Freight Railroads Help Reduce Greenhouse Gas Emissions

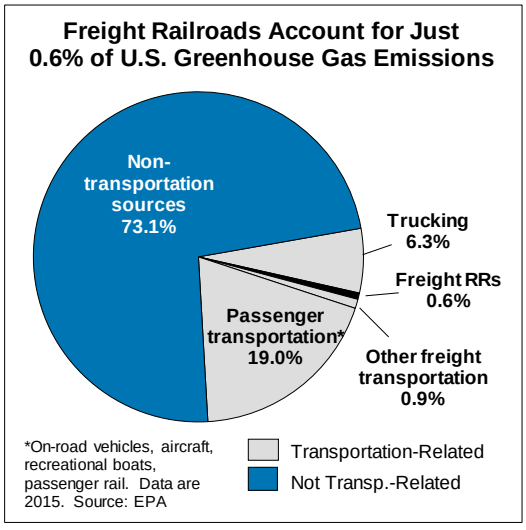
ASSOCIATION OF AMERICAN RAILROADS APRIL 2017

Summary

Expanded use of freight rail offers a meaningful way to reduce greenhouse gas emissions without harming the economy. On average, railroads are four times more fuel efficient than trucks. That means moving freight by rail instead of truck **reduces greenhouse gas emissions by 75 percent**. According to Environmental Protection Agency (EPA) data, **freight railroads account for just 0.6 percent of U.S. greenhouse gas emissions from all sources** and just 2.3 percent of emissions from transportation-related sources.

Moving More Freight By Rail Would Significantly Reduce Greenhouse Gas Emissions

- According to an independent study for the Federal Railroad Administration, **railroads, on average, are four times more fuel efficient than trucks**. Greenhouse gas emissions are directly related to fuel consumption. That means that moving freight by rail instead of truck reduces greenhouse gas emissions by 75 percent.
- If just 10 percent of the freight that moves by Class 7 or Class 8 (the largest) trucks moved by rail instead, fuel savings would be around 1.5 billion gallons per year and annual greenhouse gas emissions would fall by approximately 17 million tons — equivalent to removing 3.2 million cars from the highways for a year or planting 400 million trees.
- According to EPA data, non-transportation sources (power plants, manufacturers, etc.) accounted for 73.1 percent of U.S. greenhouse gas emissions in 2015; transportation accounted for the remaining 26.9 percent. Freight railroads accounted for just 0.6 percent of total U.S. greenhouse gas emissions in 2015, according to EPA data, and just 2.3 percent of transportation-related greenhouse gas emissions.



- **Moving more freight by rail also reduces highway congestion**, which cost $160 billion in 2014 just in wasted time (6.9 billion hours) and wasted fuel (3.1 billion gallons), according to the Texas Transportation Institute's 2015 Urban Mobility Scorecard. **A single freight train can replace several hundred trucks**. Moving freight by rail instead of trucks also reduces highway wear and tear and the pressure to build costly new highways.

U.S. Greenhouse Gas Emissions By Economic Sector: 2015

Economic Sector	Tg CO2 Eq.	% of Total
Electric. generation	1,941.4	29.5%
Residential	372.7	5.7%
Industry	1,411.6	21.4%
Agriculture	570.3	8.7%
Transportation	1,806.6	27.4%
Commercial	437.4	6.6%
U.S. Territories	46.6	0.7%
Total	6,586.6	100.0%

Data are in teragrams of CO2 equivalents.

