

What the end of the US shale revolution would mean for the world

Fracking catapulted America to the top of the energy hierarchy, but low yields and a lack of reinvestment threaten that position

Derek Brower and Myles McCormick in New York JANUARY 16 2023

When the Decathlon, a 274-metre-long tanker, powered into the German port town of Wilhelmshaven last month it was tangible evidence of American geopolitical power.

Days earlier, an EU embargo on Russian seaborne crude had come into force, threatening yet more disruption in global energy markets. As the Decathlon unloaded its cargo, American oil was arriving in the nick of time.

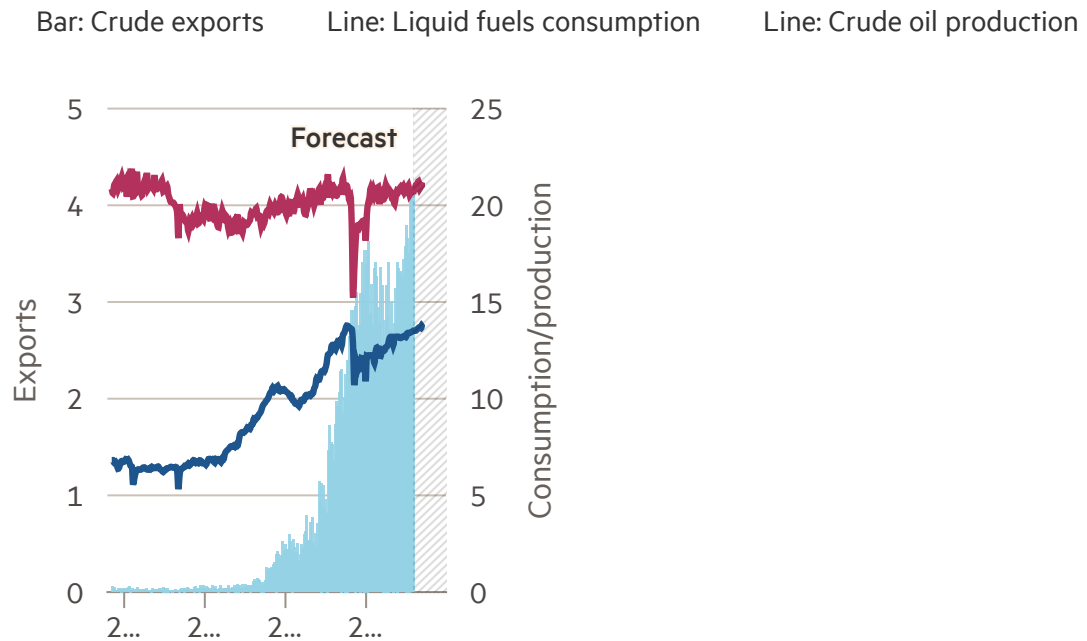
Russia's invasion of Ukraine has precipitated a global energy crisis — and the US has been among the biggest beneficiaries. As Moscow has cut natural gas shipments to Europe and western sanctions have targeted its oil, American exports of both have soared. About 500 tankers laden with American oil have sailed to Europe since February 2022, according to data firm OilX, helping US crude exports hit a record high last year.

The milestone marked the apogee of the shale revolution — a 15-year energy and technology upheaval in which fracking made the world's largest consumer of [oil and gas](#) also its biggest producer. Rapid shale growth delivered a huge stimulus to the global economy by keeping fuel prices low, and freed Washington's hands to take on oil-rich rivals in Iran and Venezuela without fear of economic blowback for voters at home.

Soaring shale oil output helped soothe volatile crude markets — even as the Arab Spring brought turmoil to Middle Eastern producers and fresh conflict erupted in northern Iraq and the Arabian peninsula, including attacks on Saudi oil infrastructure. Today, the flotilla of American oil and gas exports traversing the Atlantic has helped to neutralise Vladimir Putin's energy war.

