

FREIGHT RAIL & CLIMATE CHANGE: REDUCING EMISSIONS

Key Facts

- Freight railroads are the most fuel-efficient way to move freight over land.
 - Railroads invest billions yearly to build climate-resilient infrastructure.
 - Sustainability is industry-wide, from zero-emission yards to locomotive fuel management systems.
-

As total global emissions and CO₂-attributable warming continue to rise annually, immediate emissions reductions are critical. Additionally, smart policies to transition toward a net-zero economy are essential. With one train carrying one ton of freight nearly 500 miles on one gallon of fuel, railroads remain a responsible partner. They are capable of delivering sustainable transportation solutions in the near term and for the long haul.

With an eye trained on that goal, freight railroads are developing and implementing new technologies. They are also refining operating practices and working with their suppliers, customers, and supply chain partners to reduce GHG emissions. Every North American Class I railroad has an approved target with the Science Based Targets initiative. This organization drives ambitious climate action in the private sector and works to curb temperature rise and mitigate climate change-related impacts.

Reducing locomotive and yard emissions.

Rail yards are the heart of freight movement, where thousands of rail cars are sorted. Trains are built, and containers are transferred between trucks and rail. To reduce emissions at these hubs, railroads are deploying zero-emission cranes to move intermodal containers. They use low-emitting natural gas and battery-electric hostlers to transport equipment.

Additionally, they apply filters on diesel switch locomotives to improve air quality. Railroads are also expediting truck movement through biometric scanners, automated gate systems, and mobile apps. These systems reduce idling and emissions by cutting wait times.

On the mainline, locomotives feature advanced fuel management systems. These systems improve efficiency by up to 14%. Additionally, stop-start technology cuts idle time and fuel waste by 50%. Railroads are also piloting battery-electric and hydrogen fuel cell locomotives. They test hybrid consist models that capture braking energy to reduce emissions by nearly 30%. Furthermore, they incorporate renewable fuels to further lower carbon output.

Building resiliency.

Freight railroads invest approximately \$23 billion annually to fortify their nationwide network [against climate-related disasters](#) like floods, wildfires, and storms. They ensure uninterrupted supply chain operations. Strategies include clearing rights-of-way to prevent wildfires and deploying specialized “fire trains.” They also use seismic and weather detectors, replace wood with concrete or steel, construct raised tracks, and adjust timing of maintenance projects. These strategies help minimize heat-induced track-buckling.

Evolving operations.

With a commitment to sustainability ingrained in their culture, railroads harness the collective power of their skilled workforce. Together, they drive eco-friendly practices. Each railroader plays a vital role in environmental protection. They do this by developing fuel-saving software, sharing best practices, or promoting overall environmental stewardship. In addition to emission reduction efforts, freight railroads actively engage in various sustainability initiatives. These include recycling, resource management, office efficiency improvements, electricity conservation, and landscape protection along their routes.