U.S. Rail Crude Oil Traffic

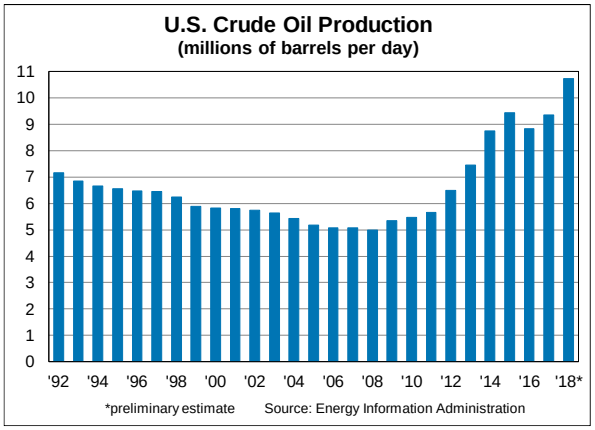
ASSOCIATION OF AMERICAN RAILROADS **DECEMBER 2018**

Summary

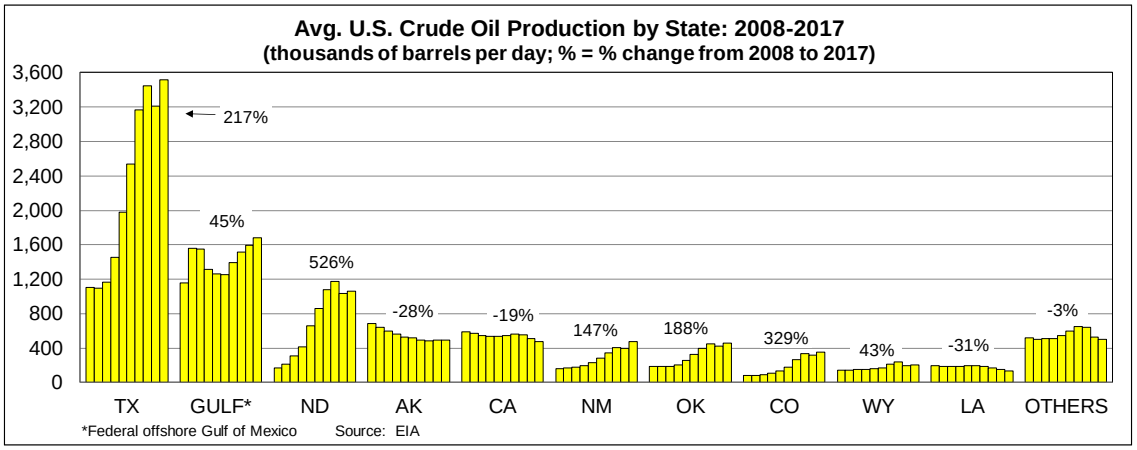
U.S. crude oil by rail volumes have fluctuated sharply over the past decade. In 2008, U.S. Class I railroads originated 9,500 carloads of crude oil. That grew to 493,146 carloads in 2014, but then had fallen to 128,967 carloads by 2017. Rail crude oil volumes are affected by a variety of factors, including pipeline capacity and crude oil prices.

The Shale Revolution Has Led to Sharply Higher Crude Oil Production

- U.S. crude oil production in 1970 averaged 9.6 million barrels per day. By 2008, it had fallen to just 5.0 million barrels per day as new fields failed to keep pace with depletion of older fields. However, thanks mainly to growth in shale oil, U.S. crude oil production grew to 9.4 million barrels per day in 2017 and will come close to 11 million barrels per day in 2018.



- Texas and North Dakota have accounted for most of the increase in U.S. crude oil output. In North Dakota, crude oil production rose from 98,000 barrels per day in 2005 to 1.1 million barrels per day in 2017. Crude oil output in Texas has skyrocketed, rising from 1.1 million barrels per day in 2005 to 3.5 million barrels per day in 2017.



