

DISCUSSION OF TRANSPORTATION FACTORS & METHODOLOGY
SONOMA COUNTY GREENHOUSE GAS REPORT FOR 2014
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GHG emissions in the transportation sector for on road travel are quantified using three factors:

1. Overall vehicle miles traveled (VMT)
2. The percentage of vehicle miles accounted for by each vehicle type
3. The fuel efficiency and fuel type of each vehicle category in the fleet

The first factor, overall vehicle miles traveled, is primarily a function of population and economic activity. As population increases and as economic activity increases, the number of trips taken increases. To a lesser extent, the level and type of development in an area influences VMT as well, as the number of more local destinations and the average trip length depends on community structure. These factors are somewhat dependent on local policies.

The second factor, percentage of VMT by each vehicle type, is related to the makeup of the vehicle fleet and also to the frequency of travel in each vehicle category. Passenger automobiles are typically the largest share, followed by SUVs and light trucks. Transit vehicles and heavy trucks are the smallest share of both the vehicle inventory and VMT. These proportions can change depending on fuel price and the economy of various vehicle categories. This factor is largely independent of any government policy, except perhaps fuel economy standards. The cost of vehicles and the state of the economy probably exert most influence over this factor.

The third factor, fuel efficiency of each vehicle category, depends largely on state and federal policies regarding fuel economy standards. These have increased (better fuel economy) over time, but in particular over the last few years in California as the AB 1493 (Pavley) standards kick in as well as the Low Carbon Fuel Standard (pursuant to AB 32).

The Center for Climate Protection has used the ICLEI Clean Air Climate Protection software to create greenhouse gas emissions reports since it began tracking Sonoma County emissions in 2004. This software contains default vehicle inventory and fuel efficiency numbers that are based on national averages. It includes assumptions about how fleet fuel economy and fleet inventory change over time. Earlier assumptions were more reflective of real world conditions. More recently, the Metropolitan Transportation Commission has developed vehicle inventories for Sonoma County going back to 1990, as well as fuel economy estimates for each vehicle category on a county basis.

The following table shows the MTC fuel economy estimates, as produced by EMFAC 2011,¹ for various years going back to 1990.

Year	Overall average	Pavley & LCFS	% change in overall
1990	15.64		
2000	17.92		14.6%
2005	17.51		-2.3%
2010	17.65	17.70	0.8%
2014	17.79	19.17	0.8%

There was an improvement in the fuel economy of 22.5% between 1990 and 2014 when Pavley and the Low Carbon Fuel Standard (LCFS) are taken into account.

The following table shows the VMT between 1990 and 2014. These numbers are from Sonoma County Transportation Authority and are based on a 347 day year, using the Average Daily VMT. This is the factor recommended by SCTA for obtaining annual VMT.

Year	Annual VMT (millions)	% change
1990	2,859.627	
2000	3,469.653	21.3%
2005	3,698.375	6.6%
2010	3,880.706	4.9%
2014	3,846.609	-0.9%

Overall, VMT increased 34.5% between 1990 and 2014.

The ICLEI software gives a 9% increase in GHG emissions in the transportation sector between 1990 and 2014. The difference between the increase in VMT and the increase in fuel economy would result in about a 12% increase in GHG, using the MTC fleet inventory and the updated VMT numbers from SCTA. This approximately 3% difference between the two approaches shows a similar trend, and is within a reasonable margin of error, given the assumptions inherent in each approach.

¹ The EMISSION FACTORS (EMFAC) model is used to calculate emission rates from all motor vehicles, such as passenger cars to heavy-duty trucks, operating on highways, freeways and local roads in California.