

Striking Diesel/Jet Fuel Shortages *Are Coming*

BY PHILIP K. VERLEGER, JR.

*The world economy
is in trouble.*

The words below appear in the second volume of John Maynard Keynes' *A Treatise on Money*. Keynes, known for his macroeconomic writings, was a famous, successful commodity economist and trader. In 1936, his long position in wheat amounted to a month's worth of consumption for the United Kingdom, according to Reuters.

If there is a shortage of supply capable of being remedied in six months but not at once, then the spot price can rise above the forward price, which is only limited by the unwillingness of the buyer to pay the higher spot price rather than postpone the date of his purchase.

Keynes's comment regarding supply shortages is evident today in the market for gasoil, also known as distillate, diesel fuel, or heating oil. It is also evident in jet fuel. The evidence can be seen in the market data. The figure on the next page shows the spread between cash distillate delivered in New York Harbor and the fifth futures contract for the fuel.

The graph shows the difference between the spot price of low-sulfur distillate fuel oil (generally diesel fuel) delivered in New York Harbor and the fifth futures contract for the identical fuel. The data are weekly and begin in 1986. The last observation is for early May 2022. The spread at that point is the highest in the thirty-six years of data presented. It is fifteen times the standard deviation around the mean, which is statistically not different from zero. The probability of such an event is zero.

I have followed and collected these data as part of my study of energy commodity markets since 1985. Never have I observed such a situation.

Philip K. Verleger, Jr., is president of PKVerleger LLC.



Agricultural economists who follow spreads such as these are equally amazed.

The graph reflects Keynes' maxim, in this case for diesel fuel, at least as delivered in New York. A similar graph can be generated for the European gasoil market by comparing the spot price of low-sulfur gasoil (again diesel fuel) with the third forward contract. Data from forward markets in other regions, such as the large U.S. Gulf Coast refining center or Singapore, show an identical pattern.

Markets are warning us that supplies of the fuel we need to run the global economy are exhausted. Consequently, some types of economic activity will be forced to slow or stop. Airlines may have to cut flights. Railroads might need to reduce the amount of cargo moved. Farmers could be forced to cut planting or let fields lie fallow. Truckers may be brought to a standstill as they already have in places like Cameroon. Diesel and a similar product, kerosine, are the lifeblood of the modern economy.

No substitute fuels are available. It will likely take a serious economic slowdown to bring supply and demand into balance.

The slowing has started in Africa. As noted, the lack of diesel has stranded trucks in Cameroon. Nigerian airlines are canceling flights due to jet fuel shortages. The unavailability of fuel in Kenya has become so severe the country deported the CEO of a key oil supply company to placate political anger.

Disruptions may soon spread to Brazil. In that country, the national oil company, Petrobras, has raised domestic

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diesel prices as costs of imports have risen, defying the demands of President Jair Bolsonaro. The nation's truckers have shut the country down in the past over higher fuel prices.

Saudi Arabia's oil minister recently blamed the shortages on a lack of investment in refining capacity. Citing the rise in mobility, he asserted, "I think it provided us with a reality check to how aspirations ... can be compromised by the realities of the day." The minister also assigned responsibility to aggressive environmental programs, noting that, even before the Ukrainian crisis, the "la la land scenario about net-zero had been smacked with so many realities."

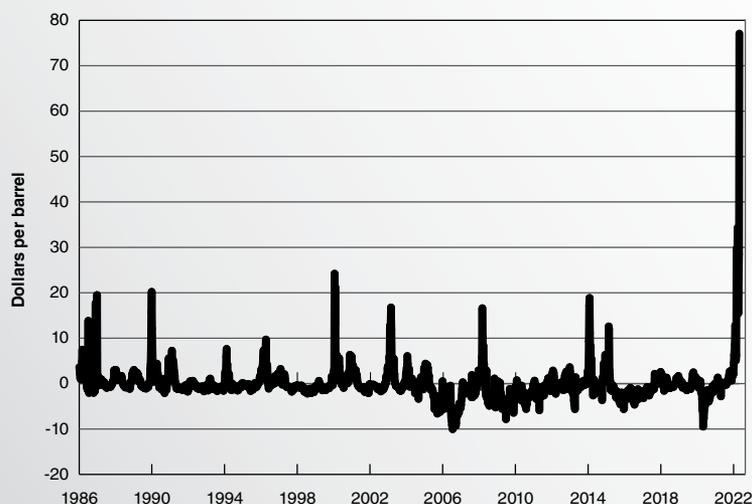
In my view, it is the minister, not the world, who is living in "la la land." The transition to a net-zero world is essential for human survival. The current situation, though, is extremely serious and will worsen as sanctions on Russia cut perhaps 5 percent from the world's oil supply.

Several factors contribute to the diesel fuel shortage. These include the limits on product exports imposed by China, the output restrictions of OPEC and allies, economic incentives that cut U.S. refiners' capacity to produce the fuel, and regulations on the marine fuel sulfur content that took effect in 2020.

