Pacific NorthWest Economic Region

The Pacific Northwest Economic Region Presents:

Safer, Faster, Cleaner:
The Future of Freight Mobility

Wednesday, August 18th | 9:30am-10:30am

Photo Courtesy of Montana Office of Tourism & Business Development

Pacific NorthWest Economic Region

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Photo Courtesy of Montana Office of Tourism & Business Development

Safer, Faster, Cleaner- The Future of Freight Mobility

Zak Andersen
VICE PRESIDENT
CORPORATE RELATIONS

AUGUST 18, 2021

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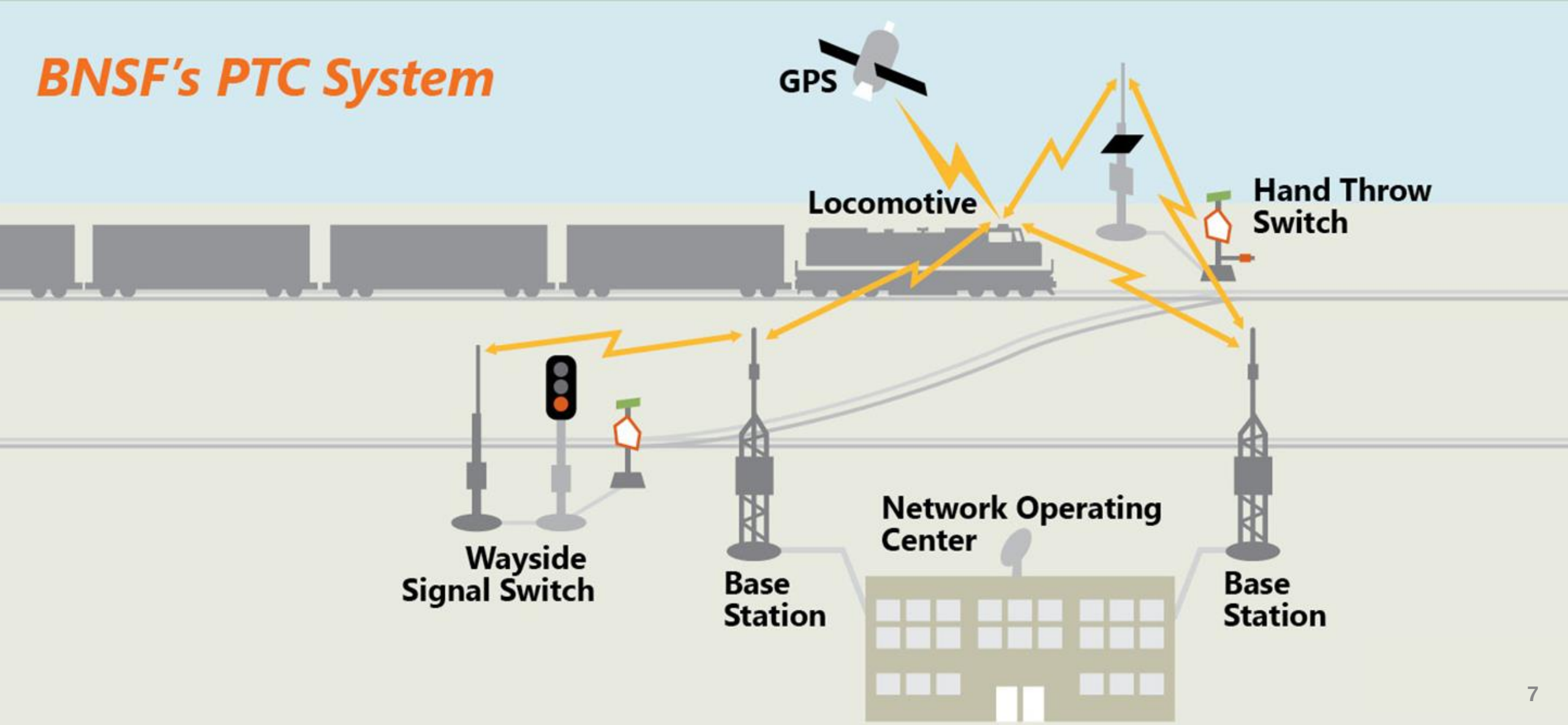
This is BNSF

