



# CSX DECARBONIZATION STRATEGY

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## CSX BY THE NUMBERS

- **195** Years in Operation
- **20,000** route-mile rail network
- **22,500** employees
- **3.3** million carloads
- **3** million intermodal shipments
- **3,600** locomotives
- **12.5 million tons of carbon emissions avoided**



For calendar year 2022, as reported in **2023 CSX Proxy Statement**

# 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

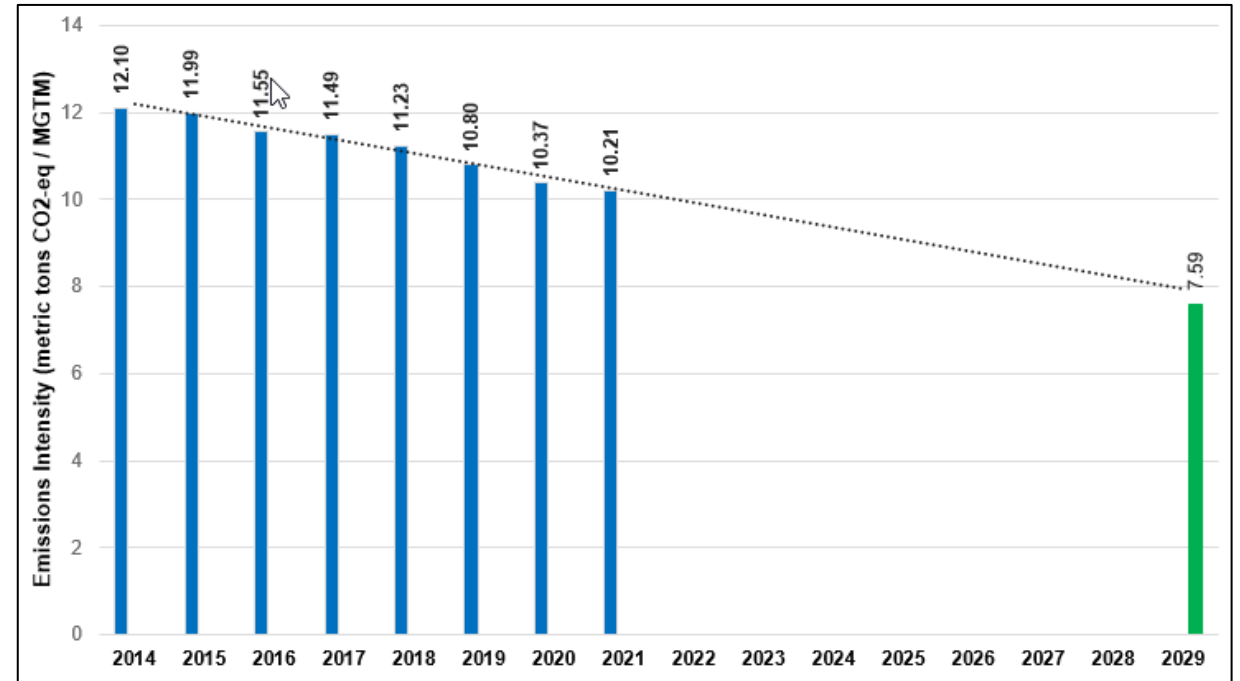
## CSX Pathways

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

# CSX GREENHOUSE GAS INVENTORY

## SBTI Target Progress - Emission Intensity

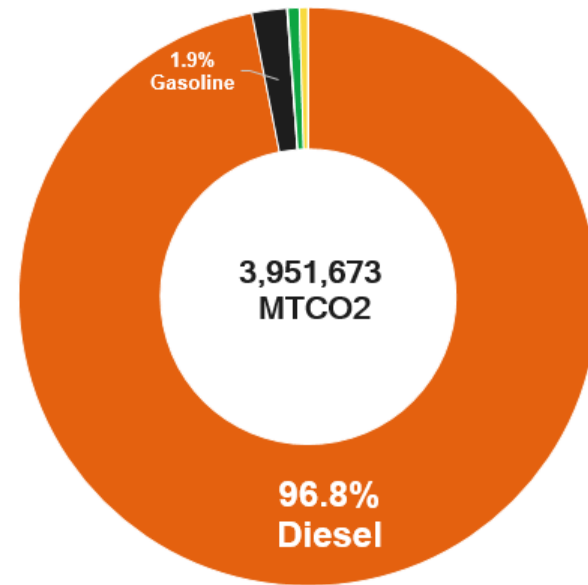
Data	Unit	2021	2020	2019
<b>Greenhouse Gas Emissions</b>				
Direct (Scope 1) GHG emissions <sup>21</sup>	Metric tons CO <sub>2</sub> Eq	3,956,081	3,815,113	4,309,317
Energy indirect (Scope 2) GHG emissions	Metric tons CO <sub>2</sub> Eq	144,891	185,216	195,606
Other indirect (Scope 3) GHG emissions	Metric tons CO <sub>2</sub> Eq	325,168	179,446	182,629
GHG emissions intensity for SBT <sup>22</sup>	Metric tons CO <sub>2</sub> Eq/ MGTM	10.21	10.43	10.80
Reduction of GHG emissions for SBT <sup>23</sup>	% Reduction	-15.6%	-13.8%	-10.8%



