VTrans Carbon Reduction Strategy and GHG Transportation Performance Measure

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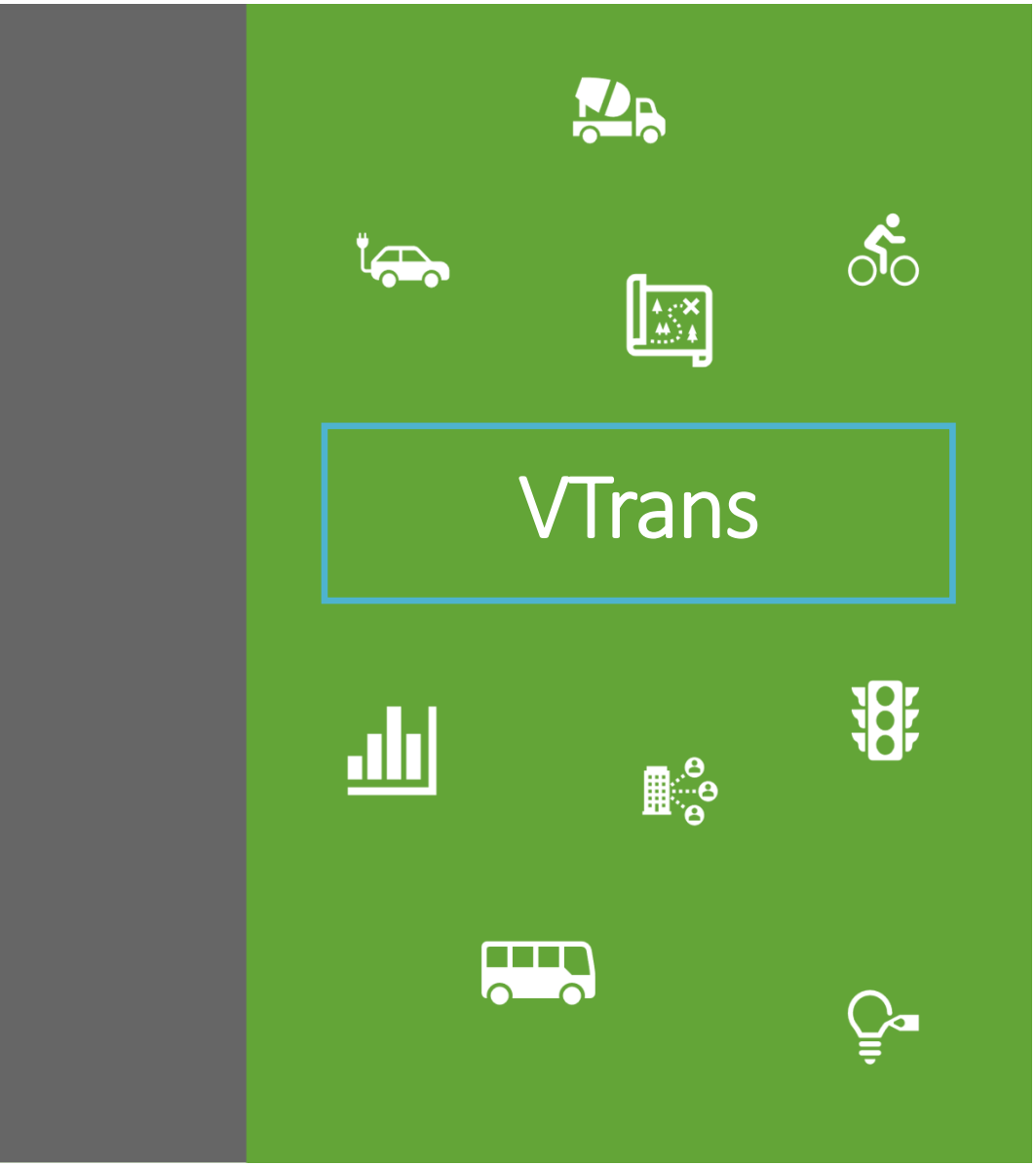


CARBON REDUCTION STRATEGY

https://vtrans.vermont.gov/climate/carbon-reduction-strategy

U.S. DOT Carbon Reduction Program

Infrastructure Investment and Jobs Act (IIJA)

