Three Charts about the Petroleum Industry

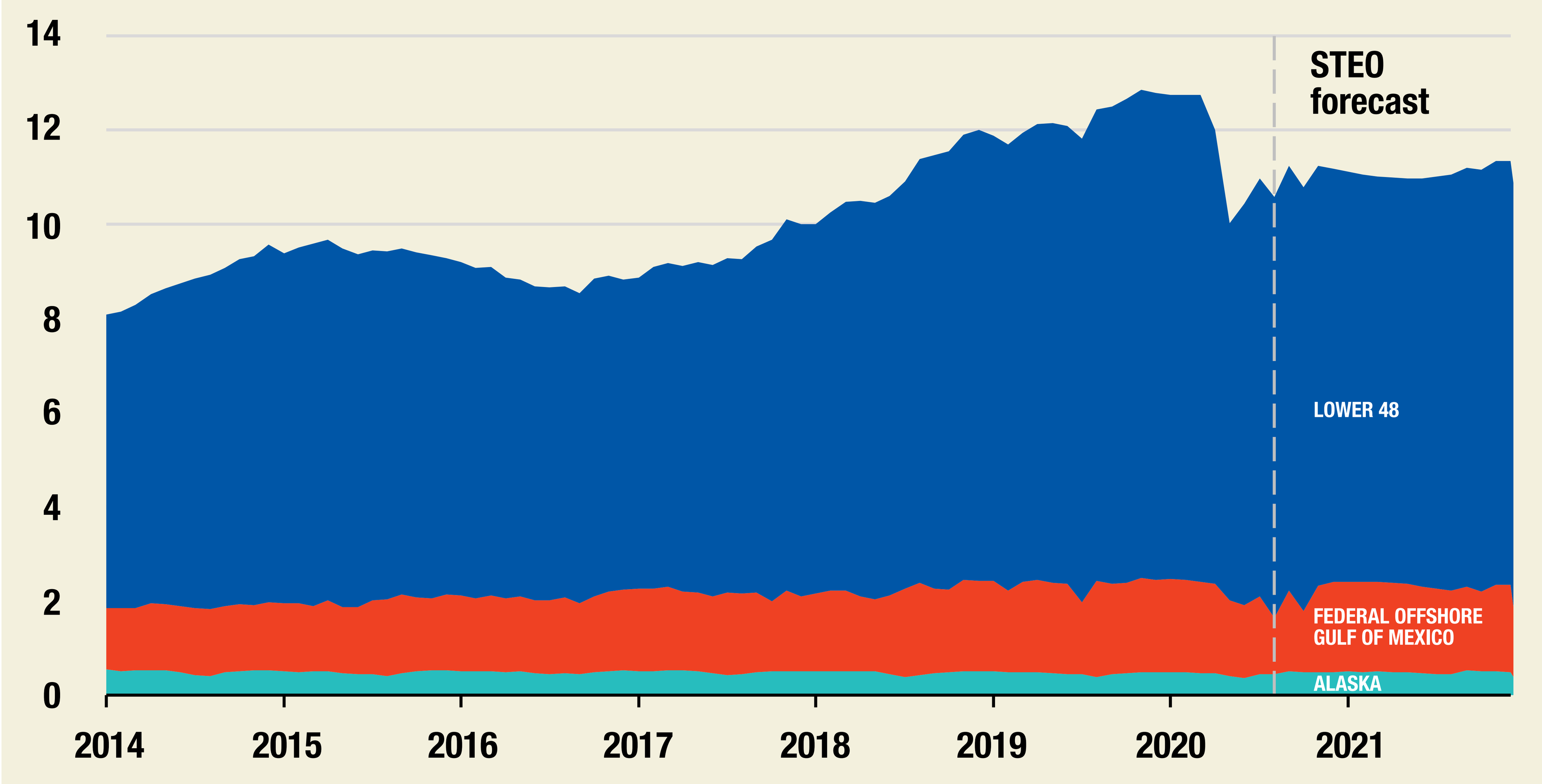
A STEADY STATE FOR 2021

The global pandemic slashed demand for oil. Experts believe that 2021 will see only a partial recovery. **BY JEFFREY WINTERS**

The COVID-19 pandemic was unprecedented for many reasons, but the energy industry will never forget one first: Negative prices for crude oil. For a short period in the end of April, commodities traders were trying—without luck—to find buyers for May oil futures contracts and resorted to paying people to take the oil. The oil market stabilized over the summer and stayed within a narrow range around $40 a barrel.

The price for oil depends on a balance of supply and demand. It also relies on the economics of oil fields: There are prices so low as to make pumping existing wells unprofitable, and prices so high as to encourage new drilling. The forecast prices for crude oil produced in the U.S. suggest that the petroleum industry will receive neither signal. Until demand for oil rises—which likely won't happen until U.S. drivers start commuting to work and taking vacations by car—prices won't support widespread new drilling. These three charts tell the tale.