CSX has achieved **15.6%** reduction in emission intensity

# FUEL DIVERSITY AND RESEARCH CARBON REDUCTION PROJECTS

- Trip Optimizer
- Zero to Zero
- Meet/Pass Planning
- Train Pacing
- Distributed Power
- Rail lubricators
- SD40 Repower Project
- Biodiesel (B20)
- Renewable Diesel
- Battery Hybrid Consist
- Battery Switch Engines

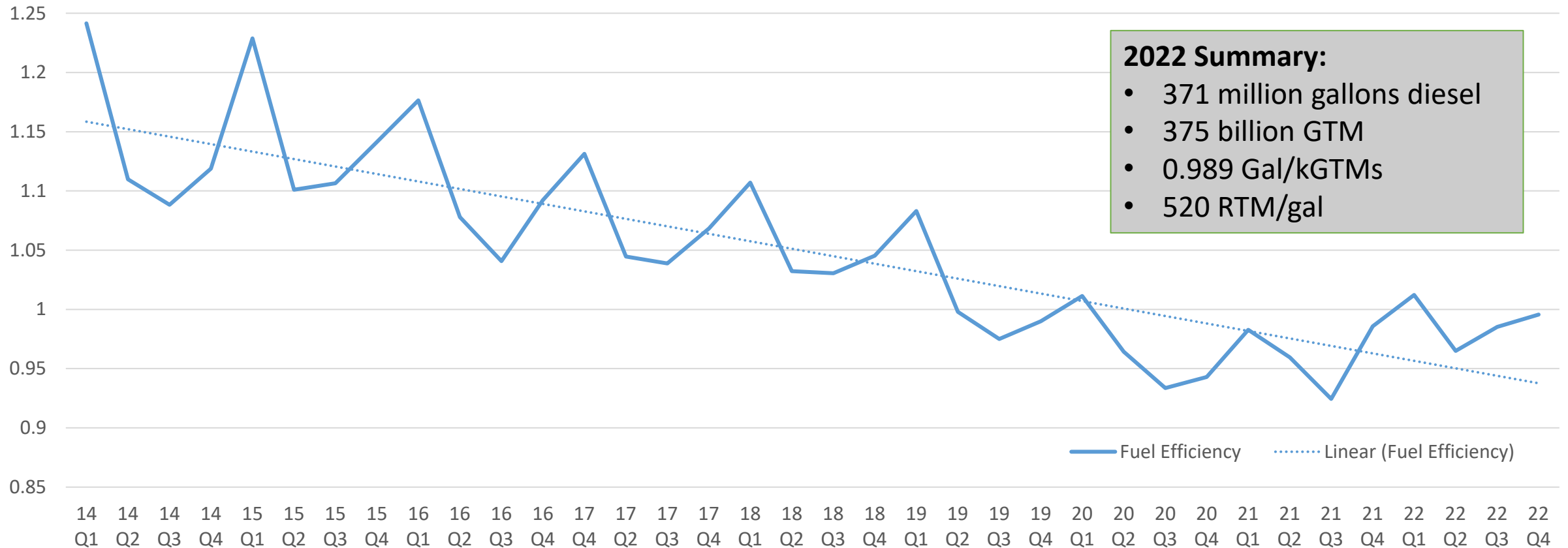


Share of Scope 1 and Scope 2  
GHG Emissions By Fuel Type



# FUEL EFFICIENCY - GALLONS PER KGTM

**15.34%** improved fuel efficiency since 2014 that is **15.6%\*** reduction in emission intensity.



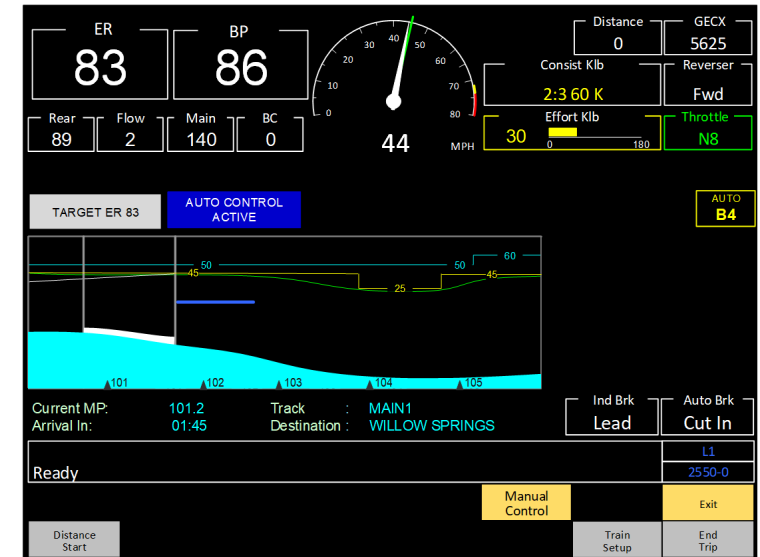
