MDT – MPOs
GHG Performance Measure

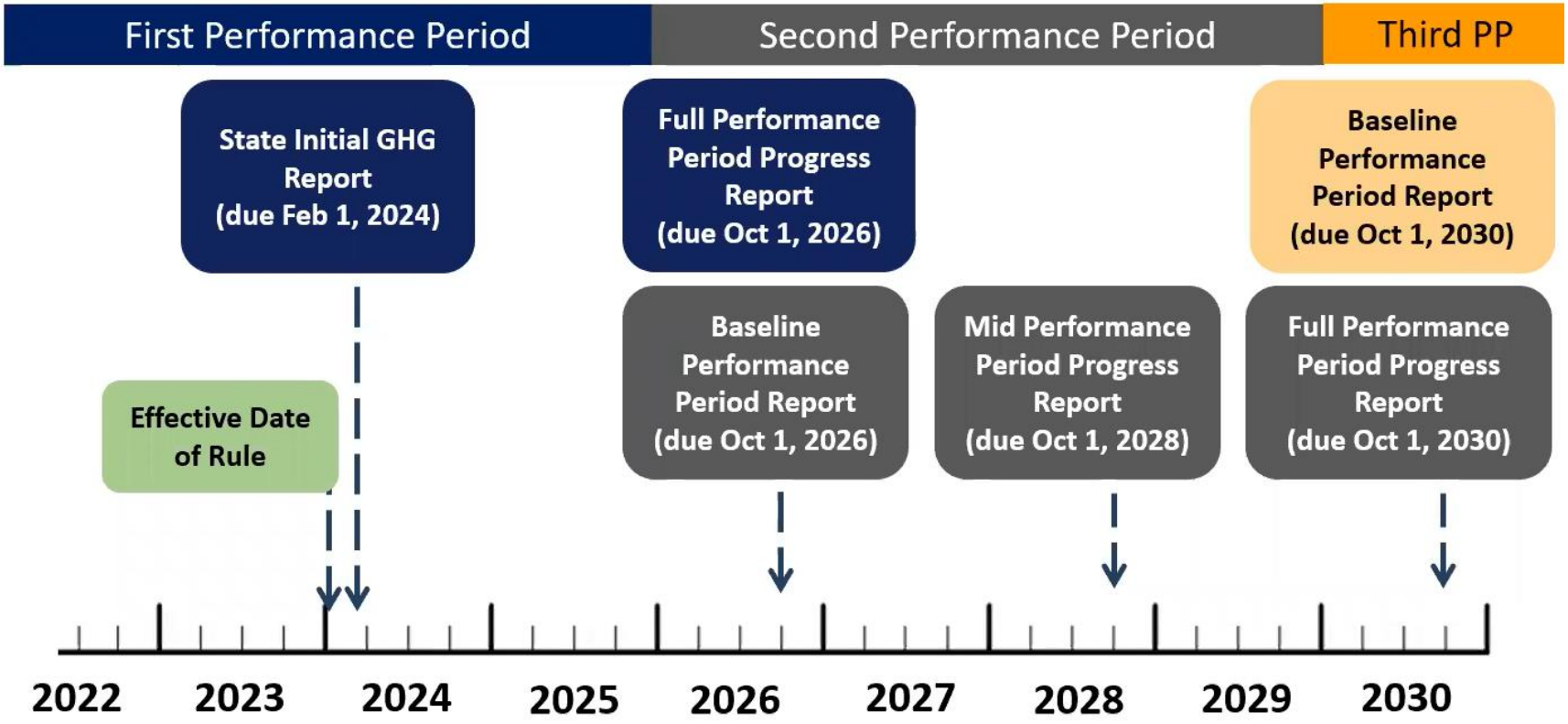
January 2023

MONTANA
Department of Transportation

Transportation Performance Management (TPM) Performance Measure - Overview

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.

State Performance Reporting Requirements



This does NOT apply to or affect any other performance measure and reporting in place, only GHG

GHG Target Requirements

Responsible	Action
MDT	• Establish declining 2-year (begin in 2026) & 4-year statewide target
MPOs	• Establish declining 4-year target for the metropolitan planning area (MPA) • Option to commit to support established statewide targets or establish a unique quantifiable target.
Currently, there are no financial penalties for failing to achieve declining targets	

