POLICY CHANGES TO SUPPORT CANADIAN RAIL SECTOR SUSTAINABILITY

Railway Association of Canada

RIGHT TRACK

MARCH 2022

The Railway Association of Canada (RAC) recommends that:

1. Environment and Climate Change Canada reintroduce rail Energy Efficiency Ratios into the Clean Fuel Regulation to enable credit generation opportunities for rail under compliance category 3.

2. Rail yard equipment become eligible under the Clean Fuel Regulation in Compliance Category 3 to encourage further decarbonization.

3. Environment and Climate Change Canada work with fuel suppliers to ensure that renewable fuel content disclosure is made available.

4. A rail sector Permit of Equivalent Level of Environmental Safety be provided to the RAC for its members by the Minister of Environment and Climate Change for the rail sector under the *Cross-border Movement of Hazardous Waste and Hazardous Recyclable Materials Regulations*.

5. The federal government create a robust funding program to support research, development, and deployment of low-carbon and net-zero technology in the Canadian rail sector.

INTRODUCTION

Canada's rail sector operates nearly 43,000 km of track from coast to coast to coast. Every day, locomotives are transporting goods and people in an environmentally efficient manner as demonstrated by the fact that rail ranks among the lowest GHG emitters in the transportation sector. In 2019, the Intergovernmental Panel on Climate Change reported that Canada's rail sector accounted for only 3.5% of total transportation emissions.[1] This environmental achievement is significant, as railways contribute a total of $17.6 billion to Canada's real GDP, sustain 182,000 jobs across the country, and transport $320 billion worth of goods annually, demonstrating positive economic impacts.

1 National Inventory Report 1990-2019: Greenhouse Gas Sources and Sinks in Canada

FIGURE 1. CANADA'S GHGS BY SECTOR – 2019

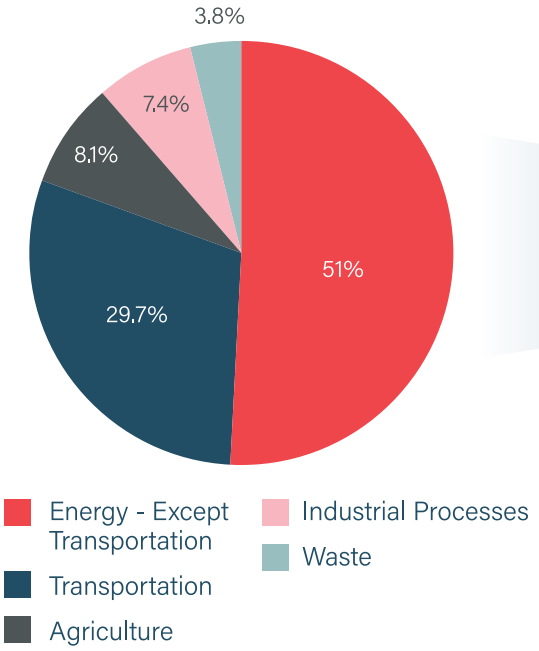
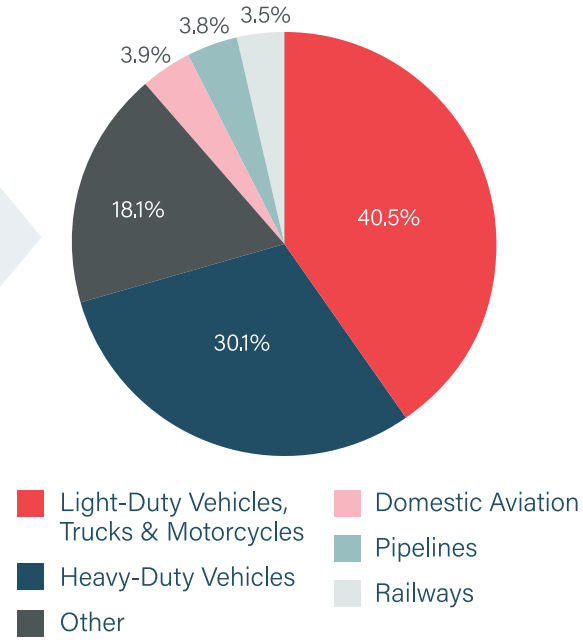