\* EMISSION INTENSITY BASED ON 2021 PERFORMANCE UNTIL 2022 GHG INVENTORY COMPLETE



# TRIP OPTIMIZER

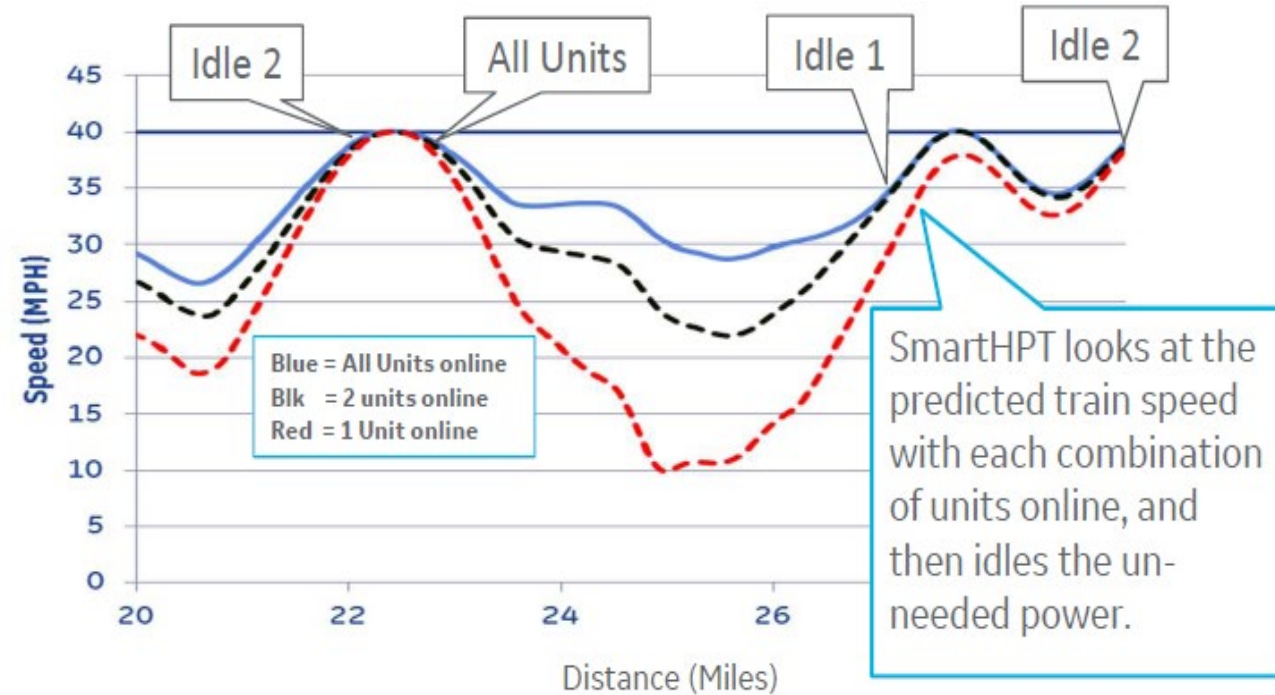
**Trip Optimizer (TO)** is like a plane's auto pilot or a car's cruise control.

- Operates the train in compliance with the track's temporary and permanent speed restrictions and the requirements to save fuel
- Creates a fuel-efficient trip plan, and then controls the locomotive's throttle and brakes to keep the train on this plan. If conditions change, TO generates an updated plan.



