



HOUSEHOLD TRAVEL AND ENERGY

The Maryland Greenhouse Gas Reduction Act requires the state to achieve a 25 percent reduction in statewide greenhouse gas (GHG) emissions from 2006 levels by 2020. Most of Maryland's greenhouse gas emissions come from power plants and mobile sources—cars and trucks. Household travel produces 22 percent of the total. It's the largest component after electricity, which produces 42 percent.¹

- **How many miles** does the average household in the Baltimore region drive in the course of a day?
- **What factors** influence how much households travel?
- Do **households who travel more** compensate by purchasing vehicles that get better gas mileage?
- **How** would changes in the vehicle fleet affect GHG emissions?

The staff of the Baltimore Metropolitan Council, working on behalf of the Baltimore Regional Transportation Board (BRTB), gathers and examines data to identify the issues that affect travel in the Baltimore region. To answer these questions about travel, staff turned to the BMC Household Travel Survey conducted in 2007-2008 as well as other US and British household travel surveys.

How many miles does the average household in the Baltimore region drive in the course of a day?

Households are very different. In the BMC Household Travel Survey, 3,756 Baltimore region households drove their vehicles anywhere from two-tenths of a mile to 300 miles on their survey day.²

- Only 20 percent of the households (778) account for half of all miles traveled.
- The other 2,978 households account for the other half.

For convenience, the 778 households will be called the “Upper20”. The other 2,978 households, who make up 80 percent of the households, will be called the “Lower80”.

- The average Lower80 household made 5 trips and covered 30 miles.
- The average Upper20 household made 8.5 trips and covered 115 miles.

Upper20 households drove twice as far as Lower80 households for work, but most of the difference was travel for non-work purposes.

¹ Data is from 2005. Final Maryland Greenhouse Gas Inventory and Reference Case Projections, in Maryland *Climate Action Plan*, Appendix C, August 2008.

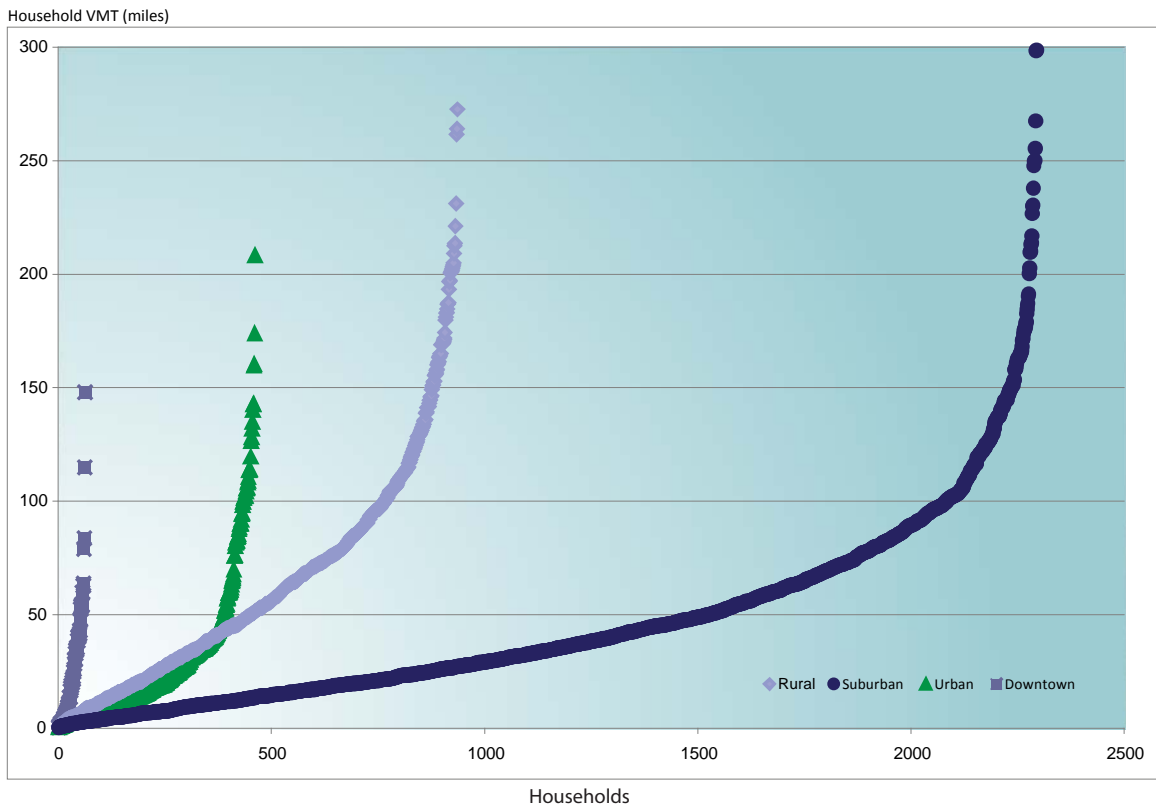
² 4,650 households participated in the survey; 15 percent made no trips. Transit trips and passenger trips were also excluded from this analysis but not from the survey itself.

