# ORANGE IS THE NEW GREEN

## BNSF: Sustainable Freight Transportation for Your Agricultural Products Supply Chain

**www.bnsf.com/orangeisgreen**

# **BNSF:** Sustainable Freight Transportation for Your Agricultural Products Supply Chain

For nearly two centuries, BNSF Railway and its predecessors have been in the business of transporting first people, then the commodities and goods that helped develop the West. Today, our trains help deliver goods to and from all over the world.

We're a leader in our industry, thanks to a proven track record of providing rail services that meet our customers' changing needs. Our success is also based on our ability to continually evolve; in the early days we powered trains with steam, then diesel. On the horizon are zero emissions locomotives and we're exploring various technologies such as next-generation battery-electric locomotives.

In short, our history and business model underscore the vital role we continue to play in building and sustaining this nation's economy. And as a railroad, we're sustainable in another important way: **We offer the most fuel-efficient method of moving freight over land.**

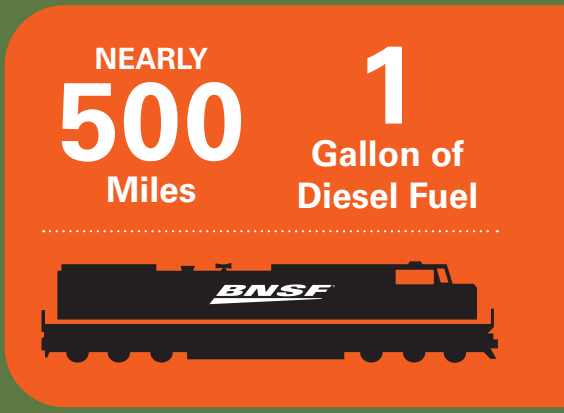
That's right, no other form of land freight transportation is more resource- and fuel-efficient than rail.

## *Our Customers Care*

Sustainability is increasingly influencing transportation choices among shippers. **By using rail to transport goods, customers reduce emissions without sacrificing efficiency. That's where BNSF comes in.**

Rail significantly reduces emissions because it is the most resource-efficient mode of land transportation. The more freight we take off the road, the lower the impact is on the environment. Across the board, freight railroads account for roughly 40% of the nation's long-distance freight volume (measured by ton miles) more than any other mode of transportation, yet account for just 0.5% of total U.S. greenhouse gas (GHG) emissions, and just 1.9% of the transportation-related greenhouse gas emissions according to the U.S. Environmental Protection Agency (EPA).

Rail saves fuel and relieves highway congestion, moving freight more than three times as far as trucks per gallon of fuel and lowering GHG emissions up to 75%. On average, BNSF trains move one ton of freight nearly 500 miles on just one gallon of diesel fuel.



At BNSF, we take the benefits of rail a step further by reducing our environmental impacts – while contributing to our customers' efforts to reduce their carbon footprint. In short, we don't stop where our customers' carbon reductions begin.

More than 90% or our emissions come from our locomotives, so we look for ways to improve our fuel efficiency, explore renewable fuels and continue to advance hybrid technology. Another tenet of our carbon-reduction strategy is to make capital improvements that positively impact the environment and our communities.

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.**

## *We Care*

Choosing to ship with BNSF can be part of our customers' – or potential customers' – strategy to achieve significant carbon emissions savings within their supply chain and thereby reduce their carbon footprint. We can back it up with numbers to help quantify the environmental benefits of rail compared with long-haul trucking as more companies look for ways to better understand and reduce their supply chain impacts.

Our carbon estimator method shows customers just how much they can reduce GHG emissions by putting their shipments on rail instead of the highway. We compare the difference of carbon produced by rail vs. those produced by truck. In 2022, our customers reduced total carbon emissions by 23.9 million metric tons by shipping with BNSF. That's the equivalent of taking 5.2 million vehicles off the road annually.

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No matter what our customers are shipping, BNSF has a service to meet their needs, consistently, cost-effectively and – of growing importance – in the most sustainable mode of land transportation possible.

For agricultural shippers, for example, we also support the shipment of renewable fuels and their feedstocks, such as vegetable oils, recycled animal fats, used cooking oils and greases. One loaded tank car holds roughly 30,000 gallons, offering a safe and efficient way to transport both renewable fuels and feedstocks while reducing carbon emissions.