Considerations and Challenges

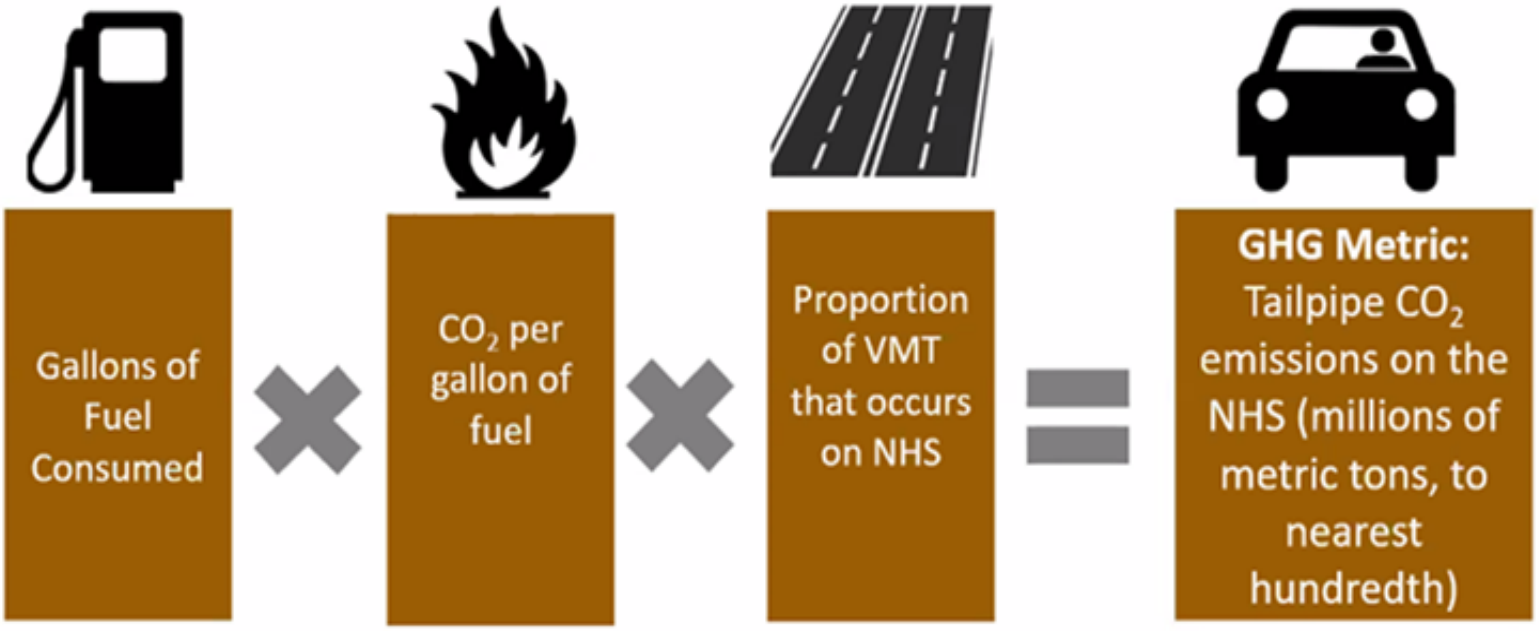
- Large rural state with long distances between population centers
- Rapid population growth
- Local land use decisions
- Harsh climate and terrain
- MDT's limited ability to influence
- Economic growth, tourism, lack of alternative transportation options
- Fleet mix and vehicle turnover rate
- The purpose of the NHS to serve the efficient movement of people and freight, supporting nationwide defense and commerce

GHG Metric and Measure

GHG Metric	Purpose
Annual total tailpipe CO_2 emissions on the NHS	Metric used to calculate measure
GHG Measure	**Purpose**
Percent change in tailpipe CO_2 emissions on the NHS compared to the reference year (Calendar Year 2022)	MDT and MPOs report on progress towards established targets

Calculating 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.

Calculating GHG Metric – CY 2022

Annual Tailpipe CO_2 Emissions on the NHS

$$(\text{Tailpipe } CO_2 \text{ Emissions on NHS})_{CY} = \left(\sum_{t=1}^{T} (\text{Fuel Consumed})_t \times (CO_2 \text{ Factor})_t\right) \times \left(\frac{\text{NHS VMT}}{\text{Total VMT}}\right)$$

Gasoline & Gasohol Fuel Calculations

$$Tailpipe\ CO2\ Emissions\ on\ NHS = (491{,}008 \times .00000810) \times \frac{7.275}{13.514}$$

$$2.14mmt = 3.9771648 \times 0.5383306$$

Special Fuel Calculations

$$Tailpipe\ CO2\ Emissions\ on\ NHS = (300{,}403 \times .00001019) \times \frac{7.275}{13.514}$$

