

STATE **FREIGHT** ADVISORY COMMITTEE



Welcome

April 3, 2024

1:00 PM – 4:00 PM Eastern

STATE **FREIGHT** ADVISORY COMMITTEE

Agenda

1:00 – 2:20 PM	Decarbonizing Urban Freight Panel
2:20 – 2:30 PM	Break
2:30 – 2:45 PM	Maryland State Update
2:45 – 3:00 PM	CSX Railroad Update
3:00 – 3:45 PM	SFAC Discussion

STATE **FREIGHT** ADVISORY COMMITTEE

Panel: Decarbonizing Urban Freight

Denise Kearns

Environmental Protection Specialist

EPA SmartWay Program

Freight movement and decarbonization in urban centers

Denise Kearns,
USEPA, Office of Transportation and Air Quality
SmartWay



Covered Today



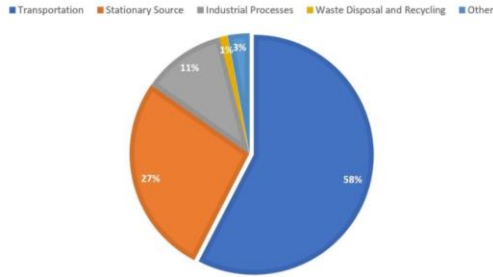
- Transportation, freight and hub emissions
- Public health and environmental impacts
- EPA SmartWay Transport Partnership
- EPA SmartWay Partners, Sustainability Programs
 - NFI
 - Uber Freight
 - Waste Management



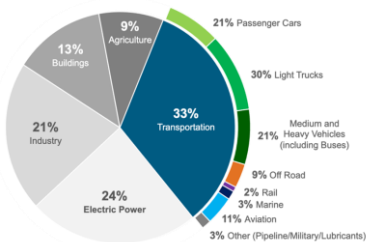
Transportation Emissions



TOTAL NATIONAL NOX EMISSIONS BY SECTOR, 2018



2019 U.S. GHG Emissions



Aviation and marine include emissions from international aviation and maritime transport. Fractions may not add up to 100% due to rounding.

Transportation

- Largest source of NOx emissions (~60%)
- Largest source of GHG emissions (29%)
- Source of particulate matter and other harmful emissions

Onroad Freight

- Onroad HD/MD trucks
 - ~ 50% of NOx emissions
 - ~ 25% of transportation GHG emissions
- Heavy-duty, line haul trucks
 - ~ 60% of NOx emissions;
 - ~ 65% of GHG emissions
- Vocational vehicles
 - ~ 20% of GHG emissions
- Delivery and service
 - ~ 15% of GHG emissions

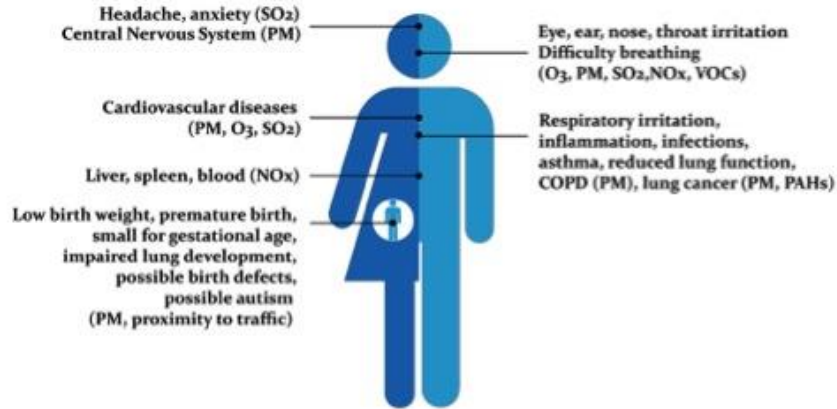
Offroad, Rail, Marine, Aviation

- Significant source, NOx, PM
- ~ 25% of transportation GHG emissions

Source: U.S. Environmental Protection Agency

Criteria pollutants and health effects

Health Effects of Air Pollution



Freight hubs, like ports, warehouse districts, and other transportation centers are a significant source of transport emissions.

These hubs and corridors are often near or adjacent to disadvantaged, low-income communities.

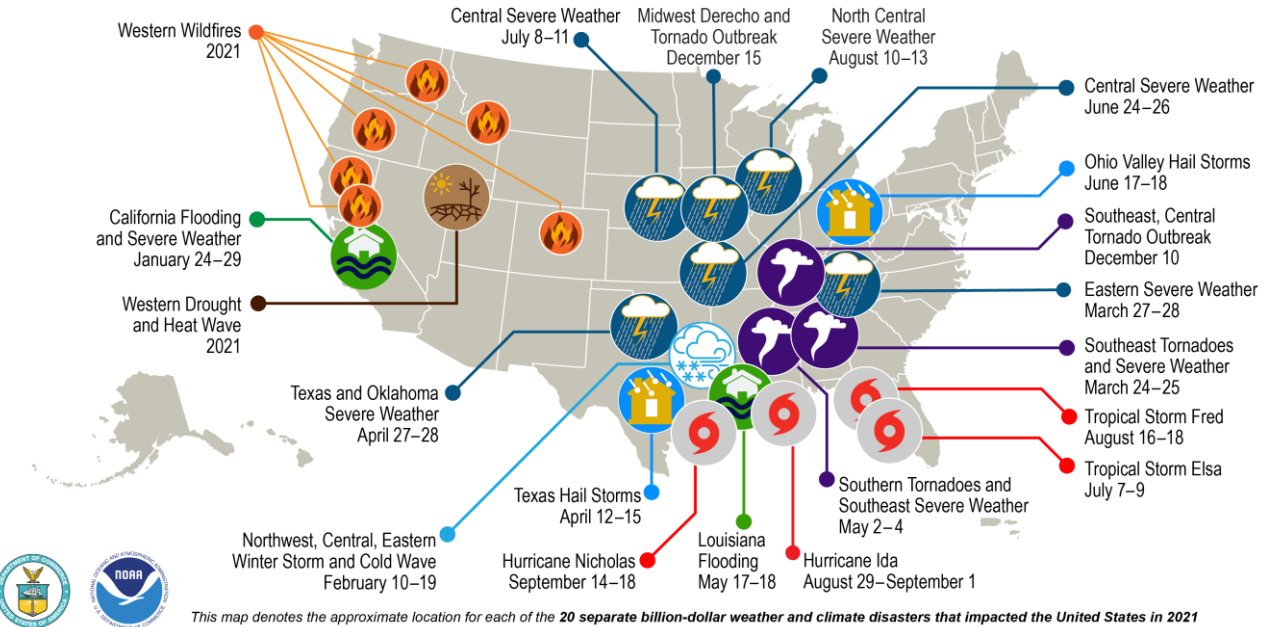
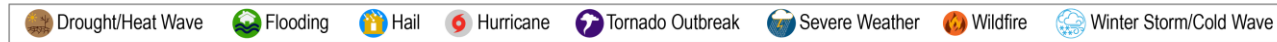
By 2050, 89% of the U.S. population is projected to live in urban areas, where pollution-related health conditions are more common.