US oil exports have soared

Million barrels per day



FINANCIAL TIMES

Source: Energy Information Administration

The golden age of [shale](#) “vaulted the United States back to the top of the table in terms of geopolitical significance”, says David Goldwyn, a former senior energy adviser to Barack Obama and head of Goldwyn Global Strategies, a Washington consultancy. “The US is no longer in a position where it has to worry about the physical supply of oil or gas . . . and that gives it a great deal more freedom of action in international affairs.”

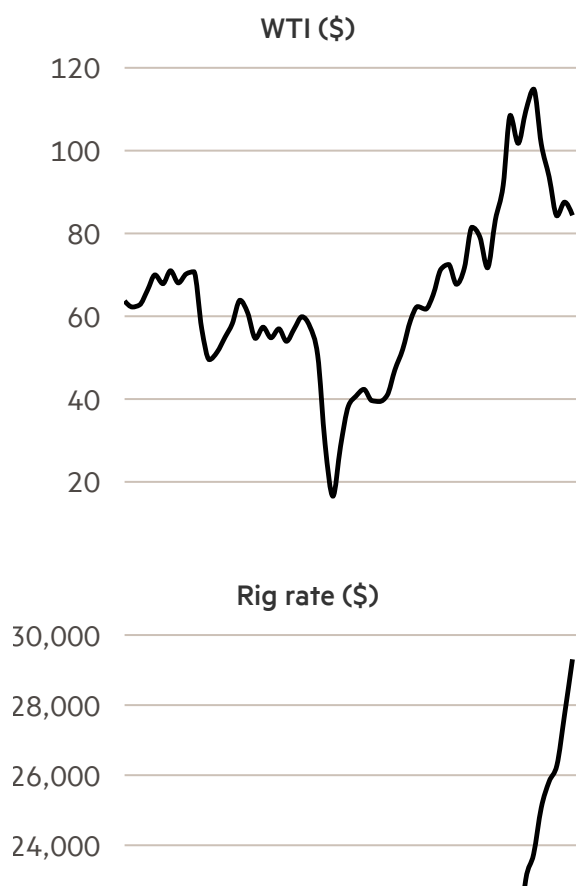
Additionally, the cumulative abundance of shale supply delivered over the past 15 years continues to shelter Americans from the sky-high natural gas and fuel prices that have rattled other developed economies, giving its industry a competitive advantage and its households more disposable income.

But that transformative age is drawing to a close, say analysts, with unpredictable consequences. High costs and labour shortages now bedevil the shale patch. Wall Street wants profits paid back to investors, not reinvested in new rigs. Even with crude prices at \$80 a barrel, a price far above the long-term average, shale producers still fear to splurge capital. To top it off, new wells are yielding less oil.

“The aggressive growth era of US shale is over,” says Scott Sheffield, chief executive of Pioneer Natural Resources, the country’s biggest shale producer. “The shale model definitely is no longer a swing producer.”

There are scenarios where this might not matter: if China’s economy keeps sputtering and Russian oil exports remain robust, despite sanctions, then oil markets should be well supplied. And if an energy transition takes off quickly, the world may cope without fast-growing American oil supply. Indeed, some environmentalists will welcome slower fossil fuel growth from a major supplier.

Shale fracking costs have surged



But the evidence that the world's consumers are losing their thirst for oil is thin, despite some governments' efforts to decarbonise their economies and lower emissions. The International Energy Agency says the world will burn another 1.7mn barrels a day in 2023, reaching a record high of almost 102mn b/d. Goldman Sachs forecasts a demand leap this year of 2.7mn b/d, pushing oil prices back above \$100 a barrel.

As the established global energy order rapidly unravels, the world may be entering a phase of yet more oil market volatility, analysts and executives warn.

This will be a problem for oil-importing countries, but an era of renewed power for some, especially Saudi Arabia, the United Arab Emirates and the other petrostates that form the Opec producer group.