$32 million

$6.3 million annually over 5 years

- Public Transit
- Transportation Alternatives
- Congestion Mitigation
- Efficient Street and Traffic Lighting
- Travel Demand Management Strategies
- Deployment of Alternative Fuel Vehicles and related Infrastructure
- Carbon Reduction Strategy

Objectives

Support Vermont's requirements for GHG emissions reduction

- Reduce emissions 40% below 1990 levels by 2030
- Reduce emissions 80% below 1990 levels by 2050
- Transportation sector contributes to 40% of reduction

Support U.S. DOT requirements for each State to develop a Carbon Reduction Strategy

- Describe how new Carbon Reduction Program funding will be used

Strategy Steps

Phase 1

Estimate VTrans' Capital Program Impact on GHG emissions

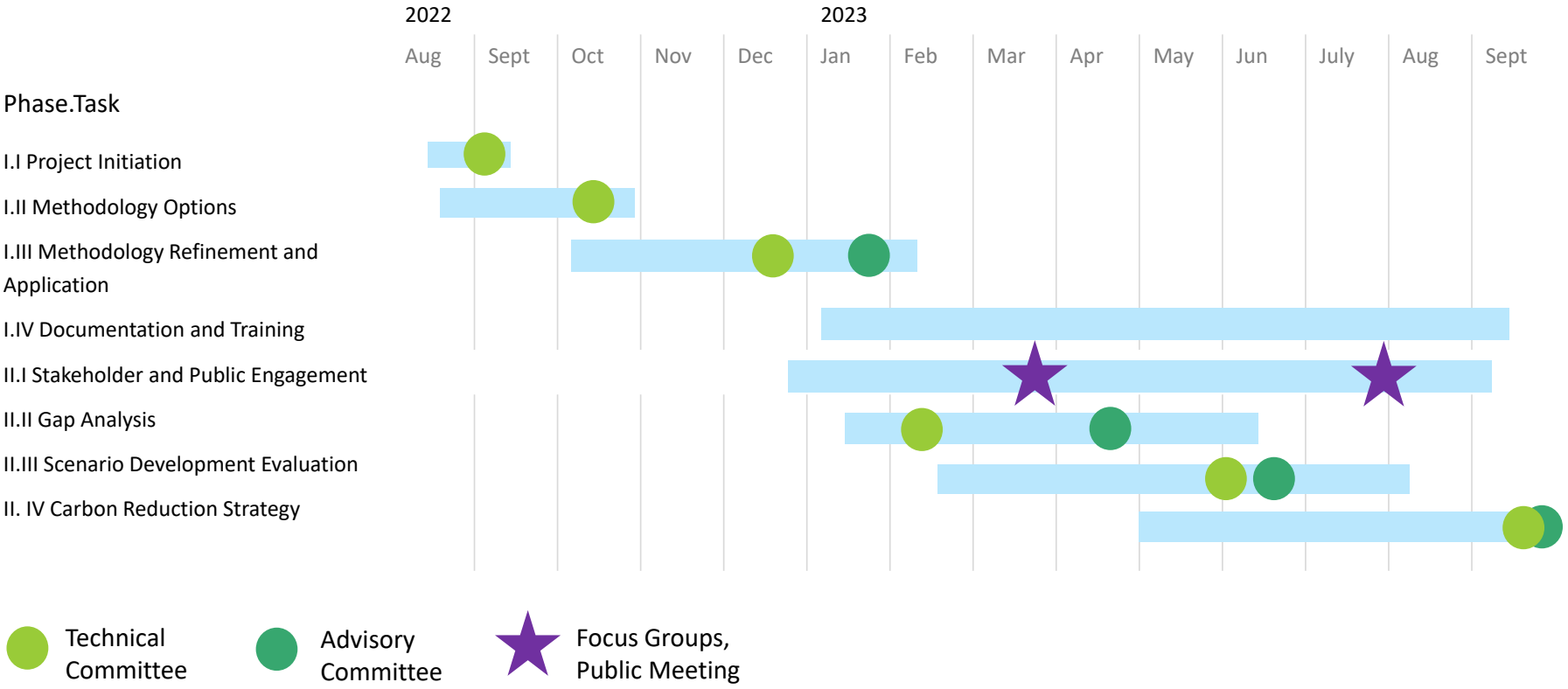
- Baseline projection
- Construction and maintenance
- Transportation system user emissions