About BNSF Railway

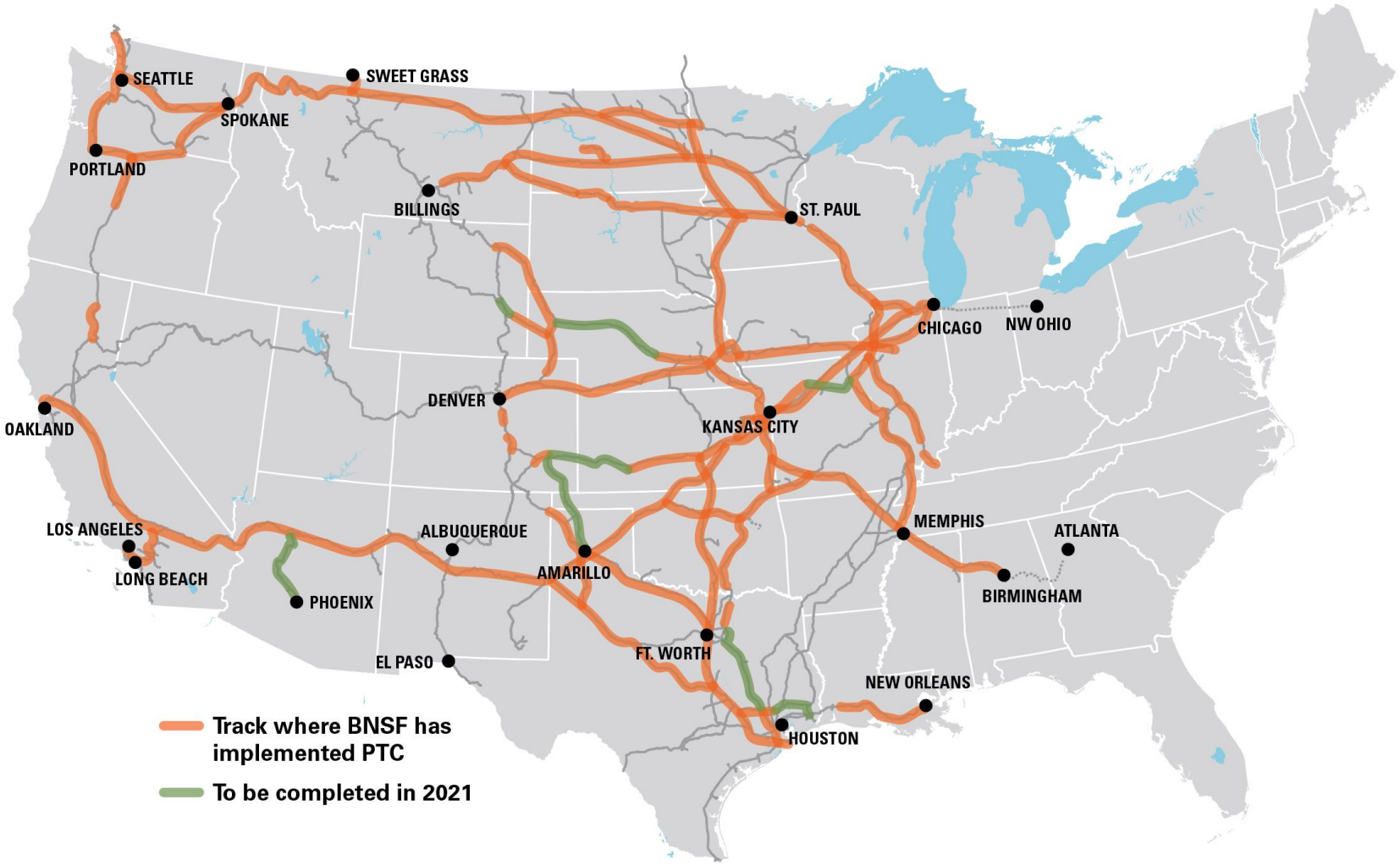
- A Berkshire Hathaway company
- **~34,000** employees
- **~ 8,000** locomotives
- Operates an average of **1,200** trains/day
- **32,500 route miles** in 28 states and three Canadian provinces
- **13,000** bridges and **89** tunnels
- Serves **+40 ports**
- **26** intermodal facilities

