

# Railroads and Chemicals

## Summary

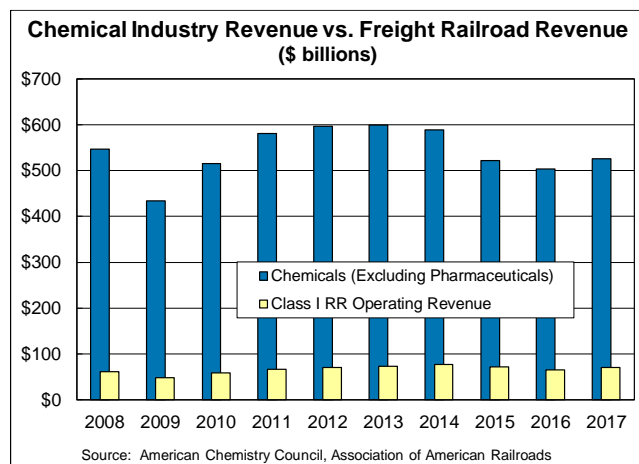
Producers and consumers of chemicals require a safe, efficient, and cost-effective national transportation system. America’s freight railroads provide such a system. In fact, chemicals and rail transportation go hand in hand. In 2017, U.S. Class I railroads originated 2.1 million carloads of chemicals (7.4 percent of total carloads — third behind coal and intermodal) carrying 175.9 million tons (10.8 percent of total tons originated — second only to coal) and yielding \$10.3 billion in gross revenue (14.8 percent of total gross revenue, third behind intermodal and coal).

## Overview of Chemicals

Broadly defined, chemicals consists of thousands of distinct products. Using the Standard Transportation Commodity Code (STCC), they are classified under the two-digit code 28. Major subcategories include industrial chemicals (STCC 281), plastics and synthetic fibers (STCC 282), drugs and biological products (STCC 283), soaps and allied products (STCC 284), paints and allied products (STCC 285), gum and wood chemicals (STCC 286), fertilizers and other agricultural chemicals (STCC 287), and other chemical products (STCC 289). The vast majority of rail chemical traffic consists of STCCs 281, 282, and 287, though less than half of chemical industry production consists of these three types of chemicals.

Since most chemicals are used in the production of other goods, the chemical industry’s fortunes tend to rise and fall with the economy as a whole, especially manufacturing. The chemical industry is one of the largest U.S. industries — the chemical industry’s revenue of \$526 billion in 2017 (excluding pharmaceuticals) was approximately seven times the revenue of the U.S. freight railroad industry.

Although the U.S. chemical industry consists of thousands of firms located throughout the country, many plants are concentrated in the Gulf States (where petroleum and natural gas raw materials are readily available), the Delaware Valley, and the Midwest. The top chemical producing states (including Texas, California, Louisiana, North Carolina, Illinois, Ohio, Indiana, New York, Pennsylvania, and Iowa) account for approximately two-thirds of total U.S. chemical production.