Shale became the “readily available spare capacity that could compete with Opec, creating what we then called the ‘new oil order’,” says Jeff Currie, global head of commodities research at Goldman Sachs. “Today that flexibility is gone, pushing us back to the ‘old oil order’ of Opec dominance.”

Wil VanLoh, head of Quantum Energy Partners, one of the shale patch's biggest private equity investors, puts it another way. “The world was really lulled into sleep by the success of the shale revolution,” he says. “The US took control of prices from Opec, because we became the sole source of growth for oil supply globally. Until suddenly, all of that changed.”

The shale boom

Nowhere encapsulates shale's story better than North Dakota's Bakken field. In the decade to 2020, the state's oil production rocketed more than sevenfold to almost 1.5mn barrels a day, more than some Opec members produce.

A sleepy agrarian economy became an energy powerhouse. It made Harold Hamm, who bet the farm that he could blast oil from the Bakken's brittle shales, America's most famous oilman — and a billionaire.

An oil price crash in 2014 hurt the sector. But the pandemic crash of 2020 was near fatal, unleashing a wave of shale bankruptcies. It was the first sign of shale's vulnerability, and it compelled then-President Donald Trump to beg Saudi Arabia and Russia to raise prices and spare America's oil sector.



Continental Resources' Harold Hamm, who made his fortune in the Bakken shale fields, has gone hunting elsewhere for resources after the region's output slumped © Continental Resources/Reuters

The Bakken's output slumped to a little over 1mn b/d and has barely recovered. Just 39 rigs were operating across the field in the first week of January, down from more than 200 a decade ago. Continental Resources, Hamm's company, has gone hunting for shale resources elsewhere. The Bakken's heyday is over.

The Permian Basin in New Mexico and Texas has emerged as the new workhorse of the American oil industry. Output has hit a record high in recent months, enhancing its status as the world's most prolific oilfield. Bumper wages have lured drivers, welders, and pipe fitters back to West Texas oil towns such as Midland and Odessa.

Even so, overall, US oilfield activity is not what it was; the pace of production is increasing at a fraction of the boom times.

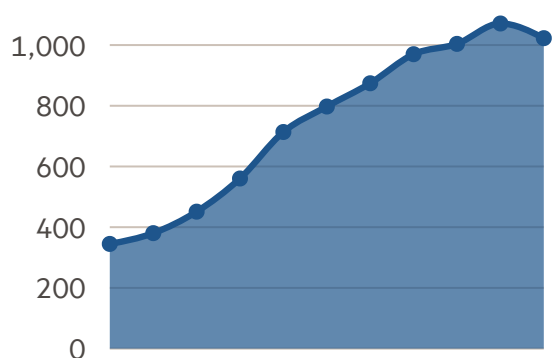
As the Bakken and others were still emerging, between 2011 and 2014, US crude output rose each year on average by about 15 per cent. Production more than doubled in the 10 years to 2019, to a high of 13mn barrels a day just before the pandemic crash saw output go into reverse, as companies shut wells, mothballed equipment, and sacked tens of thousands of workers.

Output today remains well below the pre-Covid highs, and is now growing glacially by shale standards despite 18 months of strong oil prices. The Energy Information Administration, a government forecaster, expects supply over the next 12 months will rise by just 250,000 barrels a day, or 2 per cent — unable even to keep up with the forecast rise in the country’s oil demand. Output will only reach a new high again in late 2024.

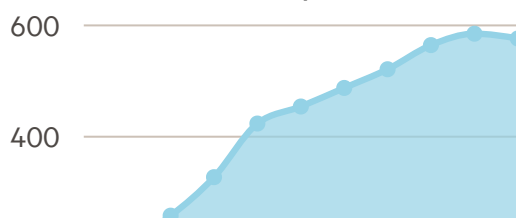
Newer shale wells’ output has peaked

Average in the Permian by start-up year

Initial production over first 30 days (barrels per day)



Estimated ultimate recovery (thousand barrels)



Even this may overestimate the growth, some consultants believe, given recent falls in the number of operating rigs. Unless activity picks up again, consultancy Energy Aspects said shale’s decline rates would accelerate next year, “possibly even leading to outright year-on-year declines” in US output.