Safety

Positive Train Control Enhances Safety



Leveraging PTC Technology for Efficiency



Installation of mandated PTC infrastructure completed in Dec. 2017

- **92%** of freight volume is moving on PTC routes
- **14,500+** route miles of PTC infrastructure have been installed

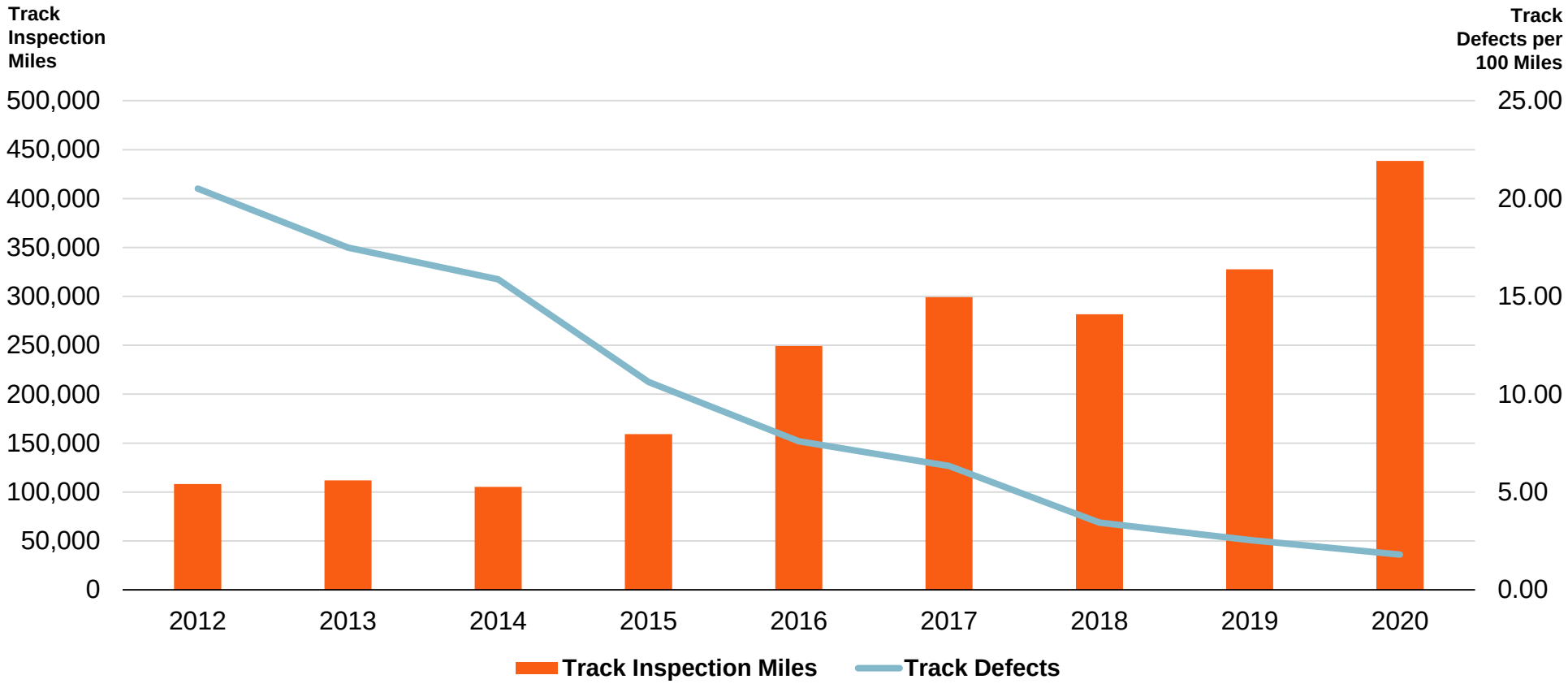
Autonomous Track Geometry Cars

Purpose:

- Reduce risk to employees
- Drive inspection efforts on track where they are most needed
- Increase the availability of network and track to customers by reducing number of inspection-related work windows

Increased Track Inspection Miles Drive Improvements

Since 2012, BNSF has reduced the number of track defects by 91%



Source: BNSF internal data for main tracks and sidings.