Source: United Nations Population Division, World Urbanization Prospects

Increasing greenhouse gases may exacerbate severity of extreme weather events



U.S. 2021 Billion-Dollar Weather and Climate Disasters

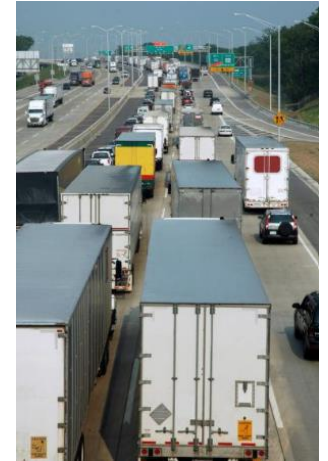


This map denotes the approximate location for each of the 20 separate billion-dollar weather and climate disasters that impacted the United States in 2021

Freight emissions: public health and climate impacts



- 🌿 Near-port, railyards, inland ports, bus depots, near-road
 - Criteria pollutants disproportionately impact public health in disadvantaged communities
- 🌿 Weather, drought, flood impacts of climate change on freight networks
 - Supply chain disruptions
 - Road, bridge, highway closures
 - Widespread, +vulnerable communities



SmartWay overview



 Launched by freight industry leaders in 2004 as a voluntary market-based program aiming to:

- Improve U.S. freight efficiency, lower emissions impact
- Highlight freight industry's efforts to reduce emissions
- Provide partners with tools for purposes of standardized emissions benchmarking, reporting system
- Clean America's air, reduce dependence on oil



Light Duty
Class 2b-3



Medium Duty
Class 4-6



Heavy Duty
Class 7-8



Rail,
Intermodal



Barge, Ocean
Going Vessels



SmartWay Partners



- More than 4,000 Partners
 - Truck, Rail, Air, Marine Carriers
 - Logistics Companies
 - Shippers
- Emissions Accounting, Benchmarking, Disclosure
- Efficiency, emission reduction strategies
 - Alternative Fuels
 - Intermodal
 - Digitization
 - Collaboration

Unlock sustainability in transport and logistics



NFI, SmartWay Carrier Partner



NFI Industries

- Carrier partner, early adopter, 20 years
- 4,500+ tractors, 12,500+ trailers
- 60 Battery Electric Dray Trucks, Yard Trucks

Battery Electric Truck Collaboration

- Volvo Lights: Volvo, South Coast AQMD, NFI Dependable, Ports of LA/LB, Southern Cal Edison, Hondo College, Greenlots + more
- Joint Electric Truck Scaling Initiative (JETSI): NFI, DTNA CARB, CEC, South Coast AQMD



SMARTWAY
AWARDEE,
HIGH
PERFORMER



Uber Freight, SmartWay Logistics Partner



Uber Freight

- SmartWay logistics partner (freight broker), early adopter, SmartWay partner since inception (7 years)
- Over \$17 billion freight under management, logistics platform



Using big data to assess, provide carriers, shippers with more sustainable options

- WATT EV, CHEP
- Greenlane, DTNA, Blackrock Financial



Waste Management, SmartWay carrier partner



Waste Management

- SmartWay carrier partner, early adopter (14 years)
- ~22,00 waste collection and transfer vehicles

 12,000 Natural Gas (NG) Vehicles

 194 NG fueling stations (28 public)

 Increasing use of Renewable Natural Gas (RNG), NG drop-in replacement

- RNG fuels nearly 55% of CNG fleet



Questions?



Denise Kearns

734-214-4240

kearns.denise@epa.gov



William H. Robertson, PhD

Vehicle Program Specialist, Mobile Source Control Division
California Air Resources Board (CARB)



Decarbonizing Urban Freight: Holistic Approach to Protect Public Health

William H. Robertson, Ph.D., Vehicle Program Specialist, Mobile Source Control Division
Maryland State Freight Advisory Committee Meeting, April 3, 2024

Importance of Freight in California

**1/3 of
California GDP**

5 million jobs



California's Environmental Leadership



100% ZEV sales by 2035

Full transition to

ZEV drayage trucks by 2035



Full transition to **ZEV buses & heavy-duty long-haul trucks**

by 2045*



Full transition to

ZE off-road equipment

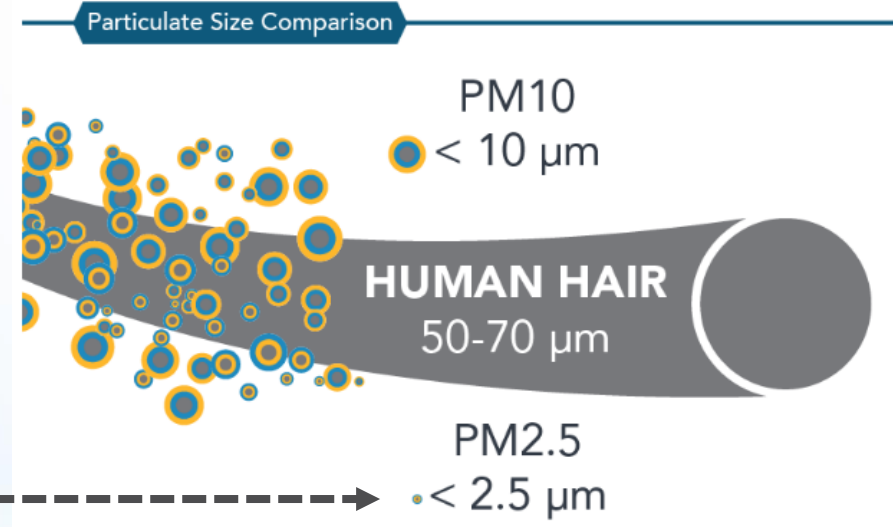
by 2035*

*where feasible

Diesel Exhaust

Diesel exhaust is a complex mixture of:

- Diesel particulate matter (DPM)
 - Subset of PM_{2.5}
 - Over 40 known cancer-causing compounds
- Gaseous pollutants, including:
 - Volatile organic compounds
 - Oxides of nitrogen (NO_x)



<https://ww2.arb.ca.gov/resources/overview-diesel-exhaust-and-health>

<https://ww2.arb.ca.gov/resources/inhalable-particulate-matter-and-health>

Equity and Health Benefits

In-Use Locomotive Regulation

- \$32.0 Billion Health Savings in California

Advanced Clean Trucks Regulation

- \$8.9 Billion Health Savings in California

Advanced Clean Fleets Regulation

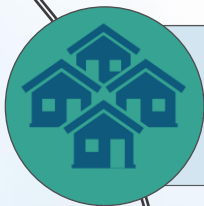
- \$26.5 Billion Health Savings in California

Transportation Refrigeration Unit Regulations

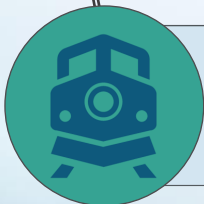
- Under development



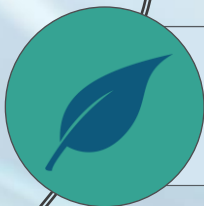
In-Use Locomotive Regulation



Prioritize emission reductions in communities disproportionately impacted by locomotive emissions



Decrease locomotive emissions by increasing turnover to Tier 4 and cleaner locomotives



Move toward Zero Emission Locomotives in California

Advanced Clean Trucks Regulation

- Part of a holistic approach to accelerate a large-scale transition of zero-emission medium-and heavy-duty vehicles from Class 2b to Class 8.