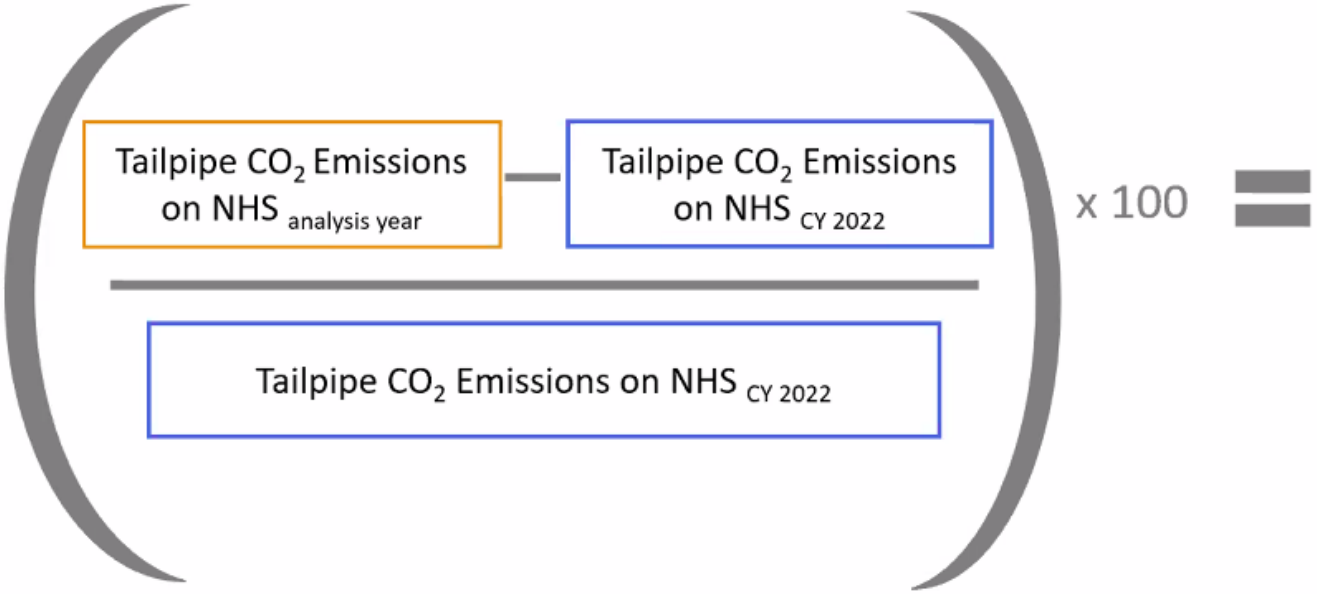
$$1.65mmt = 3.0611066 \times 0.5383306$$

TOTAL CY 2022 Annual Tailpipe Emissions = 3.79 mmt

$$3.79\ mmt = 2.14 + 1.65$$

Calculating GHG Measure

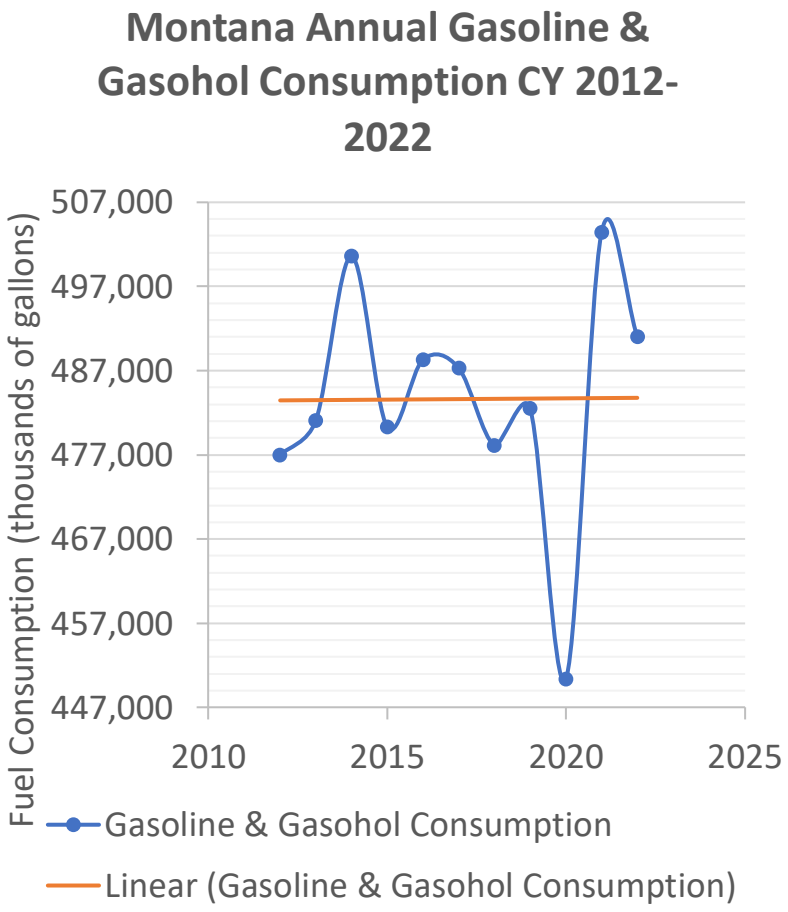
§490.513(d)