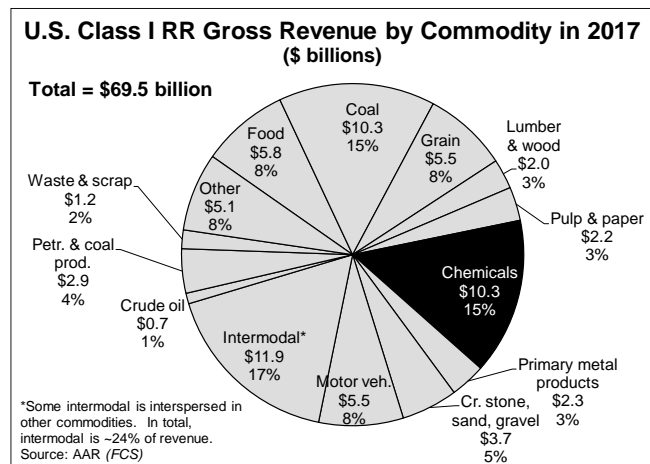
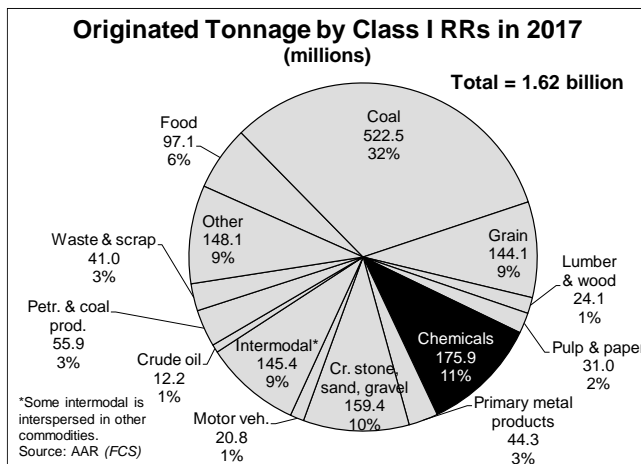
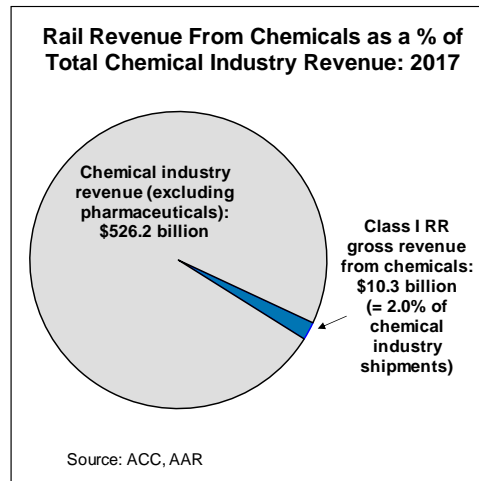
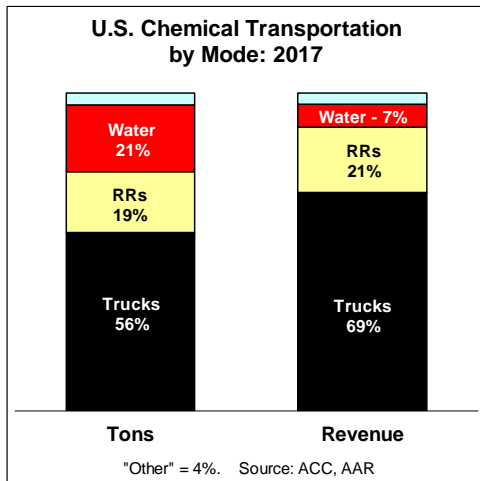
## Chemical Transportation

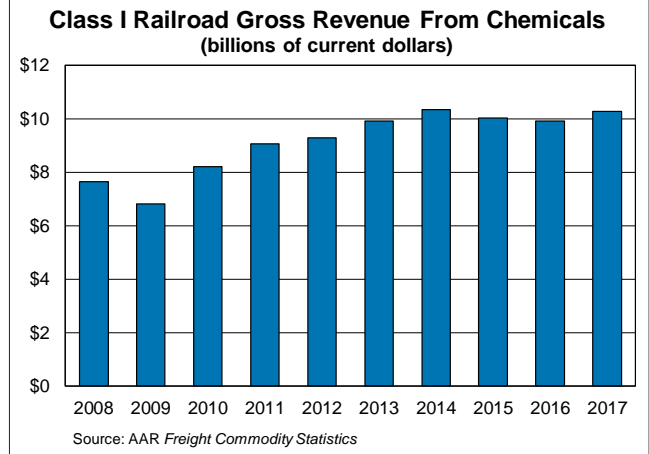
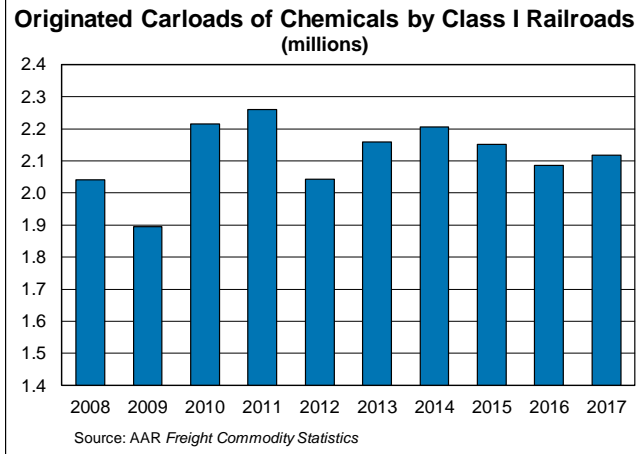
Because end users of chemicals are spread throughout the country, huge volumes of chemicals are transported each year.