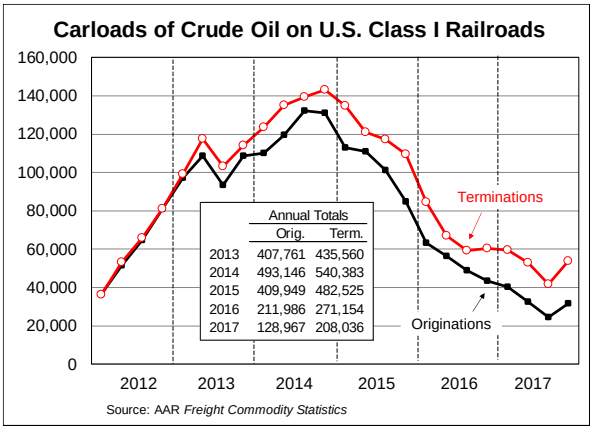
Volumes of Crude Oil by Rail

The growth in domestic crude oil production presents a tremendous opportunity for the United States to move closer to energy independence. Railroads have been crucial to this effort:

- Historically, pipelines have transported most crude oil. However, especially in North Dakota but elsewhere too, higher crude oil production outpaced growth in pipeline capacity. Railroads have helped fill this gap. Originated carloads of crude oil on U.S. Class I railroads rose from 9,500 in 2008 to 493,146 in 2014. Terminated carloads of crude oil on U.S. Class I railroads rose from 9,344 in 2008 to 540,383 in 2014.[1]

- However, growth in pipeline capacity, a narrowing in the "spread" between domestic and imported oil, and other factors have led to a sharp decline in rail shipments of crude oil. After peaking in 2014, originated carloads of crude oil on U.S. Class I railroads fell to 128,967 in 2017, 74 percent lower than in 2014.

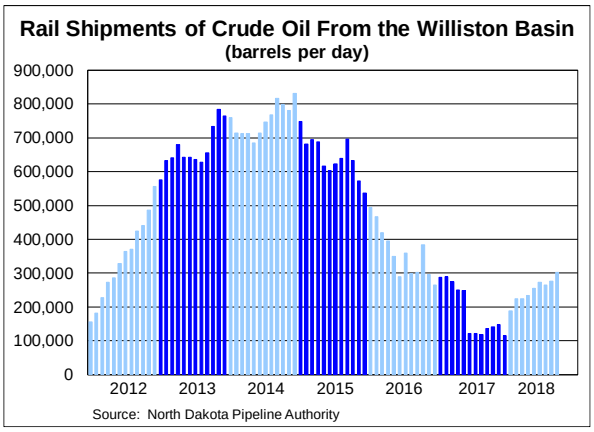
- From the first quarter of 2009 through the third quarter of 2018, U.S. Class I railroads originated 2.11 million carloads of crude oil and terminated 2.49 million carloads. At its peak in 2014, crude oil accounted for 1.6 percent of total originated carloads on Class I railroads. In 2017, it accounted for less than 0.5 percent.

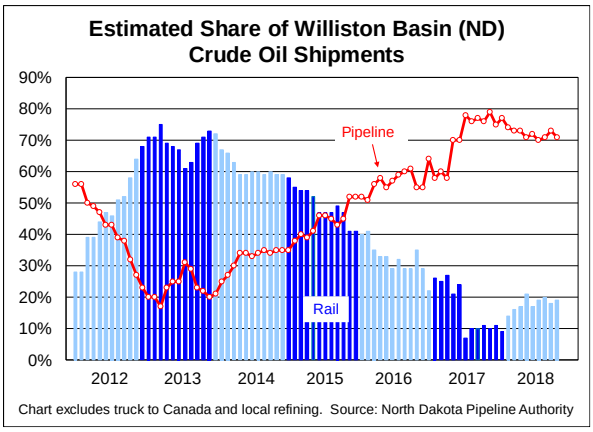


- The amount of crude oil in a rail carload varies depending on (among other things) the source of the oil, the type of tank car used, and the season of the year. In 2017, the average carload of crude oil originated in the United States carried 691 barrels of oil. Using that, the 128,967 carloads of crude oil originated by U.S. Class I railroads in 2017 was equivalent to around 244,000 barrels per day. According to data from the Energy Information Administration (EIA), U.S. crude oil production in 2017 averaged 9.4 million barrels per day, so the rail share was approximately 2.6 percent of total production. In 2014, the peak year for rail crude oil shipments, railroads accounted for around 11 percent of U.S. crude oil production.

