TRINITYRAIL

Building a More Sustainable Supply Chain

How transportation impacts supplier sustainability targets.

Executive Summary

Sustainability is good for the environment, encouraged by the government, helpful for employee engagement and a potential boon for business profitability. Most company leaders understand why climate action is important, but many are unable to identify their organization's worst impacts on the environment.

Freight transportation is a great place to begin sustainability initiatives because small changes provide significant environmental benefits. In fact, the transportation sector is the largest contributor to greenhouse gas emissions (GHG) in the U.S. Additionally, air emissions from freight are projected to exceed growth in emissions from all other transportation activities.

When considering ways to improve transportation sustainability, shifting more freight to rail makes a huge difference. Indeed, rail transportation is essential for meeting global climate targets and will help attain global net-zero goals.

This whitepaper outlines the sustainable benefits of rail transportation, showcases innovations that are improving rail efficiency, and offers criteria to help guide shippers to select the most reliable and sustainable providers to maximize supply chain sustainability.

Current Situation

Across all industries around the world – there is a drive to increase sustainability.

For example, the United Nations General Assembly created a collection of 17 interlinked Sustainable Development Goals. The SDGs are intended to be achieved by 2030.

In the United States, the Inflation Reduction Act, passed in August 2022, includes investments to improve public health, reduce pollution, and revitalize communities that are overburdened by pollution while increasing access to affordable and accessible clean energy.

Corporate America is also under increased scrutiny for its collective environmental impact. A proposed Securities & Exchange Commission (SEC) climate risk disclosure would require companies listed on U.S. stock exchanges to disclose their direct and indirect greenhouse gas emissions if they are 'material' or included in a company-set emissions target. Although the final rule on this matter is pending, this move is a sign of future U.S. sustainability enforcement changes.

Sustainability is also influencing the success or failure of businesses. A study by Nielsen showed that companies committed to positive social and environmental impact are able to charge a premium for the products and services they sell. Sustainability now joins price, quality and service as important components of the supplier-customer relationship. As a supplier, finding a way to support your customers' sustainability goals is beneficial to your relationship because it demonstrates support for your customers' strategic initiatives.

Additionally, a study by the National Environmental Education Foundation reports that almost 90 percent of employees involved with their company's sustainability program say it enhances their job satisfaction and overall feelings about the company.

Sustainability is good for the environment, encouraged by the government, helpful for employee engagement and a potential boon for business profitability. That's why adopting sustainability practices is no longer optional. There are, however, still barriers to successful sustainability initiatives. One of the primary obstacles is knowing the best way to start.

Considering the Supply Chain

Most executives and board members understand why climate action is important, but many do not know how to assess or reduce an organization's worst impacts on the environment.

Companies that are most successful in improving sustainability go far beyond their own walls. There are several reasons why supply chain sustainability is critical to address:

- Organizations with purchasing power can influence their suppliers and vendors to make reductions in supply chain impacts.
- Sustainability improvements throughout an organization's supply chain make a much larger impact than those at one organization.
- The production and transportation of goods are significant pollution sources with a great deal of room for improvement.
- Proposed SEC greenhouse gas regulations would require publicly traded corporations to disclose "Scope 3" emissions that are generated by a company's supply chain.

U.S. manufacturing relies upon multiple sources and modes of transportation. A single product can be transported by marine vessel or plane multiple times, then distributed across the country via barge, truck, and rail. Freight transportation has historically used oil and other fossil fuels as an energy source. For shippers, carriers and logistics companies that move a lot of products and supplies, this energy use can represent a significant operational cost.

Freight transportation is an ideal place to address supply chain sustainability because changes provide significant environmental benefits. The U.S. transportation system moves an average of 51 million tons of freight each day. This much movement

demands an extraordinary amount of energy, consuming over a billion barrels of oil. Additionally, the transportation sector is the largest contributor to greenhouse gas emissions (GHG) in the U.S., standing at 29%. As demand for online shopping and delivery has risen, transportation emissions also have continued to rise.

Air pollution emitted from transportation contributes to smog and to poor air quality, which negatively impact the health and welfare of U.S. citizens. Poor air quality pollutants include particulate matter (PM), nitrogen oxides (NOx), and volatile organic compounds (VOCs).