According to figures compiled by the American Chemistry Council (ACC), some 917 million tons of chemicals were shipped in the United States in 2017 at a cost of \$49.8 billion. In 2017, transportation costs were equivalent to 9.5 percent of the value of chemical industry shipments excluding pharmaceuticals.

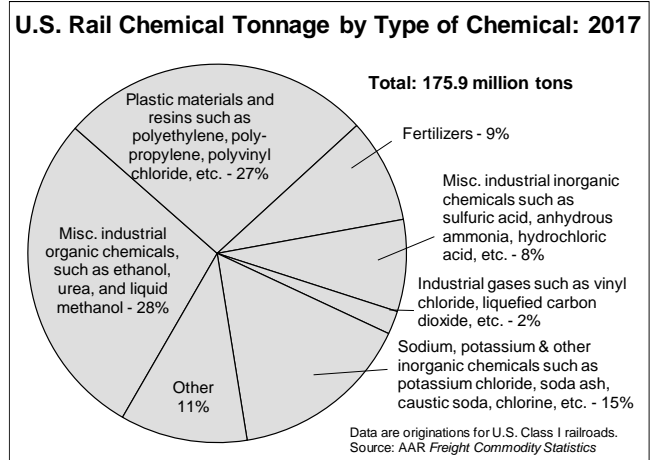
In 2017, trucks accounted for more than half of chemical tonnage shipped and more than two-thirds of chemical transportation costs, while water transport accounted for 21 percent of tonnage and 7 percent of transportation costs, according to ACC data. Pipelines and air transport accounted for 4 percent of tons and costs.

The remainder — 19 percent of tonnage and 21 percent of chemical transportation costs — is attributable to rail. In 2017, chemicals accounted for 7.4 percent of originated carloads, 10.8 percent of originated tonnage, and 14.8 percent of gross revenue for U.S. Class I railroads.

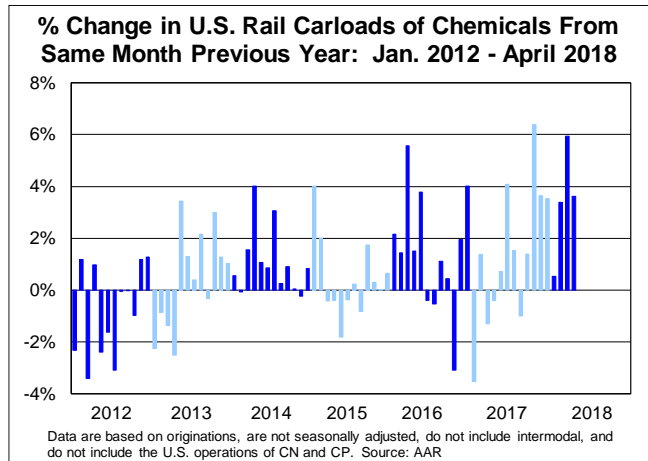
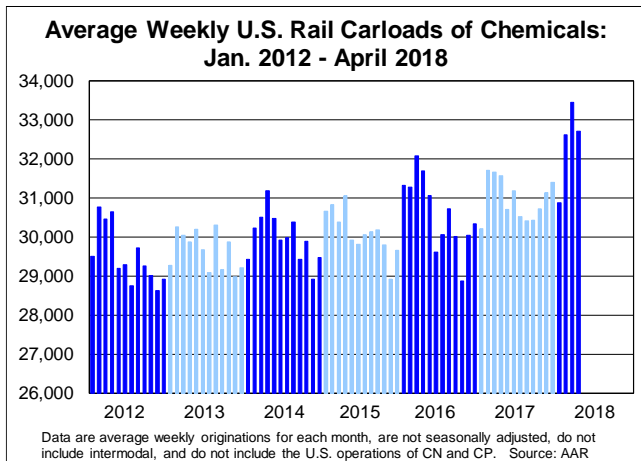




In 2017, U.S. Class I railroads originated 2.1 million carloads and 175.9 million tons of chemicals. The highest-volume chemical carried by U.S. railroads is ethanol. More than half of all rail chemical tonnage consists of various industrial chemicals, including potassium chloride, sodium carbonate (soda ash), sodium hydroxide (caustic soda), urea, sulfuric acid, and anhydrous ammonia. Plastic materials and synthetic resins (including polyethylene, polypropylene, polyvinyl chloride, and similar products) account for 27 percent of rail chemical tonnage. Most of the rest is agricultural chemicals.