# SMART HPT AND INDEPENDENT CONTROL

**Trip Optimizer** can control locomotives independently including idling, shutting down, and restarting the diesel engines as needed.





# WHY WE USE TRIP OPTIMIZER

Auto Control is significantly more efficient:

- CSX average savings is **1.4 gallons per auto mile**
- Industry leading operator performance above 90% auto control utilization
- CSX now has Trip Optimizer deployed over the entire mainline network



	Auto/Available	Auto/All Miles	Auto Miles	Gallons Saved
<b>2019</b>	84%	37%	23,275,325	32,585,455
<b>2020</b>	88%	43%	22,714,402	31,800,163
<b>2021</b>	90%	49%	25,893,529	36,250,940
<b>2022</b>	91%	51%	27,072,021	37,900,830

# AIR BRAKE CONTROL STATUS



- The air brake interface requires regulatory approval to test and deploy.
- This type of technology does not fit neatly into any existing regulatory framework
- Successfully tested for a year with FRA oversight
- Working with FRA to navigate the approval process for implementing this technology
  - Request to continue testing filed Oct 2021
  - Final Product Safety Plan filed Nov 2022

# REDUCING ROLLING RESISTANCE

CSX increases the efficiency of the steel wheel on the steel rail by deploying:

- Wayside top of rail lubrication
- Wayside curve lubrication
- Locomotive-mounted flange lubrication sticks