We are also helping our agricultural customers to support new sustainable business markets built around the circular economy, where materials are perpetually reused in closed-loop supply chains and upcycled into higher-value goods. We look to integrate rail solutions into these sustainable business markets as well as advancing new energy.

**Another way we help our Agricultural Products customers reduce their environmental impact is though our Logistics Centers and Certified Sites, which create a more sustainable, streamlined supply chain for our customers by locating them near growing markets.**

## Logistics Centers:

These are multi-customer, multi-commodity business parks that offer direct rail in growing markets. They offer more choices, flexibility and efficiency and are created in partnership with our customers to streamline service and supply chains, enable rapid growth, save significant development time, increase speed-to-market and provide reliable and cost-effective services. Logistics Centers are also highly efficient, which reduces emissions and environmental impact and generates sustainable value for everyone.

**BNSF Certified Sites:** These are areas of land adjacent to our network ready-made for customer development. They reduce entry barriers for customers to gain access to rail-served sites and benefit from their efficiencies. BNSF identifies real estate that could be readily connected to our network and studies environmental and social factors—such as wetland inventories and community outreach—to minimize potential impacts that could delay or stop a development project. Once a site is studied, it is certified and ready for development. BNSF's certified site process streamlines customers' development processes and ensures BNSF can operate with the utmost safety and efficiency with the least amount of environmental impact. Currently, BNSF has 33 Certified Sites available and ready for development.


For those considering transporting goods by rail, the benefits to the environment go beyond fuel efficiency; reducing supply chain costs also allows American businesses to be more competitive in the global market. **Think of it as being "green" – in more ways than one.**

# Efficiency = Reduced Emissions

*By its very nature, rail is the most fuel- and resource-efficient land transportation method available for moving goods long distances. There are several key factors that contribute to these inherent efficiencies, which we build upon by adopting new technology, implementing and improving work practices, and enhancing the efficiency of our trains.*

## Energy-Efficient Engines:

Diesel electric locomotives—a string of locomotives pulling a train that use a combination of diesel combustion engines and electric traction motors—decrease fuel use.

## Reduced Rolling Friction:

Trains' steel wheels running on steel tracks create less rolling resistance than other forms of land transportation.

## Dedicated Right of Ways:

Allow trains to move continuously without frequent stops, increasing fuel efficiency and reducing emissions.

## Horsepower per Ton Optimization:

BNSF optimizes the number of locomotives on each train based on the weight of the trailing freight, reducing unnecessary horsepower to improve the fuel efficiency of each train.

## Weight Reduction:

Over the years, the industry has improved aerodynamics and reduced overall weight of the freight rail car components, and we've realized improved fuel efficiency because less locomotive horsepower is required to move a train.

# Energy-Efficient Locomotives:

Because railroads run on diesel, 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).

**Battery-Electric Locomotives:** 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.

**New Locomotives:** BNSF is proud to have the largest number of the newest and cleanest emissions locomotives in North America, including more than 300 Tier 4 locomotives purchased since 2015 when new Environmental Protection Agency standards took effect.

**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 more than 4,000 locomotives with Energy Management Systems (EMS), such as Trip Optimizer, which allows the throttle and dynamic brake to be controlled automatically, similar to cruise control in an automobile. EMS factors in the train makeup 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.

# Practice, Practice, Practice

*Not only do we invest in new environmentally friendly technologies to use in our operations, we also practice good housekeeping and other sustainability protocols to do our part on the front line.*


*Here are just a few examples:*

## People Power

Every day, our machinists maintain locomotives and railcars to keep them in top condition, track crews lubricate rails to reduce friction between the wheels and the rails, and locomotive engineers shut down idling locomotives or adjust acceleration and braking to conserve fuel.

## Recycle, Reduce, Renew

In 2022, our railroad recycled approximately 2.8 million railroad ties, 1.2 million pounds of batteries and 2.6 million gallons of lube oil.

## Audit Teams

BNSF teams regularly audit facilities and participate in risk-mitigation efforts, as well as follow environmental stewardship practices.

