

# ORANGE IS THE NEW GREEN

**BNSF: Sustainable Freight Transportation  
for Your Intermodal Supply Chain**

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# BNSF: Sustainable Freight Transportation for Your Intermodal Supply Chain.

## Background

As more and more consumers make buying decisions based on their personal values, the companies that provide them goods and services are becoming equally conscientious. The progressive company recognizes that its actions and initiatives must lessen the impact to the environment, not just because it's good business but ethical and right.



**Consider that nearly 50% of U.S. consumers plan to reduce their environmental footprint by changing their consumption habits,** according to Nielsen. In a global survey conducted by the Conference Board, 81% of respondents felt strongly that companies should help improve the environment. This passion for corporate responsibility is shared across generation– from Baby Boomers to Gen Z.

In response, companies are stepping up, building sustainability into innovation and production plans, specifically looking for ways to reduce their carbon footprint. **Success in the future will mean embedding sustainability into every aspect of how companies do business.** Between the consumer and the businesses providing goods and services are links of a supply chain that are equally committed to sustainability.

For surface transportation, one that can have a significant impact is freight rail, which can dramatically reduce carbon emissions. **No other form of land freight transportation is by its very nature more fuel- and resource-efficient than rail.**

Across the board, railroads handle 40% of the nation's long-distance freight volume, yet account for only 0.5% of total U.S. greenhouse gas emissions and only 1.9% of the transportation related sources, according to the U.S. Environmental Protection Agency (EPA).

Today's railroads, a backbone of the U.S. economy, continue to innovate to drive sustainability. BNSF Railway is one of seven U.S. Class 1 freight railroads and an industry leader for the protection of our air, land and water.

**The most impactful way we serve as a good steward is by reducing carbon emissions, being more fuel efficient and relieving highway congestion.**

Railroading's steel wheels moving on steel rails, combined with the lower aerodynamic drag of a single train pulling hundreds of cars of freight, provide advantages over long-haul trucking. Also, trains move continuously without frequent stops, increasing fuel efficiency and reducing emissions.

## Reducing, Minimizing, Relieving

**On average, trains are three to four times more fuel efficient than their highway counterparts and lower greenhouse gas emissions up to 75%.** In 2021, our customers reduced total carbon emissions by 21 million metric tons by shipping with BNSF. That's the equivalent of taking 4.4 million vehicles off the road annually.

To look at it another way, when it comes to fuel efficiency, **a U.S. freight train can move one ton of freight more than 480 miles on just one gallon of diesel fuel.**

Over the years, the industry has improved aerodynamics and reduced overall weight of the freight rail car components, and we've realized added fuel efficiencies because less locomotive horsepower is required to move a train. In 2020 alone, U.S. freight railroads consumed 675 million fewer gallons of fuel and emitted 7.6 million fewer tons of carbon dioxide than they would have if their fuel efficiency had remained constant since 2000.

**480**  
Miles

**1**  
Gallon of  
Diesel Fuel



At BNSF, we have tools, technologies, practices and processes in place to minimize our impact. On our locomotives, we utilize Trip Optimizer, a system that factors key metrics—such as train length, number and types of locomotives used and track conditions—to help maximize a train's fuel economy. Whenever certain predetermined conditions are met, Trip Optimizer activates an auto-control setting allowing the train to operate at enhanced efficiency, saving fuel and creating significant emissions reductions.

**BNSF is proud to have the largest number of the newest and cleanest emissions locomotive fleets in North America.** Since 2005, BNSF has purchased more than 3,600 new locomotives, including more than 300 locomotives since Tier 4 EPA standards took effect in 2015. BNSF has also equipped more than 3,900 locomotives with Energy Management Systems (EMS), which allows throttles and dynamic brakes to be controlled automatically, similar to cruise control in an automobile.