The transportation sector is responsible for:

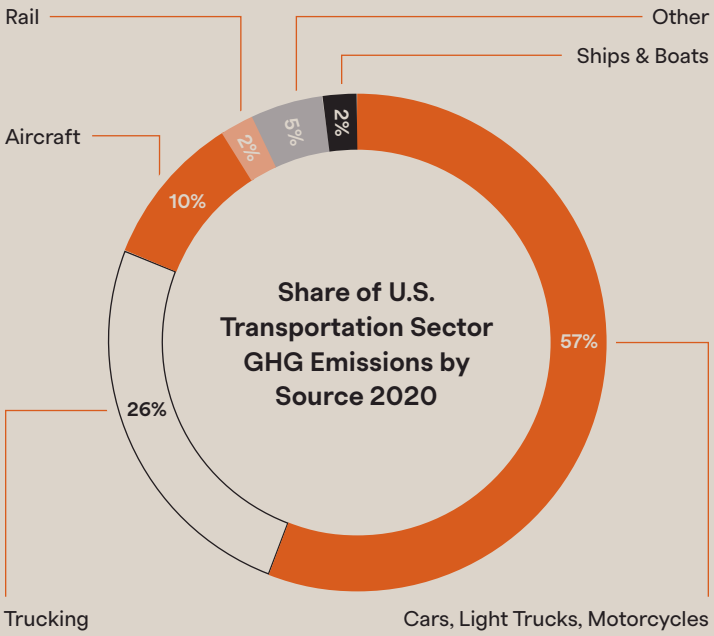
- Over 50% of NOx total emissions inventory in the U.S.
- Over 30% of VOCs emissions in the U.S.
- Over 20% of PM emissions in the U.S.

Within transportation, heavy-duty trucks are the fastest-growing contributor to emissions.

Source: Environmental Protection Agency (EPA)

EPA Projections are that by 2025, shipments of U.S. goods will increase another 23.5%, and by 2040, by another 45%. As freight activity in the United States increases, air emissions from freight are projected to exceed growth in emissions from all other transportation activities, including passenger transportation.

As the freight industry grows, governments, investors, communities and consumers are becoming more aware of the industry's climate and public health impacts. They are increasingly looking to freight carriers, shippers and logistics providers to take steps to reduce truck, rail and other transport emissions. Communities near freight hubs may also seek relief from increased congestion, noise and other negative impacts.



Source: EPA Fast Facts U.S. Transportation Sector Greenhouse Gas Emissions 1990-2020

The good news is that lower-cost freight transportation is also more efficient and sustainable. More efficient freight transportation also helps improve air quality and mitigate climate change by cutting emissions. Finally, it demonstrates the 'people, profit and planet' principles that are attractive to investors, customers and employees.

Many companies feature positive environmental indicators such as reductions in CO2 emissions in investor reports, marketing efforts and employee communications.

Sustainability in Motion

Sources: Association of American Railroads, EPA, and Texas Transportation Institute

1:1

1 Ton of Freight

United States railroads, on average, move one ton of freight 480 miles on one gallon of fuel.

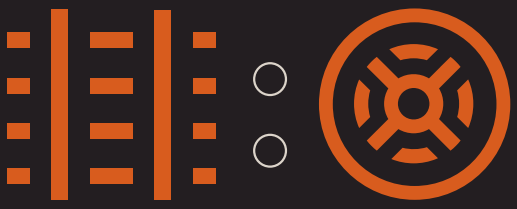
Air Emissions

Freight railroads account for only 0.6% of the US GHG emissions, according to the EPA.

3x

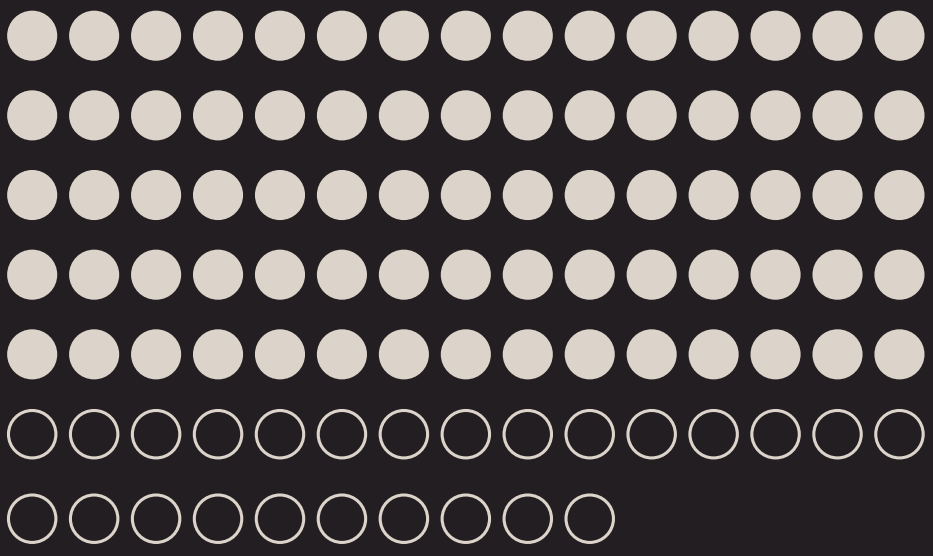
Efficiency

Trains are 3-4x more fuel-efficient than trucks.