A small share of households also accounted for a large share of travel in a British travel survey.³ In the British travel survey, participating households completed a travel diary for a full year. Over the length of the survey, the same households regularly drove more than others.

What factors influence how much households travel?

Geography is a good predictor of household travel. On average, rural households travel more than suburban households, who travel more than urban households. In the Baltimore region, rural households average 62 vehicle miles per day, suburban households 46 miles, urban households 29 miles, and households that reside downtown 27 miles.

HOUSEHOLD VEHICLE MILES TRAVELED (VMT) BY AREA



Source: BMC Household Travel Survey

³ Brand, Christian. 'Hockey Sticks' Made of Carbon – The Unequal Distribution of Greenhouse Gas Emissions from Personal Travel in the UK. In TRB 2009 Annual Meeting CD-ROM.

These results are not surprising as low density settlement patterns mean that residents of the suburbs and rural areas have to travel further to reach activities.

But it's worth pointing out that, in each geographical area, a small number of households travel significantly more than other households. Although geography can help predict household travel, it does not fully explain the Upper20 / Lower80 household split.

Household size is also a good predictor of household travel. In the Baltimore region, the average Lower80 household has two members while the average Upper20 household has three members. Likewise, national data shows that having more workers in the household is also associated with more travel.⁴

Do households who travel more compensate by purchasing vehicles that get better gas mileage?

As was mentioned previously, Upper20 households drive almost four times as much as Lower80 households (115 miles per day versus 30 miles per day). Therefore, it's possible that Upper20 households try to economize on gasoline by purchasing more fuel efficient vehicles.

Unfortunately, when the fuel efficiency of Upper20 and Lower80 household vehicles are compared, there's almost no difference. Average fuel efficiency for Lower80 vehicles is 20.8 mpg and for Upper20 vehicles it is 20.6 mpg.

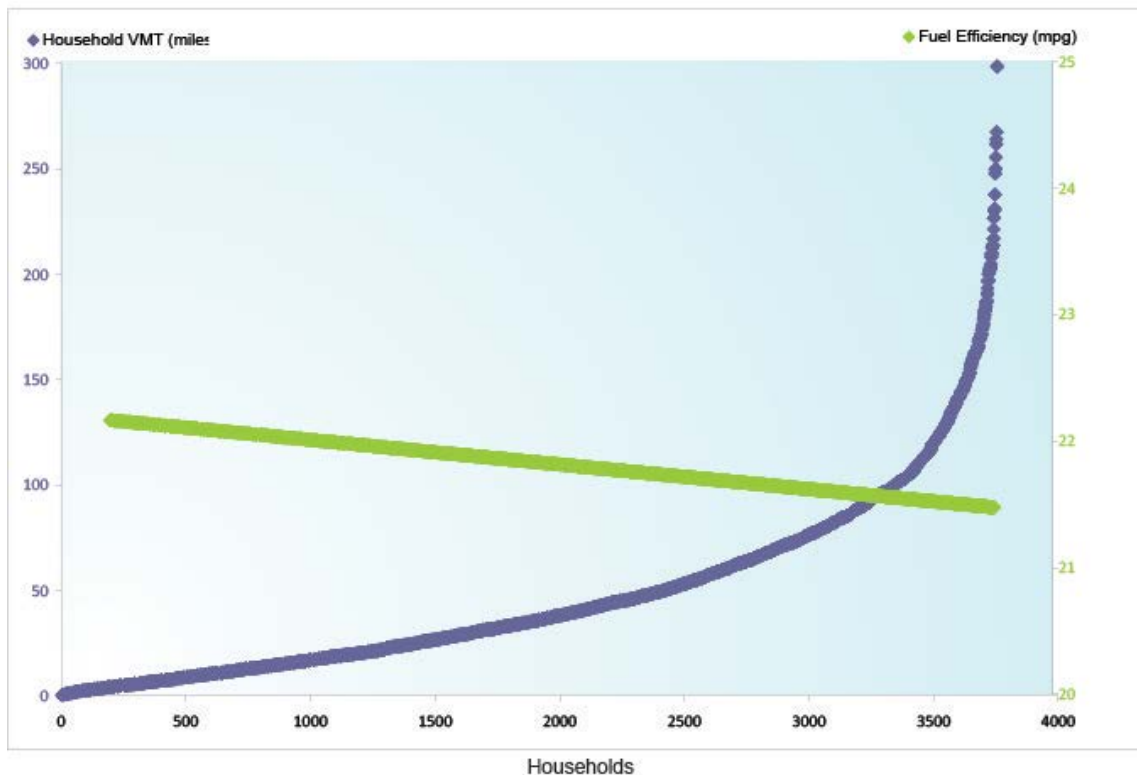
Why are the fuel efficiency numbers the same?