“What was once considered as the supply growth engine of the world may well be nearing its peak,” says Amrita Sen, the consultancy’s head of research.

Wall Street cashes out

Many headwinds now blow across the shale oil sector. Even in the Permian, which during the pandemic became the sole major area of production growth, operators say years of rampant drilling have shrunk the available acreage. The biggest producers there — Pioneer, Chevron, Devon Energy, ConocoPhillips, and a few others — still hold a healthy inventory of top-tier drilling locations, but smaller companies are running low.

Unlike conventional oil production, output from newly drilled shale wells plummets after a year or so of operation. To hold output steady each year, companies must keep drilling more wells. Tens of thousands have been drilled across the US in the past 15 years.

But “well performance and drilling inventory are emerging concerns”, in the shale patch, says Morgan Stanley. Last year, for the first time, the average volume of oil produced from each new well was down on the year before, estimates Rystad Energy, a consultancy.

Some Republicans and drillers blame the Biden administration for discouraging activity, but supply chain bottlenecks are a more tangible drag on the industry.



The Permian Basin in New Mexico and Texas has emerged as the new workhorse of the US oil industry with output hitting a record high in recent months © Spencer Platt/Getty Images

Goldman Sachs says labour shortages remain “severe”, with the jobs-to-workers gap running at about 20,000 people in recent months. The need to pay higher wages has contributed to rising costs; Enverus, an energy consultancy, says wells cost 30 per cent more to drill last year than in 2021 and expects the price to go up another 12 per cent in 2023.

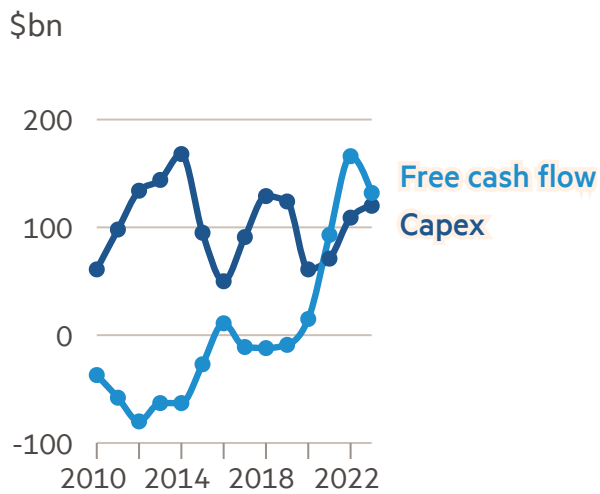
The average shale well cost just \$7.3mn to drill in 2019, but will cost \$9mn this year, according to Rystad, while the price of drilling 100 feet has risen from \$75,000 in 2020 to \$100,000.

Some rigs and essential kit have lain without maintenance for months and now need refurbishing. Even if they had the will and capital to drill more wells, some operators say, they couldn’t do so quickly, given the poor state of some equipment and workforce constraints.

Perhaps the biggest obstacle to growth, however, is Wall Street. Shale’s boom years saw operators consistently outspend cash flows, chewing through tens of billions of dollars of outside capital to fund their drilling binges. Output soared, but the profligacy sparked an investor exodus.

With the help of an oil price recovery, shale operators pulled off a stunning business reversal: reining in capital spending and ploughing the windfall from a buoyant market into dividends and share buybacks. The transformation has made the sector the S&P’s best performer for the past two years — but only at the expense of growth.

Shale is suddenly profitable



FINANCIAL TIMES

Source: Rystad Energy • Based on 21 shale companies, accounting for about 40% of output

“We produced too much oil and competed with Opec,” says Pioneer boss Sheffield. “We actually lowered the price by \$20 to \$30 per barrel over the past 10 years to the detriment of losing our entire investor base.”