Phase 2

Develop Carbon Reduction Strategy

- Gap analysis
- Stakeholder and public engagement
- Strategy and scenario development and evaluation
- Carbon Reduction Strategy

Project Timeline



Technical Analysis

A **baseline forecast** of the state's transportation emissions through 2050, considering current adopted policies.

An assessment of the **GHG impacts of AOT's current Capital Program**, related to project construction, mode shift, efficient traffic operations.

An assessment of the **gap** between projected baseline emissions and emission levels required under the GWSA in years 2025, 2030, and 2050.

Development and evaluation of potential **strategies** to close the gap, including evaluation of potential benefits, costs, and co-benefits.

Transportation Emissions Baseline Forecast (MT CO2e)

Source Category	2022	2025	2030	2050
Onroad Vehicles	2,650,367	2,546,692	2,146,801	508,778
Public Transit	15,781	15,781	15,781	15,781
Rail (passenger and freight)	63,453	64,221	65,120	65,171
Aviation	99,502	100,702	102,104	102,188
Marine (navigation)	33,555	33,961	34,434	34,465
Other	29,128	29,480	29,892	29,916
Construction and Maintenance	7,390	7,095	6,686	6,179
Total	2,899,177	2,797,933	2,400,818	762,477

VTrans Capital Program Evaluation

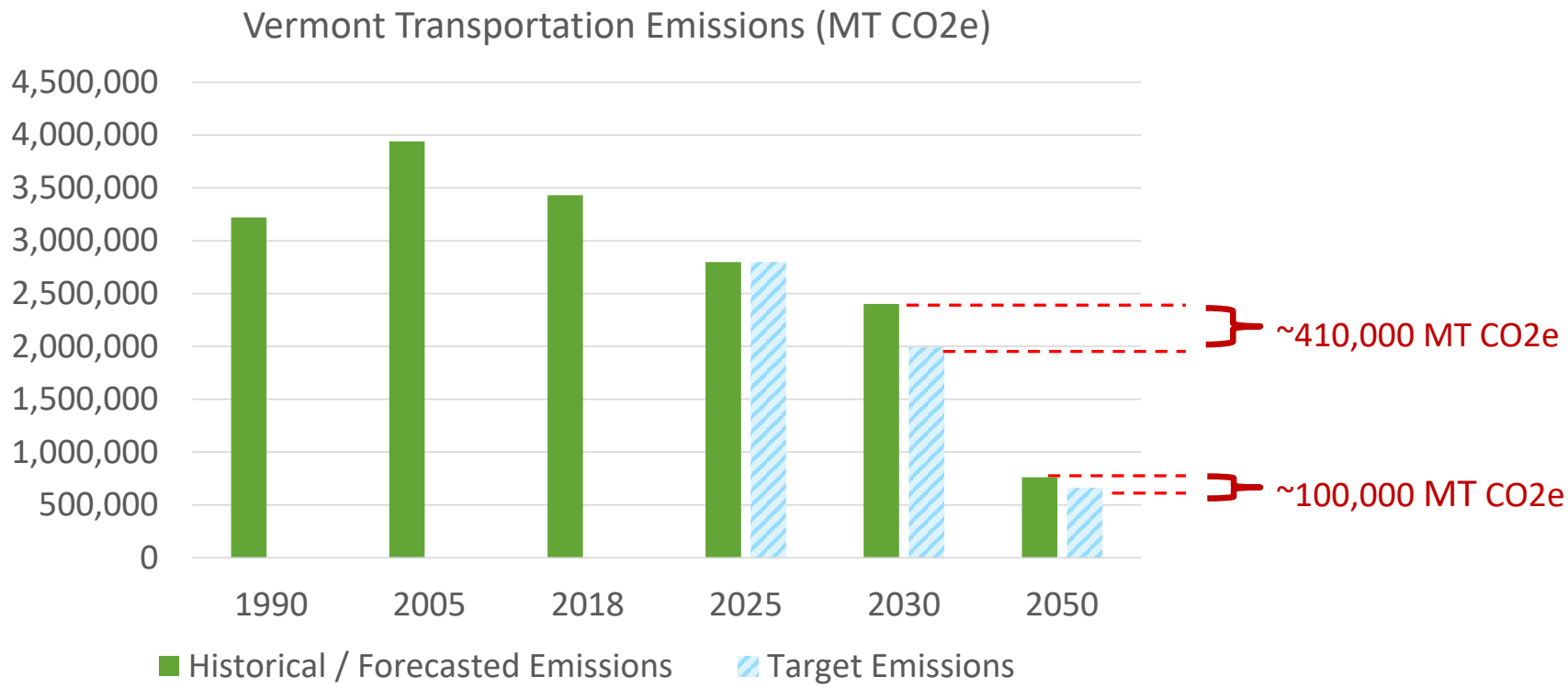
Count of Capital Program Database Projects

