NORTH AMERICA RAIL SUSTAINABILITY WEBINAR : best practices & upcoming challenges

29 September 2021
ONLINE

INTERNATIONAL UNION OF RAILWAYS

Moderator:

Lucie Anderton
Head of Sustainability

29 SEPTEMBER 2021

Agenda

9.30 to 12.00 (US Central Time)

- **Introduction and Welcome -** Marie Plaud-Lombard, Coordinator for NA region & Barbara Barr, Chair of the UIC North American Region
- **Keynote Speech - Maryam Allahyar, Director of Research, Development & Technology, FRA**
- **Global Vision for Rail -** Lucie Anderton, Head of Sustainability, UIC

Coffee break

- **Best Practice Roundtable**

  & interactive panel discussion and Q&A session

- **Feedback**
- **Closing remarks**

Welcome

INTERNATIONAL UNION OF RAILWAYS

Marie Plaud-Lombard
Director of UIC Communication Department

Barbara Klein Barr
Chair of the UIC NARA
Director, International Programs at US Department of Transportation

Keynote speech

INTERNATIONAL UNION
OF RAILWAYS

Maryam Allahyar,
Director of Research, Development & Technology
Federal Railroad Administration

INTERNATIONAL UNION
OF RAILWAYS

GLOBAL VISION FOR RAIL

Lucie Anderton, Head of Sustainability, UIC

UIC: 100 years of serving member railways and facilitating international railway cooperation

200 members in 95 countries	**3,000** billion passenger-kilometres	**10,000** billion tonne-kilometres	**1** million kilometres of line
7 million rail personnel	Cooperation with over **100** institutions	**700** UIC leaflets - new International Railway Solutions (IRS)	**85** congresses, conferences, workshops

6 UIC focus areas for global cooperation serving the entire railway community

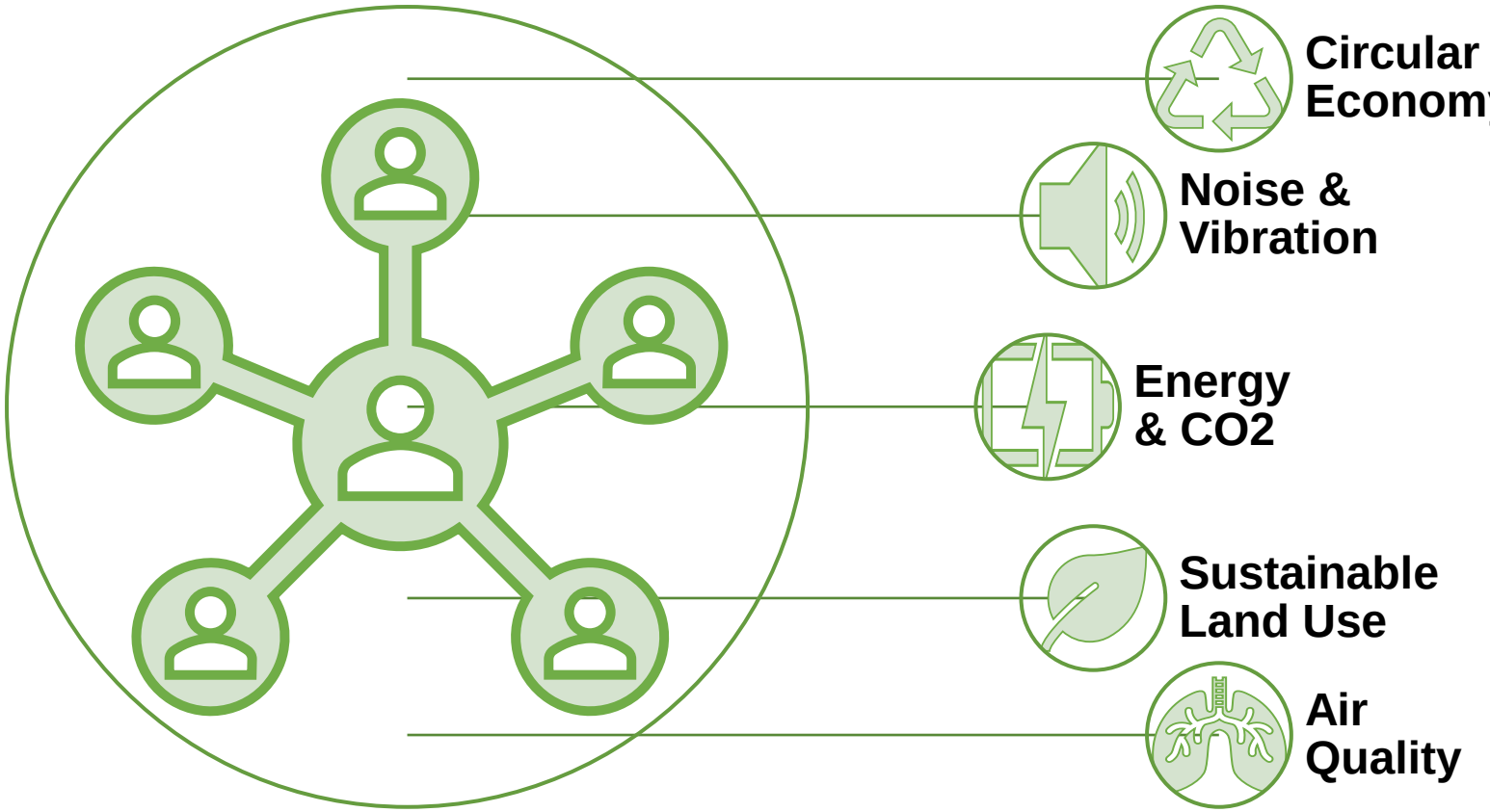
- **Environment & Sustainable Development**
- **Safety & Security**
- **Freight/Intercontinental corridors**
- **Railway Signalling & Control Command**
- **Standardisation**
  UIC leaflets, IRSs
- **Research & Expertise Development**

INTERNATIONAL UNION
OF RAILWAYS

SUSTAINABILITY @ UIC

- Set the vision
- Provide the tools
- Convene the community

Our Community



- Sustainable Procurement
- Climate change Adaptation
- Inclusive stations
- Finance and carbon taxation
- Rail system (train-track interaction & track expert group

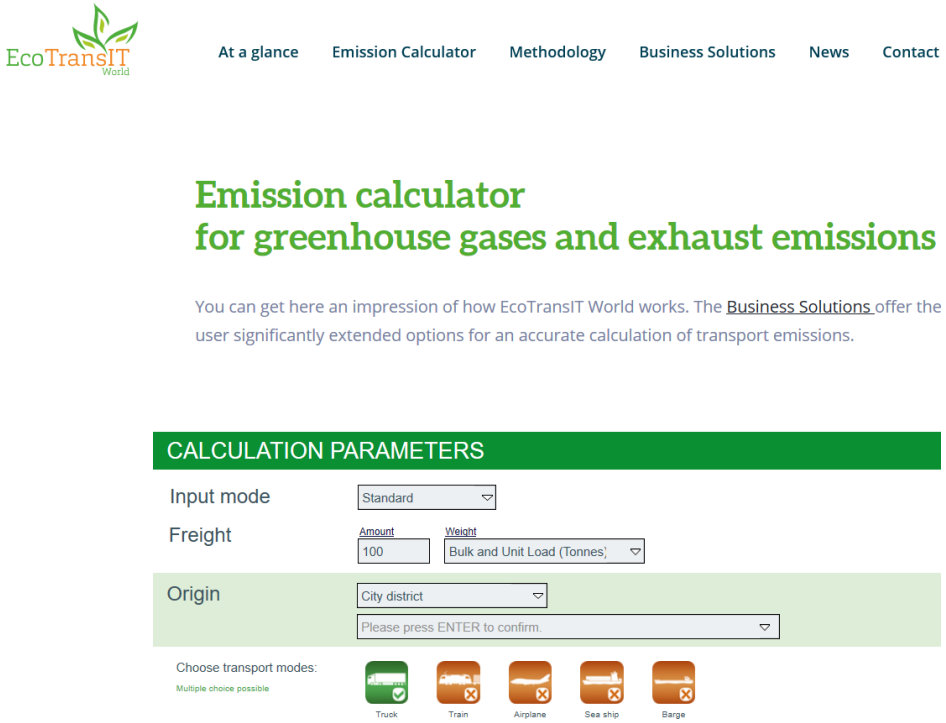
Our Tools

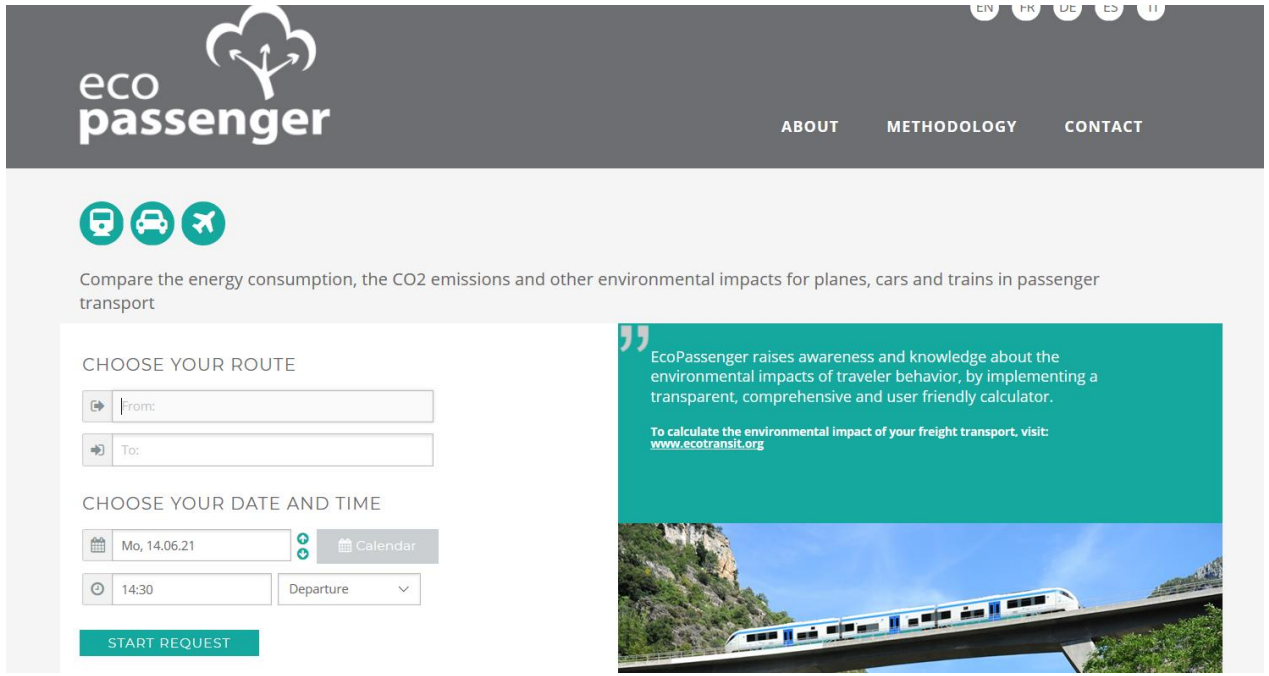
- Eco Passenger
- EcoTransit
- SDG Rail Index

Traction Energy Settlement and Data Exchange
IRS 90930

Data Exchanges with Driver Advisory Systems: SFERA
IRS 90940

Sustainability
Reporting
(Update of Leaflet 330)



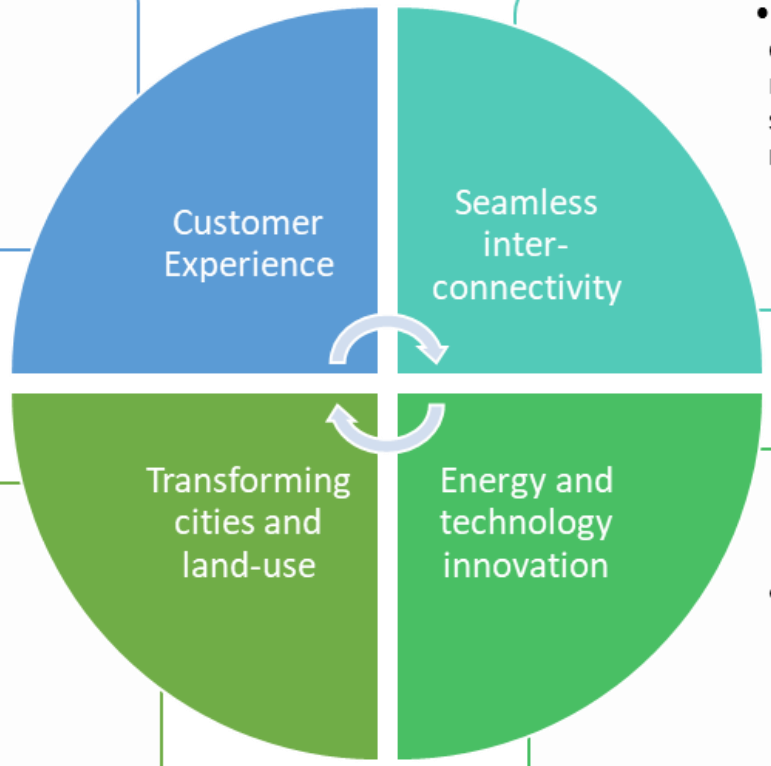


Our Vision

A railway that supports a green recovery as the **backbone of sustainable mobility**. Connectivity that contributes to healthy and sustainable lifestyles and economies on every continent – that is zero emissions, a community hub, accessible for all, and is both biodiverse and a good neighbour.