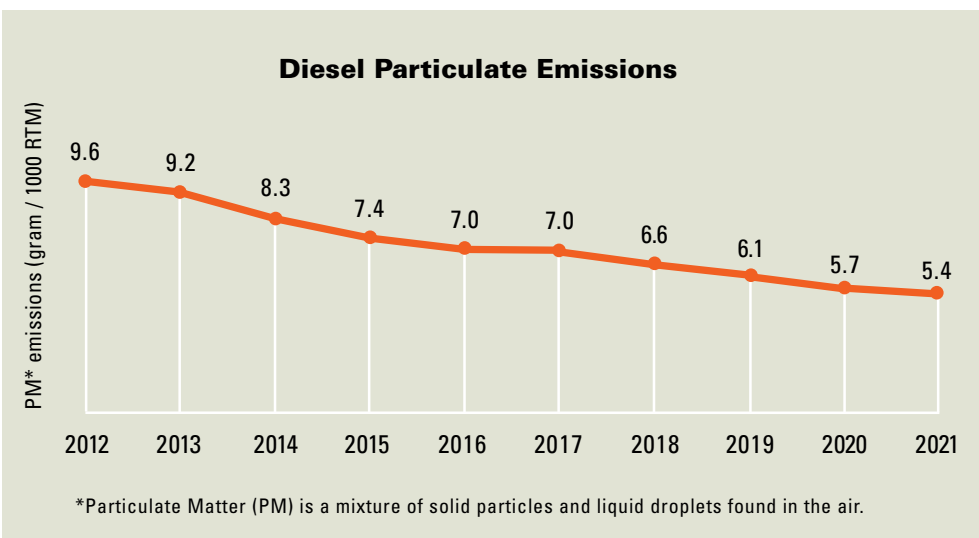
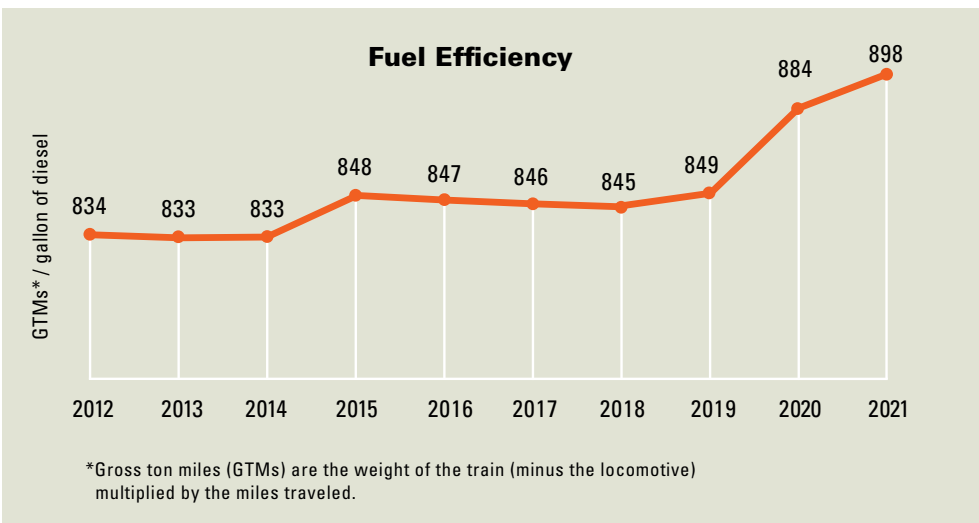






## Reducing our Carbon Impact

Over the last 10 years, BNSF has upgraded the majority of our locomotive fleet to more energy-efficient technologies, allowing us to increase fuel efficiency and decrease emissions. Improvements in operations and maintenance practices are also contributing to enhanced fuel efficiency.



BNSF has improved fuel efficiency and reduced emissions by **10%** over the last 10 years.