Project Type	Count
Aviation	9
Bike & Pedestrian Facilities	29
Interstate Bridges	15
Maintenance	3
Municipal Mitigation	16
Other	1
Park & Ride Lots	3
Paving	76
Rail	55
Rest Areas	6
Roadway Projects	71
State Highway Bridges	56
Town Highway Bridges	24
Traffic & Safety	28
Transportation Alternatives[a]	37
Total	429

GHG Emissions Impact of AOT Capital Program (MT CO2e)

Project Type	2025	2030	2050
Bicycle and Pedestrian	-560	-425	-68
Roadway Expansion	0	0	0
Traffic Operations	-1,925	-1552	-564
Transit	-19	-23	-4
Park and Ride	-141	-107	-17
Total	-2,654	-2,115	-654

Gap Analysis



Possible Strategies to Close Gap

Mode Shift

- Bicycle and pedestrian network expansion, Transit service expansion, Micromobility subsidies, Expanded travel demand management programs to encourage less carbon-intensive means of travel and non-single occupancy vehicles.

Traffic and Roadway Strategies

- Compact land use/smart growth.
- Broadband expansion to serve the entire state.

Land Use & Tele-Travel Strategies

- Transit vehicle electrification.
- Advanced Clean Fleets to further electrify truck fleets in the state.

Clean Car/Truck Incentives and Requirements

- Feebates to further incentivize clean vehicles.
- Clean Transportation Standard
- Cap and Invest

Carbon Management Strategies

Strategy	CO_2 Reduction (2030 metric tons)	% of 2030 Gap Closed	Estimated Cost Through 2030 ($M)
Bicycle and pedestrian network expansion	220	0.1%	55.7
Transit service expansion	690	0.1%	44.0
Micromobility	1,420	0.3%	7.9
Travel demand management	80	0.0%	2.8
Transit vehicle electrification	4,260	1.0%	31.5
Land use	5,660	1.4%	NA[a]
Broadband expansion	5,300	1.3%	191.7
Advanced Clean Fleets	35,700	7.7%	79.3
Feebates	19,800	4.8%	NA[b]
Combined Effects			
Transportation investment and services	6,500	1.6%	141.8
Transportation + land use + broadband	17,600	4.3%	333.5
Transportation + land use + broadband + ACF + feebates	73,000	17.8%	412.8

GHG Reduction Strategies: 2030 Effects

Proposed Use of Carbon Reduction Program Funds

Project Type	Target % of state-directed funding
Bicycle and pedestrian projects, including Complete Streets, shared-use paths, bike lanes, and sidewalks, prioritized within designated smart growth locations (town and village centers)	33%
Transit and micromobility services and incentives (e.g., microtransit, shuttles, e-bike incentives)	33%
Fleet conversion, including conversion of transit buses and/or AOT heavy equipment to electric and/or other zero emission technology, and supporting infrastructure	33%