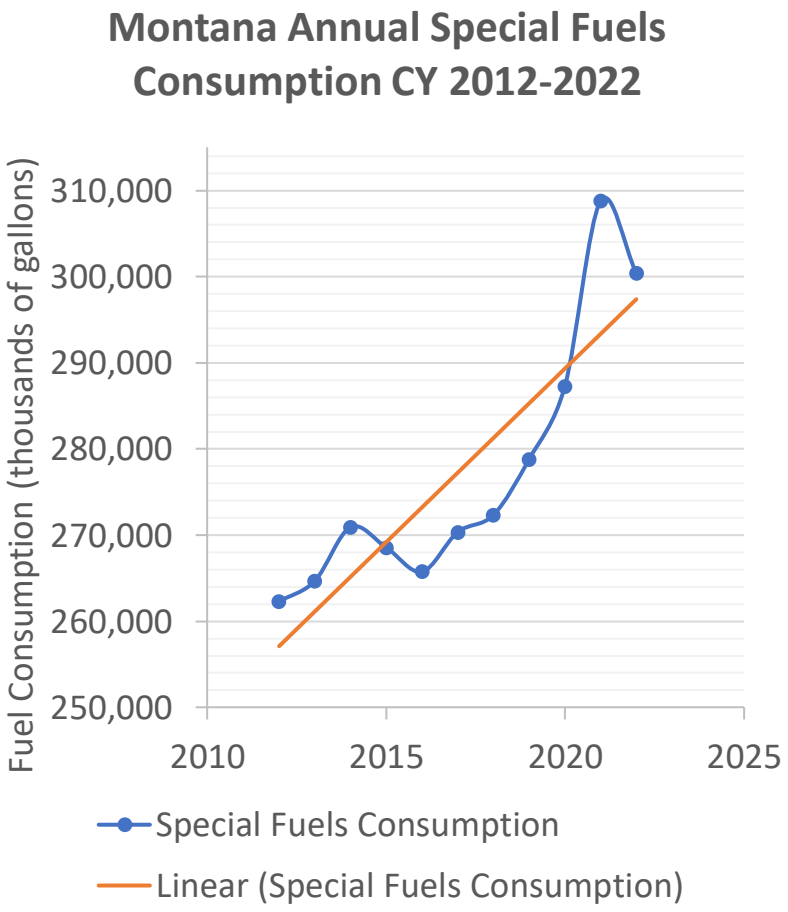


% change in tailpipe CO_2 emissions on the NHS compared to CY 2022

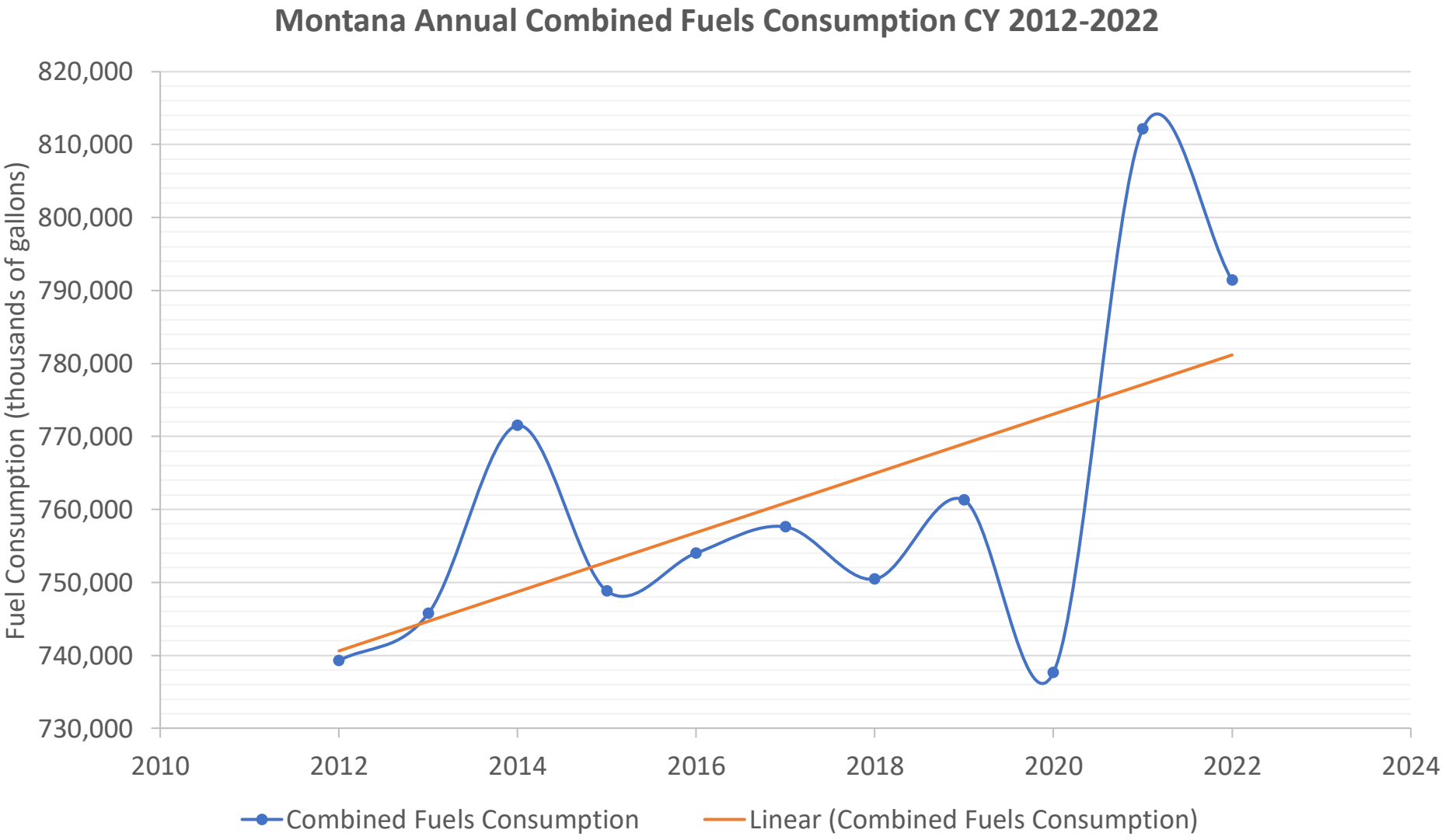
$$\frac{(\text{Tailpipe } CO_2\text{Emissions on NHS})_{CY} - (\text{Tailpipe } CO_2\text{Emissions on NHS})_{\text{reference year}}}{(\text{Tailpipe } CO_2\text{Emissions on NHS})_{\text{reference year}}} \times 100$$