Another way we make efficiency gains at BNSF is to look holistically at our network to understand where investments are needed most in track and infrastructure. For example, when we built 10 miles of third mainline track on our Southern Transcon, our rail “superhighway” connecting Southern California to the Midwest, like we did near Belen, New Mexico, we eliminated a chokepoint. This additional track allows faster trains to pass slower trains, plus it enables us to perform track maintenance without holding trains. **By eliminating the time trains are held, we’re decreasing locomotive idle times, reducing carbon emissions by more than 400,000 metric tons annually, the equivalent of removing more than 86,000 passenger vehicles off the road every year.**



At BNSF, our intermodal freight averages about 500 miles of transit per day, comparable to travel distances of single-driver trucks but with **three times greater fuel efficiency.**



Another example is when we built a new fueling track in the middle of our network, reducing the amount of time trains are in queue for refueling – again improving network fluidity and reducing emissions.

Railroads, including BNSF, play an important role in reducing highway congestion by taking long-haul freight trucks off the road.

For example, **one double stack BNSF intermodal train can replace hundreds of freight trucks, thus easing congestion for motorists on overburdened highways and the related idle time – reducing pollution and saving energy.**

Shifting freight from trucks to trains also reduces highway wear and tear and related maintenance and replacement costs. The shipping of containers and truck trailers by rail – intermodal – is a mode that BNSF and its predecessors pioneered, and today, we are the largest intermodal railroad, with access to all major North American markets.

At BNSF, our intermodal freight averages about 500 miles of transit per day, comparable to travel distances of single-driver trucks but with three times greater fuel efficiency. We know that environmental issues, specifically carbon reduction, play an important role



in our customers' decision-making process when it comes to transportation. **Shipping with BNSF can be part of an effective strategy for an organization to achieve significant carbon emissions savings within their supply chain and thereby reduce their carbon footprint.**


We are working to help our customers quantify the environmental benefits of rail compared with longhaul trucking as more of them look for ways to better understand and reduce their supply chain impacts.

We have a tool to aid potential customers in calculating the reduction of their carbon footprint when they incorporate BNSF into their transportation portfolio.

Your Intermodal Advisor Search Results Perform [New Search](#)

origin: LOS ANGELES, CA / destination: CHICAGO, IL / Cargo Owner / Dry Load

Results **Sustainability** FAQ Helpful Links [Contact Intermodal](#) [View Complete Schedules PDF](#)



**How much can you help the environment?**

Rail is the most environmentally friendly form of surface transportation. By partnering with BNSF, you can help conserve fuel, relieve highway congestion, and reduce emissions. Now, that's a breath of fresh air.

	Standard Service	Expedited Service
<b>Estimated Net CO<sub>2</sub> (equivalent) Reduction Per Unit*</b>	75%	62%

[Please click here for more information about BNSF and the Environment.](#)

\* Versus shipping all truck.

**In the last decade, BNSF has helped avoid more than 80 million metric tons of CO<sub>2</sub>e, which is the equivalent of removing more than 17 million passenger vehicles off the road.**



# Investing in Sustainable Technologies

*The basics of railroading – steel wheels on steel rail – are essentially the same as they were nearly 200 years ago, but over the decades, new technologies have made the mode more efficient and safer. At BNSF, we continue to deploy and leverage new technologies to make our operations even more efficient, which can translate into more sustainable.*

*Here are just a few examples of these technologies that we have adopted:*



## Wide-Span Electric Cranes

In 2007, BNSF was the first U.S. rail carrier to use wide-span electric cranes at our intermodal facilities. These cranes produce zero emissions on-site and significantly reduce the number of diesel-powered hostlers—container-moving trucks within BNSF’s facilities—needed at our intermodal facilities due to a wider range of motion. Today, we operate 26 of these cranes at our intermodal yards.





## Automated Gates and RailPASS Mobile Application for Trucking Partners

We use automated gate systems (AGS) at our busiest facilities to facilitate truck entry and exit, reducing idling time and emissions. Today, approximately 90% of the freight that comes through BNSF's intermodal facilities goes through an automated gate. When used in conjunction with the BNSF's RailPASS mobile app, drivers can pass through the AGS in as little as 30 seconds, cutting each gate transaction time in half, making it easier and faster for trucks to move freight in and out of our facilities. About half of our intermodal transactions utilize both AGS and RailPASS, which was built by BNSF to support trucking partners with a goal to create a safer, easier and faster experience for drivers.