ON TRACK 2030 Vision of Rail

- Cultural transformation for rail towards a more customer-focused service for the changing needs and behaviours of freight and passengers



- Radical innovations in physical and digital connectivity with other modes for a DOOR-TO-DOOR service and greater system resilience

- Transport-oriented Development, lighter trains and green City Logistics, the role of rail in creating liveable cities and connected communities

- With a shortened cycle of innovation, Rail takes leading role in the race to zero carbon and in the renewables revolution

By 2030

Following the Covid dip, rail passenger numbers have recovered and rail's market share has increased by 50% from pre-pandemic levels.

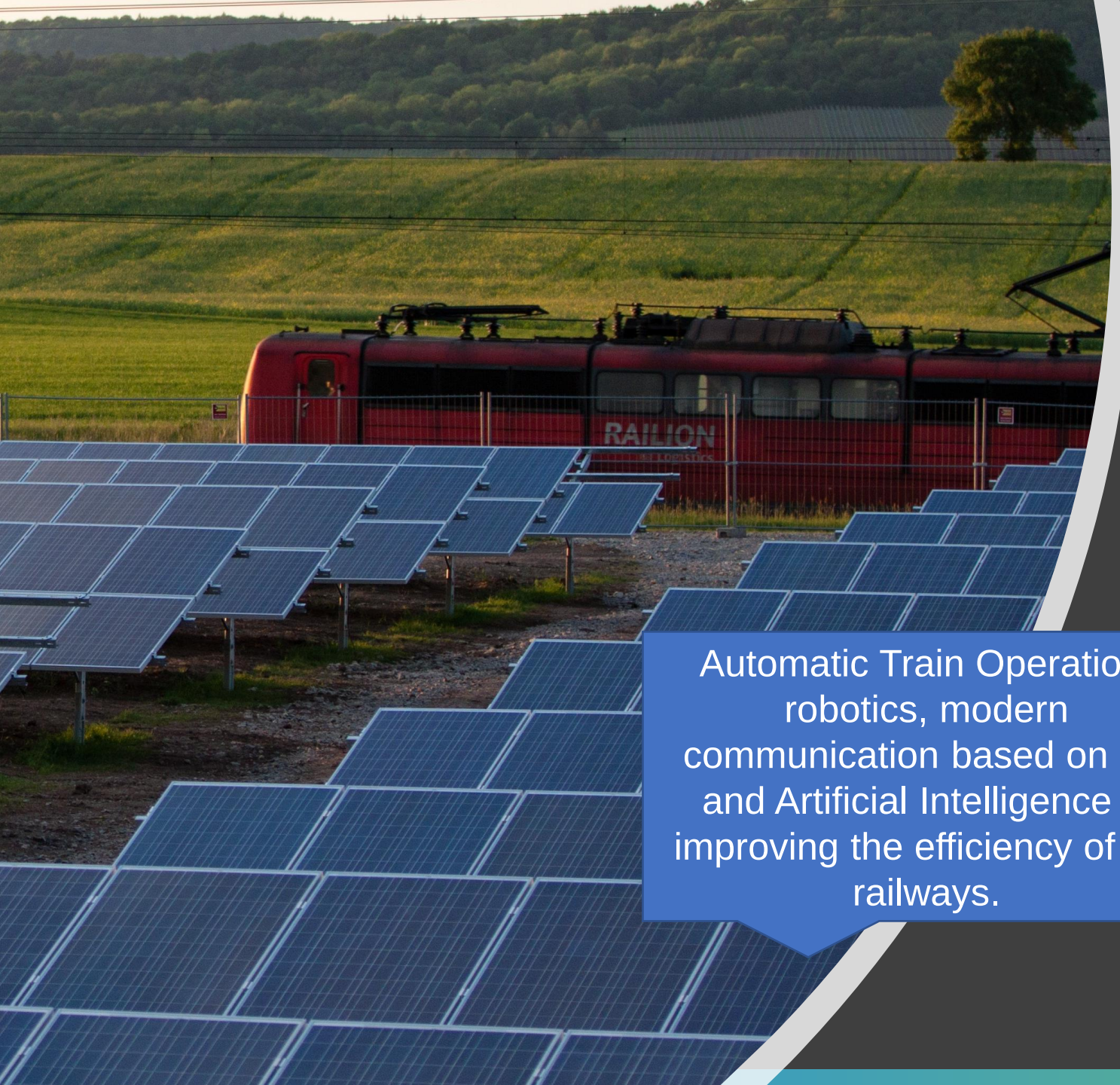
Highspeed rail traffic has doubled globally.

Customer Experience

Rail operators adapted to the new travelling behaviours and became increasingly aware of customer needs, catering for new working patterns and the voices of a wider range of people.

Particularly vulnerable infrastructure owners have accessed the finance and technology they need for climate change adaptation and resilience-building.

All passengers will feel more secure and safe. These actions have been supported through a more diverse and better gender-balanced workforce in transport.



Energy and Technology Innovation

Dedicated renewable energy generation as well as energy storage on the railway estate including on buildings and on the lineside.

Automatic Train Operation, robotics, modern communication based on 5G and Artificial Intelligence is improving the efficiency of the railways.

Diesel trains are fast becoming a thing of the past, with a large-scale programme of electrification of main lines continuing and the use of bi-mode vehicles common.

Interconnected and transforming cities, connecting communities

By connecting cities better and reducing car use, railway stations are the gateways to cities that are less congested and where people can breathe cleaner air.

Most passenger journeys will be made with multimodal e-tickets, passengers will be able to move seamlessly between different modes of transport.

INTERNATIONAL UNION
OF RAILWAYS

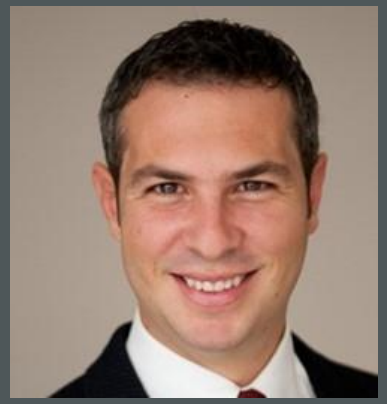
COFFEE BREAK

ROUNDTABLE

INTERNATIONAL UNION OF RAILWAYS

Françoise Granda
Desjardins, Senior Advisor, Corporate Social Responsibility and Sustainable Mobility, ViaRail

Beth Termini
Assistant Vice President, Public Health, Environment & Sustainability at Amtrak



Baldomero Garza
General Director of Studies, Statistics and the Mexican Railway Registry

Ben Chursinoff, *Policy Analyst and Program Coordinator, Railway Association of Canada*

Nathan Loftice, *Planning and Business Sustainability, BNCF Railway*

VIA Rail's sustainability plan and waste ambition
An overview

Françoise Granda
Senior Advisor, Sustainability and Corporate Social Responsibility

September 2021

Desired outcome

Be recognized as an engaged corporate citizen and as a reference in sustainable development.

Building our strategy

	Corporate Governance	Environmental Stewardship	People Management	Responsible Mobility Service	Socio-economic Contribution
1 Category					
2 Most Common Topics Selected by Stakeholders and Executive & Board	• Ethics and compliance • Risk management • Responsible procurement policies • Transparent communications	• GHG emissions • Air emissions • Locomotive fuel efficiency • Asset lifecycle • Waste management • Environmental management	• Diversity, inclusion & equity • Safety at work • Employee engagement • Health & wellness • Harassment & discrimination • Labour relations	• Accessibility • Travel experience • Affordability • Public safety • Inter-modality • Service reliability	• Community partnerships • Economic prosperity • Social mobility

3 Grouped topics

ENVIRONMENT
- Carbon Net Zero
- Waste and Circularity
- Air Emissions

SOCIAL
- Diversity, equity and inclusion
- Responsible mobility service
- Health & Safety
- Employee Engagement

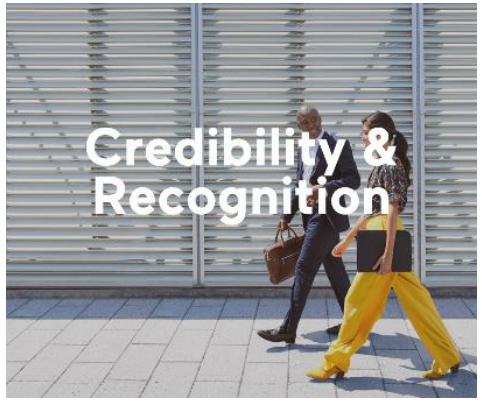
GOVERNANCE
- Ethics and Compliance
- Responsible Procurement
- Economic Prosperity

Our priorities

Environmental

Social

Governance



Impact

- Customer choice
- Shareholder support
- Community awareness
- Employer brand

Zero Waste ambition

Our ambition

- Demonstrate VIA's sustainability excellence by offering zero waste trains to passengers.
- Improve environmental performance, reduce emissions and secure compliance to future regulations

Current state

- Low level of waste valorization
- Majority of waste composed of organic or recyclable material

Zero Waste ambition

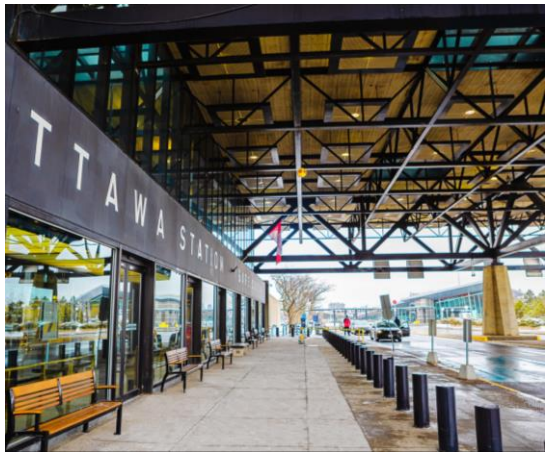
Our plan: execute on three fronts and gradually

1.

Reduce packaging and materials sourced on board

2.

Improve waste sorting and collection on board



3.