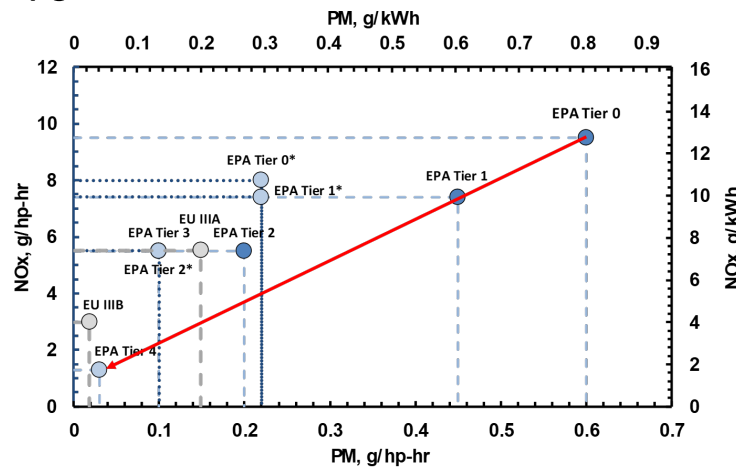


# REPOWERING TO THE LATEST TIER LEVEL

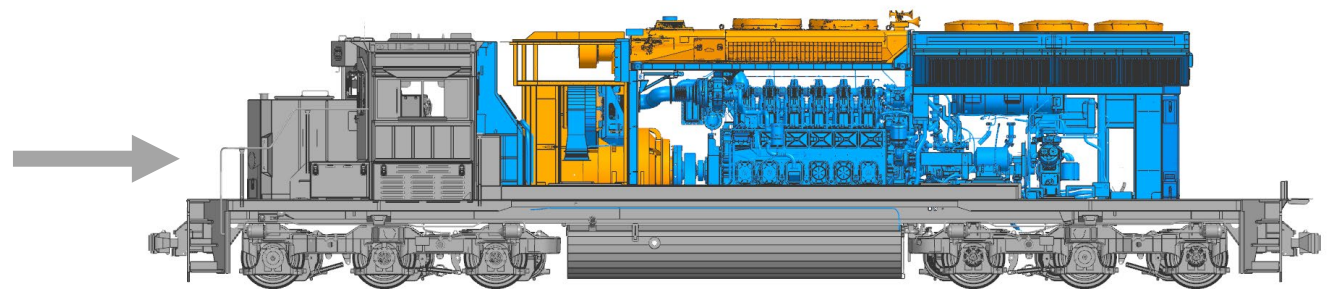
*Current SD40-2*



- Legacy 645 engine baseline
- Pre-Tier or T0+

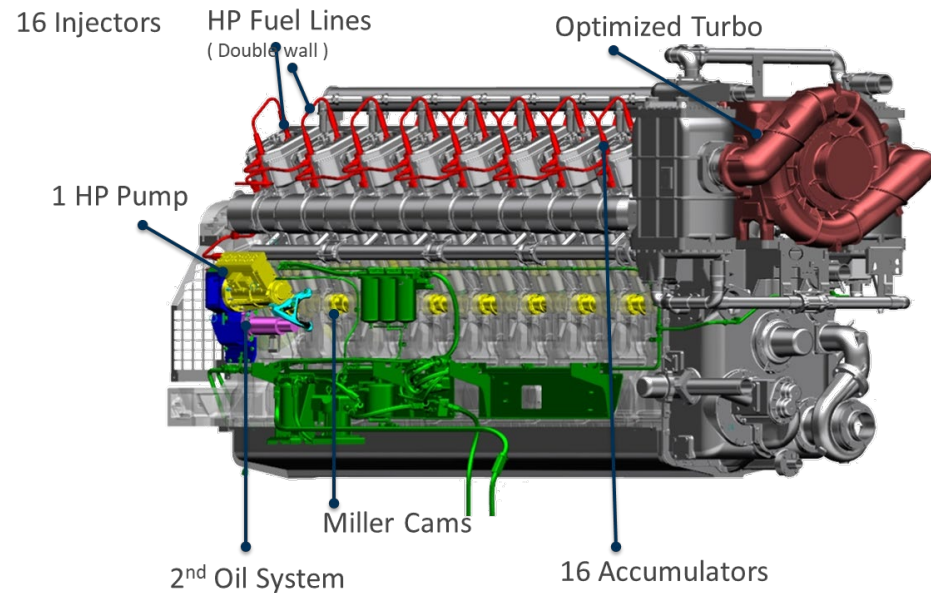


*SD40 Tier 4 Repower*



- Tier 4 certified, No after treatment
- 20% improvement in fuel efficiency
- 50% reduction in lube oil use
- **4.7 Tons/yr NOx** eliminated per repower

# IMPROVING EXISTING DIESEL LOCOMOTIVES



**FDL Advantage** – Rebuilding 25-year-old engines with the latest technology

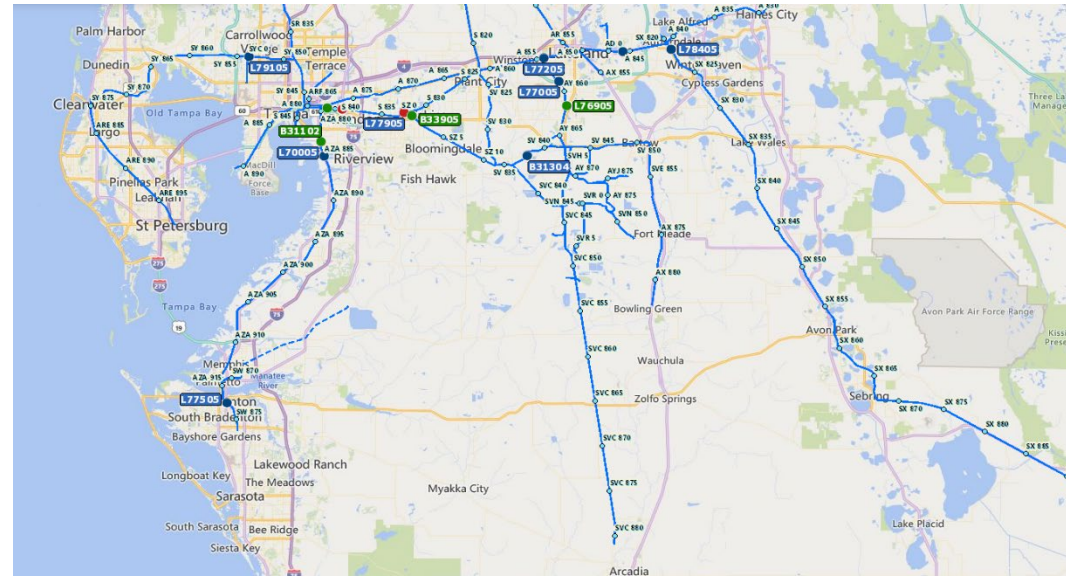
- 5% SFC Fuel Savings over Current Tier 1+
- Incorporating Evolution Loco Designs:
  - High Pressure Common Rail
  - 1 HP Fuel Pump vs. 16 on current FDL
  - Turbo Design Enhancement
  - Miller Cam Profiles

# BIODIESEL B20 TESTING IN TAMPA, FL

Ten (10) FDL Advantage Locomotives  
20% reduction of CO2

## Project Support:

- Engine testing
- Fuel testing
- CSXT Mechanical Department



# QUESTIONS?

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