From the viewpoint of gas stations around the US, refineries are gasoline producers and gas stations are the consumers. How does gasoline make its way from refineries to gas stations?

I live near and occasionally drive by a large gasoline tank farm in Franconia, Virginia along I-95. The gasoline arrives there from southern US refineries via a pipeline operated by Colonial. Gasoline trucks load gasoline at the tank farm and deliver to gasoline stations in the region. You can see the Google Maps aerial view of the tank farm in Franconia VA in **illustration 1**. North is up. I-95 is on the left.

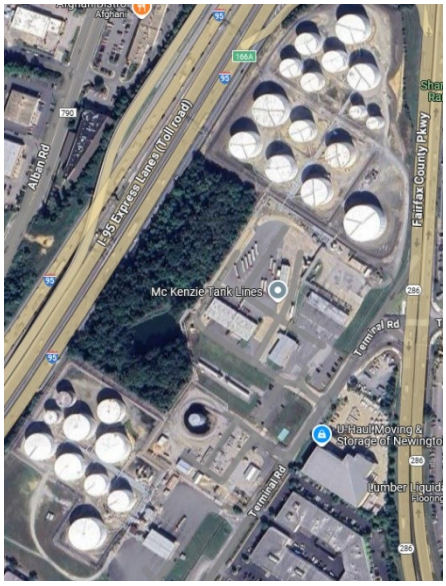

Illustration 1

Like all pipelines, that Colonial gasoline supply pipeline is computer controlled. In May 2021, those pipeline computers were frozen by a ransomware attack. That attack shut down gasoline delivery to several tank farms, including the one in the illustration. The tanks ran out of their supply in a couple of days due to normal pickup by delivery trucks. Gas stations exhausted their supplies a day or two later and shut down.

I was glad to be driving a Pluggable Hybrid Electric Vehicle at the time. I could afford to drive to grocery stores, doctor offices, and other local destinations on electricity alone.

My experience was a perfect example of the economic Theory of Alternate Goods that I learned in a college introductory economics course: when one product is extremely costly or unavailable, people who can use an alternative product will buy it. Neither a gasoline auto nor an electric vehicle make that possible.

In addition, my cost per mile driven using electricity is less than 2 cents. That is far less than the cost per mile driven using gasoline. The exact dollar per mile figures depend on the local prices of electricity and gasoline.

How consumers can avoid gasoline price increases due to tariffs on imported crude oil

The tarriffs on Canadian and Mexican crude oil are a reality, and a government-induced inflation factor. Not just because the Us underfed heavy crude refiners must choose to buy heavy crude to stasify US fuel demands, but also because the US foil fields may also raise their own prices to match the tariff-increased price of overseas crude oil. Yikes.

You can act in your economic interest more quickly and easily: buy or lease a new or used Electric Vehicle (EV) or PHEV, and drive using electricity as your fuel.

You won't be the only one to head that way. Demand will drive up the cost of those vehicles, new or used, when crude oil tariffs become reality. At the same time, the prices for used gasoline-powered cars will likely go down. Don't expect your trade-in of a gasoline car to pay for much of a PHEV or EV.

One more thought: you can easily find zero-cost charging stations for EVs and PHEVs throughout much of the US, using zero-cost smartphone apps. Have you ever found free gasoline?

ABOUT THE AUTHOR: John Krout is a retired software developer. He has been writing about and delivering presentations on interesting uses of personal computers since the early 1980s. In the 21st century, as digital tech became more powerful and widespread, he has also been writing and delivering presentations about interesting uses of smartphones, tablets, digital music, digital photography, Electric Vehicles (EVs) and Pluggable Hybrid Electric Vehicles (PHEVs). He lives in Arlington Virginia.

About finding free charging stations for an EV or PHEV: John Krout provided a presentation about smartphone apps to find such charging stations on April 24, 2024 for a meeting of PATACS and OPCUG. Here is a link to download the PDF file of his presentation slides:
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