U.S. Monthly Crude Oil Production (Jan 2014-Dec 2021) million barrels per day

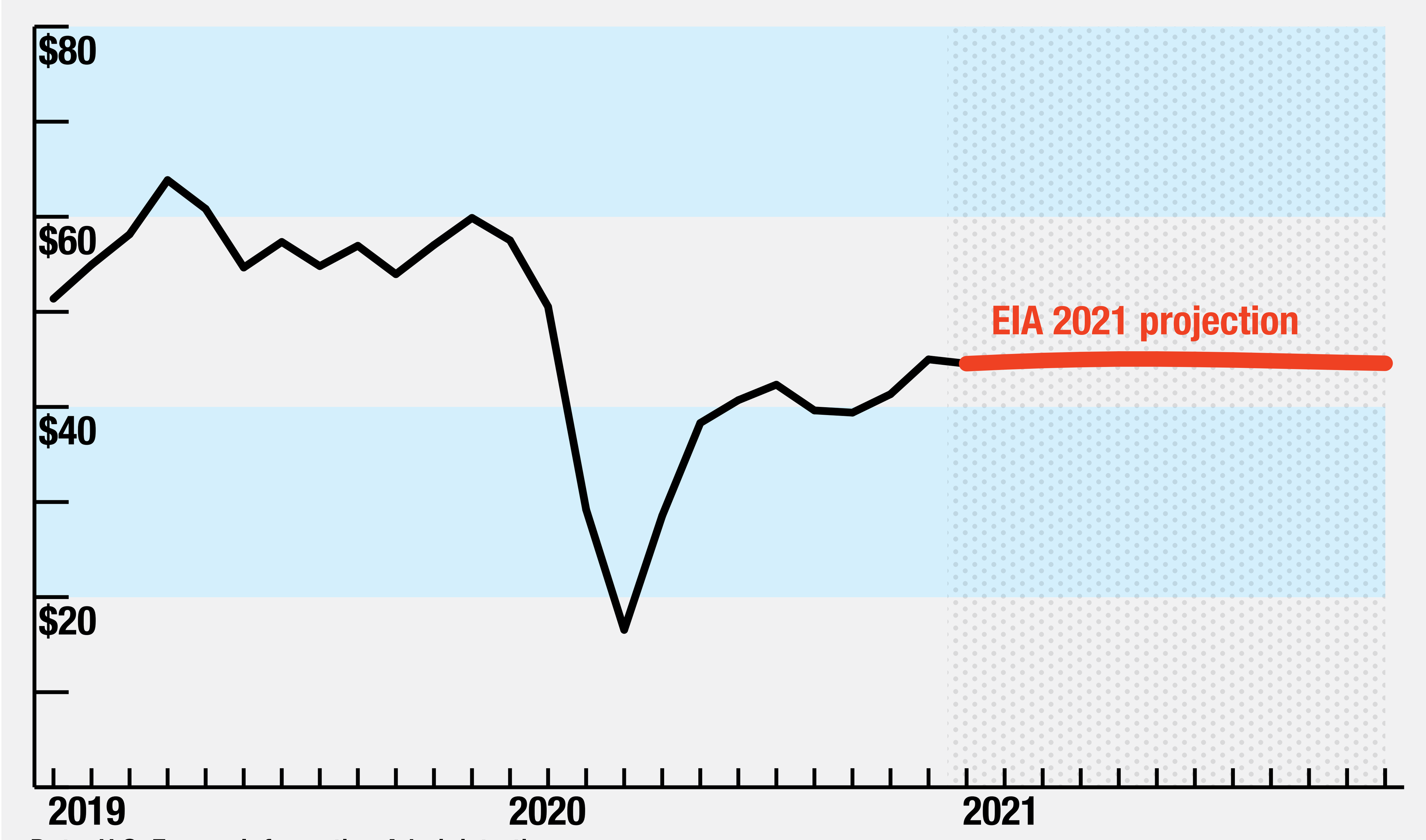


Data: U.S. Energy Information Administration

In recent years, U.S. petroleum production has grown to nearly cover domestic oil needs, with production reaching 13 million barrels a day in early 2020. When the COVID-19 crisis hit in March and many localities issued stay-at-home orders, both driving and industrial activity dropped sharply, and oil production quickly followed suit. This chart, prepared by the U.S. Energy Information Administration in November, tracks past oil production and projects it though 2021. As can be seen, the forecast is for steady oil demand, consistent with an economy that is still recovering from the effects of the pandemic and the ensuing recession.

The chart also shows that the production cuts were felt primarily in oil fields in the mainland U.S., which had seen large gains due to drilling in oil shale fields in Texas and North Dakota.