Optimize waste collection in train stations

Climate Resilience Planning

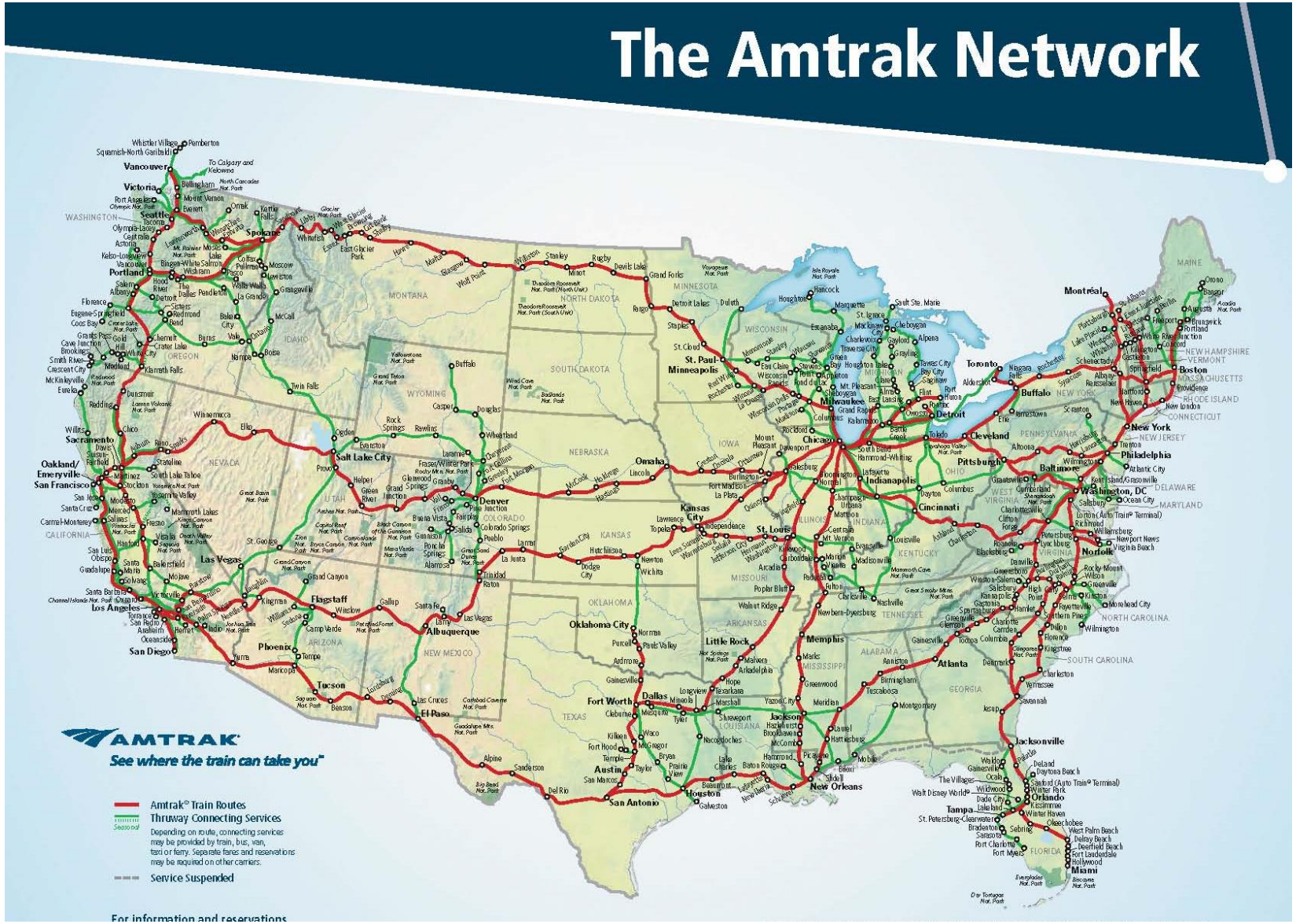
The Future Rides with Us

UIC North America Rail Sustainability Webinar –
Best practices and upcoming challenges
9/29/21

Beth Termini, AVP Health, Environment &
Sustainability

AMTRAK®

The Amtrak Network

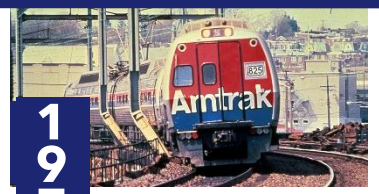


AMTRAK'S CLIMATE JOURNEY AND FUTURE

1971

DAY 1

The first Amtrak train rolls out of New York to Philadelphia.



2010

GHG ACCOUNTING BEGINS

20% reduction since 2010, with a goal of 40% by 2030.

2015

CLIMATE STUDIES

Since 2015, we completed three climate studies. We are now finalizing a resilience strategic plan and a NEC vulnerability assessment.

2019

QUANTIFYING CLIMATE IMPACTS

Named storms from 2006-2019 cost Amtrak $127M in lost ridership and revenue, with estimations of $220M by 2030.

2021

PLANNING FOR THE FUTURE

Major shifts are taking place including changing customer priorities; the opening of Moynihan Train Hall – preparing for growth and increased train service; new train fleet (Acela and ICT); the launch of a new national Corridor Strategy Plan; and record investment from Congress.

2035

TARGETS

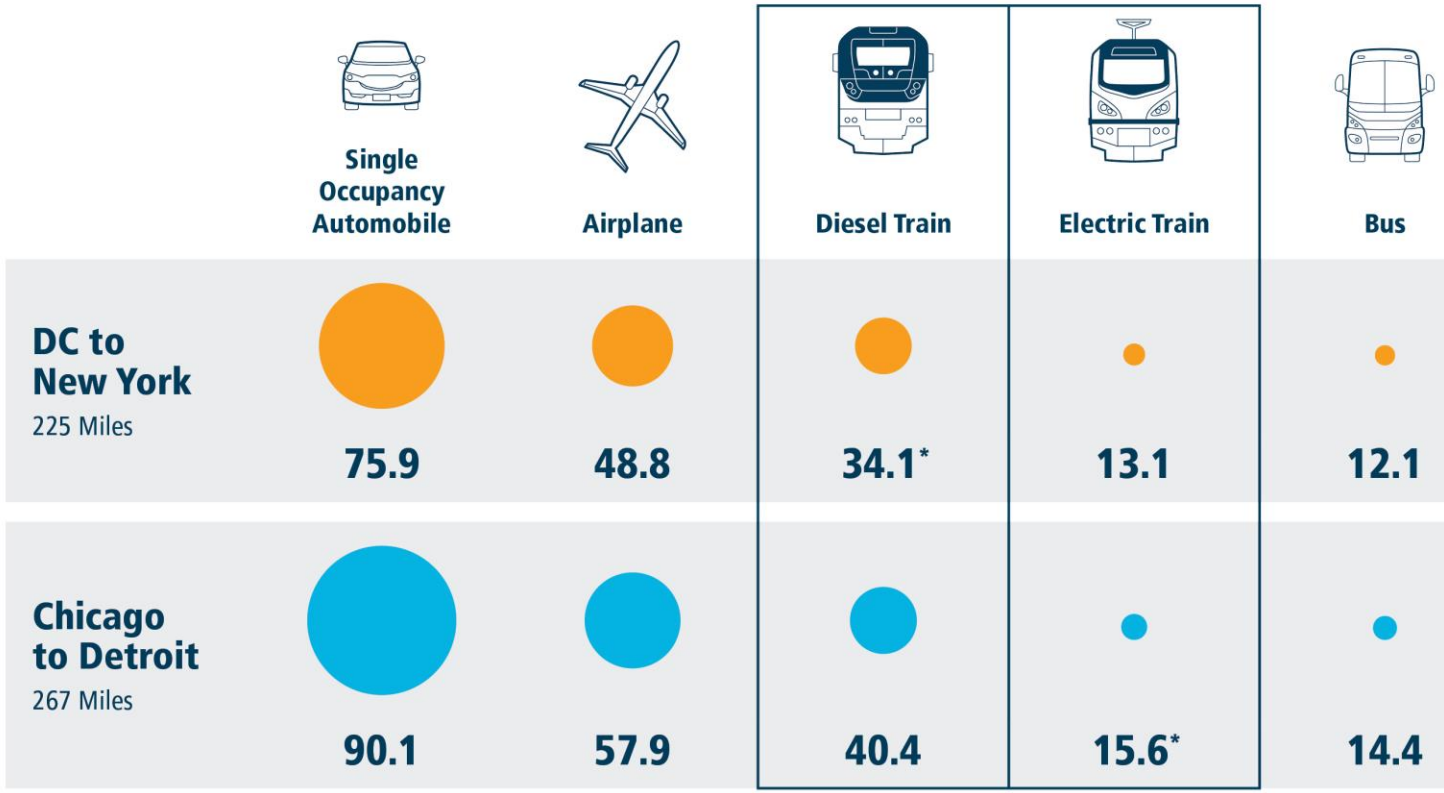
Pending regulation would require Amtrak to operate as a net zero carbon emissions company by 2035.