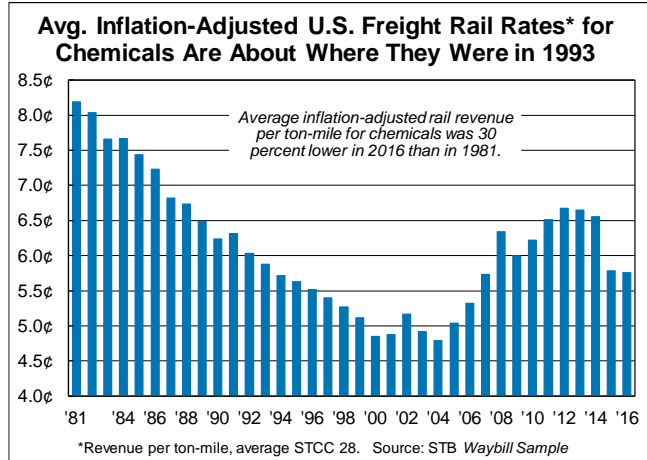


Historically, only coal and intermodal have provided more revenue to railroads than chemicals. Class I gross revenue from chemicals was \$10.3 billion in 2017 (14.8 percent of total gross revenue), up slightly from \$9.9 billion in 2016. In 2017, Class I rail revenue from transporting chemicals was equivalent to just 2.0 percent of chemical industry revenue (excluding pharmaceuticals).



## Rail Rates for Chemicals

Revenue per ton-mile (RPTM) is a useful surrogate for rail rates. Adjusted for inflation, RPTM for chemicals was 30 percent lower in 2016 than in 1981. Generally speaking, railroads, like firms in other competitive industries (including chemical firms), set their prices mainly based on the value they provide to their customers, not on their input costs. This market-based approach allows railroads to balance the desire of each customer to pay the lowest possible rate with the requirement that railroads be able to attract capital and pay for all the things needed to keep their networks functioning and growing in the future.

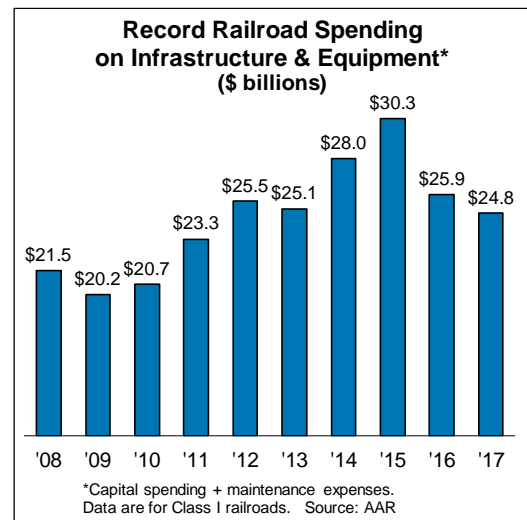


## Continued Spending Back Into the Rail Network

In the future, transportation demand will grow. Recent forecasts from the Federal Highway Administration found that total U.S. freight shipments will rise from an estimated 18.1 billion tons in 2015 to 25.5 billion tons in 2040 — a 41 percent increase.

Freight railroads are preparing for this future demand today. Unlike trucks, barges, and airlines, which travel mainly on infrastructure that the government provides and pays for, America's privately owned freight railroads operate almost exclusively on infrastructure that they own, build, maintain, and pay for themselves. In recent years, America's freight railroads have been putting more money back into their networks than ever before. From 1980 through 2017, they spent more than \$660 billion — their own funds, not taxpayer funds — on renewal, maintenance, and expansion of their infrastructure and equipment. That's more than 40 cents out of every rail revenue dollar.

In the years to come, railroads will be asked to continue to grow capacity for grain and other current and potential customers. Additional spending on capacity can only be made if rail earnings are robust enough to attract the capital needed to pay for it.



## Conclusion

Chemical producers and consumers require a safe, efficient, and cost-effective national transportation system. By providing fertilizers to Midwest farmers, plastic resins to container manufacturers, caustic soda to pulp and paper manufacturers, and countless other chemical products to intermediaries and end users throughout the United States and the world, railroads provide such a system. The value-added transportation service that railroads provide helps ensure that chemical producers and consumers can maintain their competitiveness here and abroad and continue to enhance our health, safety, and quality of life.