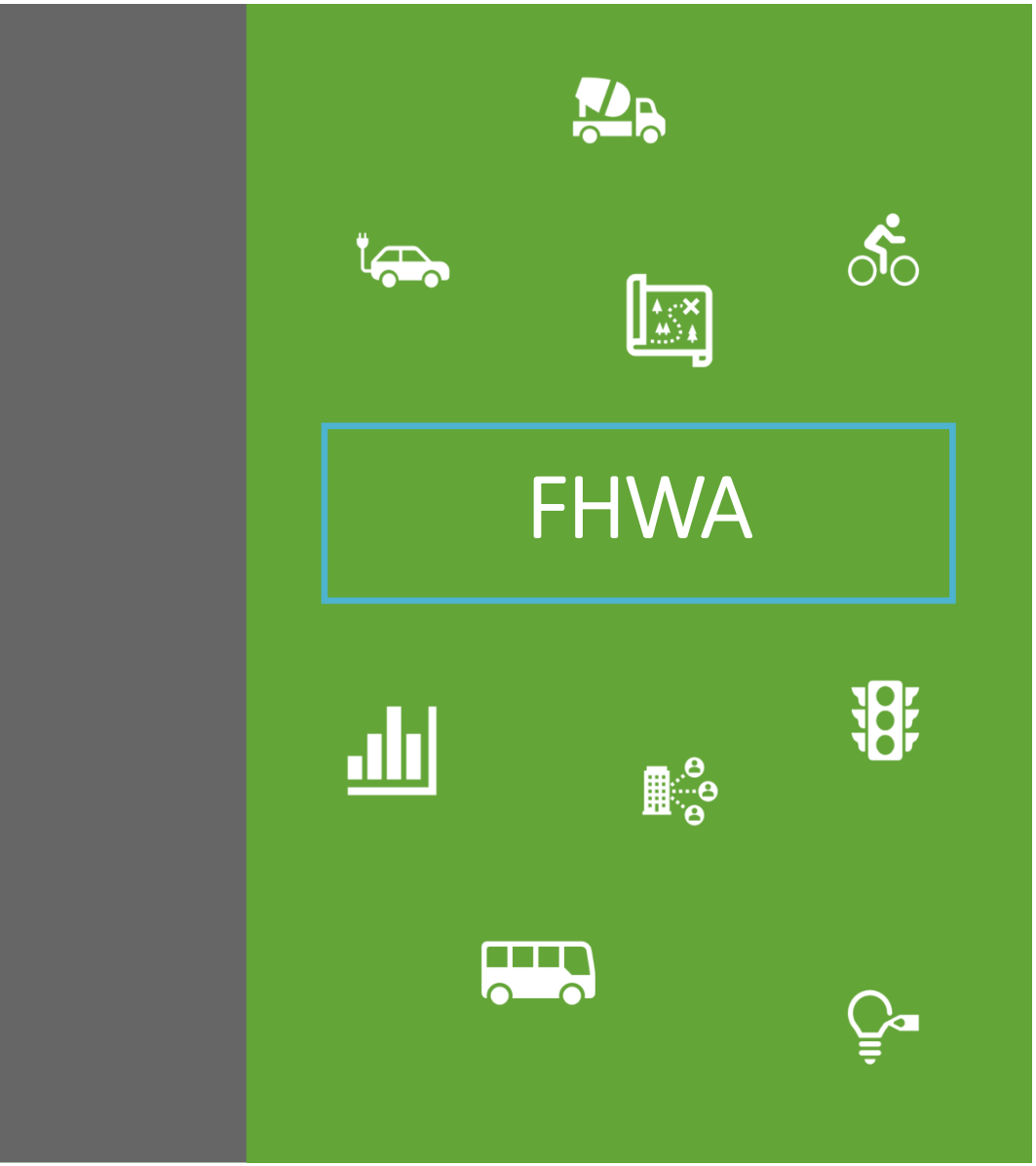
Considerations:

- Cost-effectiveness
- Co-benefits
- Stakeholder/public support
- Alignment with CAP and LRTP
- Immediate need/ opportunity

Total anticipated funding: ~$32M

Questions

https://vtrans.vermont.gov/climate/carbon-reduction-strategy



GREENHOUSE GAS PERFORMANCE MEASURE

https://www.federalregister.gov/documents/2023/12/07/2023-26019/national-performance-management-measures-assessing-performance-of-the-national-highway-system