2100

Materials Management

Greenhouse Gas Emissions from Passenger Transport

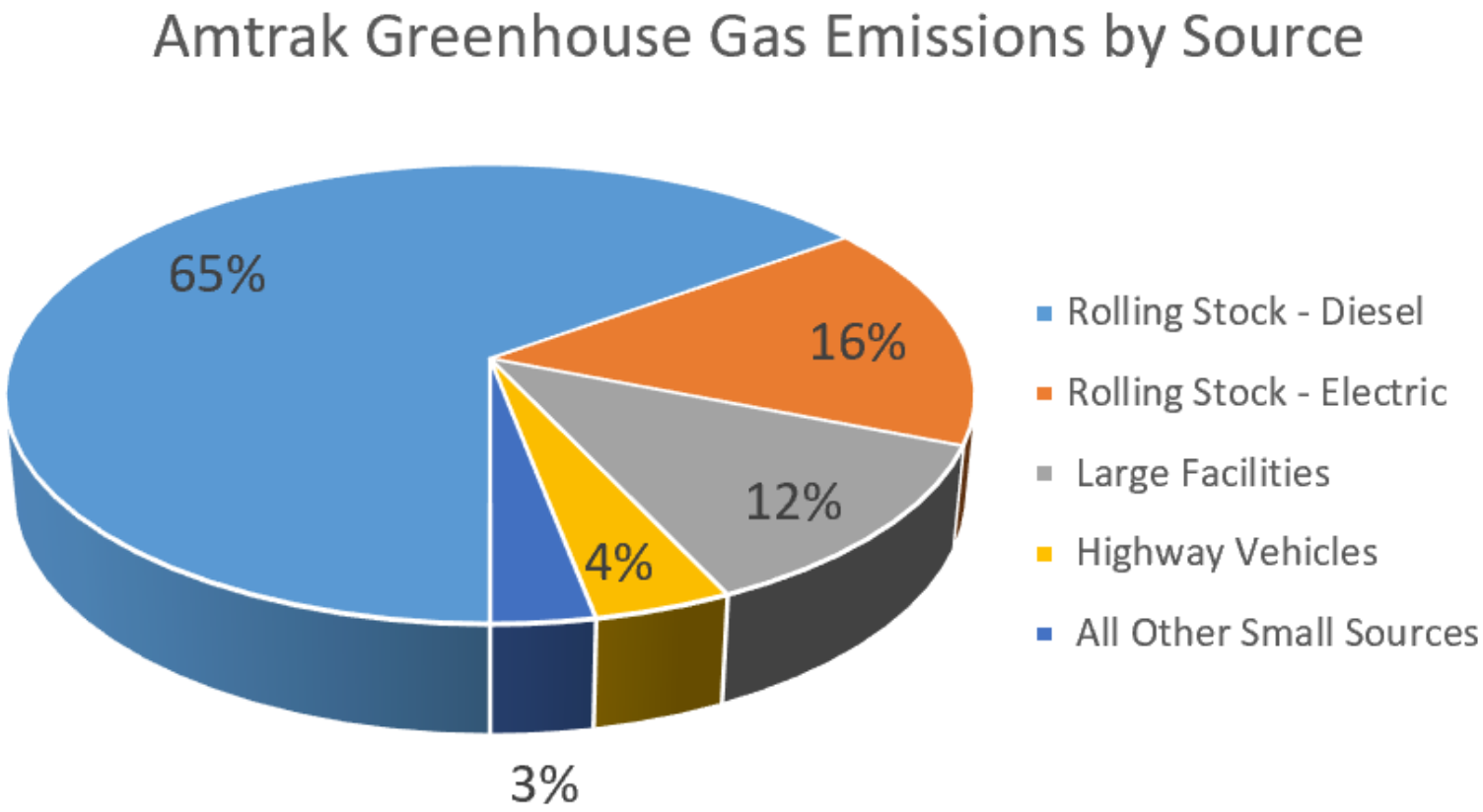
Total kg CO_2e per Passenger by Mode



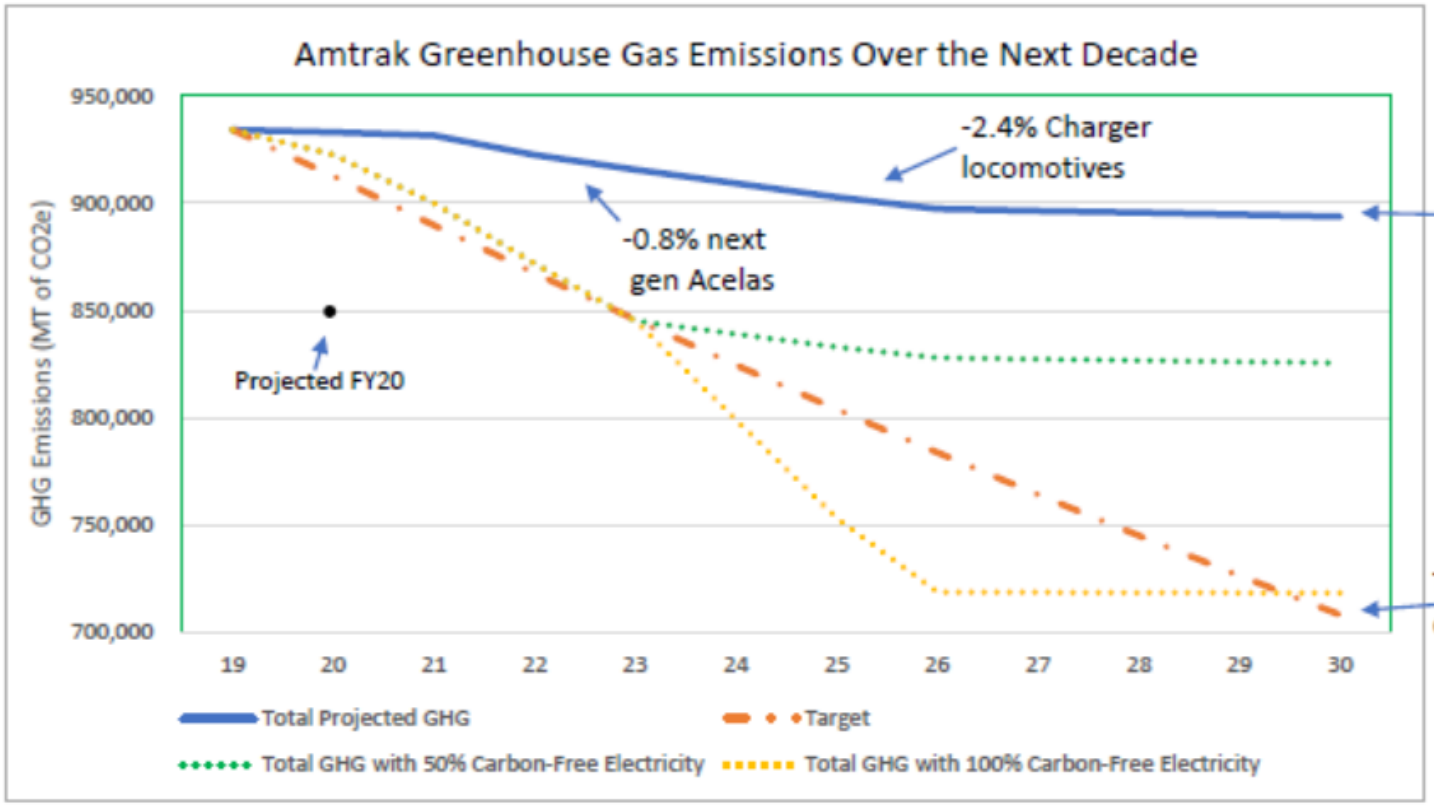
Calculations use EPA's Emission Factors for Greenhouse Gas Inventories [March 2020] and the IPCC Fifth Assessment Report's global warming potential values for CO_2, CH_4, and N_2O.

These figures are based on Amtrak's FY19 national network operations and are not route specific. By 2026, Amtrak will be operating Charger locomotives that are 10% more fuel efficient—further reducing Amtrak's GHG emissions.

**Not an option for this route; data only for comparison.*



Amtrak Emissions by Facility Group
FY19 emissions: 934,038 MT CO2e =
201,793 passenger cars driven for 1 year



- Projection is based on FY19 operations
- Acela 21 fully implemented by FY23, results in 0.8% reduction in TOTAL GHG emissions
- 100 Chargers into service by FY26 results in 2.4% reduction in TOTAL GHG
- Assumed continued YOY 1% reduction in facility electricity
- FY19 GHG emissions were 20% less than 2010 baseline

11% in flood zone

–Landover Substation, September 1, 2020

Amtrak Climate Change Vulnerability Assessment

Northeast Corridor (NEC) Study
Extreme Precipitation Event

Year 2080

Stantec

Track

Vulnerability = 3

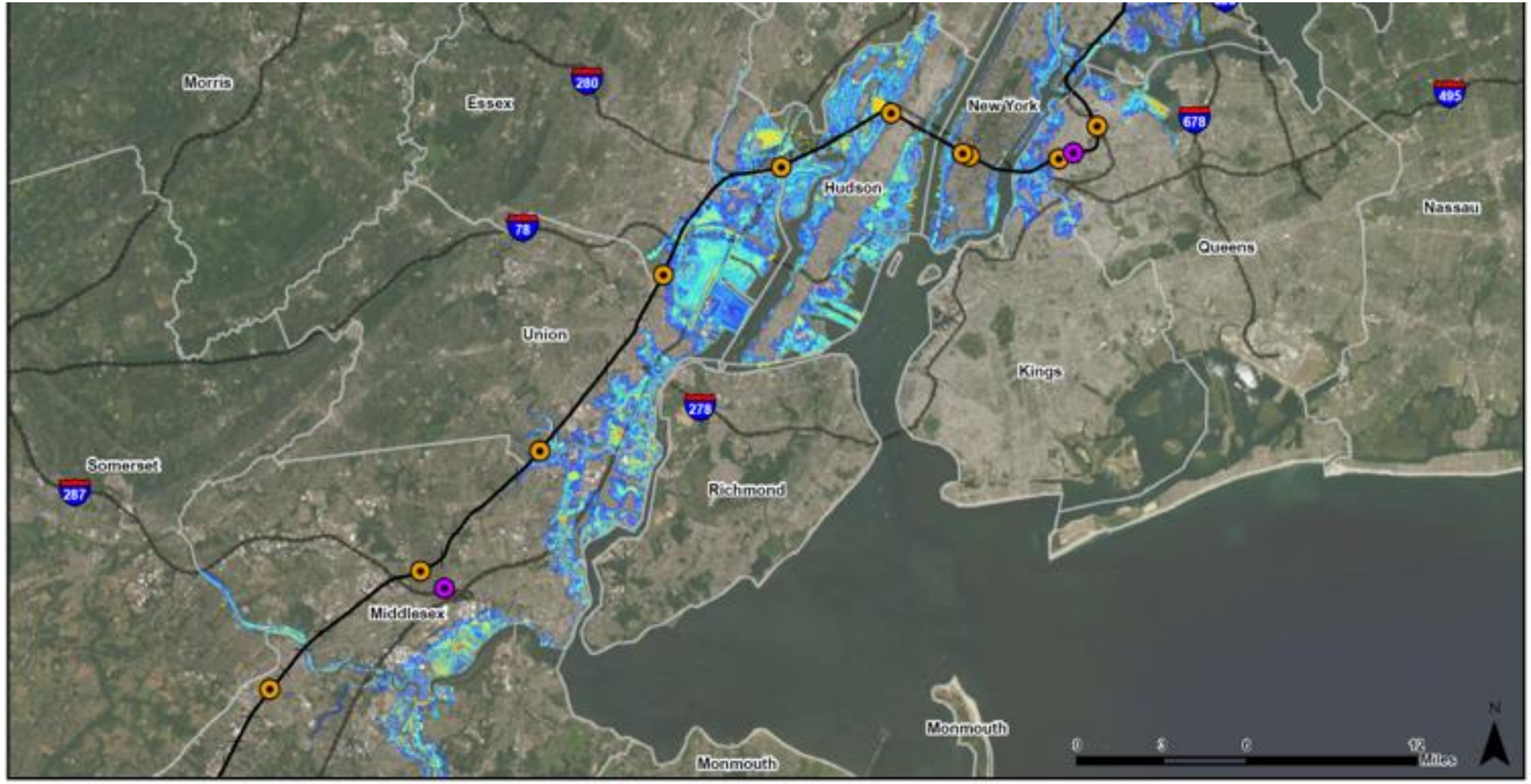
Vulnerability = 4

Maximum Precipitation

12.2 inches

3.81 inches

AMTRAK®



Amtrak Climate Change Vulnerability Assessment

Northeast Corridor (NEC) Study
Projected Sea Level Rise with Surge (SWEL)

Year 2100

Substations

- Vulnerability = 0
- Vulnerability = 1
- Vulnerability = 2

Amtrak Line

Sea Level Rise with Surge Depth

19 feet

7 feet

AMTRAK®

– Identify vulnerable assets

– Embed resilience into capital funding

– Build resilience into design stds and PM

–Landover Substation, September 1, 2020

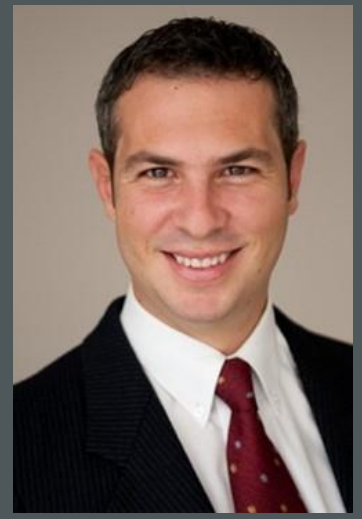
What could affect our path forward

- Regulation and funding
- Our current workforce and pipeline of talent
- Technology
- Another pandemic

INTERNATIONAL UNION
OF RAILWAYS

BALDOMERO GARZA

GENERAL DIRECTOR OF STUDIES, STATISTICS AND THE MEXICAN RAILWAY REGISTRY



ARTF Strategies for Reduction of GreenHouse Gas Emissions

Regulatory Agency for Rail Transport

Ministry of Communications and Transportation

COMUNICACIONES
SECRETARÍA DE COMUNICACIONES Y TRANSPORTES

130 AÑOS 1891 - 2021
SECRETARÍA DE COMUNICACIONES Y TRANSPORTES

ARTF
AGENCIA REGULADORA DEL TRANSPORTE FERROVIARIO

5 ANIVERSARIO ARTF

México 2021 Año de la Independencia

UIC North America

September 29th

CONTENTS

1. ARTF Overview
2. Grand Vision of the Mexican Railway System
3. Carbon footprint of the Mexican Railway System
4. ARTF Strategies for sustainable transport
5. ARTF ongoing CO_2 emission reduction projects

Mexico's Regulatory Agency for Rail Transport (ARTF)

In 2016, the Regulatory Agency for Rail Transport (ARTF) was created as a decentralized administrative office of the Ministry of Communications and Transportation

Objective:

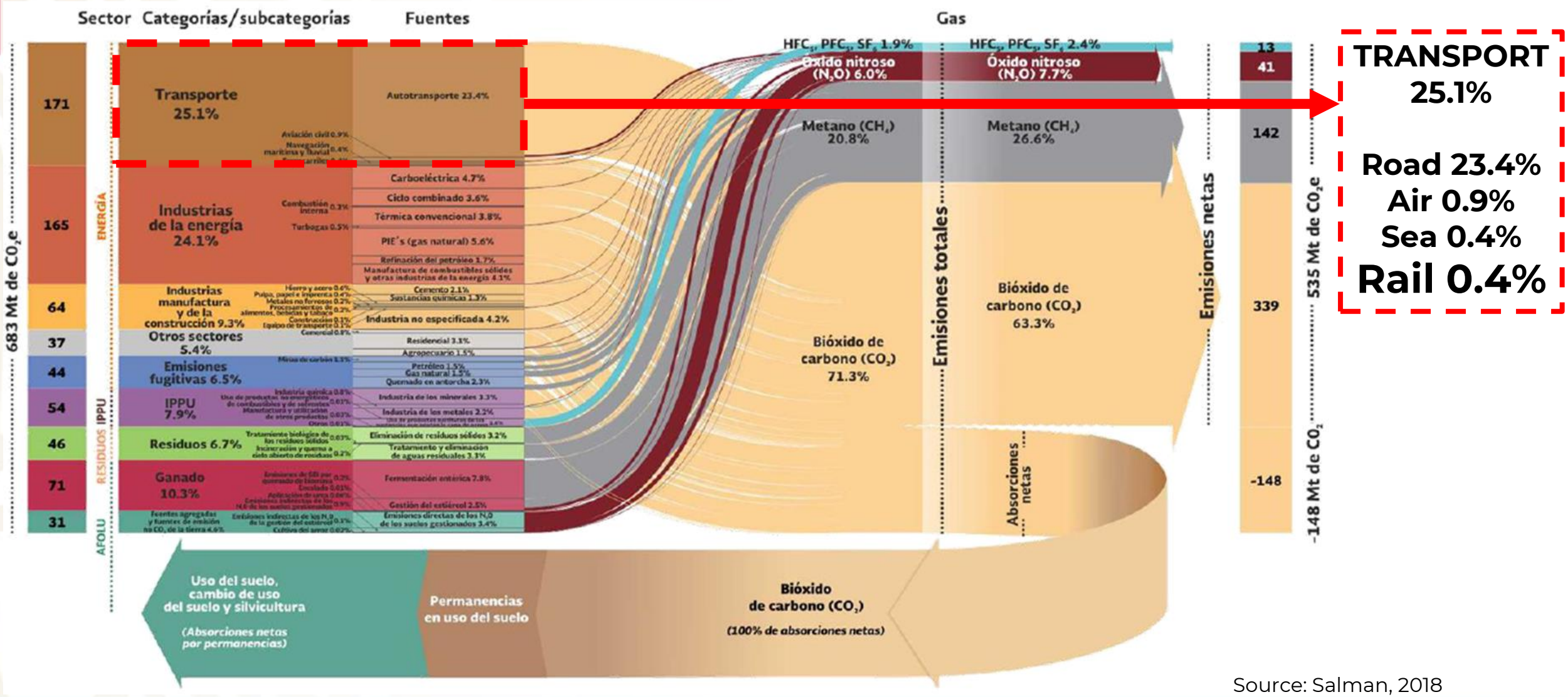
Regulate, promote, monitor and verify the construction, operation, exploitation, conservation, maintenance of the railway infrastructure and the **provision of the public railway transport** and its auxiliary services.

The ARTF is needs to assure the **interconnection of the railways**, **promote multimodal operation**, as well as **impose sanctions** in case of faulty behavior of concessionaires.

ARTF
Attributions

- Provide **safety and sustainability** of the Mexican Railway System (MRS).
- Promote the **optimal use and expansion** of the railway network (Freight & Passenger).
- Establish the **tariff regulatory basis**.
- Strengthen the **technical & legal framework** of the railway service.
- Perform **traffic railway studies** to evaluate the capacity & efficiency of the railway system, based on adequate railway operational concepts **to avoid overcosts and oversized projects**.
- **Verify and monitor** the fulfillment of concessionaires' obligations and services.
- Perform railway **studies & research**.
- Integrate the **Mexican Railway Registrar**.
- Issue, revalidate, suspend and cancel the **Federal Railway License**.

Mexico's National CO_2 emissions

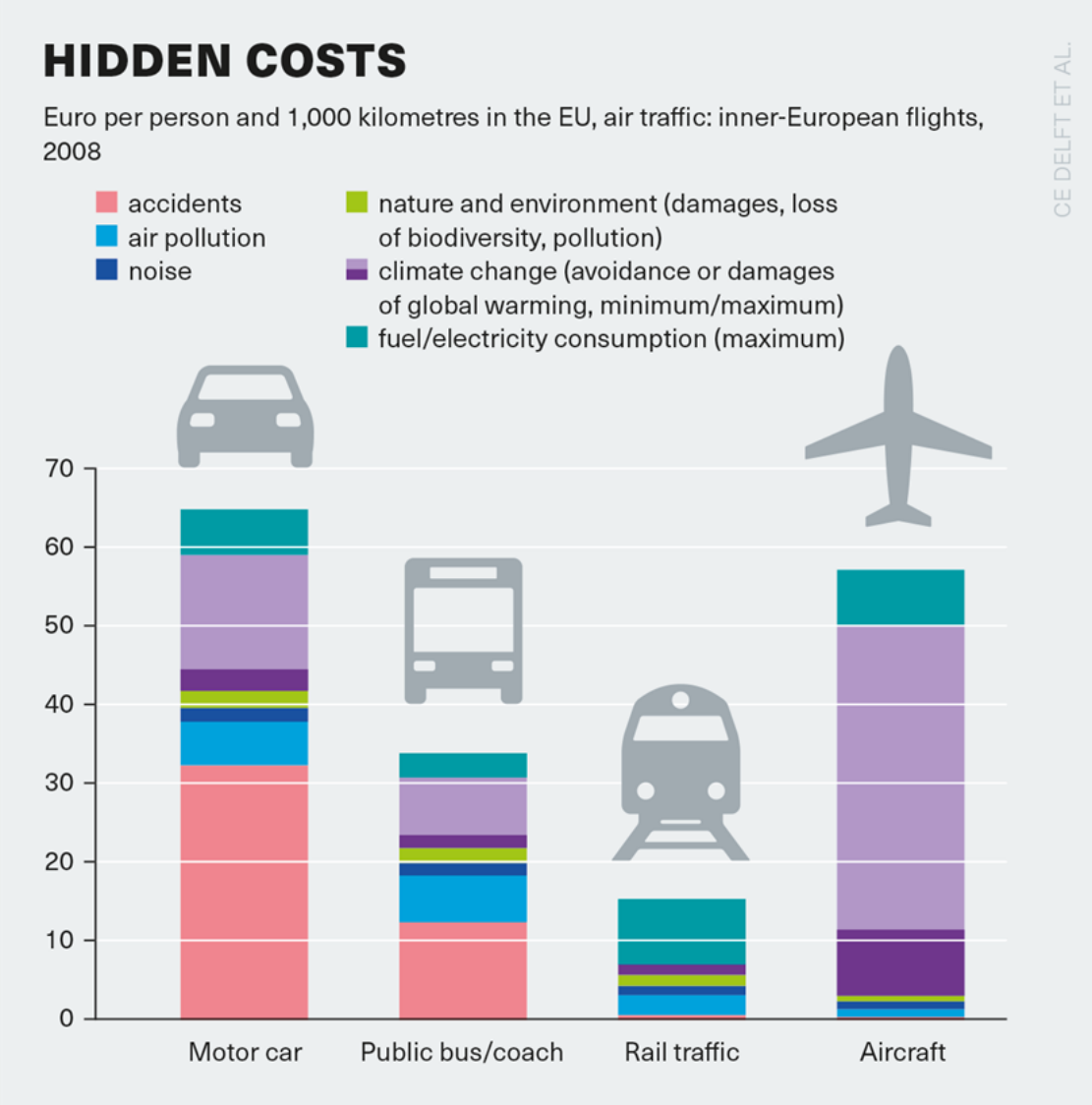


TRANSPORT 25.1%

Road 23.4%
Air 0.9%
Sea 0.4%
Rail 0.4%

Source: Salman, 2018

External transport costs



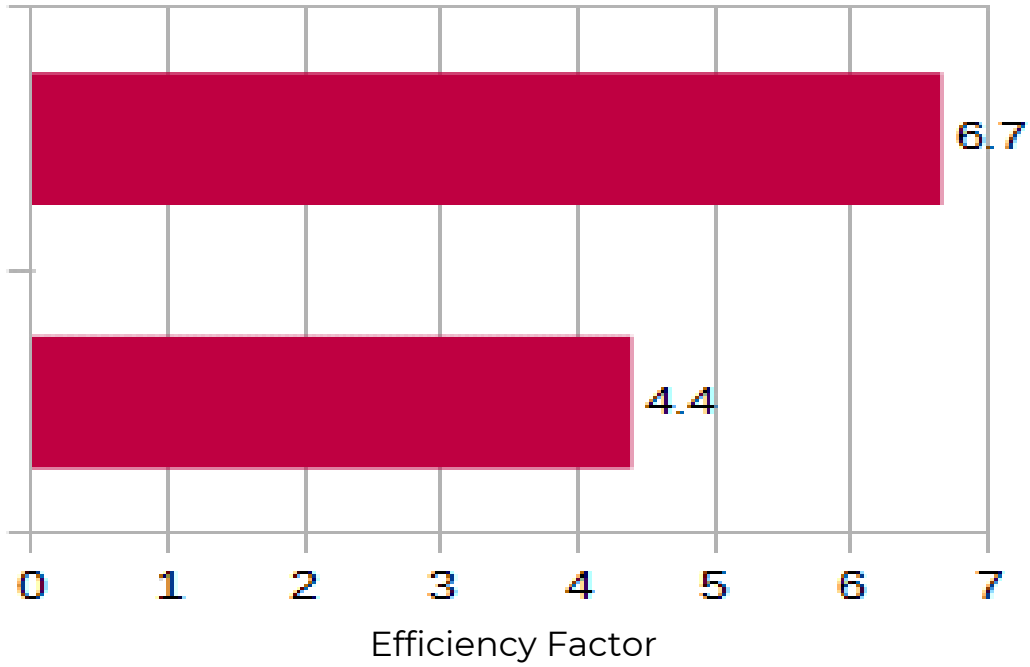
Source: eu.boell.org

Land Transport efficiency
Railway vs Road Transport - Mexico

Comparison of land transport efficiency in Mexico

Efficiency Railway vs Road transport per t-km

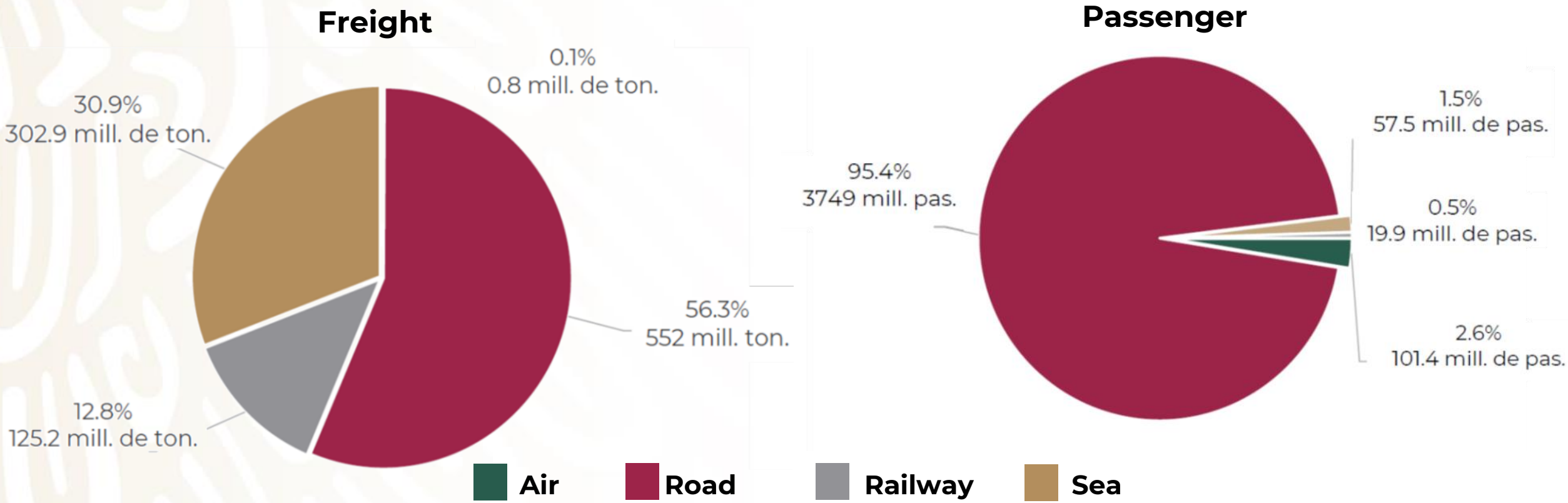
Efficiency Railway vs Road transport per ton



Source: Arredondo, with data of ARTF & SENER 2019

Modal Split - Mexico

In 2019, the freight modal split of the Mexican Railway System was 12.8% and Passenger modal split was 1.5%