Manufacturer
Sales Requirement

Increasing percentage ZE truck sales from 2024 to 2035

Reporting
Requirement

Identify future strategies

Advanced Clean Fleets Drayage Truck Requirements



- Legacy trucks may operate until the end of their useful life
- Must visit a regulated seaport or railyard at least once a year
- May use limited extensions

Transportation Refrigeration Unit (TRU) Airborne Toxic Control Measure

- Adopted in 2004, amended 2010, 2011, 2022
- Transition diesel-powered TRUs to zero-emission in two phases:
 - TRU Part 1 (2022 Amendments)
 - Zero-emission truck TRUs
 - Other key requirements
 - TRU Part 2 (Initial Planning)
 - Zero-emission non-truck TRUs



California's Indirect Source Rules

PR 2304 - Ports

- Sets further emissions reduction targets
- Require ZE infrastructure planning and implementation
- Compliance flexibility

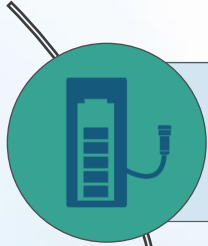
Rule 2305 - Warehouses

- Requires large warehouses to offset pollution from truck traffic and other warehouse operations
- Points based system and can be earned multiple ways

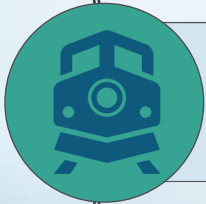
PR 2306 - Railyards

- Facility-based emission reduction target
- ZE infrastructure planning and deployment
- Compliance flexibility built in

Port Infrastructure Upgrades



Provide important resources to accelerate port modernization

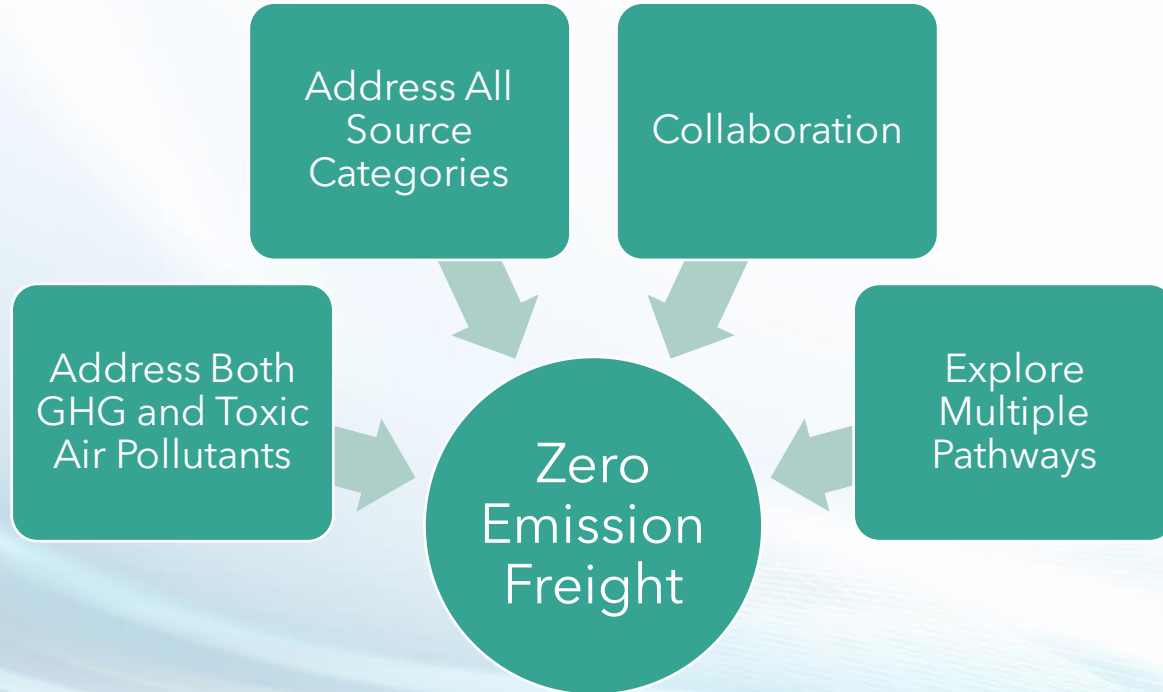


Improve the efficiency of goods movement



Reduce harmful environmental effects experienced by port-adjacent communities

Holistic Approach to Address Emission Near Communities



Contact

freight@arb.ca.gov

Q&A

Aravind Kailas, PhD

Advanced Technology Policy Director
Volvo Group North America

V O L V O

DECARBONIZING URBAN FREIGHT

MD State Freight Advisory Committee

Aravind Kailas, Ph.D.

Volvo Group

2024-04-03

Trucks, buses, construction eqpt. and marine and industrial engines

Complete solutions for financing and service



Our unique position in electric mobility

In addition, the Volvo Group has created a new business area, Volvo Energy, dedicated to accelerating electrification



Volvo LIGHTS provided a pathway to commercialize the Volvo's electric truck

Many battery-electric Class 8 trucks operating in diverse, revenue-generating, customer operations today – we want this to go up!



Enablers that are driving commercial technology transformation

A good combination of robust state funding, commitment, and workforce

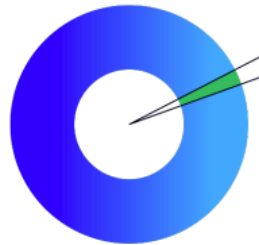
- California's multi-year investments and utility programs
 - HVIP
 - VIP, Carl-Moyer
 - Grant projects from California Air Resources Board (CARB) and California Energy Commission (CEC)
 - Low Carbon Fuel Standard
 - EnerGIIZE
 - Utility make-ready (at least through 2026)
 - Electric tariff rule 29
- California's commitment to zero-emission vehicles and clean air
- California's growing technical workforce

The infrastructure challenge

The country's infrastructure readiness, ZEV-focused goals, and enabling regulations are not in sync

MHD ZEV deployments
currently outpace
infrastructure
readiness

60,000



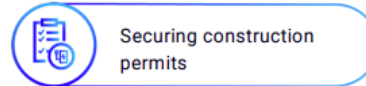
Less
than 10

Support Class
8 ZEVs¹

¹ https://afdc.energy.gov/stations/#/analyze?country=US&fuel=ELEC&ev_levels=all

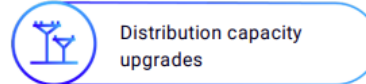
Building ZEV infrastructure takes time²

1-2
Years



Securing construction
permits

3-5
Years



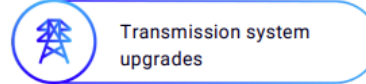
Distribution capacity
upgrades

7-10
Years



Building new substations

10+
Years



Transmission system
upgrades

² <https://efiling.energy.ca.gov/GetDocument.aspx?tn=250051&DocumentContentId=84769>