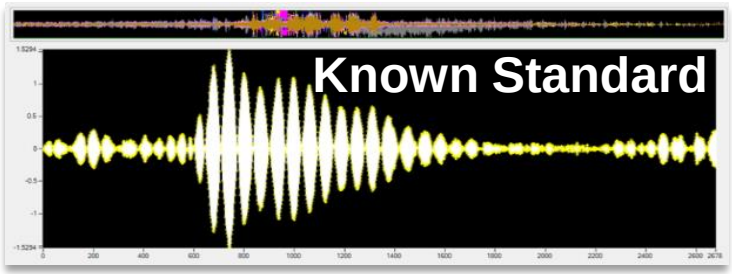
Equipment Detection Technology

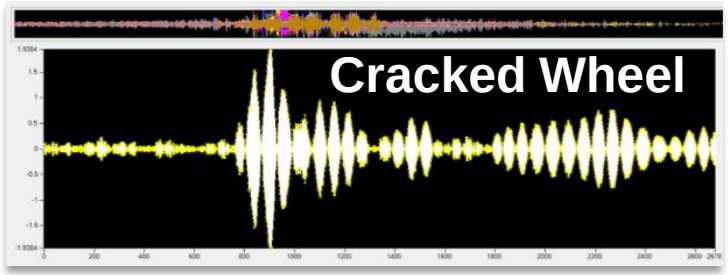
- More than 4,000 trackside detectors
- Hot Box Detector (HBD)
- Wheel Load Impact Detector (WILD)
- Trackside Acoustical Detector (TADS)
- Sonic Cracked Wheel/Axle Detector (CWAD)
- Machine Vision Systems
- Magnetic Particle Inspection
- Warm Bearing Detection System (WBDS)
- Hot Wheel Detectors (HWD)
- Truck Performance Detectors (TPD)

Moving from Detection to Prediction

- ***Acoustic Bearing Detector (ABD)*** – acoustic systems used to evaluate sounds generated by specific bearing component defects

- ***Hot Box Detector (HBD)*** – evaluates bearing temperature history for statistical outliers; brake issues, burned off journals

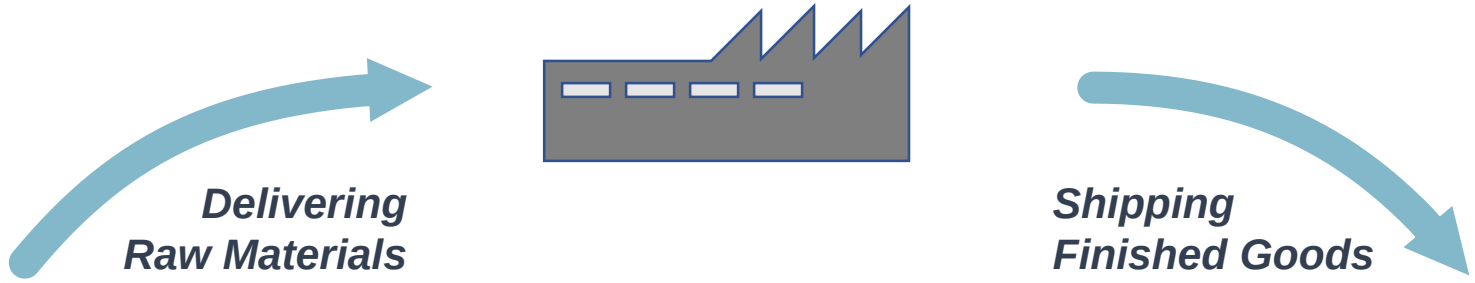




- ***Cracked Wheel/Axle Detector (CWAD)*** – Rail mounted sensors capable of detecting the difference between tones generated by normal vs. flawed wheels and axles