Source: ARTF, 2020

CO_2 comparative emissions
Intercity CDMX – Toluca

Source: SCT - DGDFM

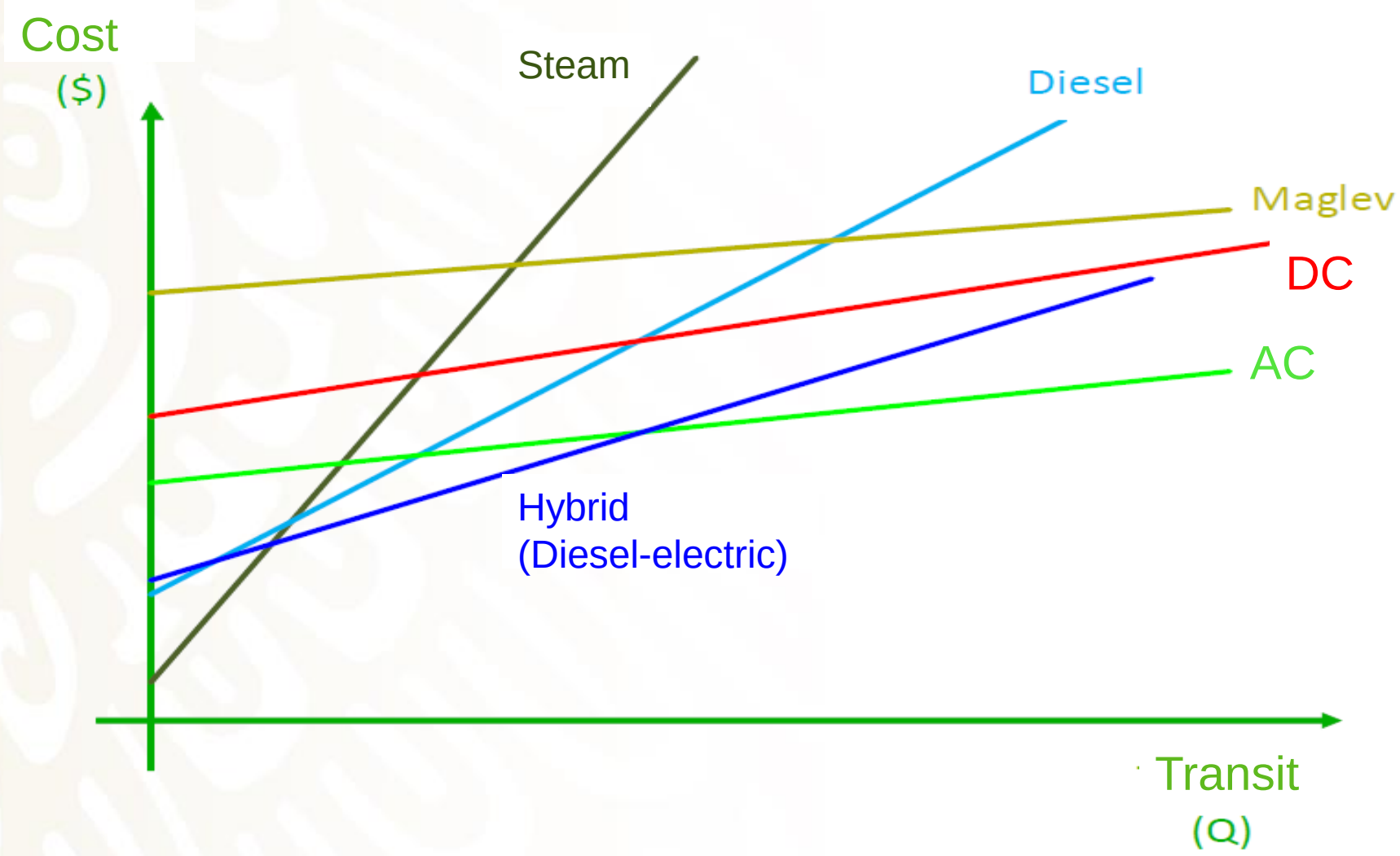
CO_2=664,708 Tons/Year

CO_2=18,963 Tons/Year

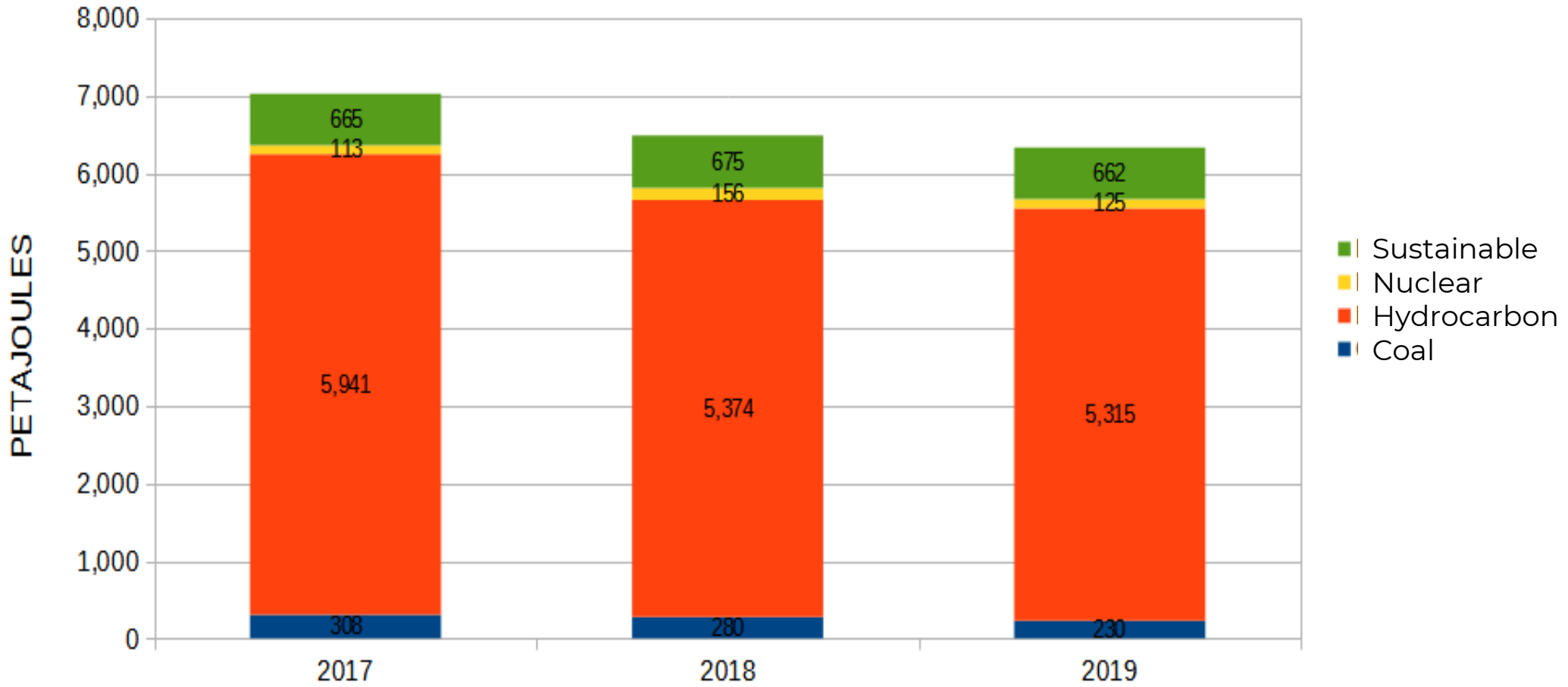
CO_2=202,639 Tons/Year

Source: Adapted from Arredondo y Frescas, 2011

Technological threshold for tractive force



Primary energy sources in Mexico



Source: Energetic Information System, SENER, 2021

Railways Green House Gas
Reduction opportunities

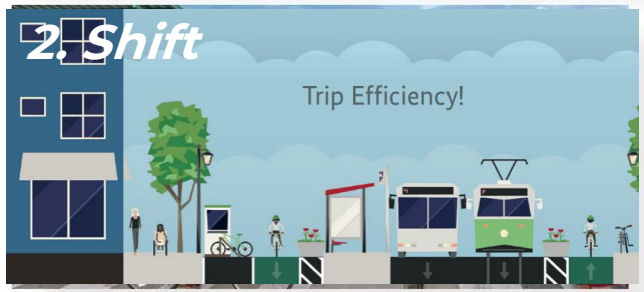
- Avoid - Shift - Improve
- Transit Oriented Development
- Efficiency increase through fuel management systems
- New railway technologies
- Digitalization of processes
- Lighter and stronger materials
- Aerodynamic performance
- Replacement of diesel for electric cranes on railway yards
- Carbon sequestration through filters and even tree planting

Avoid – Shift - Improve

AVOID: Reduce the need for motorized travel and the trip length.

SHIFT: Change from the most energy consuming and polluting urban transport mode (i.e. cars) towards more environmentally friendly modes.

IMPROVE: Optimize the operational efficiency of public transport.



Source: From *Sustainable Urban Transport: Avoid-Shift-Improve, TUMI & www.raillynew.com*

Transit Oriented Development

Global planning goal for the **construction and expansion of urban areas**, allowing the **national railway service** to become the **backbone of sustainable development** due to its potential to carry out mass movements of people and the most important freight movements, all this in an efficient way, at a low cost and with a focus on environmental sustainability.

- Integrated urban development and urban planning
- Integration of rail transport systems
- Compatibility, re-densification and land redevelopment
- Land development (housing and industrial) and rail demand generation
- Integration of other modes of transport
- Development of production clusters