Fuel Consumption

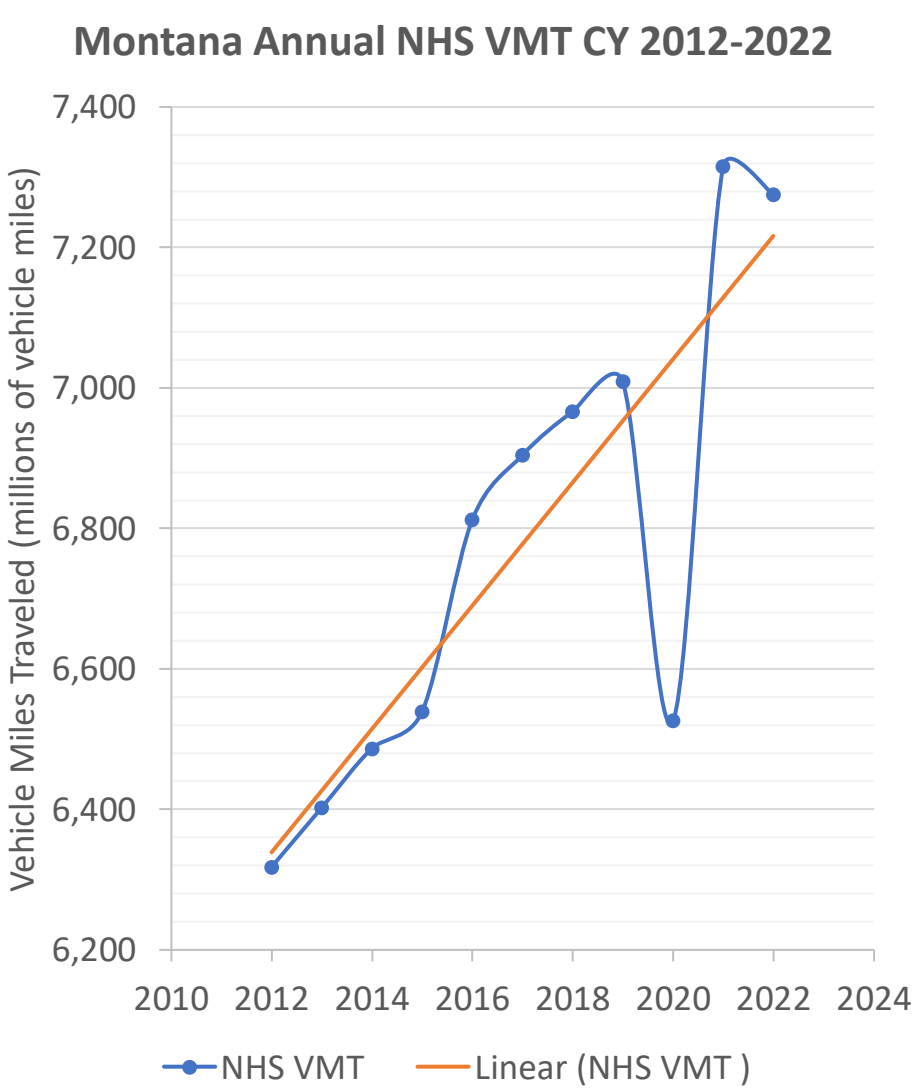


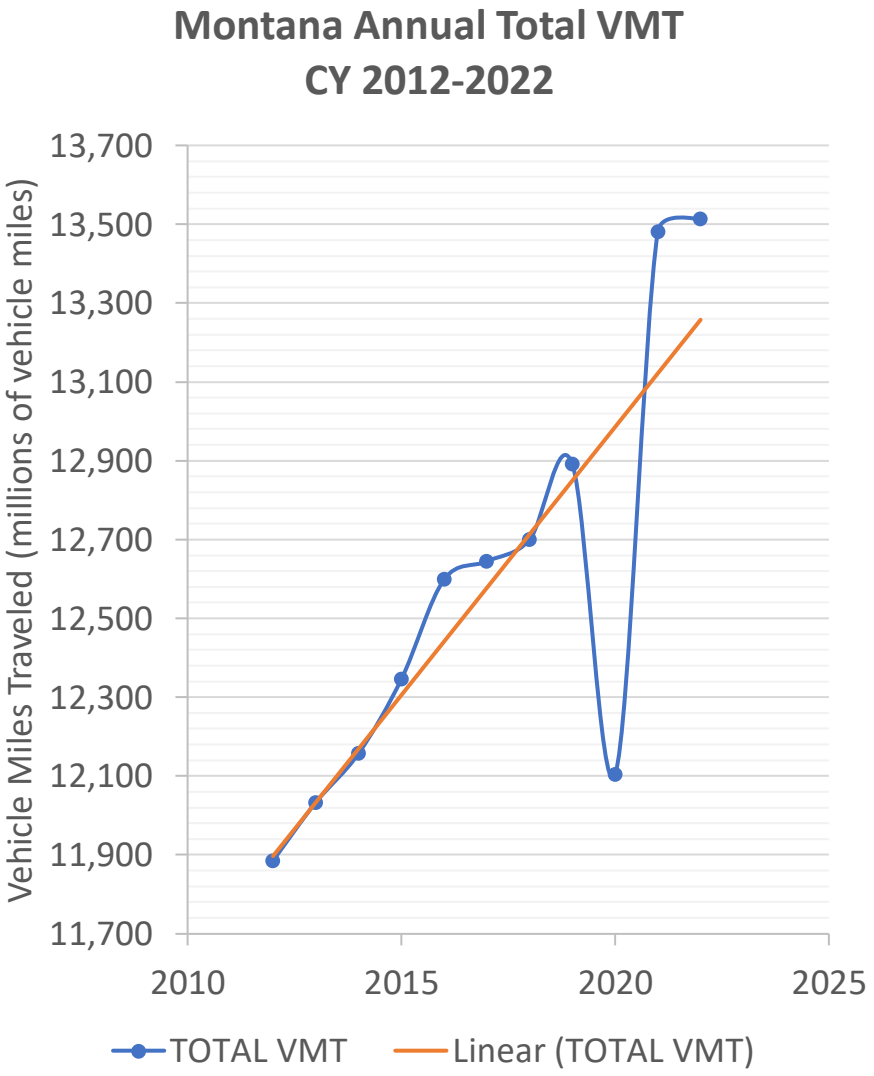


Fuel Consumption



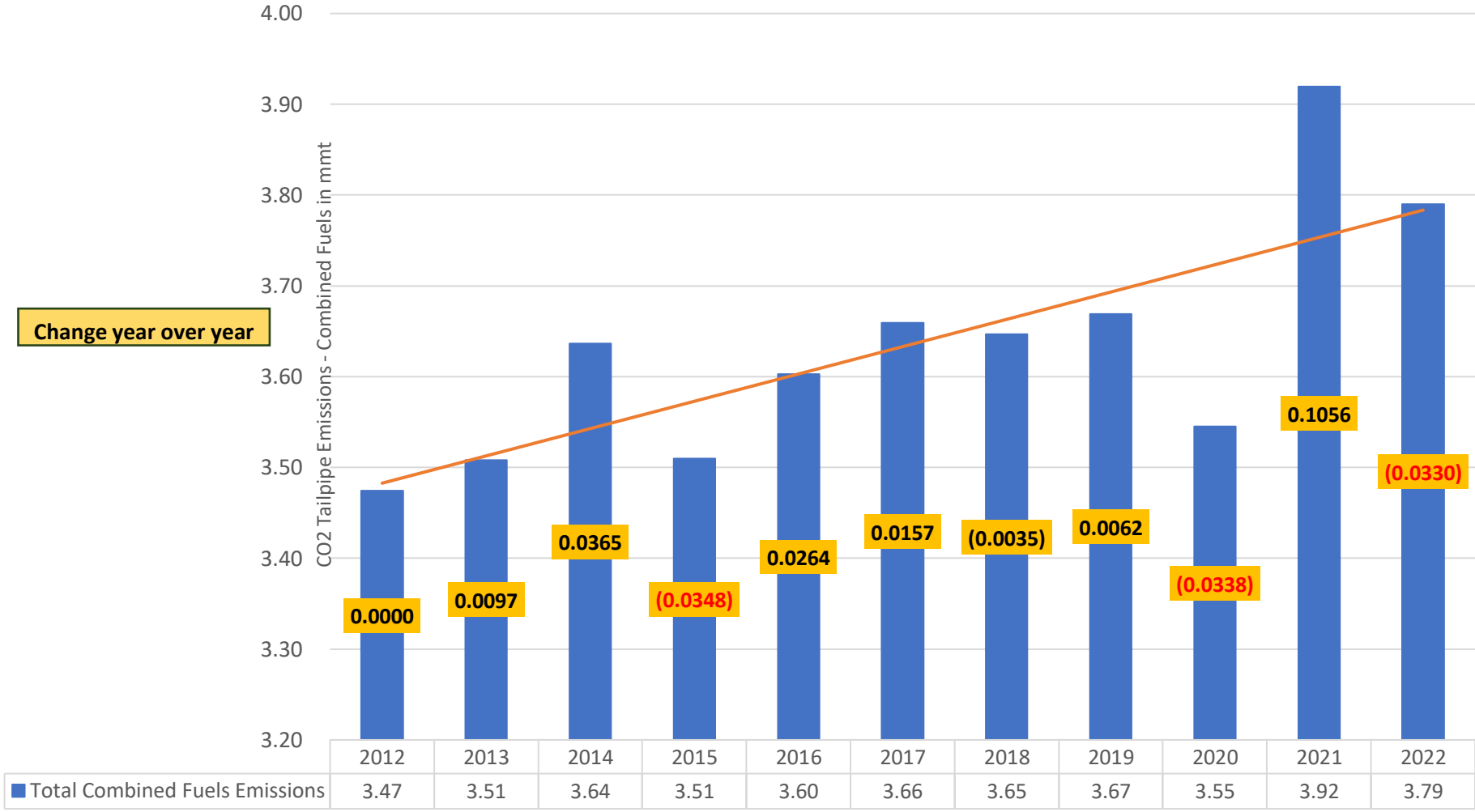
VMT


Montana Annual NHS VMT CY 2012-2022
Vehicle Miles Traveled (millions of vehicle miles)
7,400
7,200
7,000
6,800
6,600
6,400
6,200
2010
2012
2014
2016
2018
2020
2022
2024
NHS VMT
Linear (NHS VMT)


Montana Annual Total VMT
CY 2012-2022
Vehicle Miles Traveled (millions of vehicle miles)
13,700
13,500
13,300
13,100
12,900
12,700
12,500
12,300
12,100
11,900
11,700
2010
2015
2020
2025
TOTAL VMT
Linear (TOTAL VMT)