Highway Congestion

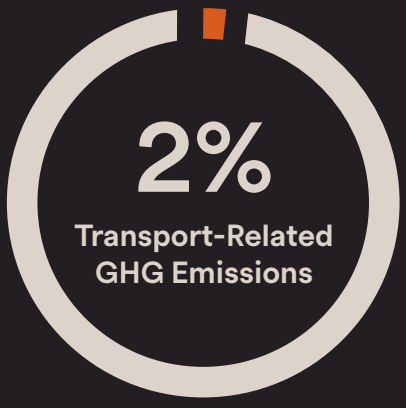
One train can carry the freight of hundreds of trucks, reducing highway congestion and greenhouse gas (GHG) emissions.



75%↓

GHG Reductions

Moving freight by train instead of truck reduces GHG emissions by up to 75%.



Freight Volume

Railroads account for about 40% of long-distance freight volume, but only 2% of U.S. transport-related GHG emissions.

Truck vs. Rail

Since the industrial age, freight railroads have delivered the goods that fuel America's economy. Today rail remains the most fuel-efficient form of land-based transportation.

With ongoing innovative technology and environmental investments, freight railroads can deliver a more sustainable future for us all.

Sustainability in Motion

When you consider that a ton of freight can be moved by rail, 480 miles on one gallon of fuel, while semi trucks range between 84 to 167 ton-miles per gallon, it's clear that transporting freight by rail is vastly more efficient. Railroads are far less harmful to the environment as well. According to the EPA, railroads make up about 40% of U.S. freight but account for only 2% of U.S. transport-related GHG (greenhouse gas emissions).

Freight transport by rail also reduces highway congestion. In 2021, highway-related inefficiencies cost Americans over $100 billion in lost time (4.3 billion hours) and wasted fuel (1.7 billion gallons), according to the Texas Transportation Institute's 2021 Urban Mobility Report. A single freight train can replace several hundred trucks, freeing up more road for fellow motorists. In addition, by moving more freight from trucks to rail, we can reduce the cost of heavy truck damage on our nation's aging highways by $1.5 billion each year.

Progress to enhance the sustainability of rail continues. The freight rail freight industry has introduced a variety of advances to reduce its environmental impact:

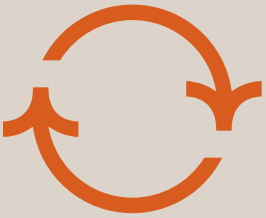
- The fuel efficiency of trains has doubled since 1980.
- Enhanced locomotive and railcar designs offer as much as 30% reduced energy consumption.
- Improved railcar design, efficient locomotives and other factors, have increased the amount carried by the average train to 3,667 tons in 2019, up from 2923 tons in 2000.
- To meet EPA regulations, locomotives manufactured after 2015 have reduced nitrogen oxide emissions by 80% and particulate matter emissions by as much as 90%.
- Locomotive enhancements include "genset" locomotives with several independent engines that can be turned on and off depending on how much power is needed at the time. Additionally, "start-stop" systems allow locomotives to automatically shut down when not in use and quickly restart when they're needed again. Finally, locomotives positioned in the middle of a train reduce the total horsepower required.
- Reducing wheel-to-rail friction helps freight companies save fuel and reduces track and locomotive wear and tear.
- Operational software is optimizing fuel consumption by calculating best speed, throttle, and braking for each trip.
- A range of innovations are reducing energy consumption in noncore activities, including the use of LEDs in safety lighting and natural refrigerants in air conditioning.

Evidence of the increased attractiveness of rail can be found worldwide as shippers take advantage of rail's sustainability.

Moreover, the rail industry continues its drive to improve sustainability. A few of the advances include clean manufacturing initiatives, new railcar designs, railcar recycling and technology to reduce water use. Leading firms have established sustainability goals and are tracking progress toward reducing emissions, water use and waste in annual corporate responsibility reports.

Scope 3 GHG Emissions

Proposed regulations indicate that tracking and reducing Scope 3 GHG emissions is a critical next step to meet sustainability targets. The rail industry's indirect Scope 3 GHG emissions make up a significant portion of the industry's overall carbon footprint. Reducing these emissions will require a combined effort by all players in the global rail ecosystem. Several



operators are already taking the steps needed to measure and reduce emissions across the industry, including:

Creating Transparency
Operators that build a baseline of GHG emissions across the value chain are able to set reduction targets for all three emission scopes and publicly report progress. For example, *TrinityRail* has started calculating Scope 1 and 2 GHG emissions tied to each car produced for certain customers.

Optimizing for CO2 Reductions
Rail and infrastructure operators are focused on sustainable sourcing strategies that can extend these efforts throughout the supply chain.

Engaging Suppliers
By integrating emissions data with data from suppliers, operators can define clear emissions-based procurement standards and report suppliers' performance, encouraging them to address their own emissions.