Transit Oriented Development

Pedestrian/Bike Path

Bike Parking

Bike Network Project

Rail

Pedestrian overcrossing

Urban renewal zone

Intervention area

University consolidation

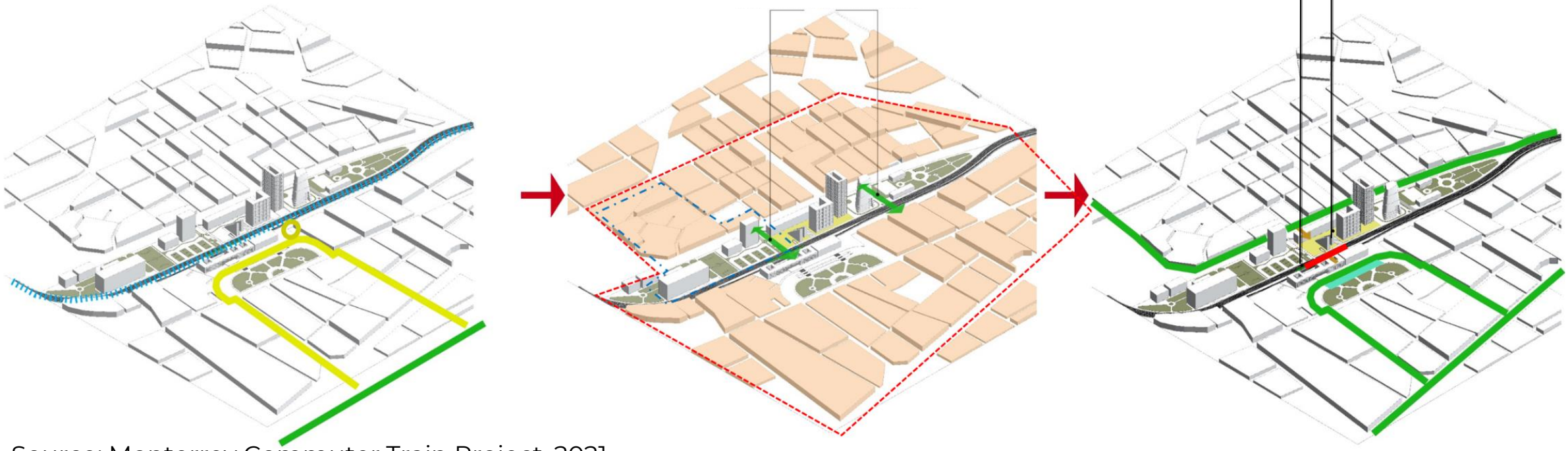
Transit routes

Underground mode transfer Terminal

Rail Station

Transit stop

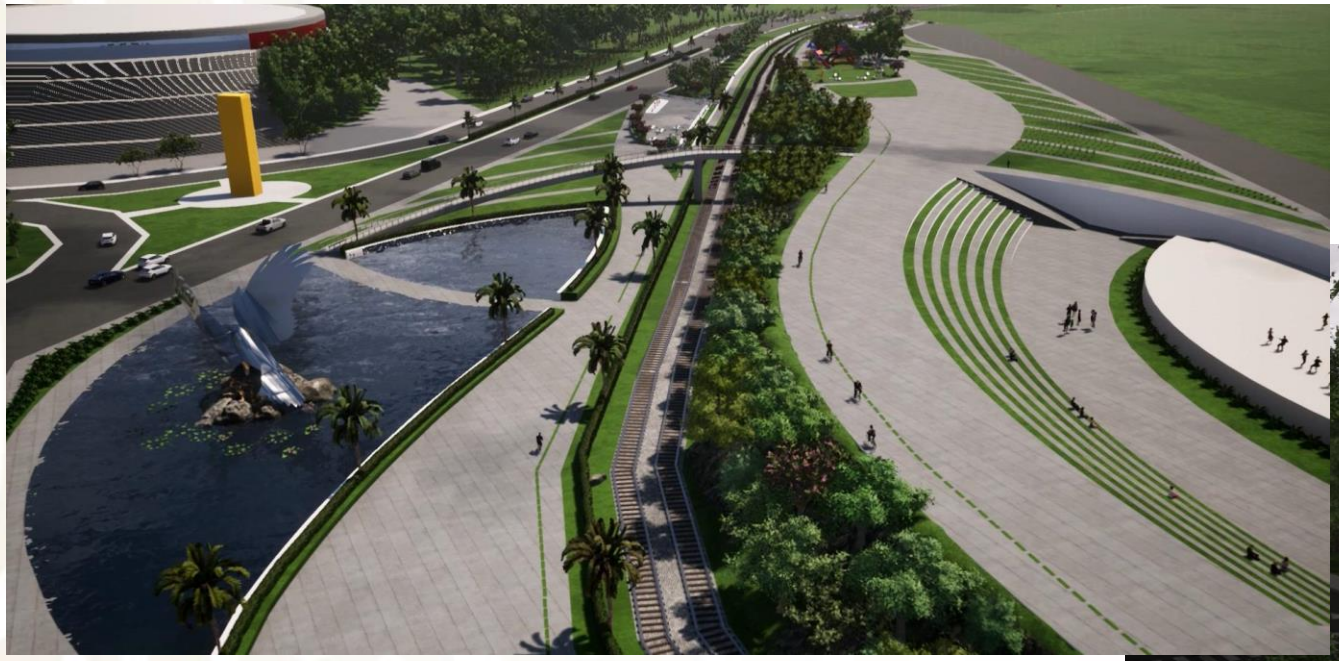
Zones communication



Source: Monterrey Commuter Train Project, 2021

Transit Oriented Development

Linear Park Concept for Xalapa Light Train Project



Source: Concept for Xalapa Light Train Project Contest

ARTF Strategy for CO_2 reduction

1. Implementation projects on existing railway assets (e.g. existing rights of way)
2. Optimizing the use of available rolling stock and railway infrastructure (e.g. improving slopes and curvatures)
3. Implementing new railway systems (e.g. commuter and intercity services) based on current technologies (even used diesel / diesel electric vehicles), but replacing inefficient modes of transport (e.g. buses trucks / cars / airplanes)
4. Detailing processes to make operations more efficient (e.g. optimize scheduling even length of trains for certain routes)
5. Implementing signaling and control systems to optimize railway operations (e.g. PTC)
6. Creating efficiency indicators and measuring the performance of the MRS
7. Replacing old rolling stocks and locomotives, focusing on energy consumption and CO_2 emissions – favoring contactless technology (e.g. batteries / hydrogen / etc. when they are already proven Technology at an accessible cost)
8. Promoting modal shift within the Secretariat
9. Actively coordinating land uses and urban / regional development with railway development with state and local authorities as well with other ministries in Mexico

ARTF ongoing projects aiming at CO_2 reduction

1. Estimation external costs reduction (e.g. road maintenance / accidents / emissions) of road transport by migrating users to the railway service.
2. Mathematical modelling of more efficient modal split and its impact (using electronic waybills form all modes of transport in Mexico).
3. Georeferentiation of Mexican railway externalities and determination of mitigation measures.
4. Comparison of environmental costs of construction and maintenance of land transport infrastructure and its carbon footprint.
5. Development of a carbon footprint calculator for rail transport (and its comparison to other modes) and design of an interactive Web page to analyze the railway carbon footprint and the assessment of compensation mechanisms.
6. Estimation of the potential reduction of the carbon footprint by optimizing the current rail systems of freight and passenger transport.
7. Methodology to estimate environmental impact indicators of the Mexican Railway System.

5 ANIVERSARIO ARTF

THANK YOU AND PROMOTE TRAINS!

COMUNICACIONES
SECRETARÍA DE COMUNICACIONES Y TRANSPORTES

ARTF
AGENCIA REGULADORA DEL TRANSPORTE FERROVIARIO

México 2021 Año de la Independencia

Railway Association of Canada

RIGHT TRACK

PEOPLE. GOODS. CANADA MOVES BY RAIL.

Ben Chursinoff, Policy Analyst & Program Coordinator

We’re the voice of Canada’s railway industry

Representing close to 60 freight and passenger railways

With 60 industrial railways and rail supply company members

Over 100 Million passengers annually

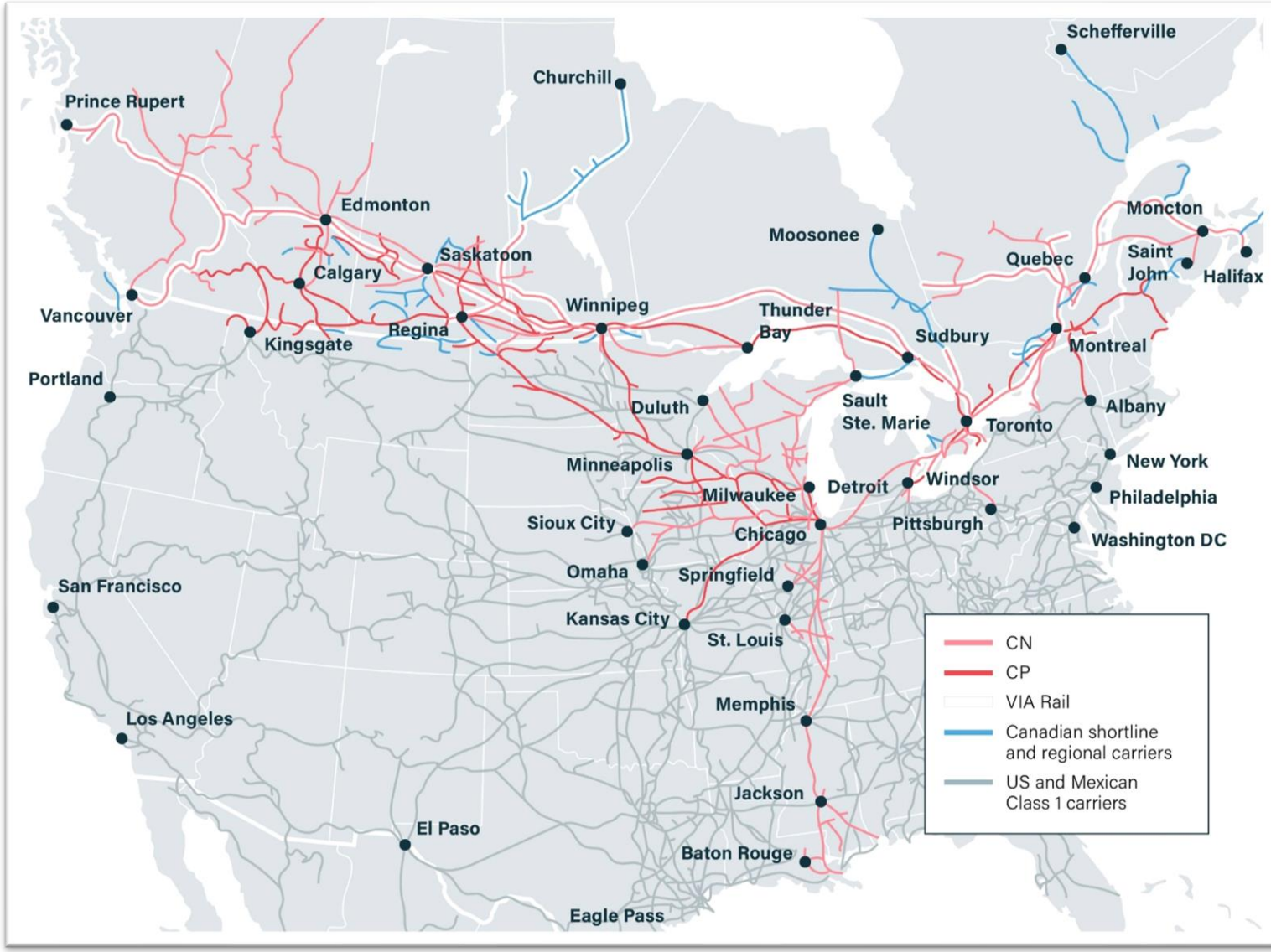
$320 billion worth of goods moved annually