U.S. Greenhouse Gas Emissions from Transportation: 2015

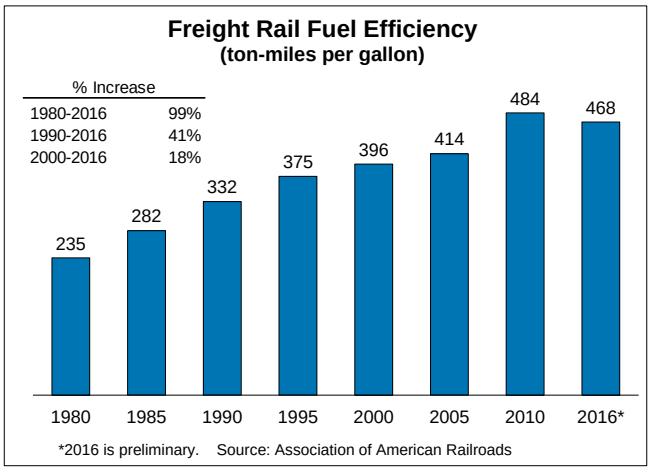
Economic Sector	Tg CO2 Eq.	% of Transp. Total
Trucking	415.0	23.5%
Freight Railroads	**41.3**	**2.3%**
Waterborne Freight	4.8	0.3%
Pipelines	38.0	2.1%
Aircraft	145.8	8.2%
Recreational Boats	12.3	0.7%
Passenger Railroads	5.4	0.3%
Cars, Light Trucks, Motorcycles	1,087.2	61.4%
Buses	19.8	1.1%
	1,769.6	100.0%

Source: EPA, *Inventory of U.S Greenhouse Gas Emissions and Sinks: 1990-2015 (April 2017)*, Tables ES-6, A-118, and A-119. Totals for "transportation" in the two tables do not match in part because the table on the left includes emissions from sources considered to be transportation but not considered to be passenger or freight (e.g., lubricants).

Railroads Are Constantly Working to Improve Fuel Efficiency

- In 1980, one gallon of diesel fuel moved one ton of freight by rail an average of 235 miles. In 2016, one gallon of fuel moved one ton of freight by rail an average of 468 miles — a 99 percent improvement since 1980 and an 18 percent gain since 2000.

- In 2016 alone, U.S. freight railroads consumed **617 million fewer gallons of fuel** and emitted **6.9 million fewer tons of carbon dioxide** than they would have if their fuel efficiency had remained constant since 2000. From 2000 through 2016, U.S. freight railroads consumed 7.5 billion fewer gallons of fuel and emitted 84 million fewer tons of carbon dioxide than they would have if their fuel efficiency had not improved.



- Railroads use a variety of means to cut fuel consumption and greenhouse gas emissions:

  - ✓ **Acquiring thousands of new, more efficient locomotives**. Many older, less fuel efficient locomotives have been retired from service.

  - ✓ **Increasing the amount of freight in rail cars and on trains.** Thanks to improved freight car design, the use of longer trains, and other factors, the amount of freight railroads carried in an average train in 2016 was 3,533 tons, up from 2,923 tons in 2000.

  - ✓ **Developing and implementing highly advanced computer software systems** that, among other things, calculate the most fuel-efficient speed for a

train over a given route; determine the most efficient spacing and timing of trains on a railroad's system; and monitor locomotive functions and performance to ensure peak efficiency. These systems provide locomotive engineers with real-time "coaching" on the best speed for a train from a fuel-savings standpoint.

- ✓ **Training**. Railroad fuel efficiency depends in part on how well a locomotive engineer handles a train. That's why railroads use the skills of their engineers to save fuel. For example, some railroads offer training programs through which locomotive engineers offer suggestions to their colleagues on ways to save fuel — e.g., the best way to accelerate and decelerate from a fuel-savings standpoint, or the best procedures to follow for shutting down an engine.

- ✓ **Reduced idling**. Railroads are implementing "stop-start" idling-reduction technology that allows main engines to shut down when ambient conditions are favorable. Some railroads also use "**auxiliary power units**" that warm engines so that locomotives can be shut down in cold weather.

- ✓ **New technologies and operational changes**, including expanding the use of **distributed power** (positioning locomotives in the middle of trains) to reduce the total horsepower required for train movements; improving **rail lubrication** to reduce friction at the wheel-rail interface and wear and tear on track and locomotives; using **low-torque bearings** in rail cars to reduce weight and save fuel; aerodynamic **drag-reducing devices** at the front of double-stacked intermodal trains; and advanced **defect detectors** which identify poorly performing equipment that waste energy and are a safety risk as well.