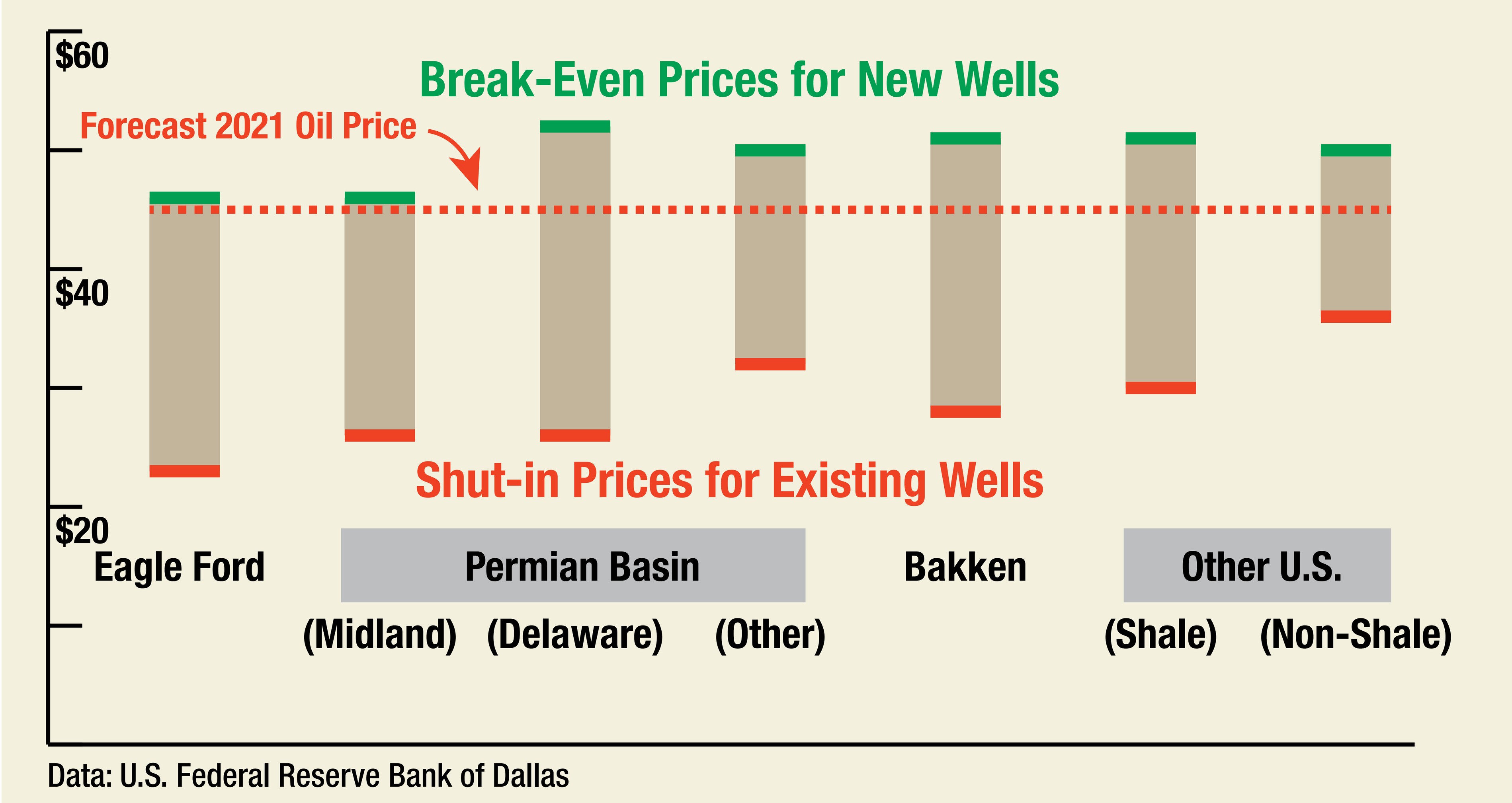
West Texas Crude Oil Prices, 2019 - 2020 and 2021 forecast



Data: U.S. Energy Information Administration

In 2019, the price for domestically produced oil hovered near $60 a barrel, which was strong enough to support new drilling that would increase the oil supply. When the pandemic hit with full force, oil prices plunged to chase the falling demand. (These are month-end prices and so don't reflect the day-to-day volatility that led to negative oil prices in April.) Over the summer, as oil producers shut in uneconomic wells and some motorists returned to the roads, the price stabilized. The price forecast from the E.I.A. ($45/bbl) suggests that equilibrium will remain throughout next year. Barring unforeseen events, the price of oil—and for petroleum products such as gasoline—in December 2021 will be the same as it is now.

Price Levels Needed to Support Continued and Expanded Oil Production



Data: U.S. Federal Reserve Bank of Dallas

The Federal Reserve Bank of Dallas serves the largest region of oil production in the U.S. and so has a longstanding interest in the fortunes of the petroleum industry. During a November 2020 presentation, the Dallas bank published dozens of slides outlining the near-term prospects for oil production, and this chart combines two of them. Researchers at the bank asked oil companies in seven broadly defined oil producing regions, including the Eagle Ford and Permian Basin in Texas and the Bakken in North Dakota, what price was needed to support new drilling and what price was needed to cover expenses on existing wells. The average response for each region and the forecast price for 2021 are shown. The expected price falls just under the average needed to support new drilling in all regions, though the Dallas bank survey does show that some companies could profitably drill at that price level. That's good because existing wells will produce less oil over time, so even steady production at a steady price to meet a steady demand requires some new supply. Just not a lot.

MECHANICAL ENGINEERING
THE MAGAZINE OF ASME