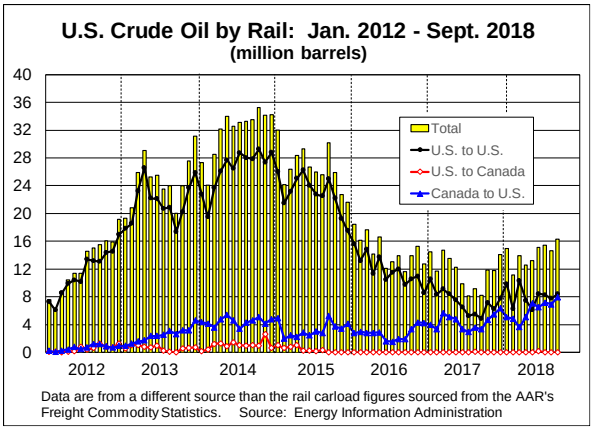
- The Bakken region has accounted for the vast majority of rail crude oil originations. According to the North Dakota Pipeline Authority (NDPA), near the end of 2014 around 800,000 barrels of crude oil per day were moving out of the area by rail. By the end of 2017, though, this was down to fewer than 140,000 barrels per day. In the first four months of 2018, it was up to around 240,000 barrels per day, according to the NDPA.

[1] "Originated" carloads are loaded carloads beginning a rail journey; "terminated" carloads are loaded carloads completing a rail journey. U.S. Class I originations do not equal U.S. Class I terminations because some crude oil that originates on U.S. Class I railroads is terminated by U.S. short line railroads or by railroads in Canada. Likewise, some crude oil that terminates on U.S. Class I railroads originates on railroads in Canada or on U.S. short line railroads.



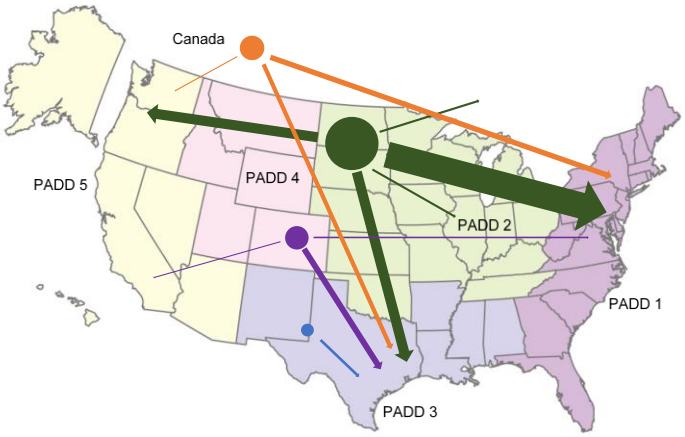


- The rail share of North Dakota crude oil movements averaged around 62 percent in 2014, but had fallen to around 10 percent by the end of 2017. Rail was up to close to 20 percent in 2018 through September (see the bars in the chart above right). Meanwhile, the pipeline share rose from around 31 percent in 2014 to more than 70 percent today (see the line in the chart above right).

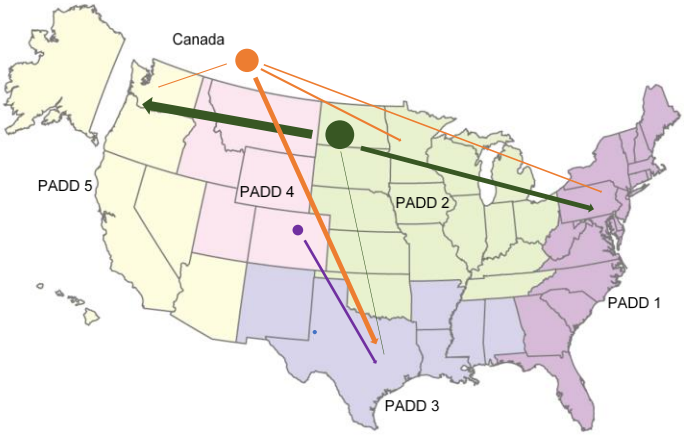


- The Energy Information Administration releases data each month on U.S. crude by rail movements, including movements between Petroleum Administration for Defense Districts (PADDs), as shown in the maps below.

U.S. Crude by Rail Movements 2014



U.S. Crude by Rail Movements 2017



Note: thickness of lines and area of circles correlate to volume, but location of lines and circles do not necessarily indicate originating or terminating locations. Source: AAR analysis of EIA data.