

Task 2b. Technical Report One – Baseline Regional Transportation-Related GHG Emissions. COIC, using data on vehicle miles traveled, shall prepare an estimate of baseline GHG emissions from intercommunity trips in 1990 (year 1 of statewide emissions reductions goal) and 2020 (base year for this project).

INTRODUCTION

The State of Oregon recognizes the impact of transportation on the production of greenhouse gas (GHG) emissions. The transportation sector accounts for about 34% of the greenhouse gas (GHG) emissions produced by Oregonians. Oregon's light vehicle travel (passenger cars and light trucks) accounts for about 75% of transportation emissions, or about 20% of total statewide GHG emissions¹. Strategies to reduce GHG production from motor vehicles are a critical component of the State's overall efforts to reduce our overall carbon footprint.

In order to determine the effects of local strategies on GHG emissions, it is first necessary to establish baseline data. The Central Oregon Strategic Transportation Options Plan (Study) examines the GHG emissions produced by light vehicles in 1990 and 2010 between the incorporated cities of the Central Oregon area. The study area focuses on inter-city travel on the main travel corridors, which are also state highway² segments, as determined by the mile point data collection point located closest to each city boundary. The Technical Advisory Committee suggested using a mid-city mile point rather than a city boundary mile point. This concept was considered but ultimately rejected because of the uncertainty added by the unquantifiable effect of local trips on the data.

CALCULATING BASELINE GHG

Most new and existing analytical methods for estimating the GHG impacts of transportation require the collection or compilation of new data. For example, the Oregon Department of Transportation has developed a process called GreenSTEP to model GHG emissions from the transportation sector through the measurement of multiple factors. However, because this study is meant to be a "30,000-foot level" examination based on existing available and relatively easily obtainable data, the Technical Advisory Committee advised using a simplified quantitative method for estimating the amounts of GHG from inter-city trips.

Therefore, this study used a formula derived from the US Environmental Protection Agency's Emissions Facts³ to determine baseline GHG for this study. The formula is as follows:

$$\text{(Vehicle Miles Traveled (VMT) * 0.19 (lb CO}_2 \text{ per mile) / average Miles per Gallon (MPG) for study year) / 2204.62 = metric tons of CO}_2 \text{ per highway segment}$$

¹ Background Report: The Status of Oregon Greenhouse Gas Emissions and Analysis, October 2009; Oregon Department of Transportation.

² The Technical Advisory Committee suggested also examining the Powell Butte Highway and possibly the Old Bend-Redmond Highway. However, insufficient data was available to analyze these segments (in particular, vehicle classification data).

³ Emission Facts: Average Carbon Dioxide Emissions Resulting from Gasoline and Diesel Fuel. Office of Transportation and Air Quality, U.S. Environmental Protection Agency (EPA), February 2005.

LONG-RANGE STRATEGIC PLAN FOR PUBLIC TRANSPORTATION
 Central Oregon Strategic Transportation Options Plan (COSTOP)
Technical Report One: Baseline Regional Transportation-Related GHG Emissions

VMT was calculated by multiplying the average annual daily trips (AADT) by the length of each highway segment, using mile points located on or as close as possible to city boundaries. AADTs were obtained from ODOT Transportation Volume Tables and averaged over all mile point counts within segment. Transit trips were subtracted from AADT for 2010.

The percentage of cars (FHWA Class 2) and light trucks (FHWA Class 3) was obtained from ODOT Traffic Volumes and Vehicle Classification tables, averaged over the length of the highway segment. Light traffic was differentiated from heavy traffic based on the theory that light traffic is more likely to represent passenger trips that could potentially be converted to transit trips.

GHG are expressed as metric tons of CO₂, since CO₂ is the principal component of GHG.

The miles per gallon (MPG) for study year 1990 (18.2) were obtained from the US Bureau of Transportation Statistics⁴ as an average of passenger car and light trucks.

The MPG for study year 2010 (20.3) were obtained from the US EPA as an average of passenger car and light trucks.

Table 1 (attached) summarizes the results of the baseline data.

TABLE 1: SUMMARY OF BASELINE GHG EMISSIONS			
Highway Segment	1990	2000	2010
	Metric tons GHG		
126, Sisters-Redmond (ODOT 15)	18	35	38
126, Redmond to Prineville (ODOT 41)	16	50	50
97, Madras-Redmond (ODOT 4)	90	109	112
97, Redmond-Bend (ODOT 4)	104	128	148
97, Bend-LaPine (ODOT4)	77	84	94
26, Madras-Prineville (ODOT 360)	23	26	20*
361, Culver & Metolius (ODOT 361)	8	9	6*

* Lower GHG estimates for these 2 highway segments result from a drop in % of light vehicles

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The contents of this document do not necessarily reflect views or policies of the State of Oregon.

⁴ Average Fuel Efficiency of US Passenger Cars & Light Trucks, Research and Innovative Technology Administration, Bureau of Transportation Statistics, US Department of Transportation.