Deployment of charging infrastructure is expensive and will take time

Charging infrastructure projects are massive construction projects



0 months

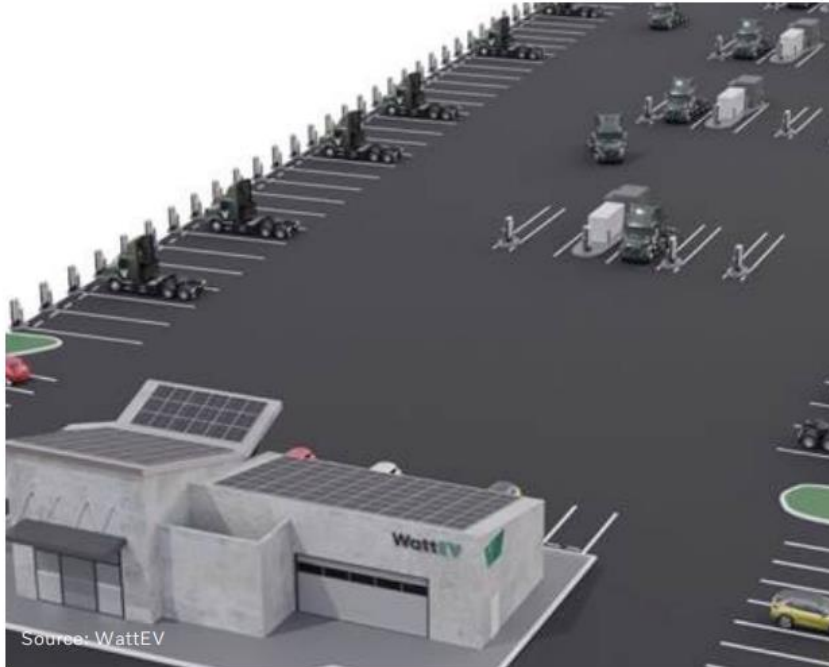
12+ months

Problem Statement: We need power – now



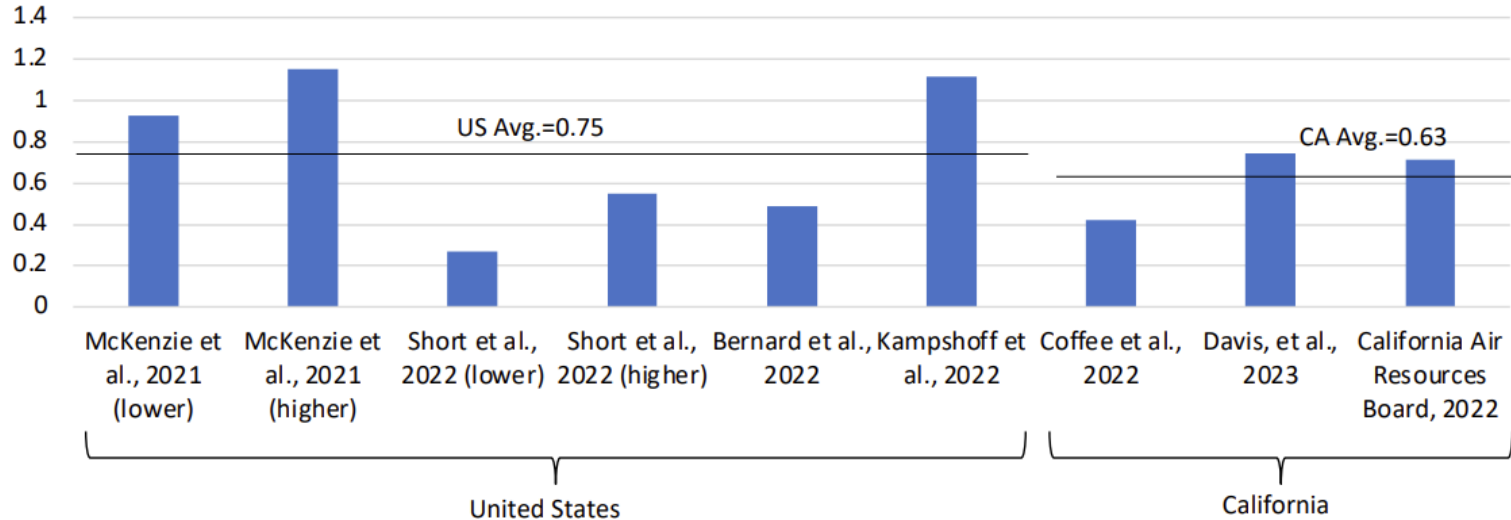
- Sold electric trucks are stacking on factory and dealer lots, waiting for delivery to fleet customers because they can't get power to charging infrastructure.
- Jan. 1 this year: CARB's Advanced Clean Trucks Rule (ACT) requires MHD truck OEMs to make and sell electric trucks.
- Jan. 1 this year: CARB's Advanced Clean Fleets Rule (ACF) requires large fleets to buy electric trucks.
- The delay in energizing truck charging infrastructure poses two significant risks:
 1. Truck OEMs and fleets will struggle to meet their compliance obligation timelines.
 2. Long-term delays in compliance pose a threat to reaching state goals.

Every site is a snowflake



Survey of charger-to-electric truck* ratios

Level-setting efforts are needed to inform future research



Review of California and the United States Medium- and Heavy-duty Electric Truck Charger Assessment to 2030, Hong, et al., *working draft*

* Class 2b-8 vehicles

What else is needed?

We can get there by working across sectors and with greater collaboration with the private and public sectors

- Access to timely and reliable charging infrastructure
 - Faster and streamlined interconnection/energization processes
 - Pre-building for anticipated transportation electric loads
- Resolving other macro issues
 - Strained supply chain for electric trucks, chargers, and utility infrastructure
 - Underdeveloped workforce to support truck and charger uptime
- Enhancing fleet awareness when it comes to charging infrastructure projects
- Payload parity between electric and diesel trucks
- TCO parity with diesel truck-based operations
 - Interdependent charging factors - charging rates, impact on batteries, energy costs, etc.
 - Residual value are unknown today – marketplace and speed of technology development will determine this
 - Maintenance costs (for trucks and chargers) are unknown

Getting it built and energized

Understanding existing policies will guide future research

- A solution: Powering Up Californian Act (California SB 410)
 - Directs utilities to do everything needed to prepare the grid for the transportation and building electrification needed to meet "state decarbonization goals and federal, state, regional, and local air quality and decarbonization standards, plans, and regulations."
 - Sets a deadline for the California Public Utilities Commission (CPUC) to establish average and maximum target interconnection timelines, holds utilities accountable to those deadlines
 - Requires the utilities to train and hire the workforce necessary to electrify everything
 - Requires utilities' future grid planning and investment to align with federal, state, regional, and local decarbonization and air quality goals, standards, and regulations
 - Provides for cost recovery of the associated investments between general rate case cycles



PACT

Powering America's Commercial Transportation

The voice for zero-emission vehicle infrastructure

Powering America's Commercial Transportation (PACT)

Accelerating the adoption of medium- and heavy-duty (MHD) ZEVs by overcoming barriers to the deployment of infrastructure



Collaborate

Convening cross-sector stakeholders whose operations would benefit from a streamlined approach to deploying ZEV infrastructure



Educate

A multi-channel approach to inform stakeholders about the state of ZEV infrastructure and installation challenges fleets face



Advocate

Specific policies, regulations, and funding are needed to support the deployment of reliable ZEV infrastructure for commercial fleets













Lead

Share best practices to launch and execute commercial ZEV infrastructure projects

PACT Founding Members

Diverse coalition of OEMs, charging technology providers and developers, commercial fleets and electric utilities

			
<p>DAIMLER TRUCK North America</p>			
			
<p>V O L V O</p>			

V O L V O

THANK YOU

aravind.kailas@volvo.com

STATE **FREIGHT** ADVISORY COMMITTEE

Break: Stretch, Coffee, Well-Being

Tim Shepherd

Maryland Department of Environment

Overview and Update: Maryland Clean Trucks Act



Maryland
Department of
the Environment

Advanced Clean Trucks





New Vehicle Emission Regulations

- The Clean Trucks Act of 2023 required the Department to adopt California's Advanced Clean Trucks (ACT) Program by the end of calendar year 2023.
- ACT is one of California's vehicle emission regulations.
 - California is the only state authorized to set vehicle emission standards
 - Section 177 of the Clean Air Act allows other states to adopt California's standards if they are identical
- The regulation would take effect for the 2027 Model Year. The Clean Air Act requires two MY lead time for vehicle manufacturers.
 - Adopting through Incorporation by Reference the same way Clean Cars Program was adopted.

