# Oppose Rail Electrification & Support Sensible Climate Policy

Without action, the impacts from climate change on the planet, our nation, our economy, and even day-to-day railroad operations will continue to increase. As proposals are considered for how to best mitigate the impacts of climate change and reduce greenhouse gas (GHG) emissions, freight railroads encourage policymakers to engage in a cooperative, multi-faceted approach with stakeholders.

Policymakers should avoid prescriptive measures that dictate how industries should reduce emissions and instead adopt market-based strategies that incentivize transportation providers to find innovative ways to further reduce or eliminate emissions and encourage businesses to transport freight via modes of transportation with lower GHG emissions. Additionally, such policies should provide long-term regulatory certainty to businesses and permit capital-intensive industries, such as railroading, to make economically rational investment and planning decisions while also maintaining their competitiveness.

## Mandating Electrification of the Freight Rail Network is not a Viable Means for Reducing GHG Emissions.

Proposals that would require all or part of our nation's freight rail network to be electrified should be set aside to focus on and invest in policies and programs that would more effectively reduce GHG emissions and combat climate change. In 2016, the Rail Transportation and Engineering Center at the University of Illinois at Urbana-Champaign examined electrification and other new technology locomotive applications in order to "to identify and examine the operational changes and economic challenges and opportunities associated with a transition from conventional diesel-electric to zero or near-zero emission line-haul freight rail operations…."

While this report found that there is not yet an existing "off the shelf" zero or near-zero emission locomotive technology sufficient for North American line-haul freight rail service and suggested additional research be conducted, it did conclude that electrification was likely to be far more costly than other potential alternatives for achieving desired emission-reduction goals. Mandating electrification of the freight rail network should not be viewed as a viable means for reducing GHG emissions for the following reasons:

### 1. Electrification of the freight rail network would not be cost effective.

Electrification of our nation's freight rail network would require building and maintaining a high-voltage catenary system that spans close to 140,000 miles and is rugged and reliable enough for rail operations. This would require:

- Building a catenary system in every kind of geographic location, including congested cities, isolated deserts, rugged mountains, and across rivers;
- Delivering electricity through thousands of rail tunnels, many of which lack sufficient space for catenary wires; and
- Rebuilding many major bridges to provide clearance and support for catenary wires.

The construction of this catenary system would likely cost millions of dollars per railroad track mile and hundreds of billions of dollars in total — far beyond what freight railroads would be able to pay. Additionally, an electric locomotive able to satisfy the extremely demanding requirements of heavy long-haul freight railroading would cost far more than a new diesel locomotive costs today.

Because U.S. Class I freight railroads alone have more than 24,000 locomotives in their fleets, the cost of replacing just half of the existing Class I locomotive fleet would be close to $100 billion. Finally, the demands of this catenary system may exceed the capacity of available electric grids in certain areas throughout the rail network. As a result, electrification would likely require building new power plants in areas where existing electrical supply is inadequate and constructing countless transmission substations to deliver uninterrupted electricity supply.

Freight railroads' savings on future diesel fuel purchases would not sufficiently offset the costs of electrification either. Over the past 10 years, annual Class I railroad fuel expenses have averaged $8.7 billion. As such, it would take decades to fully recover the total investment made by freight railroads to electrify their networks, and that timespan fails to account for the likely extensive ongoing maintenance for such a system. The previously referenced University of Illinois at Urbana-Champaign study concurred with this finding, concluding that electric locomotives would be unable to generate fuel and energy cost savings large enough to offset increases in annual non-capital costs and additionally noting that its finding did not factor in the likely large-scale diversion of freight from rail to truck due to electrification.

Unlike America's trucks, barges, and airlines, America's freight railroads operate overwhelmingly on infrastructure that they own, build, maintain, and pay for themselves. If the total cost of installing and maintaining this catenary system was placed upon railroads, it would severely impair their ability to make needed long-term infrastructure investments to maintain and improve the productivity and sustainability of their systems, provide better service to their customers, and remain competitive within the freight transportation sector. Additionally, this cost burden would weaken railroads' ability to develop and implement innovative technologies that could improve their safety and efficiency.

Finally, even if the federal government completely covered the cost of the construction of this system, there are many other far more cost effective and impactful ways to reduce U.S. GHG emissions by 0.6%, which is the freight railroads' share of U.S. GHG emissions.

### 2. Electrification of the freight rail network would harm rail service and result in a modal shift to trucking.

In addition to the significant costs previously discussed, the multi-year construction of a catenary system, slowed by complex, time-consuming permitting and historic preservation processes, would also result in major disruption to rail operations. The likely impact of those consequences would be higher rates or lower quality service for railroad customers. As a result, freight customers would either pass higher costs down to consumers or shift their freight to other transportation modes, including to trucks. Service by Amtrak and other passenger railroads that use track owned by freight railroads would likely suffer as well. As such, the electrification of the freight rail system would probably shift a greater percentage of freight and passenger service to modes of transportation that are less fuel efficient than rail service.

