railroads have helped power america since its earliest days. in fact, the first big haul for america’s first major railroad was transporting coal from western maryland and virginia to baltimore. in the years since, the role of railroads in the energy industry has continued to grow. and as energy sources and consumption patterns have changed, the freight rail industry has adjusted to customer needs to continue safely and efficiently moving energy products.

*crude oil*

**data points**

- more than 99.9% of hazmat moved by rail, including crude oil, reaches its destination without incident.
- the hazmat accident rate is down 73% since 2000.
- one rail car carries enough crude oil to make about 13,500 gallons of gasoline.
- in 2022, the average carload of crude oil originated in the united states carried around 650 barrels of oil.

crude oil is an indispensable ingredient in numerous products - from transportation fuels and plastics to polar fleece jackets, toiletries and medicines. with their extensive network and adaptability, railroads play a crucial role in the nation’s crude oil logistics.

since this important commodity is a hazardous material, the freight rail industry continually evaluates and modernizes its hazmat operations to ensure its safe movement. railroads rigorously train their employees on how to handle hazmat safely, as well as train tens of thousands of first responders each year. they also leverage today’s innovative technologies, including developing software that analyzes safe and secure rail routes and wayside sensors that increase and improve track inspections. this commitment to safety standards has led to a strong track record, with over 99.9% of hazmat, including crude oil, reaching its destination safely.
In their never-ending quest to increase safety further, the rail industry has long advocated for more robust tank car standards, endorsing a federal government ruling that today’s tank cars are built with higher-grade steel, better thermal protection, improved valves and fittings and thicker tanks.

**U.S. Crude Oil Production**

The “shale revolution” created more U.S. crude oil production. U.S. crude oil production in 1970 averaged 9.6 million barrels per day. By 2008, it had fallen to just five million barrels per day as new fields failed to keep pace with the depletion of older fields.

However, thanks mainly to growth in shale oil, U.S. crude oil production grew to 12.3 million barrels per day in 2019 before falling to 11.3 million in 2020. Texas and North Dakota have accounted for most of the U.S. crude oil output increase in recent years. Production also rose sharply in New Mexico, Oklahoma and Colorado.

**Rail Shipments of Crude Oil**

Historically, pipelines have transported most crude oil. However, higher crude oil production outpaced growth in pipeline capacity, especially in North Dakota. Railroads helped fill this gap. Originated carloads of crude oil on U.S. Class I railroads surged from 9,500 in 2008 to 493,146 in 2014.

As new pipelines were built, they fell sharply over the next few years, but carloads rebounded somewhat in 2018 and 2019. Terminated carloads of crude oil on U.S. Class I railroads rose from 9,344 in 2008 to a peak of 540,383 in 2014 before falling sharply and then rising again, in part because of large volumes of crude oil originated in Canada and shipped by rail to refineries in the United States. (1).

At its peak in 2014, crude oil accounted for 1.6% of originated carloads and 1.7% of total terminated carloads. In 2021, crude oil’s share was down to 0.3% for originations and 0.6% for terminations. 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 year’s season. In 2014, the peak year for rail crude oil shipments, railroads accounted for around 11% of U.S. crude oil production.

[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 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.
**Ethanol**

**Data Point:** Railroads account for 60 to 70% of ethanol movement.

Ethanol — a renewable fuel made from corn and other plant materials — is an important commodity for U.S. railroads. The U.S. ethanol industry — and railroad carloads of ethanol — has grown tremendously since methyl tertiary butyl ether (MTBE), a gasoline additive, was banned from use in 2006. Coupled with high oil and low corn prices, the ban gave rise to ethanol’s replacement of MTBE as a fuel additive. Since then, Government policies requiring renewable and biofuels have only strengthened the demand for this energy resource.

Because of its alcohol content, ethanol cannot move in oil pipelines, making railroads the chief mode of transport for this commodity. Each U.S. Class I railroads transports ethanol, with some serving several dozen plants. An estimated 15 to 20% of ethanol rail movements originate on short line and regional railroads — not surprising, given the rural nature of many short lines and much of America’s ethanol production.

Ethanol production is concentrated in the Midwest, where most of the corn used in ethanol production is grown, but many of the major markets for ethanol are on the East Coast, California and Texas.

**Coal**

**Data Point:** In 2022 alone, U.S. railroads moved 3.4 million carloads of coal, with each railcar carrying enough coal to power 20 homes for an entire year.

Although rail coal shipments have declined in recent years, coal is still an essential part of the nation’s industrial economy and a key rail market. Well over 90% of U.S. coal consumption is for electricity generation, while some coal is used to produce coke and for other industrial purposes. U.S. coal is also exported to countries all over the world for steelmaking and power generation.

Just five states account for nearly 70% of U.S. coal production, but coal is consumed all over the country — a feat made possible by freight railroads. Thanks in part to innovative service solutions and ongoing investments, railroads continue to provide efficient and cost-effective transportation to coal shippers throughout the country.

Today, most coal is used to generate electricity. It is also used to produce coke and for other industrial purposes. U.S. coal is also exported to markets abroad. In the past few years, U.S. coal exports have been equivalent to around 14% of U.S. coal production, more than double the percentage of ten years ago.
Why Have Coal Shipments Dropped?

Historically, coal has been the single most important commodity carried by U.S. railroads. In recent years, technological advances in natural gas extraction and greater reliance on renewables like wind and solar have led to a sharp decline in coal’s share of U.S. electricity generation — resulting in a precipitous drop in the amount of coal moved by railroads. Because electricity generation accounts for so much U.S. coal consumption, the electricity market is key to coal’s fortunes. For decades, total U.S. electricity generation rose steadily, more or less in tandem with economic growth. Over the past 15 years, though, total U.S. electricity generation has been roughly flat while coal’s share has plunged.

Concerns about the environmental impact of coal have played a major role in its decline, but market forces have been even more important. Rapid increases in natural gas production brought about by technological advances in natural gas extraction, especially hydraulic fracturing, or fracking, have meant that natural gas is much more plentiful and cheaper for electricity producers than it used to be.