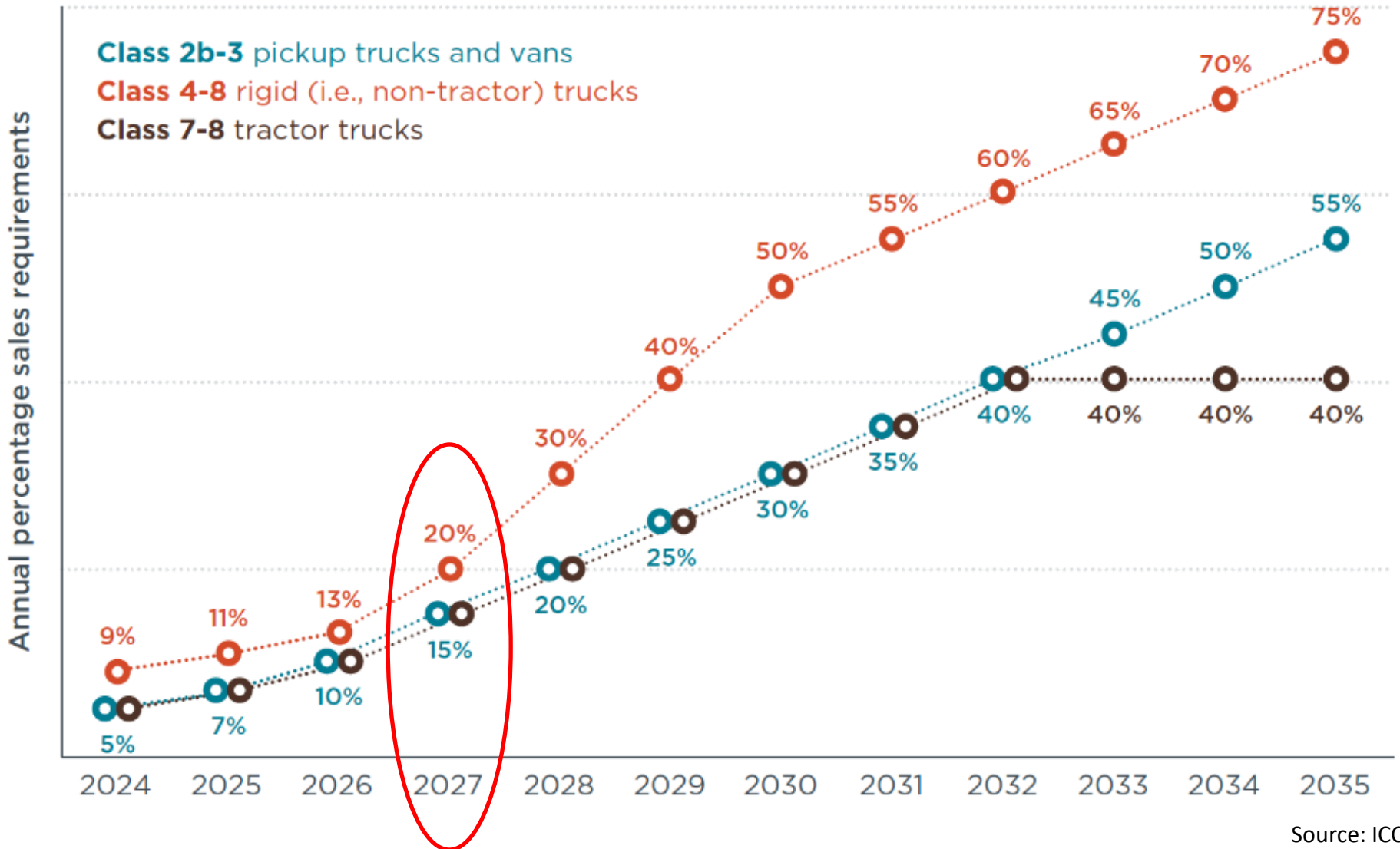


California ACT

- The Advanced Clean Truck (ACT) Regulation requires a growing percentage of medium- and heavy-duty vehicle sold to be zero emission.
 - Vehicles with a GVWR over 8,500 lbs.
 - Class 2b – Class 8 vehicles.
- ZEV sales are phased-in beginning in MY 2024 (2027 for MD) and increase through MY 2035, remaining constant thereafter.
- Similar credit, banking, and trading program as light-duty manufacturers have under the Advanced Clean Car.































Advanced Clean Truck (ACT) Program





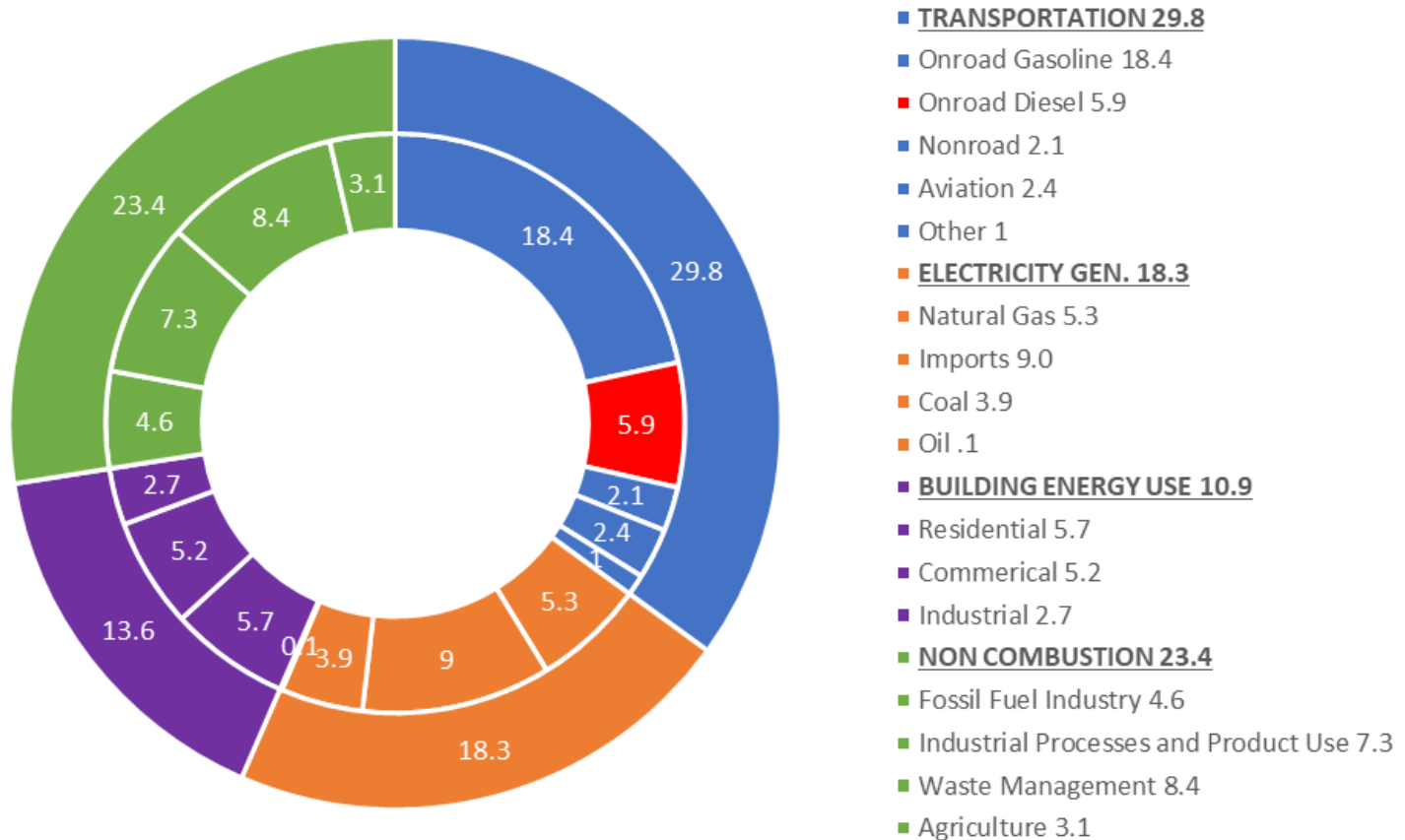
Medium/Heavy-Duty Trucks

 Minivan	 Utility van	CLASS 1 6,000 lb & less	 Bucket	CLASS 5 16,001 to 19,500 lb	
 Multi-purpose	 Full-size pickup		 City delivery		 Large walk-in
 Minivan	 Utility van		 Beverage		 Single-axle van
 Full-size pickup	 Step van		 School bus		 Rack
 Walk-in	 Conventional van	CLASS 3 10,001 to 14,000 lb	 Refuse	CLASS 7 26,001 to 33,000	
 City delivery			 Furniture		 Medium conventional
			 City transit bus		
 Conventional van	 City delivery	CLASS 4 14,001 to 16,000 lb	 Dump	CLASS 8 33,001 lb & over	
 Large walk-in			 Heavy conventional		 Cement