Transportation Performance Management (TPM) Performance Measures

Performance Area	Performance Measure
Safety	• Number of fatalities. • Rate of fatalities per 100 million vehicle miles traveled (VMT). • Number of serious injuries. • Rate of serious injuries per 100 million vehicle miles traveled. • Number of non-motorized fatalities and non-motorized serious injuries.
Pavement Condition	• Percentage of pavements of the Interstate System in Good condition. • Percentage of pavements of the Interstate System in Poor condition. • Percentage of pavements of the non-Interstate National Highway System (NHS) in Good condition. • Percentage of pavements of the non-Interstate NHS in Poor condition.
Bridge Condition	• Percentage of NHS bridges classified as in Good condition. • Percentage of NHS bridges classified as in Poor condition.
System Performance	• Percent of person-miles traveled on the Interstate that are reliable. • Percent of person-miles traveled on the non-Interstate NHS that are reliable. • **NEW: Percent change in tailpipe carbon dioxide (CO_2) emissions on the NHS compared to the reference year (calendar year 2022).**
Freight Movement	• Truck Travel Time Reliability (TTTR) Index.
Traffic Congestion	• Annual Hours of Peak Hour Excessive Delay (PHED) Per Capita. • Percent of Non-Single Occupancy Vehicle (SOV) Travel.
On-Road Mobile Source Emissions	• Total Emission Reductions for applicable criteria pollutants.

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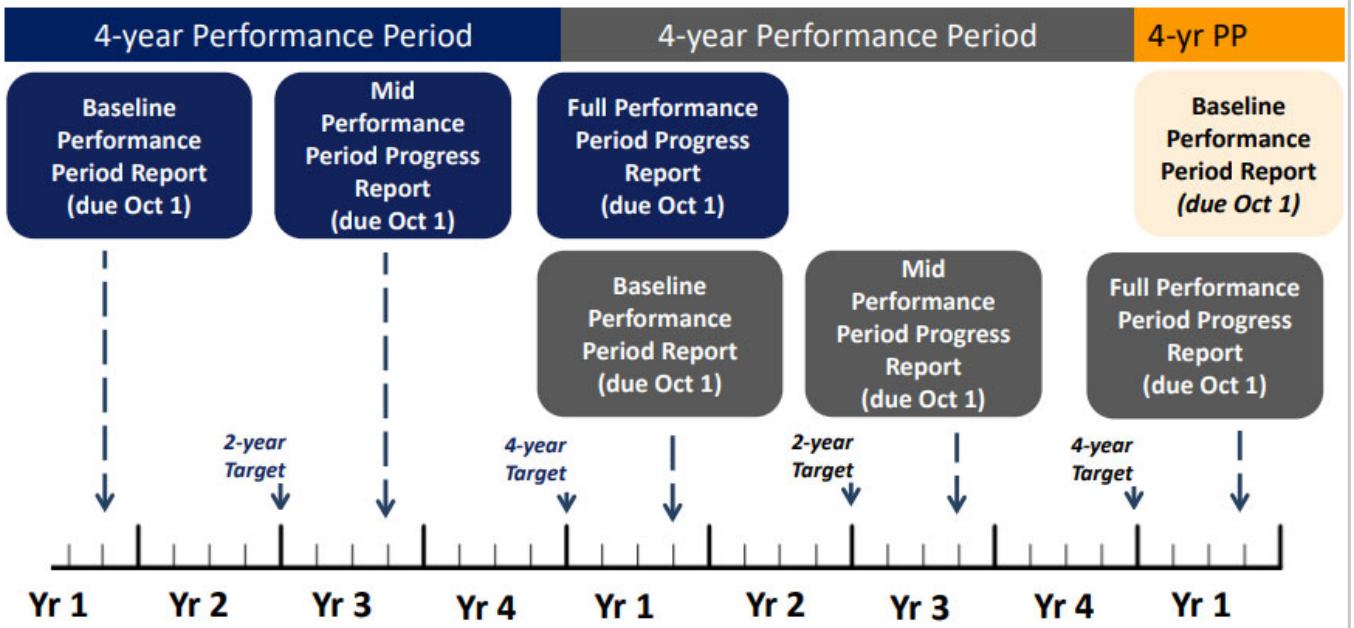
Assessing Performance of the National Highway System, Greenhouse Gas Emissions Measure - FHWA December 13th Presentation