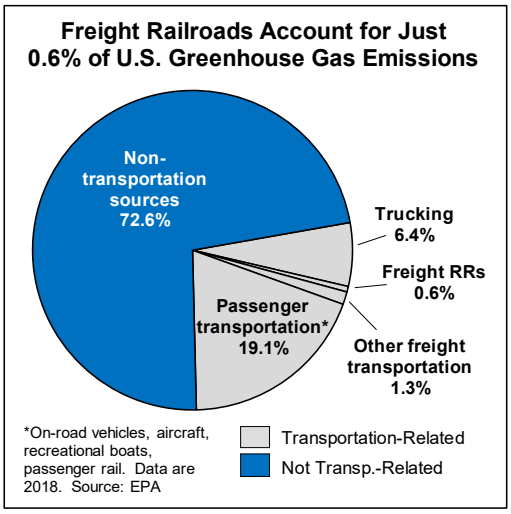
### 3. Partial electrification of the freight rail network is also problematic.

Electrification of even a portion of the freight rail network would create additional significant operational difficulties. First, railroads would face major costs, delays, and inefficiencies associated with interchanging freight to and from diesel locomotives at the edges of electrified territory. Moreover, locomotives often travel on tracks owned by other railroads. Creating captive fleets of unique locomotives serving small geographic regions would work against this practice, harm the efficiency of railroad operations, and likely cause a shift of freight to trucks. Second, specific-area electrification would limit rail flexibility to respond to changing market conditions.

Rail volumes in any given area often change substantially over time, meaning the economics associated with partial electrification would change drastically too. This would further increase costs and distort capital planning and investments as additional areas might require electrification. Finally, specific-area electrification would lock in one technology when other more cost-effective alternatives could be developed.

## Development of new technologies offers the best method for reducing freight railroads' carbon footprint.

Railroads are already working to develop and implement new technologies and refine their operating practices to increase fuel efficiency, drive down GHG emissions, and make rail operations even more sustainable. For decades, using locomotives powered by traditional diesel fuel has been the only realistic way to meet railroads' demanding operating requirements. However, research is now ongoing on a variety of alternatives to traditional diesel fuel — such as natural gas, biofuels, hydrogen, and zero-emission battery cells — that could further lower railroads' carbon footprint.




For example, battery-electric locomotives are now an area of active research. BNSF Railway is partnering with Wabtec, a major U.S. locomotive manufacturer, in a real-world test of a prototype long-haul battery-electric locomotive. This prototype uses the same technology found in a Tesla automobile, but on a much larger scale. The goal is for the prototype to succeed as a proof of concept and lead to the eventual development of next-generation battery-electric locomotives that have the power and range freight railroads need for long-haul service.

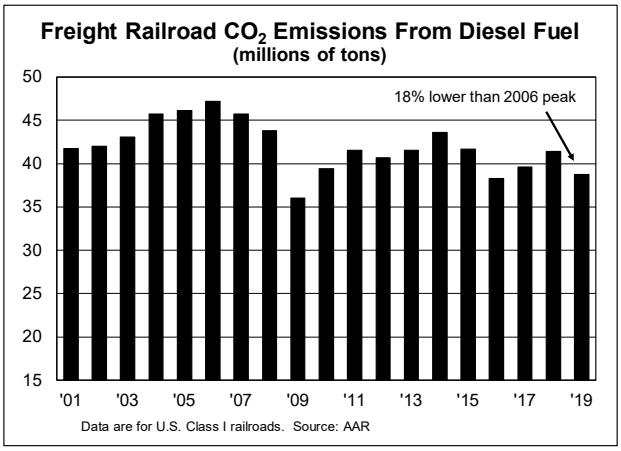
Additionally, Progress Rail and the Pacific Harbor Line are planning a demonstration project operating Progress Rail's new EMD Joule battery electric "switcher" locomotive in the Ports of Los Angeles and Long Beach. The EMD Joule locomotive uses a lithium-ion battery and battery management system, alongside state-of-the-art electronics, and will begin testing in 2021. All of these efforts have the potential to further reduce GHG emissions without the expense of catenary and electricity distribution systems.

## Railroads Are Already a Sustainable Means of Freight Transportation

Today, railroads account for 40% or more of U.S. long-distance freight volume (measured by ton-miles) — more than any other mode of transportation — and are a safe and environmentally responsible way to move that freight. According to the U.S. Environmental Protection Agency, freight railroads account for just 2.1% of transportation-related U.S. GHG emissions and just 0.6% of total U.S. GHG emissions. On average, railroads are three to four times more fuel efficient than trucks. Moreover, a single train can carry the freight of several hundred trucks, thereby reducing highway congestion and other related emissions.

In addition to the research referenced above, freight railroads are also improving the fuel efficiency of their operations using zero-emission cranes, fuel management systems, improved freight car design, anti-idling technologies, and crew training. As a result, U.S. freight railroads now move more freight with much less fuel than in the past.

In 2019 alone, U.S. freight railroads consumed 656 million fewer gallons of fuel and emitted 7.3 million fewer tons of CO2 than they would have if their fuel efficiency had remained level since 2000. From 2000 through 2019, U.S. freight railroads consumed 9.6 billion fewer gallons of diesel fuel and emitted 108 million fewer tons of CO2 thanks to industry-wide fuel efficiency efforts. In 2019, freight railroads' GHG emissions from diesel fuel consumption were 18% lower than in 2006, their peak year.




## Conclusion

The U.S. freight rail industry supports efforts to create a more sustainable, less carbon intensive future. However, policy should incentivize innovative solutions to reduce GHG emissions, encourage the greater utilization of environmentally-friendly freight transportation modes, and maintain the competitiveness of capital-intensive industries as they make investment and planning decisions to reduce GHG emissions. Mandating the electrification of the freight rail network would not achieve those goals.