Greenhouse Gas Emission in Maryland

2020 GHG Emissions in Maryland
(85.06 Million Metric Tons of CO2 equivalent)

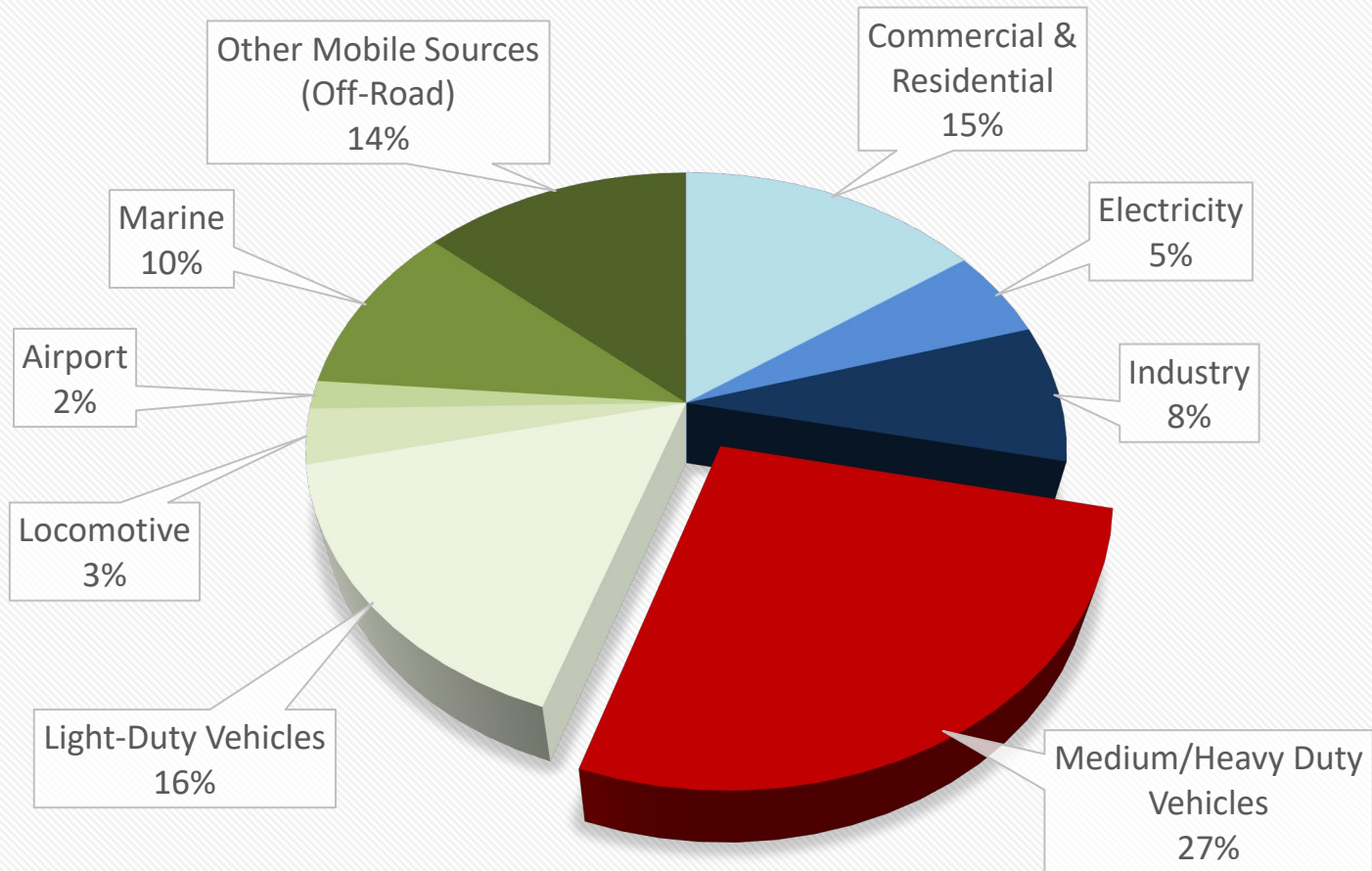


Source: Maryland 2020 Greenhouse Gas Inventory



Air Quality Impacts

NOx Emission by Sector in 2022





COMAR 26.11.43

- On December 25, 2023, MDE adopted COMAR 26.11.43 Advanced Clean Trucks Program
- The new chapter covers the implementing ACT regulations as well as the Incorporated by Reference documents in 26.11.43.02
- MDE proposes to allow manufacturers to earn early compliance credits beginning with the 2026 MY.
 - This will help encourage manufacturers to place zero emission trucks in Maryland a year earlier, improving overall emission benefits of the program.



Next Steps

Needs Assessment and Deployment Plan

- Required by *Clean Trucks Act of 2023*
- MDE, MDOT, DGS, MEA, and PSC will assess: fueling/charging demands & infrastructure; necessary fueling/charging stations; purchase incentives; state fleet transition.
- Report is due December 1, 2024
- Program may be delayed based on Report

Model Year 2027 (*calendar year 2026*): Regs begin implementation



QUESTIONS?

Rebecca Hensley

Senior Manager of Environmental Programs
CSX Transportation

CSX SUSTAINABILITY

Rebecca Hensley, CSXT Sr Manager Environmental Programs

CSX CARBON REDUCTION STRATEGIES



2030 Science Based Targets

- Reduce GHG intensity by **37.2%** from 2014
- GHG Scope 2 – **reduce by 50%**
- Decrease solid and hazardous waste
- Expand engagement with supply chain

CSX Pathways

- **Technology** innovation across the company
- **Alternative fuels** and locomotive fleet
- Continue to expand **engagement with supply chain**
- Opportunities to **partner with external stakeholders**
- Investigate & Invest for **Scope 2 reduction**
- Develop **carbon reduction** strategies

BIODIESEL TESTING IN TAMPA, FL



Ten FDL Advantage Locomotives

- 20% blend of B100 with diesel
- 20% reduction of CO2 towards Carbon Intensity target
- Captive service to maintain control

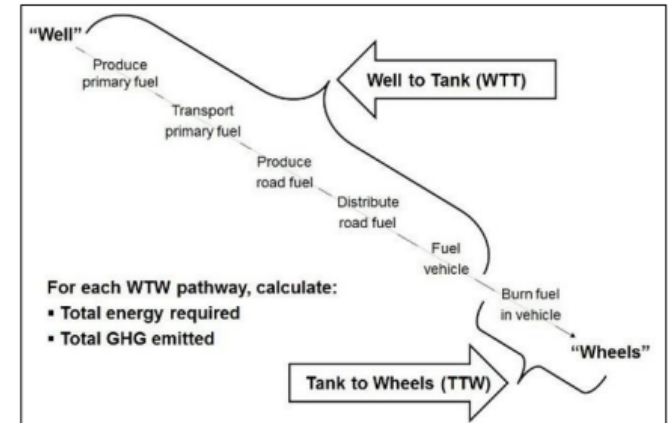
Project Support and Partnerships

- Wabtec engine services
- **Procurement** for fuel supply
- Fuel testing
- CSXT **Mechanical** Department
- Mosaic service area



BIODIESEL PROJECT CONSIDERATIONS

- Biodiesel supply into Tampa, FL market
- Captive locomotive operations
- Proximity for locomotive maintenance and testing
- Carbon accounting for biodiesel feedstock
 - How to track all deliveries?
 - Consideration for Scope 3 emissions "Well-to-tank"
- Other beneficiaries for carbon reductions?