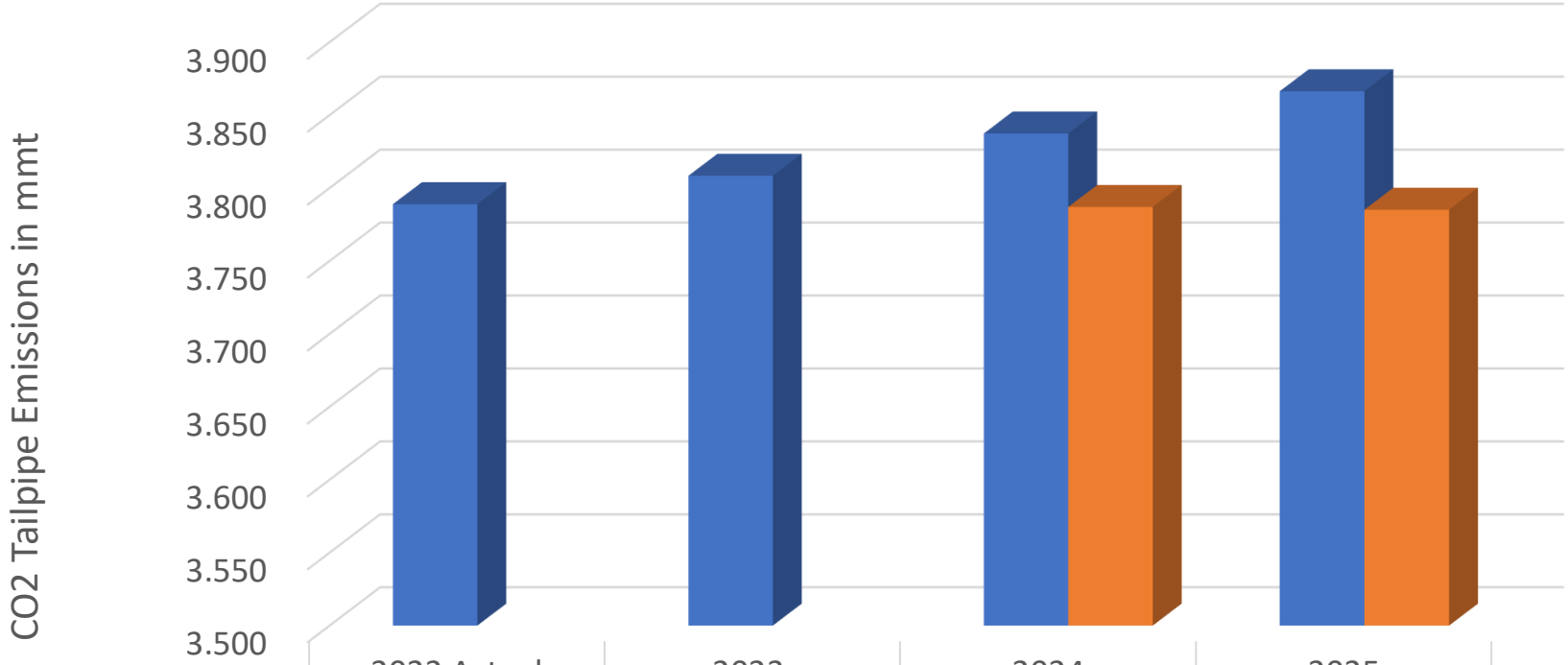
Emissions

Montana Annual CO_2 Tailpipe Emissions Combined Fuels on NHS
CY 2012-2022



Initial Performance Target

Montana Annual CO_2 Tailpipe Emissions on the NHS
2022 Actual /2023-25 Projection vs. Performance target reduction (-0.1%)



	2022 Actual	2023 Projection	2024 Projection	2025 Projection
CO2 Tailpipe Emissions	3.789	3.808	3.837	3.866
Emissions to achieve target			3.787	3.785

Achieving The GHG Target

	% of Urban NHS VMT (2022)	Projected 2025 VMT Reduction (in millions of vehicle miles)
Billings	17.83%	27.90
Great Falls	9.67%	15.14
Missoula	20.35%	31.85
Anaconda	0.00%	0.00
Belgrade	4.42%	6.91
Bozeman	8.87%	13.88
Butte	5.13%	8.03
Columbia Falls	2.29%	3.58
Glendive	1.55%	2.42
Hamilton	1.56%	2.45
Havre	0.92%	1.44
Helena	6.50%	10.17
Kalispell	9.70%	15.18
Laurel	5.13%	8.02
Lewistown	0.72%	1.12
Livingston	1.60%	2.50
Miles City	1.06%	1.66
Sidney	0.84%	1.31
Whitefish	1.88%	2.94
TOTAL	100.00%	156.49

Location	Corridor Length (miles)	2022 WAADT	2022 VMT (miles)	2022 VMT Reduction (-2.82%)
Missoula - Reserve St	5.372	32,328	173,666	-4,889
Billings - King Ave W	3.202	26,334	84,321	-2,374
Great Falls - 10th Ave	8.363	19,969	167,000	-4,701

Strategies for Reducing CO_2 in Montana

Table 15: Summary of Strategies

Strategy		Maximum Potential Effectiveness	Potential CO_2 Reduction (MT)