FIGURE 2. CANADA'S GHGS BY TRANSPORTATION SECTOR - 2019



The data highlights the fact that railways are critical to Canada's national supply chain and the economy; however,

> The low emissions profile of railways may be a lesser-known fact that should be capitalized on as an opportunity for Canada. Railways can play a key role in helping the Government of Canada achieve its net-zero objective by 2050.

The Railway Association of Canada's (RAC) objective is to ensure that rail is best positioned to contribute in meaningful ways to Canada's transition to a low-carbon economy.

> To better achieve decarbonization in the Canadian economy, government policies and programs must recognize rail's role by ensuring that their contributions are acknowledged and that they are able to fully participate in programs.

The following items have been identified by the RAC as key areas where government can provide opportunities for the rail sector to support environmental sustainability.

CLEAN FUEL REGULATION

Canada has committed to achieving net-zero by 2050 which will require significant changes to the transportation sector to lower emissions. Transportation is one of the largest emitting sectors in Canada, which accounts for about 30% of total GHGs produced. One of the major policy levers being implemented to address this is the introduction of a Clean Fuel Regulation (CFR) in Canada.

Fossil fuels continue to be the predominate fuel used in commercial and personal transportation. The federal government intends to increase incentives for the development and implementation of clean fuels and technologies which will reduce the carbon intensity of fuels over time. The CFR will require liquid fuel (gasoline, diesel, and home heating oil) suppliers to reduce the carbon intensity of fuels they produce and sell in Canada. Furthermore, the federal government has invested $1.5 billion towards a Low-carbon and Zero-emissions Fuels Fund which will increase support for domestic production of low carbon fuels.

A key feature of the CFR is that Canada's railways are being left out of is the opportunity for credit generation. Under the regulations, there will be three ways to obtain credits:

1. Undertake projects that reduce the lifecycle carbon intensity of fossil fuels (e.g., carbon capture and storage, renewable electricity);
2. Supply low carbon fuels – like ethanol in gasoline or biodiesel in diesel; and
3. Support switching from fossil fuels to lower carbon fuels or energy like electricity or hydrogen in vehicles.

The CFR as published in *Canada Gazette, Part I*, on December 19, 2020, excludes railways from generating credits by switching from fossil fuels to lower carbon fuels. This is a significant position change from the 2019 *Clean Fuel Standard: proposed regulatory approach* document which outlined an important credit generation opportunity for rail end-use transportation fuel switching. Energy efficiency ratios for rail were fully developed and created which aligned with best practices in other jurisdictions, creating opportunity for rail.

While railways may have some opportunities to generate credits under Compliance Category 2 for importing low-carbon fuels, their exclusion from Compliance Category 3 does not align with best practice from other jurisdictions such as the European Union, California, and Oregon which include rail in their respective clean fuel initiatives.

In the California Low Carbon Fuel Standard, eligible entities that provide electricity or hydrogen as a transportation fuel may generate credits or designate a third-party entity on its behalf to generate credits. More specifically, in the regulations under 95483 section (c) for electricity used as a transportation fuel, the California Low Carbon Fuel Standard includes light rail and heavy rail. Similarly, the Oregon Clean Fuels Program allows credit generation opportunities for the electrification of heavy rail. Rather than excluding rail, these jurisdictions have structured their low carbon fuel standards in such a way that could incentivize end-use fuel switching in rail thereby resulting in the reduction of GHG emissions.

As additional context, Canadian railways consumed 2,259.24 million litres of diesel in 2019, which makes fuel switching in the railway sector an important opportunity. By providing credit generation opportunities for rail, Environment and Climate Change Canada can help spur innovation and send a positive market signal for continued investments into alternative fuels for railways.