§ 490.107(b): Overview of Biennial Reporting by State DOTs



Assessing Performance of the National Highway System, Greenhouse Gas Emissions Measure - FHWA December 13th Presentation

GHG Metric and Measure *[§ 490.511(a)(2), § 490.507(b)]*

GHG Metric

Annual total tailpipe CO_2 emissions on the NHS

Purpose

Metric used to calculate measure

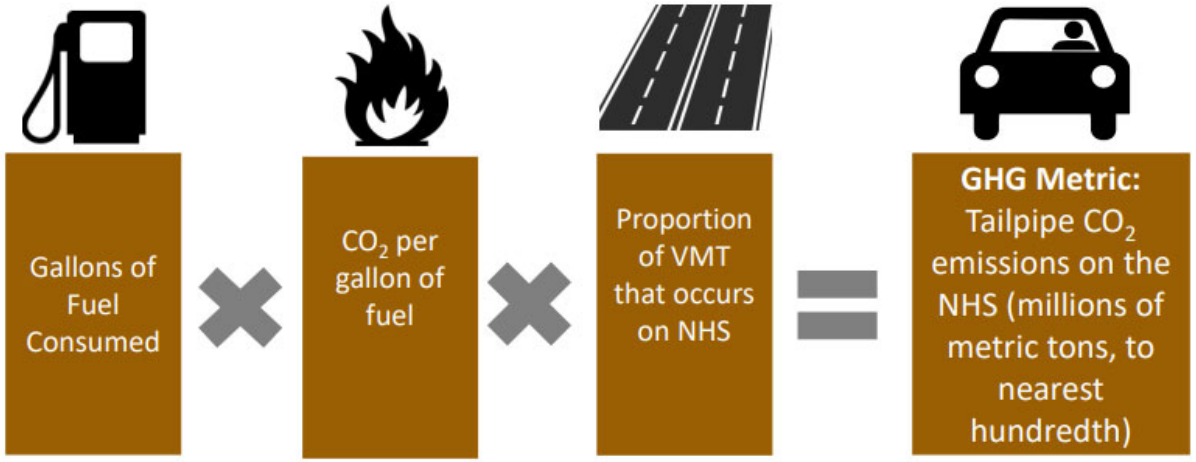
GHG Measure

Percent change in tailpipe CO_2 emissions on the NHS, compared to the reference year – (Calendar Year (CY) 2022)

Purpose

State DOTs and MPOs report on progress toward targets

§ 490.511: Calculating the GHG Metric – Annual Tailpipe CO_2 Emissions on the NHS