Three Wabtec FLXswitch Locomotives

- Three 6 axle BEL units, one charger – replacing non tiered engines
- Zero-emissions switching and local rail operation
- CRISI grant awarded Sept 2023 with MD DOT
- 2026 delivery



Zero-Emissions locomotives

- **1,530 tons CO₂ / yr**
- **71 tons NO_X / yr**
- **3.43 tons PM-2.5 / yr**
- **70% noise reduction**

**Current Switchers are uncontrolled Tier and consume 50,000 gal/yr diesel fuel and 8,000 usage hours*

Carbon Savings Equivalent to 52,144 cars off the road, or the amount sequestered by 286,391 acres of forests

CRISI PROJECT CONSIDERATIONS

- “Rehabilitating, remanufacturing, procuring, or overhauling locomotives, provided that such activities result **in a significant reduction of emissions.**” That eligibility is defined in Section C(3)(A)(xvi) of the Notice of Funding Opportunity (“NOFO”), document 2022-1900
- **Project Alignment** for climate change and sustainability
 - Executive Order 14008: Tackling the Climate Crisis at Home and Abroad; Justice40 Initiative
 - FRA Industry Climate Challenge
 - MD Climate Solution Now Act (2022)
 - MD DOT Sustainability Objectives
 - MD Air Quality Planning Program
 - MD Climate Change Program
 - MD Air Quality
 - CSX ESG Objectives

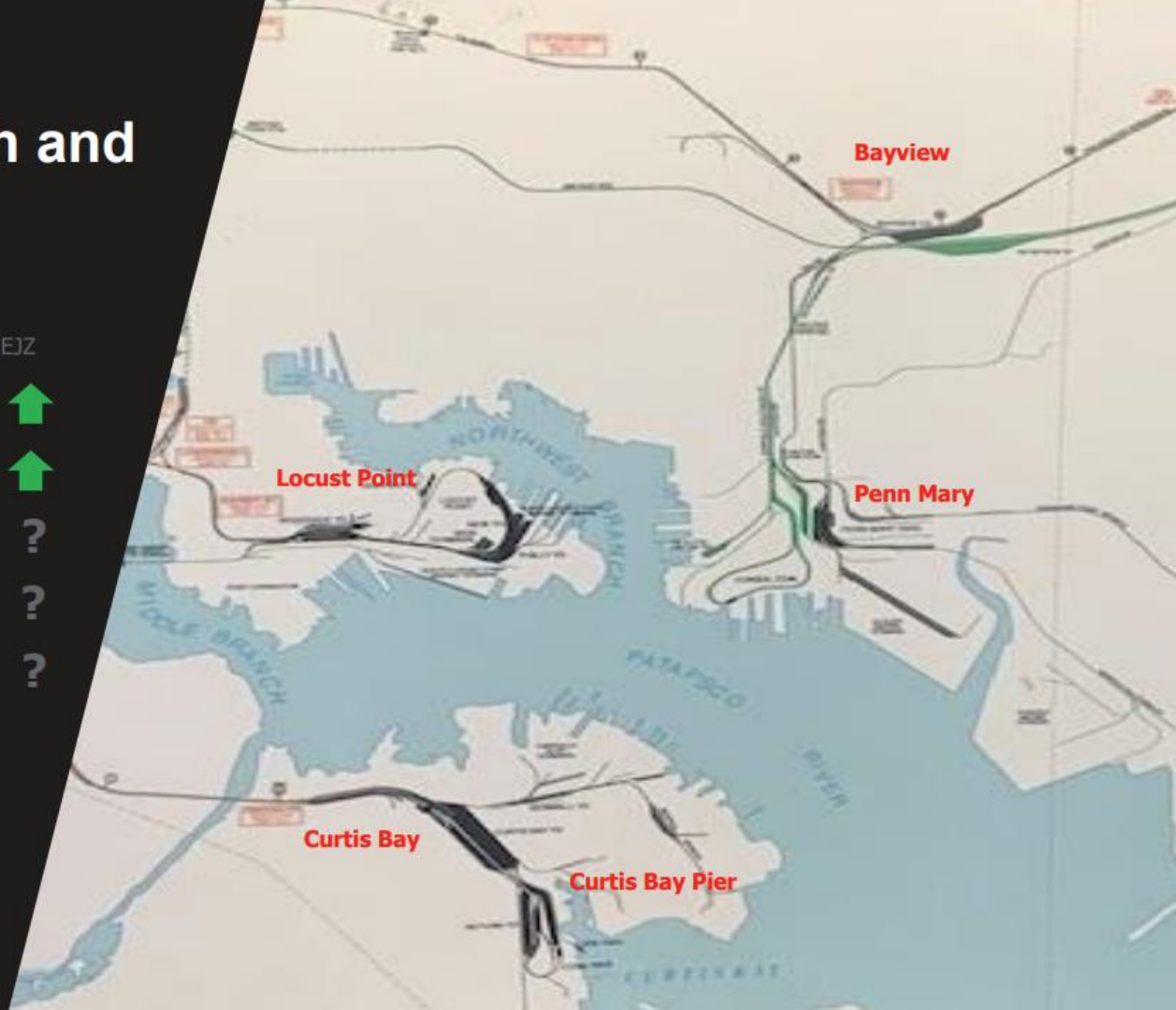
FRA’s Rail Industry Climate Challenge – April 22, 2022

“FRA commits to supporting innovation in the rail industry to keep rail one of the most sustainable transportation choices. Together, we will expand access to passenger and freight rail, ensure that they are powered by environmentally-friendly technologies, and eliminate emissions across the rail supply chain.”

———— Amit Bose, FRA Administrator ————

CSX Baltimore Switch and Local Operations

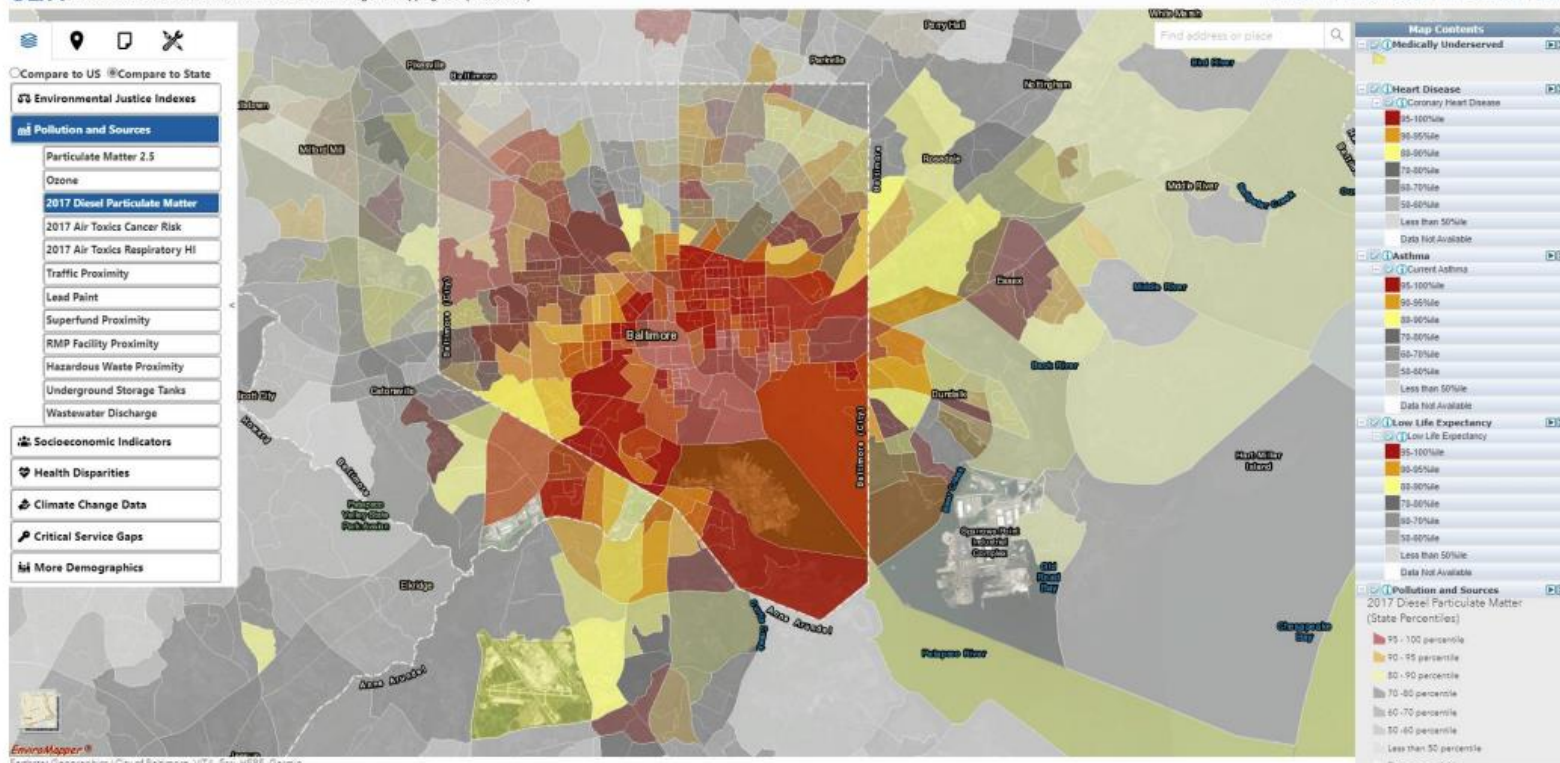
	Operational Feasibility	Electrical Infrastructure	Charging Space	EJZ
Curtis Bay Pier	↑	↑	↑	↑
Curtis Bay	↔	↔	↑	↑
Bayview	↑	↓	↑	?
Penn Mary	↑	↓	↓	?
Locus Point	↔	?	?	?