Efficiency

Shifting to Rail Cuts Land Freight Carbon by Roughly Two-Thirds



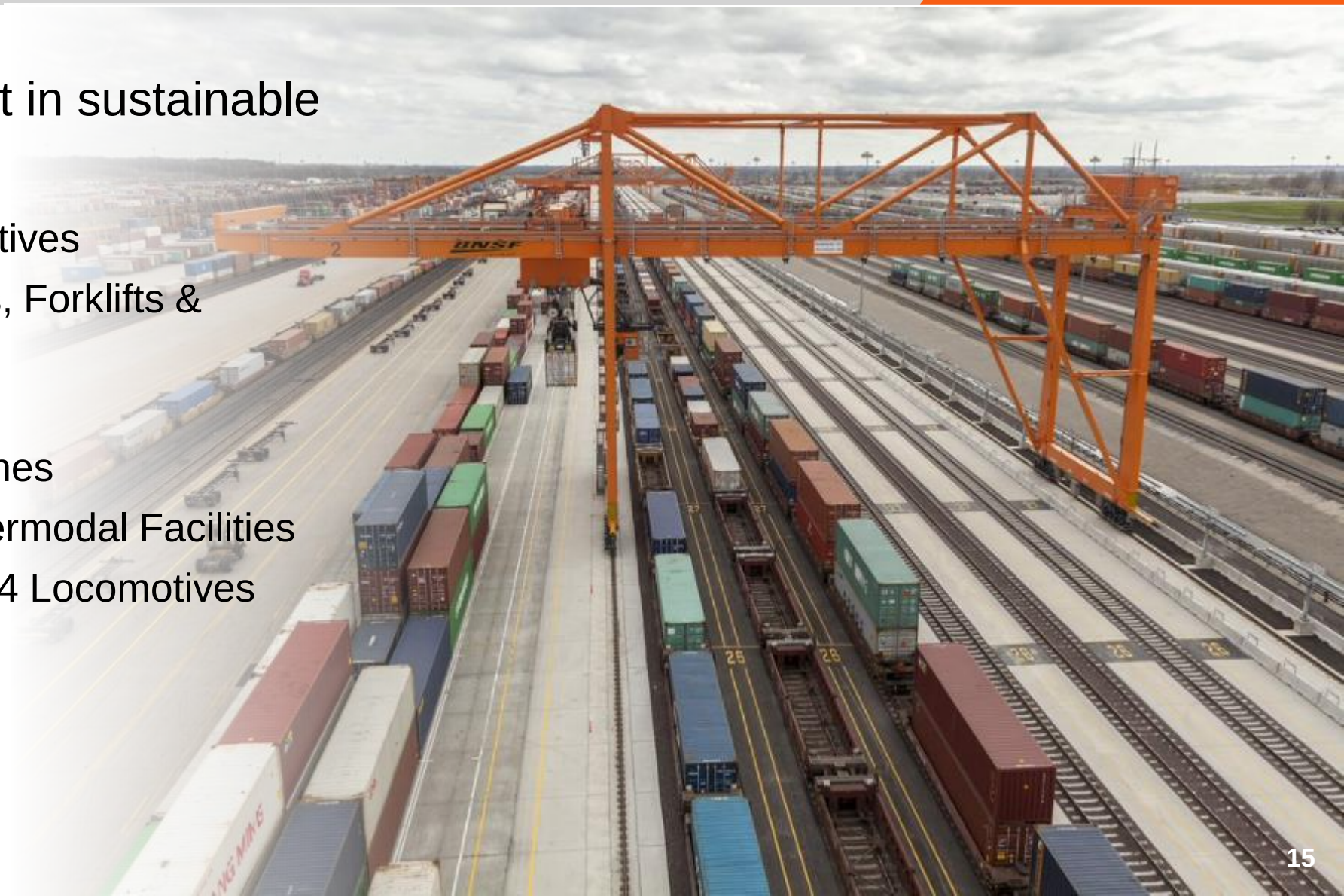
Reducing Highway Congestion	Increasing Fuel Efficiency	Generating Fewer Emissions
One BNSF intermodal train removes several hundred long-haul trucks from our nation's highways	Rail is over 3 times more fuel efficient than long-haul trucks	BNSF customers reduce GHG emissions by over 34 million metric tons each year vs. highway

Results: Significant carbon avoidance and reduction of supply chain emissions for rail customers

Becoming Even More Sustainable

BNSF continues to invest in sustainable technologies:

- Battery-Electric Locomotives
- Battery-Electric Hostlers, Forklifts & Drayage Trucks
- Idle Control
- Electric Wide-Span Cranes
- Automated Gates at Intermodal Facilities
- More Fuel-Efficient Tier 4 Locomotives