Hydrogen fuel cell technology continues to develop as demonstrated by the CP rail pilot project.[2] ECCC should ensure that hydrogen use in rail applications is included as an option to generate compliance credits in ECCC's Clean Fuel Regulation, Gaseous Stream. Separate standards/credit levels for green, blue, and grey hydrogen should be developed. Relatedly, ECCC could consider incorporating hydrogen into the Greenhouse Gas Pollution Pricing Act with different rates for green, blue, and grey hydrogen.

Recommendation 1: That Environment and Climate Change Canada reintroduce rail Energy Efficiency Ratios into the Clean Fuel Regulation to enable credit generation opportunities for rail under compliance category 3.

YARD EQUIPMENT

In addition to reintroducing Energy Efficiency Ratios for rail, the RAC and its members also suggest that including yard equipment in the CFR is an important opportunity for the transition to clean fuels and emission reductions. In the rail sector, various pieces of yard equipment such as cranes and maintenance of way equipment, are used to conduct maintenance activities, or to move railcars within rail yards, and to load and unload containers, which is essential to the movement of goods within the supply chain. Yard equipment is commonly diesel operated which results in emissions. This equipment presents an opportunity for the uptake of cleaner fuels and/or new technologies to support the transition to net-zero. However, these equipment types are not included in the proposed CFR.

Looking to California and Oregon, their respective clean fuel programs include credit generation opportunities for the electrification of yard equipment. In California for example, their Low Carbon Fuel Standard includes Electric Cargo Handling Equipment for rail yards and specifies electrification of yard trucks for credit generation under their definition of electricity/BEV and PHEV Trucks.[3] In the European Union, the Fuel Quality Directive provides a more flexible approach by using terminology such as "non-road mobile machinery". This approach contains everything from construction and farming machinery, to rail cars, locomotives, and inland water vessels which means that more opportunities are created for the European supply chain and the rail sector.[4] Creating a broader policy environment that is more inclusive of opportunities for the supply chain including the European rail sector.

2 https://www.cpr.ca/en/media/canadian-pacific-expands-hydrogen-locomotive-program-to-include-additional-locomotives-fueling-stations-with-emissions-red
3 https://ww2.arb.ca.gov/sites/default/files/classic//fuels/lcfs/guidance/faq_eche_eligibility.pdf
4 https://ec.europa.eu/growth/sectors/automotive/environment-protection/non-road-mobile-machinery_en

Another consideration for the inclusion of yard equipment is environmental justice. Considering that rail yards are localized operating environments with neighboring residents and that the environmental impacts to health are well documented[5], incentivizing the transition to lower carbon fuels and propulsion for yard equipment would have significant positive health impacts for communities. Furthermore, yard equipment typically has less energy intensity requirements than line haul locomotives, which makes yard equipment a strong candidate for a "first step" towards electrification of rail – allowing smaller scale testing of different technologies such as catenary electric, battery electric, or hydrogen fuel cells. Also, consider that the equipment used in rail yards may often be less efficient, making a strong potential for significant GHG emissions reductions. The potential for credit generation for electrification of yard equipment provides the opportunity to make a significant positive environmental impact.

Recommendation 2: That rail yard equipment become eligible under Compliance Category 3 to encourage decarbonization.

TRANSPARENCY OF FUEL BLENDING RATES

It is anticipated that the CFR will result in increasing blend rates of biodiesel and renewable diesel. Currently, most locomotives can use up to 5% biodiesel (B5) and up to 30% renewable diesel without voiding OEM warranties or without significant negative impacts to engine performance. Renewable fuel content over and above B5 or 30% renewable diesel void warranties and result in adverse performance impacts (renewable fuels have less energy density than petroleum diesel therefore requiring more total fuel and increase maintenance costs). Until manufacturers are able to ensure that locomotives can operate safely and efficiently with higher contents of renewable fuels, railway companies need to be sure they have visibility on the renewable fuel content of fuels they purchase.