The shift, says Sheffield, has been from an industry that spent 100 per cent of its cash flow on growing production to one that only reinvests 40 to 50 per cent, with the aim of growing between 0 and 5 per cent.

After a decade of deep shale losses, investors are enjoying the new model — and wary of making more risky bets on a sector with a bad record and an uncertain future in a decarbonising world.

“There’s almost no appetite from investors or companies to get back to reinvesting over 100 per cent of your cash flow,” says Arjun Murti, a veteran oil analyst who is now an adviser at Veriten, an energy consultancy. “We are looking at a slower pace of growth. It’s a meaningful development for oil markets.”

Return of the old world order

What is good for Wall Street will also, in this instance, be good for Riyadh.

Shale's tepid growth is part of a wider period of chronic under-investment in global oil exploration elsewhere, argues Goldman's Currie, and it will put oil market power — and geopolitical heft — back in the hands of Saudi Arabia and its Opec+ allies.

With decarbonisation on the horizon, investors are less willing to direct funds towards lengthy, expensive projects that often take years to pay off, such as those deep at sea, he argues. They have shifted instead to so-called "short-cycle" projects.

"And where are the world's short cycle projects? Three places: US shale, Russia, and the Middle East," says Currie. "You've taken out Russia for all the obvious reasons. Now you're losing the second engine of growth of the three, with the US struggling. That really just leaves you with core Opec: the Middle East Gulf countries."

This may not be a problem. Saudi Arabia, Opec's linchpin, has often been a stabilising force in global oil markets. In 2020, it made deep output cuts to prop up prices, helping rescue shale and other producers from oblivion.

But this shift leaves the fate of the global crude market in the hands of countries with which the west has a volatile relationship. Should those producers choose not to ramp up, due to inability or unwillingness, then the only cure to high prices will be a rationing of oil demand, say analysts, probably through recession — akin to the price shock experienced by European natural gas consumers last year.



A Biden administration that entered office pledging to crack down on fracking has spent months fruitlessly imploring shale producers and their investors to ramp up drilling © Ken Cedeno/Corbis/Getty Images

A hint of what may come was visible last year, when oil prices shot up to more than \$130 a barrel after Russian tanks rolled into Ukraine. Shale operators held fast to their capital restraint, despite repeated pleas from the White House for more oil supply. It was an example of the kind of price discovery that will be a feature of a market lacking a supplier to rival Opec, argue some analysts.

“[The market] went up to test where some poor consumer can’t afford this anymore — and I think we found this at around \$120 [a barrel],” says Raoul LeBlanc, vice-president for North American unconventional at S&P Global Commodity Insights. “Because if the supply wasn’t going to happen, then it had to go to demand. And that’s where it went.”

But leaving the market to solve the problem does not make for good politics — especially in America — or comfortable geopolitics, especially during an era of unprecedented turmoil.

That is one reason why a Biden administration that entered office pledging to crack down on fracking has spent months fruitlessly imploring shale producers and their investors to ramp up drilling. It has also released millions of barrels of crude from strategic stockpiles, loosened sanctions on Venezuela’s oil sector and dispatched diplomats to Riyadh to ask for more supply.

Weaning the global economy off fossil fuels would help, while also cutting global greenhouse gas emissions — an ambition embedded in the Biden administration’s decarbonisation programme.

This approach, however, relies on bucking a century-old trend of ever-increasing oil consumption despite some forecasters’ models showing climate policy will break the world’s fossil fuel addiction.

“If . . . we end up being more thirsty for oil than the prevailing forecasts assume, then we’ve got big problems,” says Bob McNally, a former adviser to President George W Bush who now runs Rapidan Energy Group.

It would be an era of “economy-wrecking, geopolitically destabilising, boom and bust swings”, adds McNally. “That’s when you will wish for more shale.”

Additional reporting by Justin Jacobs

Data visualisation by [Chris Campbell](#)

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