Battery Electric Locomotive

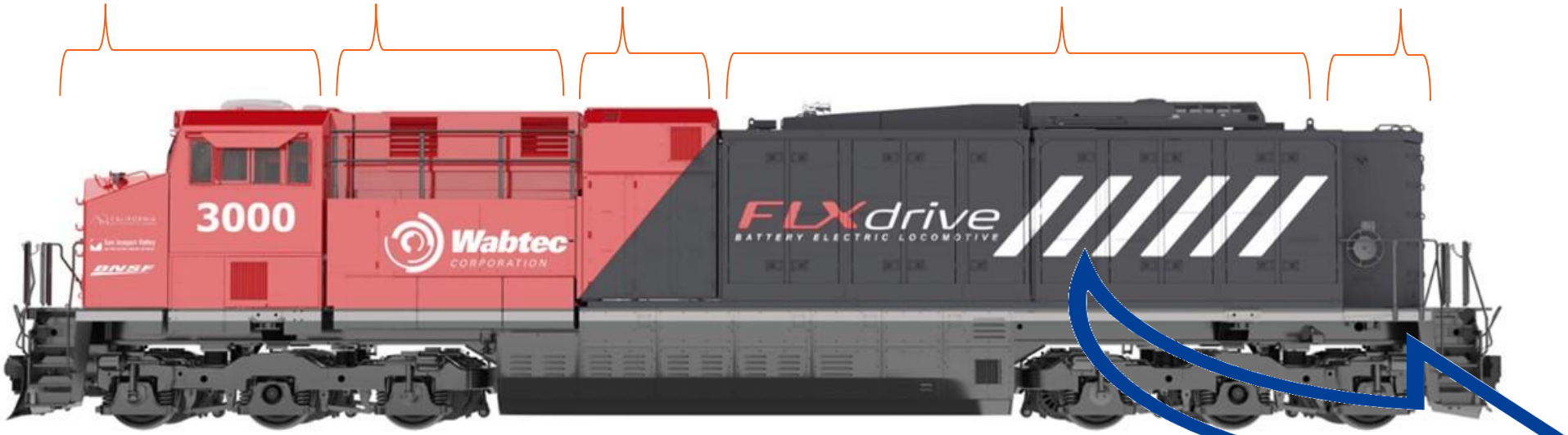
Op Cab
- No Change

Aux Cab
- New Inverter Arrangement
- 480VAC Bus

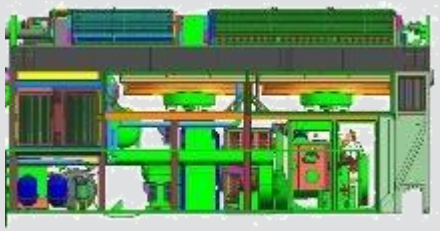
Blower Cab
- Traction Blower
- Aux Blower
- HV/LV cabinets
- Batt Cab Door

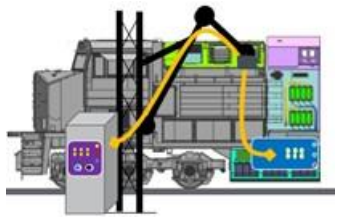
Battery Cab
- Climate controlled
- 20 Racks
- 25 Modules per rack

Sand Cab
- Batt Cab Door
- Sand Box's
- Hand Brake



Eliminated
- Engine
- Alternator
- Cooling System





Repurposed Fuel Tank
- A-side: Compressed Air components
- B-side: Wayside Charging components

Source: Wabtec

BNSF Carbon Reduction Programs and Results

Carbon Reduction Results and Target

- Emissions: Cut carbon intensity in half over last 40 yrs.
- Target: In March, committed to set a Science-Based Carbon Target

Carbon Reduction Program

- Fuel Efficiency Program leveraging technology, operations
- Expanding use of lower carbon intensity renewable diesel
- Developing zero emission equipment for intermodal railyards
- Piloted a battery-electric locomotive

Battery-electric yard trucks

Great Northern Corridor

Great Northern Corridor Coalition

GNCC Mission: Promote a premier multistate / multimodal corridor by acting collectively to promote public policy, research, and multimodal infrastructure development that protects and expands commerce and enhances safety on the corridor.

BNSF RAILWAY