Research and testing are underway in the sector to identify technical, maintenance and operational changes that could be implemented to reduce the negative impacts incurred from the use of higher renewable fuels content in order to ultimately approve the use of more renewable fuels.[6] In the event that locomotive warranties are voided, that has the potential of creating significant liability costs. Ensuring transparency into the renewable fuel content supplied by fuel vendors will alleviate railways' concerns.

Recommendation 3: That Environment and Climate Change Canada work with fuel suppliers to ensure that renewable fuel content disclosure is made available.

5 https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health
6 https://www.progressrail.com/en/Company/News/PressReleases/ProgressRailApprovesB20BiodieselFuelforUseinEMDEngines.html

CROSS-BORDER MOVEMENT OF HAZARDOUS WASTE AND HAZARDOUS RECYCLABLE MATERIALS REGULATIONS

The Cross-border Movement of Hazardous Waste and Hazardous Recyclable Material Regulations (XBR) repealed and replaced the *Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations*, the *Interprovincial Movement of Hazardous Waste Regulations, and the PCB Waste Export Regulations*. *This change* impacts railway reporting requirements for the movement of hazardous waste and hazardous recyclable material when crossing provincial or international borders while carrying these materials. Previously, the RAC held a Permit of Equivalent Level of Environmental Safety (PELES) on behalf of the Canadian rail sector which successfully enabled railways to be compliant with the requirements through an alternative approach.

The PELES permitted RAC member railways to use a *rail consist* or similar document that complied with the *Transportation of Dangerous Goods Regulations*, instead of the waste movement document, to comply with the regulations. The waste movement document is typically a multi-copy paper manifest with sections applicable to the generator, carrier and receiver and includes a substantial amount of information including waste specific codes for international movements. On the other hand, the *rail consist* is an electronic document that includes specific information on the goods carried for each railway vehicle containing dangerous goods and is commonly used in the rail sector. However, the RAC was informed by ECCC that under the new regulations, the RAC would not be eligible for a sector wide PELES and that each individual railway company will be required to apply for an individual PELES. Furthermore, new requirements included in the regulations create challenges for railways that represent only limited benefits for environmental safety. These challenges include:

- The logistics of changing company specific Electronic Data Interchange systems to include additional information required by the regulations.
- Tracking of waste railway ties moved interprovincially when railways are the generator of the waste or recyclable material (i.e., railway ties). The collection and transport of these material does not trigger internal documentation processes used for the movement of hazardous waste/ recyclable material for customers.
- The requirement to produce the required movement document upon request. Railways would not be able to produce the movement document while in transit, but rather after the shipment has been completed.

To address these challenges, the RAC proposes that ECCC reconsider its decision regarding the ability to issue a sector wide PELES for railways which would allow for a pragmatic approach to ensuring compliance while meeting rail sector operational requirements for managing shipping documents.

Recommendation 4: The RAC recommends that a rail sector Permit of Equivalent Level of Environmental Safety be provided to the RAC for its members by the Minister of Environment and Climate Change under the Cross-border Movement of Hazardous Waste and Hazardous Recyclable Materials Regulations.

CLEAN TECHNOLOGY FUND FOR THE TRANSPORTATION SECTOR

To achieve decarbonization of Canada's rail sector by 2050, technology solutions are a key enabler to meeting net-zero commitments. Several decarbonization options are advancing through various stages of research, development, and demonstration (RD&D), such as exploring the increased use of renewable fuels such as biodiesel (up to B20) and renewable diesel and alternative propulsion technologies through electrification (e.g., battery electric and hydrogen fuel cells). These technologies require additional testing in the Canadian rail sector to better understand their applicability to various operational scenarios (e.g., switcher locomotives, line haul operations, and passenger railway operations all have different operational requirements).

Implementing a net-zero technology option in the rail sector is not as simple as achieving technical feasibility. Operational requirements must be met to ensure that the technologies meet the power output requirements of various railway operations, that refueling times remain efficient relative to current diesel refueling times (e.g., charging batteries or refueling with hydrogen), that the associated infrastructure requirements are available, and that standards, training, and regulations are also in place to provide railways with the technical and operational knowledge needed to safely operate the infrastructure and equipment. The pathway to net-zero in the Canadian rail sector is still in the early stages. Therefore, in order to better understand the aforementioned requirements, additional RD&D is required within Canada to advance the path forward.