## Sustainability with our Suppliers

We communicate and collaborate with our suppliers about sustainability. As part of the BNSF procurement process, economic, community and environmental components are assessed to consider the future implications of our actions.

# Engineering in Green

*Sustainable technologies and practices extend beyond the equipment that rides on top of our rail. We also engineer "green" into our projects, using design and vegetation management principles that have the least impact to the environment. Here are some examples:*

## Solar and Wind

To power some of our facilities, we use these forms of energy where they are practical and available.

## Keeping It Fluid

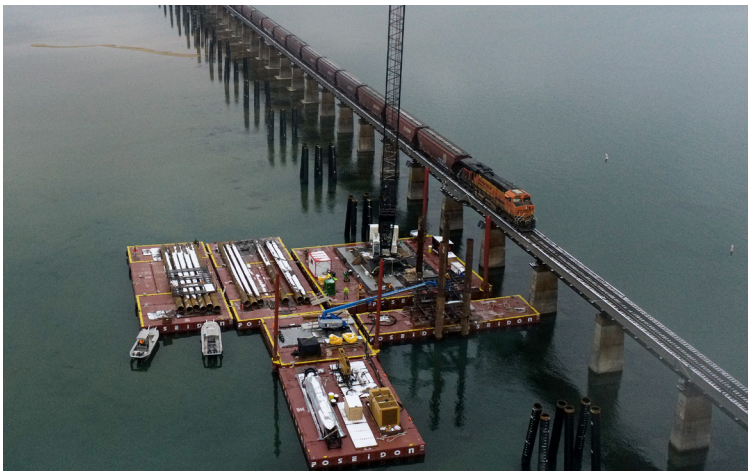
We look holistically at our network to understand where investments are needed most in infrastructure, especially to eliminate a traffic chokepoint. Additional track allows faster trains to pass slower trains, plus it enables us to perform track maintenance without holding trains. By eliminating the time trains are held, we decrease locomotive idle times, reducing carbon emissions.

## Reducing the Queue

Similarly, when we build a new fueling track in the middle of our network, we reduce the amount of time trains are in queue for refueling – improving network fluidity and reducing emissions.


## View from Above

As part of our permitting process, drones help us analyze site conditions from hundreds of feet above, a much less invasive and more cost-effective practice.



# Going the Distance for Our Communities

Sustainable freight is the right choice for those making transportation decisions, not just because it's good business, but because it's right for our families and communities – now and for future generations. At BNSF, we do our part to make positive impacts in the communities where we live and work.


**At BNSF, we've partnered with American producers for over 170 years. Together, we have innovated to make the U.S. farming supply chain one of the most efficient and productive in the world.**

For example, we work closely with communities by consulting them on an array of matters concerning our operations and properties, ranging from environmental impacts to noise pollution and site planning. This engagement helps us understand needs and expectations, which improves our social license to operate and efficiently manage and develop our network.

Many of our facilities are located on legacy sites where predecessor railroads and other companies may have conducted operations for up to a century. We address environmental impacts at our facilities regardless of their origin, and work directly with communities, regulatory agencies and other key stakeholder groups to actively manage and track our efforts. In the last decade, **BNSF has rehabilitated approximately 150 sites and invested approximately $345 million toward remediation efforts.**

Another way we invest in our communities is through the BNSF Railway Foundation, which has long supported nonprofits that promote natural resource stewardship. One that we've

worked with for many years is the National Fish and Wildlife Foundation. **Since 2013, we've contributed $2.2 million to projects that protect and restore wildlife and their habitats, promote job creation, improve water quality, reduce flood risks and more.**

We also challenge ourselves to find ways to support sustainability, sometimes in the most unlikely of places. In 2020, when we learned about the Rio Grande Valley Reef, an artificial reef under construction off the coast of Texas' South Padre Island, we saw an opportunity to recycle our concrete ties in a particularly helpful way. We donated more than 60,000 used concrete ties to help build an approximately one square mile section of artificial reef, where more than a quarter million fish, primarily red snapper, will make a home.


# We're in This Together

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 for the "long haul." We, like all influential companies, recognize that **our actions have long-standing consequences.**

What we transport touches individuals in all walks of life. We are committed to ensuring that our operations contribute to **cleaner and more efficient supply chain solutions** for our customers and their customers.