CSXT BALTIMORE - ENVIRONMENTAL JUSTICE REVIEW

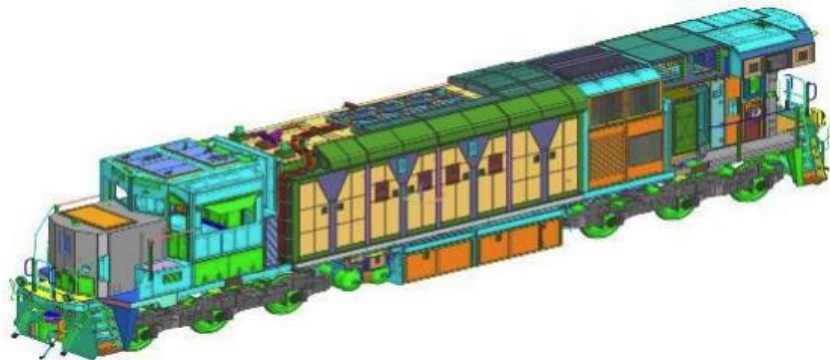
EPA EJScreen EPA's Environmental Justice Screening and Mapping Tool (Version 2.0)

EJScreen 1.0 | EJScreen Website | Mobile | Glossary | Help



ROAD TO CARBON-ZERO LOCOMOTIVES

WABTEC – FLXswitch



BATTERY DETAILS

BATTERY CAPACITY 2.7+ MWHRS*

NMCA BATTERY CHEMISTRY

WABTEC INTEGRATED BATTERY SYSTEM



**2.7MWHRS is the equivalent of ~50 Tesla's*

LOCOMOTIVE DETAILS

STANDARD SWITCHER FEATURES/CAB

SERVICE PROVEN EVO LOCOMOTIVE SYSTEMS

REGIONAL SERVICE READY

LEAD UNIT CAPABLE

FULL DIGITAL PRODUCT SUITE AVAILABLE

TE = 200KLBF STE / 155KLBF CTE
~2X THAT OF A STANDARD SWITCHER

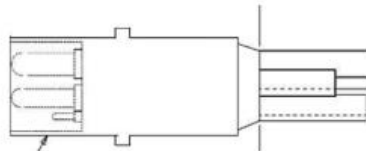


LEVERAGING SERVICE-PROVEN EVO SYSTEMS TO MAXIMIZE RELIABILITY & MINIMIZE LIFE-CYCLE COST IN A SWITCHER / REGIONAL PLATFORM

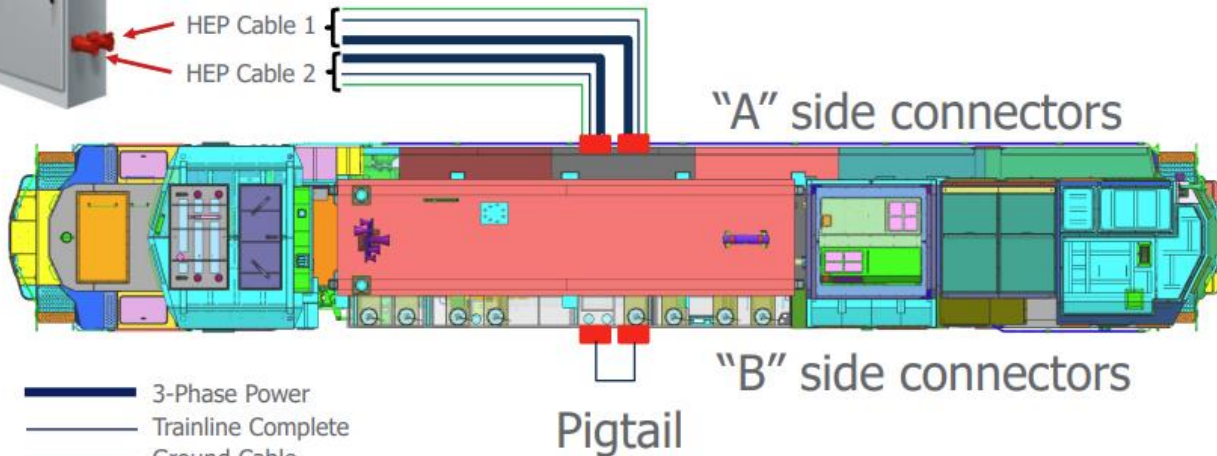
Plug-In Charger

6 pin "Cadillac" Connector

- 400A rated
- 3 pins for 3 phase for 480v (400v) supply
- 3 pins for Trainline Control (TLC)
- Control pins: "Last make first break"



HEP Cable 1
HEP Cable 2



"A" side connectors

"B" side connectors

Pigtail

- 3-Phase Power
- Trainline Complete
- Ground Cable

HEP Style Connector and cable is a standard, proven system that is readily available.



Curtis Bay Piers

Site Layout

- Substation
- Potential Charger Locations
- Coal Dumpers
- Empties Loop

General Operations:

- Coal train is pulled to indexers for each dumper from CB yard by switcher units
- Indexer feeds cars into dumpers, while switcher catches cars that are released
- Empties are pulled to pier yards to wait for return trip to mines
- Coal is dumped and sent to piles by conveyor belts based on type
- When ship is available to load, coal is sent from piles by conveyor belt to the ship
- Three six axle battery electric locomotives to replace current mother/slug diesel units
- At least one charging system to charge battery electric locomotives during off shift
- Leverage existing high energy substations for electrical infrastructure

STATE **FREIGHT** ADVISORY COMMITTEE

SFAC Member Updates

Please raise your hand in the webroom to provide your updates.

STATE **FREIGHT** ADVISORY COMMITTEE

Next Meeting: October 2024

Please drop your ideas or suggestions for meeting topics in the chat box for consideration.

STATE **FREIGHT** ADVISORY COMMITTEE



Thank You for Participating!