Some households may have little choice about the type of vehicle they purchase due to the type of work they do, e.g. hauling tools and materials, or their activities, e.g. carrying small children to soccer practice. Others could probably get away with a smaller, more fuel efficient vehicle but choose not to. They may make this decision based on lifestyle, personal identity, or other intangibles.

The not very surprising conclusion is that some things are more important to households than saving money on fuel costs.

In addition, since GHG emissions are a product of the number of miles traveled and fuel efficiency, emissions from each Upper20 household appear to be much higher than those from each Lower80 household.

HOUSEHOLD VEHICLE MILES TRAVELED (VMT) VERSUS FUEL EFFICIENCY OF HOUSEHOLD VEHICLES



⁴ The 'Carbon Footprint' of Daily Travel, NHTS topic brief, March 2009.

How would changes in the vehicle fleet affect GHG emissions?

In general, there are two ways to lower GHG emissions from household travel: 1) reduce the miles that people drive, or 2) increase the fuel efficiency of the vehicle fleet.⁵

Increasing vehicle fuel efficiency has the advantage – or disadvantage, depending on one’s point of view – that it would require no change in current household behavior. Furthermore, there are already laws on the books that regulate vehicle fuel efficiency, although they were originally intended to promote energy independence.

“Congress established Corporate Average Fuel Economy (CAFE) standards in 1975, largely in response to the 1973 oil embargo,” notes the Union of Concerned Scientists. “CAFE standards govern the composition of America’s fleet of new passenger cars and light trucks and set the average fuel economy... that a manufacturer’s fleet must achieve....”⁶

The impact on GHG emissions of some hypothetical efficiency standards have been estimated by the National Household Travel Survey (NHTS) using their 2001 survey of 300,000 U.S. households.⁷ Each approach would change the vehicle fleet differently. Results are shown below.

The NHTS points out, “...if we doubled fuel efficiency in each class of vehicle we could halve the carbon emissions from daily vehicle travel.” Other approaches resulted in fewer gains. They add: “Currently, the average vehicle is nearly 9 years old, so incentives might be necessary to encourage faster turn-over of the household fleet.”⁸

⁵ For example, the Maryland Comprehensive Greenhouse Gas and Carbon Footprint Reduction Strategy identifies two Transportation and Land Use Strategy (TLU) areas: TLU Area 1 – Reduce VMT’s contributions and TLU Area 2 – Reduce Carbon per Mile or per Hour. In *Maryland Climate Action Plan*, Chapter 4. August 2008.

⁶ Fuel Economy Basics, accessed online at UCSUSA.org

⁷ “These estimates are based on current driving patterns and vehicle use, and not the number of vehicles in each class. For example, cars are by far more numerous but are driven fewer miles on average than SUVs....” *The ‘Carbon Footprint’ of Daily Travel*, NHTS topic brief, March 2009.

⁸ *The ‘Carbon Footprint’ of Daily Travel*, NHTS topic brief, March 2009.

**RELATIVE IMPACT OF FLEET CHANGES
ON CO₂ EMISSIONS FROM VEHICLE TRAVEL⁹**

Based on current vehicle mix and use from NHTS:	Percent Reduction in CO₂
Base Case (Current)	<null>
If 20% cars, vans, SUVs were hybrid (55 mpg)	2.5%
If fuel efficiency were raised 10% for all vehicles	9.1%
If all Vans, SUVs and Pick-up trucks were replaced by cars	11.6%
If fuel efficiency was 29 mpg for all vehicles	31.7%
If we doubled fuel efficiency in each vehicle class	50.0%

For more information, see the NHTS topic briefs, *The 'Carbon Footprint' of Daily Travel*, *Rising Fuel Costs – A Big Impact*, and *Energy Use and Fuel Efficiency*, available on the NHTS website.¹⁰

⁹ Source: *The 'Carbon Footprint' of Daily Travel*, NHTS topic brief, March 2009.

¹⁰ <http://nhts.oml.gov>



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