Canada's Rail Network

5th largest network in the world

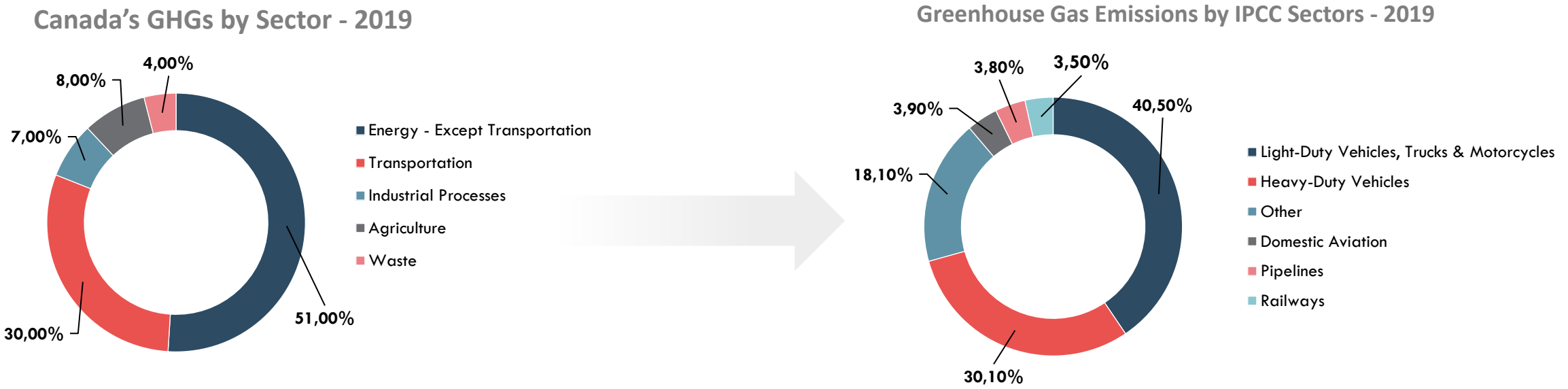
12% larger than highway system

Both Class I railways operate large U.S. networks



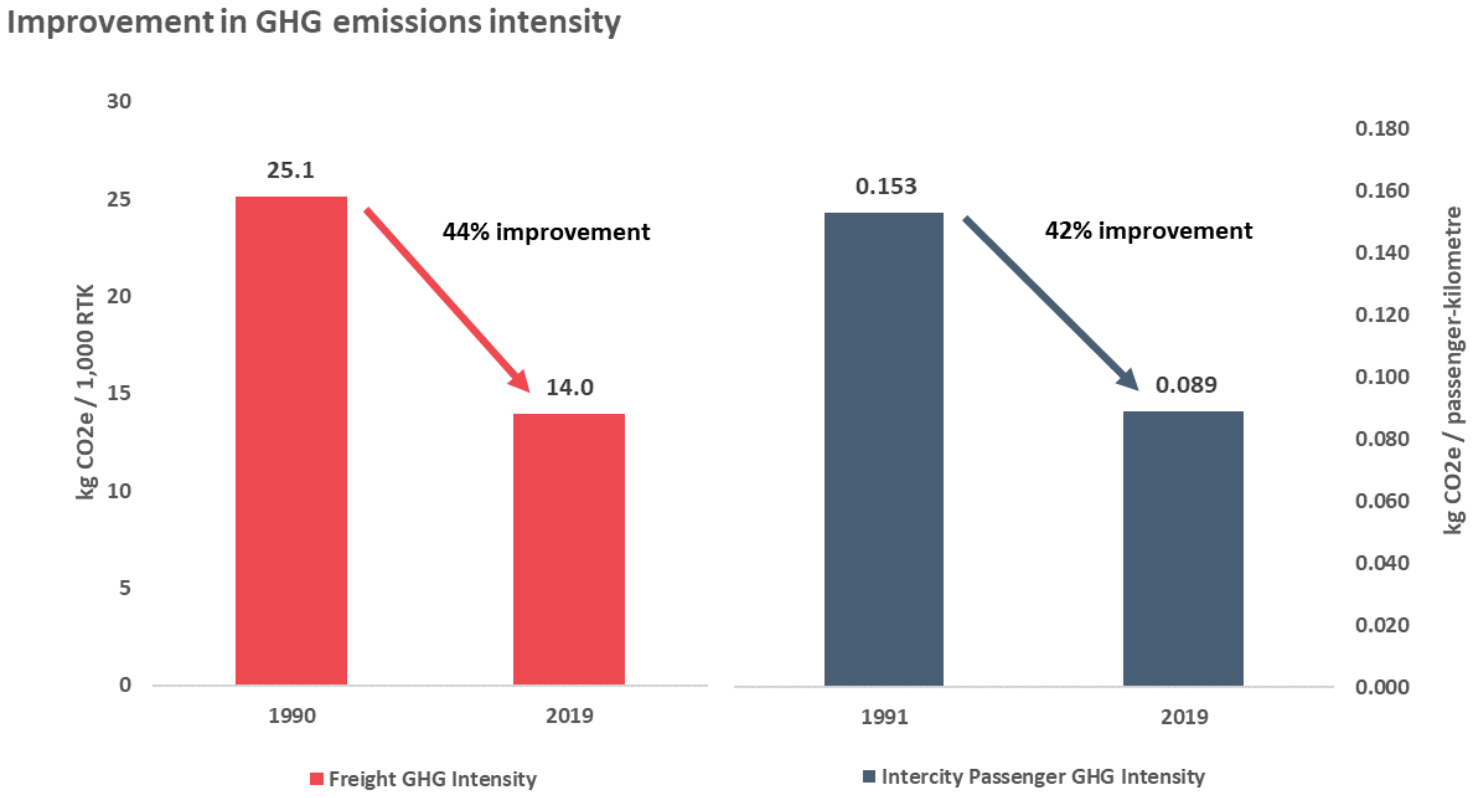
GHG by IPCC sector

- In 2019, the transportation sector accounted for 217 Mt (29.7%) of Canada's total 730 Mt of Co2e.
- Railways accounted for 7.7 Mt of Co2e – only 1 percent of Canada's total emissions, and less than 4% of total transportation emissions.



Note: Other includes propane & natural gas vehicles; off-road transportation; and marine.

Locomotive Emissions Monitoring

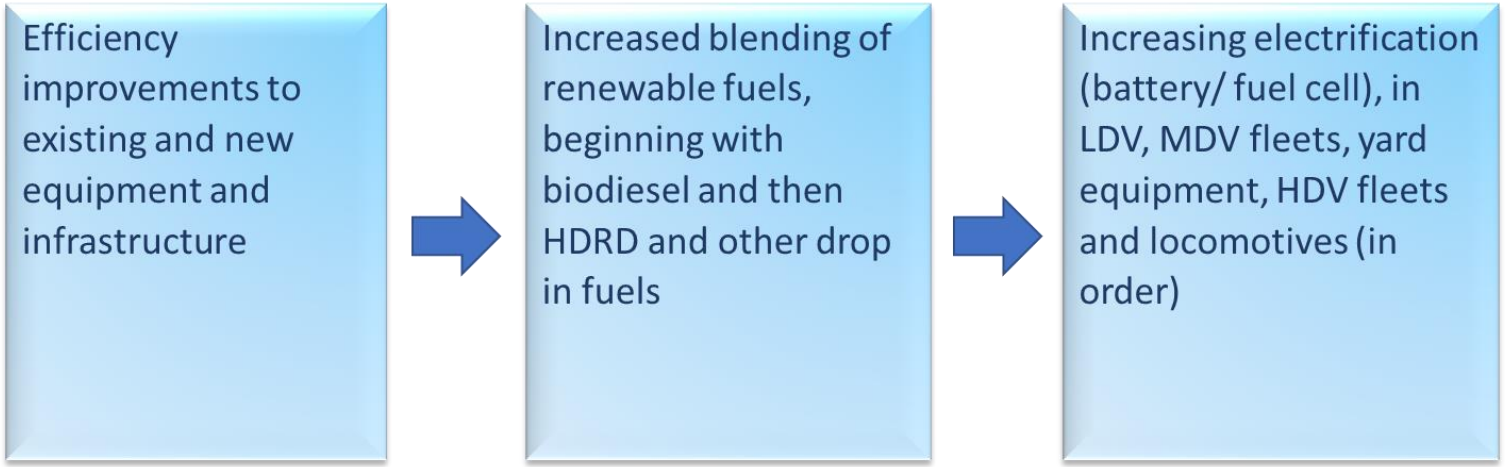


Since 1990/91, both freight and intercity passenger railways have improved their emissions intensities by over 40%.

Phase 1 – Landscape Document

- Partnership between RAC and its members, Transport Canada, Environment and Climate Change Canada, and Natural Resources Canada to identify further opportunities for decarbonization
- Objectives:
    1. Develop a common understanding of the current state of rail sector decarbonization in Canada, which can be used as a tool for collaboration between industry and government;
    2. Create a repository of current federal, provincial and territorial GHG reduction legislative instruments and activities impacting the rail sector; and
    3. Contribute to next-phase work on a roadmap to achieving future GHG reductions in Canada's rail sector.
- Phase 1 report - https://www.railcan.ca/wp-content/uploads/2021/06/Rail-Pathways-Initiative-Landscape-Document_FINAL.pdf

Rail decarbonization will look like…



Phase 2 – Rail Decarbonization Roadmap

- Objectives:

    1. Develop an analytical framework for assessing GHG reduction opportunities in Canada's rail sector.
    2. Identify and assess potential GHG reduction measures.
    3. Create a multi-stakeholder work plan for GHG reduction actions. 
    4. Develop and initiate a Roadmap implementation strategy

Analytical Assessment Framework

CP Hydrogen Powered Locomotives

(Pilot Project) Launched in the Fall 2020, CP plans to develop North America's first freight-line hydrogen-powered locomotive.

- Program aims to retrofit a freight-line locomotive with hydrogen fuel cells and battery technology
- Builds on prior experience with low-emitting locomotive technologies, including biofuels, compressed natural gas and battery-powered solutions.
- Field testing commencing Q1 2022

UBC Okanagan – SRY Switcher Locomotive

- Converting a switcher from diesel-electric to hydrogen-electric power
- Partnership between University of British Columbia Okanagan School of Engineering, Southern Railway of British Columbia Ltd., Loop Energy, and Hydrogen in Motion.
- Intended to demonstrate the viability of the technology, GHG reductions and impacts to community

Hydrail Railway Transition in Canada: Technological, Operational, Economical, and Societal (TOES) Barriers and Opportunities

- Transport Canada engaged a firm to assess the implications of a conceptual transition from diesel to hydrogen as the primary fuel to power Canada's railway services, inclusive of freight and passenger modes
- hypothetical transition model was constructed, consisting of a period of initial prototyping and testing of hydrail systems from present day to 2030, followed by a period of aggressive deployment to 2050
- The cost of a full transition scenario is estimated at $30 billion in locomotive and tender equipment and infrastructure
- The report suggests that a joint Canada-U.S. initiative involving government and industry would help advance commercialization, as the freight and passenger operations are continentally integrated.

Thank you - Merci

Railway Association of Canada

RIGHT TRACK

Comments or questions can be directed to:

Ben Chursinoff
Policy Analyst & Program Coordinator
bchursinoff@railcan.ca

Railway Association of Canada
99 Bank Street, Suite 901
Ottawa, ON K1P 6B9
(613) 564-8090
www.railcan.ca

INTERNATIONAL UNION
OF RAILWAYS

BNSF and Association of American Railroads

INTERNATIONAL UNION
OF RAILWAYS

Q&A

INTERNATIONAL UNION
OF RAILWAYS

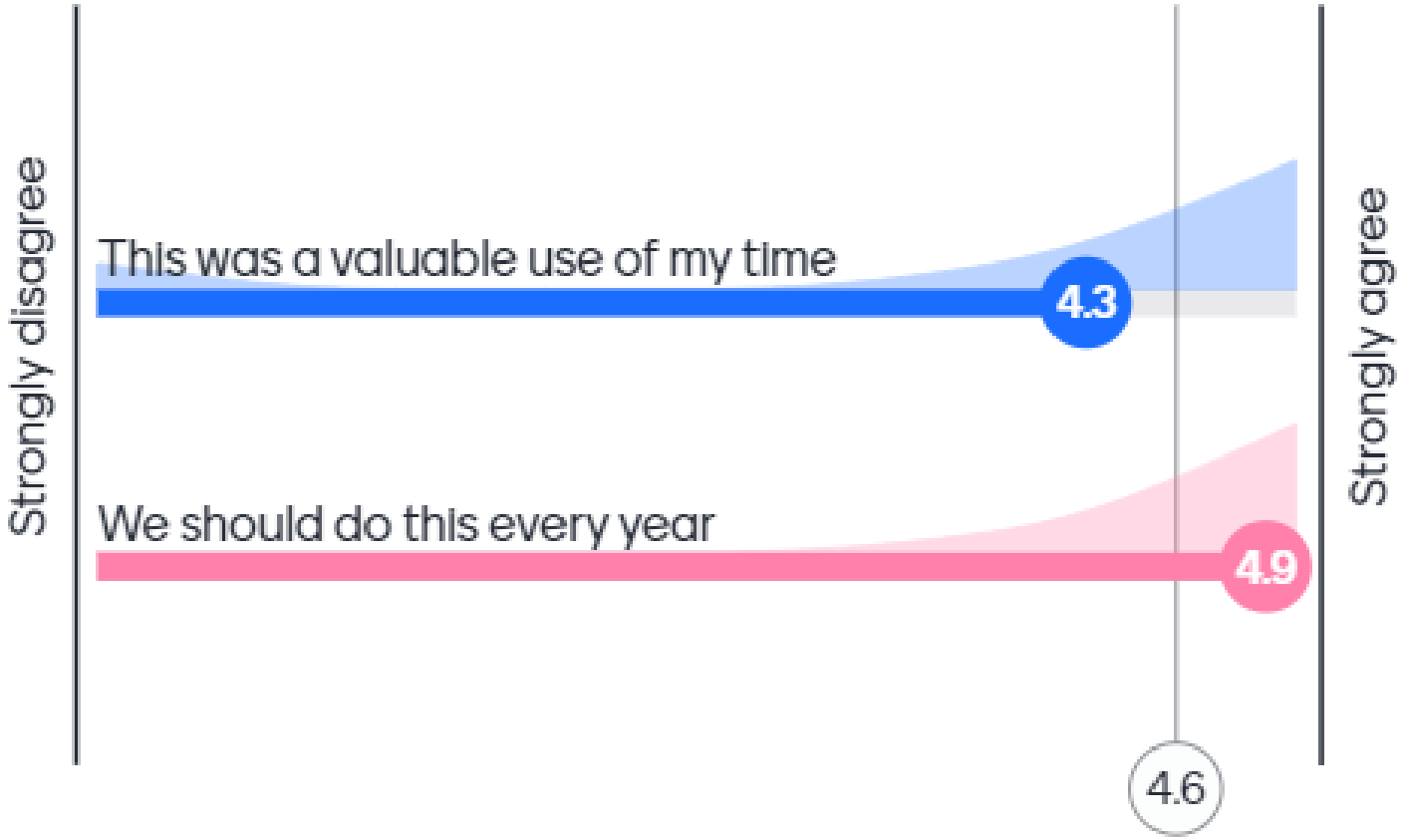
WEBINAR REVIEW

https://www.menti.com/7cv7jh23mt

Go to **www.menti.com** and use the code **2216 0037**

Webinar review

Mentimeter



INTERNATIONAL UNION
OF RAILWAYS

Stay in touch with UIC:

www.uic.org

#UICrail

sustainability@UIC.org

Thank you for your attention.