Currently, there is an absence of robust federal government support that facilitates RD&D in the Canadian rail sector. The RAC acknowledges that Transport Canada has a program called the Clean Transportation System – Research and Development Program (CTS-RD)[7] which provides total funding up to $600,000 annually to support the demonstration and pilot deployment of low carbon and zero-emission technologies in real-world testing for the aviation, marine, and rail sectors. The RAC believes that federal support for projects that seek to advance decarbonization technology are pertinent for achieving meaningful reductions in the transportation sector. Ensuring that an accessible and adequately funded program is available is necessary for supporting railways to A) advance technology demonstrations and B) to implement the technology solutions. We may look to the U.S. for examples of existing government initiatives that support the advancement of decarbonization in the rail sector.

7 https://tc.canada.ca/en/programs/apply-cts-rd-funding

State governments in the U.S. are increasing their support for clean technology RD&D in the transportation sector. The state of California continues to be a leader as demonstrated through the $22.6 million grant the California Air Resources Board provided to BNSF railway and Wabtec through its Zero- and Near Zero-Emission Freight Facilities (ZANZEFF) project.[8] This funding enabled testing of a battery electric locomotive service run between Barstow and Stockton, California. Results from the pilot indicate that approximately 6,200 gallons of fuel were saved, and zero major failures were experienced. This pilot provided opportunity for real world testing of the technology to demonstrate viability in an operational setting. Support for these types of projects in Canada would greatly assist the Canadian rail sector in better understanding the technology solutions and how they may be appropriately applied.

At the provincial level, the Government of Alberta is supporting a CP hydrogen fuel cell locomotive pilot project through Emissions Reduction Alberta. In total, CP will be receiving $15 million in support which enables CP to increase the scope of the project from 1 locomotive conversion to a series of 3 locomotive categories being converted to operate on hydrogen fuel cells.[9] The importance of this project cannot be overstated. The entire North American rail sector will benefit from the results of the project.

A second example of government funding to support emissions reductions from the transportation sector may be found in the state of Pennsylvania, where they developed the Marine and Rail Freight Movers Grant Program to improve air quality by reducing NO_x emissions produced by nonroad equipment such as freight switcher locomotives. Grant funding is provided to projects that will replace pre-Tier 4 switchers that operate at least 1,000 hours per year. The Bessemer & Lake Erie Railroad is receiving $2.9 million to replace an older diesel-powered switcher with a new battery electric unit. This initiative demonstrates government support for unlocking more investments into the adoption of net-zero technology in the rail sector. In the Canadian context, a program of this nature could bode very well for shortline railway decarbonization as they face financial challenges when compared to Class 1 railways.

A shortline railway is defined as a railway with less than $250 million in revenues for two consecutive years. The financial realities of shortline railways are much different than Class 1 railways (e.g., CN and CP) as shortlines face higher operating ratios (meaning most revenues are spent just to maintain operations). With less financial capacity to invest in new locomotives, the decarbonization of the shortline railway sector may lag behind the Class 1 railways. Federal government support for the implementation of net-zero technologies will enable further emissions reductions in the rail sector.

Recommendation 5: That the federal government create a robust funding program to support research, development, and deployment of low-carbon/net-zero technology in the Canadian rail sector.

8 https://www.railwayage.com/news/bnsf-wabtec-bel-pilot-under-way/
9 https://eralberta.ca/projects/details/cp-hydrogen-rail-initiative/

CONCLUSION

As the federal government works to stimulate economic growth and advance environmental sustainability through its numerous climate initiatives, the RAC offers these policy recommendations for consideration. The recommendations identified in this document were developed in consultation with our members to identify opportunities for the government to support both the Canadian rail sectors' efficiency and environmental sustainability.

Questions or comments about this document may be directed to:

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