TDM	Land Use Development Patterns	Medium	2,400 – 1.7M
	Work Trip Efficiency	Low-Medium	29,000 – 95,000
	Freight Trip Efficiency	Low	260 – 36,000
Mode Choice	Active Transportation and Micromobility	Low-Medium	16,000 – 314,000
	Public Transportation and Passenger Rail	Low	1,600 – 200,000
	Shared Rides	Low-Medium	24,000 – 3.7M
Vehicles	Vehicle Alternatives	Medium-High	10,000 – 3.4M
Parking	Parking	Low	7,000 – 46,000
TSMO	Management Techniques and Technology Solutions	Low-Medium	500 – 603,000
	Intersection Design	Low-Medium	15,000 – 104,000
Energy	Electric Infrastructure Upgrades	Low	Unknown
	Alternative Uses of Highway ROW	Medium	Unknown
Construction/ Maintenance	Pavement Preservation	Low	Unknown
	Construction Materials	Low	Unknown
	Construction Practices	Low	Unknown
	Construction and Maintenance Equipment Alternatives	Low	Unknown
	Maintenance Practices and Technologies	Low	Unknown

Montana's Statewide GHG Target

- Statewide Target
  - -0.10% less than 2022 NHS tailpipe CO2 emissions

    4-year GHG On-Road Tailpipe Emissions Reduction Target
    = 2025 CO2 emissions ≤ 3.785 mmt

- Present efforts by the State
  - Identifying alternative target
  - State of Montana has joined a multistate lawsuit regarding the GHG performance rule

- Questions and Discussion
  - Efforts / Goals of the MPOs

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