Working Within the Ecosystem
Reducing Scope 3 emissions is the responsibility of the entire rail ecosystem—operators, infrastructure provides, and suppliers. The entire sector must work together to set standards and commit to sustainable procurement practices, and thus create demand-side pressure to improve sustainability.

Implementing a Circular Economy
This approach helps increase efficiency, create new revenue streams, enhance raw material security, and reduce environmental impacts. Current examples of circular economy programs within the rail industry include steel recycling, part harvesting, sustainable railcar conversion, shared lease fleets, and maintenance programs.

Rail Overcoming Historical Barriers

The rail transportation industry also is hard at work innovating to improve efficiency, worker safety and customer service. The goal for these innovations is to make rail transportation transparent, prompt and predictable.

Across the rail industry, some of the progress includes:

- Real-time transportation visibility platforms provide automated and more accurate ETAs. These solutions also allow shippers to standardize data and accurately label multiple sources in order to prevent inaccurate data.
- Reactive disruption management technology provides real-time updates to unforeseen delays and allow shippers to proactively communicate and quickly adapt.
- Empty railcar tracking helps shippers identify available capacity and more efficiently utilize their fleet.
- Enhanced data quality and analytics provides timely reporting on cycle time and transit time.
- Railroads are providing service recovery plans to the Surface Transportation Board (STB) along with bi-weekly progress reports. Railroads are also sharing service-related data to help the STB monitor service recovery.
- Workforce recruitment and retention efforts including hiring bonuses, referral incentives and other benefits to encourage skilled workers to fill current vacancies. Railroads are also providing incentives to their current employees including vacation buybacks and bonuses to move to high-demand regions of the network.
- Customer collaboration is helping railroads understand their railcar needs and schedule car movements to reduce rail network congestion.
- A variety of organizational improvement efforts with aligned incentives are driving efficiency. For example, training locomotive engineers on best practices, incentivizing better driving, and providing driving tips for particular routes is reducing energy use.
- Customer financial incentives encourage weekend in-gating at certain facilities or taking a container out when one is brought in to expedite freight flows.

Railroads continue to move huge amounts of cargo, despite current supply chain challenges. In the first quarter of 2022, railroads moved more chemicals than in any other quarter in history; the second-most grain for a first quarter since 2011; and the fourth-most intermodal units for a first quarter in history. The rail industry continues to work 24/7 to meet the nation's freight transportation needs and provide the level of service customers deserve and expect.

Evaluating the Options

Within the rail industry, some firms are leading the industry with sustainable innovations. For example, the American Chemistry Council Responsible Care® program acknowledge suppliers with an exceptional commitment to environment, health, safety and sustainability performance and sound chemicals management. *TrinityRail* innovation helped Trinity Industries earn Responsible Care recognition in 2021 for achievement in the areas of product safety, waste minimization, reuse and recycling.

Shippers are also creating their own sustainability scorecards to help evaluate transportation suppliers. Examples of sustainability scorecard metrics are:

- Public Environmental, Social, and Governance (ESG) performance disclosure or corporate responsibility report, including reporting to recognized standards, such as SASB and TCFD
- Third-party health and safety and environmental certifications (such as ISO 45001 and 14001)
- Environmental & Safety data tracking and visualization
- Formalized approach to managing the energy efficiency, fuel efficiency and air emissions of its products
- Sustainability Review Team to evaluate energy efficiency and explore options for alternative energy solutions
- Scope 1 and Scope 2 GHG emissions disclosures per GHG Protocol Corporate Accounting and Reporting Standard
- Formal materiality assessment completed, ensuring full stakeholder alignment
- Regular reporting of industry trends and insights to customers

Conclusion

Rail transportation is essential for meeting global climate targets. Indeed, our net-zero goals will be far harder to attain unless we can increase rail's use and sustainability.

Significant work remains to increase the use of rail. Cars and trucks continue to attract travelers and shippers, largely because of pricing, flexibility, and perceived security concerns. Reversing this trend will take a concerted effort on the part of all major stakeholders.

Ongoing efforts by the rail industry to boost its sustainability, efficiency, and flexibility are beginning to attract new customers – especially in freight. Yet to build its customer base and contribute even more to the fight against global warming, the industry needs the support of policymakers, investors, suppliers and customers.

By continuing to increase its sustainability efforts, the industry will attract more customers looking to reduce their carbon footprints and lower their costs. More customers would mean more resources for improving sustainability. The task ahead for the industry is to reach across the supply chain and advance the sustainability agenda.

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Take Action

- Use this Association of American Railroads carbon calculator to estimate the environmental benefit of shifting more of your company's land-based freight shipments to rail.
- *TrinityRail* is a rail transportation sustainability leader. Learn more about how *TrinityRail* can meet your rail transportation needs and enhance your company's supply chain sustainability.

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