## Energy-Efficient Locomotives

Because railroads run on diesel fuel, the pursuit of energy efficiency is one of our top priorities to reduce both our environmental impact and our operating costs. Because more than 90% of BNSF's emissions come from our locomotives, we look at locomotive technologies to improve our fuel efficiency. As such, we have made a significant investment in three key areas of locomotive technology: new locomotives, Automatic Start/Stop (AESS) systems, and Energy Management Systems (EMS).

**New Locomotives:** BNSF is proud to have the largest number of the newest and cleanest emissions locomotives in North America. Since 2005, BNSF has purchased more than 3,600 new locomotives, including more than 300 locomotives since Tier 4 EPA standards took effect in 2015.

**AESS:** More than 99% of our locomotives are equipped with automatic engine start/stop (AESS) devices, which shut down a locomotive that is idling to minimize wasted fuel while the locomotive is not pulling freight. The AESS will then automatically restart the locomotive if it is needed for power or if it is necessary for the health of the engine.

**EMS:** BNSF has equipped about 50% of our fleet with EMS, which allows the throttle and dynamic brake to be controlled automatically, similar to cruise control in an automobile. EMS factors in the train makeup (length, weight and horsepower, track geometry, grade, curvature) and speed restrictions to determine the most fuel-efficient way to operate a train across a territory while maintaining appropriate train handling. Additionally, we are integrating EMS with Positive Train Control (PTC), to maximize the utilization of EMS and minimize fuel consumption.



# Testing Future Technologies

*As a leader, we are driven to explore and leverage efficiency technologies that are critical for BNSF to meet the needs of our customers, employees, communities and the environment. When we make these investments, it's not only for those we serve today, but for future generations.*

*Clean initiatives and technologies take money, time and work to test. Not all will make it past the drawing board. All will go through significant re-engineering, but in the long run, we think the effort is worth the journey.*

*Here are a few that we're working on now:*

## **Battery-Electric Locomotive**

To reduce our environmental impact, increase our fuel efficiency and lower our operational costs, BNSF is developing the next generation of locomotives.

In 2018, the California Air Resource Board awarded BNSF and the San Joaquin Valley Air Pollution Control District a \$22.6 million grant to develop a battery-electric locomotive. We worked with the San Joaquin Valley Air Pollution Control District and Wabtec to develop and test a 100% battery-electric locomotive. Paired with conventional diesel-electric locomotives, the prototype was piloted in Southern California and met our expectations for efficiency performance and confirmed that we will continue to explore the potential of this technology. At BNSF, we're doing more than just helping to reduce our customers' carbon emissions. We're also leading the way when it comes to sustainable practices.



# Testing Future Technologies



## Next Generation Cargo- Handling Equipment

We are testing next-generation cargo-handling equipment such as cranes, electric hostlers, forklifts and drayage trucks in three of our California intermodal facilities. **We have found that battery electric hostlers are three times more energy efficient than similar diesel-powered equipment.**

Another promising advancement is the digitalization of cargo manifests and train documents, which will reduce paper waste and streamline the handling of freight for both BNSF and our customers.

## No-Touch AGS Entry

In 2020, we began testing the integration of touchless technology of our automated gate systems with a couple of our motor carrier partners at our intermodal facility in South Seattle. The technology allows for the transmission of shipment information in advance, by linking the trucks' on-board computer system with our RailPASS app functionality. **It effectively eliminates the need for all driver interaction at our facility gates, with little if any idle time.**

Like other businesses around the world, we have submitted to set a science-based carbon emission reduction target via the Science Based Target initiative (SBTi). **BNSF is committed to reduce our emissions by 30% by 2030 against a 2018 baseline.** What we at BNSF do today – the investments in our network, the technologies we test, the partnerships we make, the processes and programs we undertake – we do with lasting commitment. We, like all progressive companies, recognize that our actions have long-standing consequences

What we transport touches individuals in all walks of life. **We want to ensure that our operations contribute to a cleaner and more efficient supply chain solution.** We know others want to join us, and by using rail, they too, will be doing their part.