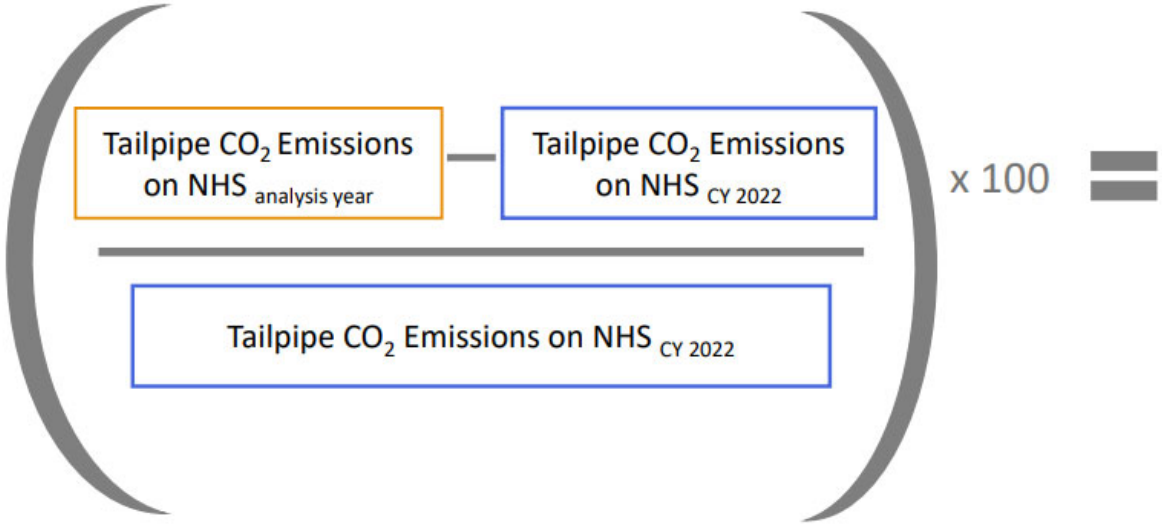


- Simple calculation.
- Data readily available from all states and already reported.
- Nationally consistent for States.
- Proportion of VMT on NHS is proxy for proportion of CO_2 on NHS.
- MPOs may use other methods to calculate the metric.

§ 490.509: Data Requirements for Metric Calculation

Data Required	Data Source	Description
Annual Fuel Sales	**Fuels and Financial Analysis System-Highways (Fuels & FASH)**	Total gallons of fuel consumed by fuel type (gasoline and gasohol, and special fuels). Based on fuel sales data for the prior calendar year. Expressed in 1,000 gallons.
CO_2 emission factors	**FHWA-supplied emission factors**	CO_2 emissions per volume of gasoline/gasohol and special fuels. Posted on FHWA website no later than August 15th of each reporting year.
Annual vehicle miles travelled (VMT)	VMT estimates are from best available data that represents the prior calendar year and is consistent, to the maximum extent practicable, with data submitted to HPMS. The reference year shall use HPMS data as of November 30, 2023.	

§ 490.513(d): Calculating the GHG Measure



% change in tailpipe CO_2 emissions on the NHS compared to CY 2022

Phase-in - Initial Target & Reporting Requirements

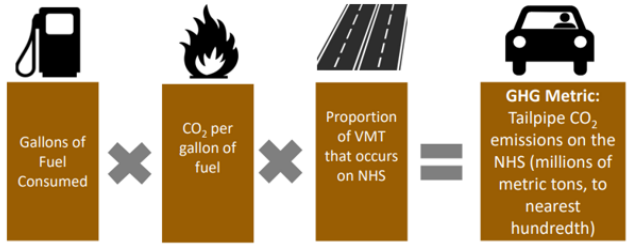
- Performance Period Starts January 1, 2022, and extends 4 years.

State DOTs:

- Establish initial targets by February 1, 2024.
- Initial Target Requirements:
  - Establish declining 4-year targets. Exempt from 2-year targets.
- State Initial GHG Report due February 1, 2024.
- Mid Performance Period Progress Report is due October 1, 2024.

Greenhouse Gas Performance Measure

Vermont NHS Emissions



FHWA prescribed methodology based on fuel sales and VMT apportionment

Category	Value (2022)
Gasoline (Thousand Gallons)	259,758
Special Fuels (Diesel, Thousand Gallons)	60,621
VMT (Million Miles): All Roadways	7,128
VMT (Million Miles): NHS Roadways	2,805
Percent of VMT on NHS	39%
Total NHS Emissions (MT CO2e)	**1,071,066**

Target Setting

Utilize projections and analysis conducted for the Carbon Reduction Strategy (CRS) to inform targets that will be applied to NHS emissions

Baseline Emissions

- VMT and technology adoption forecasts modeled through LEAP
- Assumes adoption of Advanced Clean Cars II and Advanced Clean Trucks

Category	2022	2025
Baseline Emissions	2,650,367	2,546,692
Baseline Reductions from 2022 (MT CO2e)		-103,674
Baseline Reductions from 2022 (%)		**-3.9%**

Target Setting

Category	2025
Baseline Reductions from 2022 (%)	-3.9%
Baseline + Capital Program Reductions from 2022 (%)	**-4.0%**
Baseline + Capital Program + CRS Reductions from 2022 (%)	-4.5%

Questions

https://www.federalregister.gov/documents/2023/12/07/2023-26019/national-performance-management-measures-assessing-performance-of-the-national-highway-system