China has limited diesel exports during the first part of 2022. China could be a large exporter of diesel and jet fuel. Private companies have invested in building a large refining industry there. Consequently, substantial excess capacity exists in China, especially given the economic slowdown associated with the spread of new Covid-19 variants and the country's real estate difficulties. Despite the surplus capacity, the government has

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Spread between cash distillate delivered in New York Harbor and the fifth distillate future, 1986–2022



Source: PK Verleger, LLC.

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“slashed gasoline, gasoil, and jet fuel export quotas” by almost 60 percent, according to S&P Global Platts. The reduced export quotas are part of the nation’s efforts to achieve net-zero greenhouse emissions by 2060. As a result, refineries in the major market areas are operating at between 50 percent and 77 percent of capacity.

Oil-exporting countries have exacerbated the problem by limiting the production of distillate-rich crudes. OPEC, particularly the Middle Eastern members, have contributed to the diesel supply reduction by constricting their crude oil production. “OPEC+,” the group of OPEC nations and other exporting countries such as Russia, agreed in 2021 to boost output slowly going forward. Each country was given a quota. Some Middle Eastern exporters, particularly Iraq, Kuwait, Saudi Arabia, and the United Arab Emirates, have stuck to their limits even

though OPEC+’s total production has fallen well below target levels. In March, the group produced 38 million barrels per day when the members had agreed to produce

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39.5 million barrels per day. The shortfall occurred because Nigeria and other producers could not achieve their assigned output levels.

Constraints on Growth

The macroeconomic forecasting models used by central banks, government planners, consultants, and financial institutions do not easily accommodate supply constraints on key economic inputs. For example, U.S. housing start forecasts were revised downward over 2021 due to shortages of labor, lumber, and other materials. Droughts that cut critical agricultural product supplies caused similar diversions between consensus projections and actual outcomes.

The supply squeeze on diesel fuel and its complementary product jet fuel in 2022 and 2023 will have the same depressing effect on economic growth as drought or the lack of a critical input such as lumber. A review of historical data emphasizes this point. Growing economies require increased supplies of diesel.

Demand for diesel is not price-sensitive because the fuel is an intermediate good in the economic cycle. Plant operators, truckers, ship owners, railroad operators, and electric utilities purchase diesel to provide their services to other sectors of the economy. The statistics show a GDP elasticity of one, that is, a one-to-one ratio, between economic activity and diesel consumption.

In the future, the relationship will change as hydrogen-powered and electric vehicles substitute for diesel-powered ships, trucks, and trains. Today, though,

there are no substitutes. Less diesel (and jet fuel) will constrain economic growth. A no-growth global economy seems inevitable today.

At this writing, it appears that diesel supply in 2022 and 2023 will be lower than in 2021. Absent government intervention, the decline will constrain the global economy. World GDP growth of 1 or 2 percent, half the rate forecast by the International Monetary Fund in its most recent *World Economic Outlook*, will be a real achievement. Emerging economies in Africa, Asia, and South America will suffer the greatest setbacks.

The current limit on natural gas supplies exacerbates the problem because natural gas is used to remove sulfur from diesel fuels. Less gas for refining equates to a lower supply of diesel fuel that complies with environmental regulations.

Relaxation of these rules would allow refiners to boost diesel output, a step that would avoid the no-growth outcome. However, environmental regulators in most countries have historically been less accommodating in such situations than central bankers have been under the threat of inflation.

Environmental regulations will create a 2022/2023 period of growth repression.

—P. Verleger

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The output loss deprived the world of significant diesel volumes because OPEC crudes tend to be rich in the product. Not all crudes are. For example, a presentation by Repsol economist Antonio Merino showed that one barrel of Arab Light crude processed in a sophisticated refinery could produce almost twice the diesel volume as a light Texas crude.

Well-intentioned regulations intended to induce the substitution of renewable diesel fuel for hydrocarbon diesel fuel have also reduced supply. Diesel production in California is down by 25 percent because two refineries sit idle as their conversions to renewable diesel facilities proceed. U.S. overall output is down 13 percent as refiners across the country rush to take advantage of the financial incentives offered by the state's renewable fuels program. Finally, regulations that require most sulfur to be removed from marine bunker fuels, which became effective in 2020, have boosted demand for low-sulfur diesel by over one million barrels per day. In advance of that rule's enforcement deadline, I repeatedly wrote in these pages of the

likely disastrous economic consequences. No one listened. Earlier, in 2011, I published a technical article on the possible impact of environmental regulations on product supply. While that paper has been cited occasionally, according to Google, in reality, no one listened again. A shortage of the fuel key to economic growth now confronts the world.

Regrettably, only limited substitutes for diesel exist today. Electric or hydrogen-fueled trucks are a future solution. China could ease the problem by allowing its refiners to increase exports, as would allowing the production and sales of fuel with much higher sulfur content, an action that would infuriate environmentalists.

However, only a few consumers today could use higher-sulfur diesel, the largest group being the owners of ocean-going vessels. Under the current circumstances, avoiding a serious global recession will require a reversal of the International Maritime Organization sulfur regulations. I and others warned of the consequences of the ban in 2018. The consequences of the IMO's stubborn unwillingness to bend its rule are now becoming clear. ◆