NHTS BRIEF

National Household Travel Survey

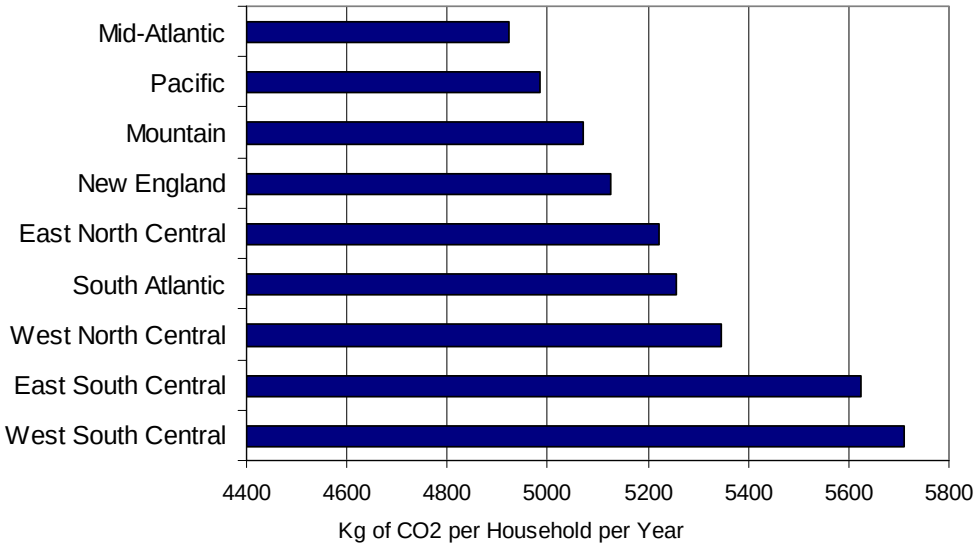
U.S. Department of Transportation
Federal Highway Administration

Daily vehicle travel contributes to global warming through the simple act of combusting petroleum (e.g. gasoline and diesel fuel), which releases carbon dioxide (CO_2), a potent greenhouse gas, into the air. Carbon dioxide accounts for over 80 percent of total greenhouse gas emissions in the United States, and transportation sources account for nearly one-third of that total. Methods used to decrease toxic pollutant emissions, such as requiring unleaded gasoline and catalytic converters, have no effect on the amount of CO_2 produced by vehicle travel.

Household travel accounts for the vast majority (over 80 percent) of miles traveled on our nation's roadways and three-quarters of the CO_2 emissions from 'on-road' sources. The 'carbon footprint' of daily travel for an individual household is based the types of vehicles that household owns, the fuel efficiency, and the number of miles traveled.

Using the vehicle and mileage data in the NHTS, it is possible to estimate the relative amount of CO_2 produced by household travel in the U.S., which varies by region of the country, as shown in Exhibit 1.

Exhibit 1 – Average Kilograms of CO_2 per Household per Year by Region



Source: NHTS 2001 - Based on 8.8 Kg CO2 per Gallon of Gasoline

An average rural household will produce more CO_2 than an urban or suburban household, because people in rural settings generally travel more miles and own more vehicles, many of which are less fuel efficient—such as SUVs and pick-up trucks. But many other factors, including socio-economic and land-use characteristics, affect the amount of CO_2 emissions by households.

Exhibit 2 shows a ranking of households by some factors that effect the miles driven, or are correlated to the number and type of vehicles owned, and therefore significantly effect CO_2 emissions from travel. These categories are not exclusive, e.g. a single household can have "Three or more vehicles' and also have 'Two workers'. On average, households with more workers and more vehicles travel more miles, which emits more CO_2 than households with fewer vehicles and fewer workers.

Exhibit 2 – Household Characteristics and Est. Annual CO_2 Emissions from Travel

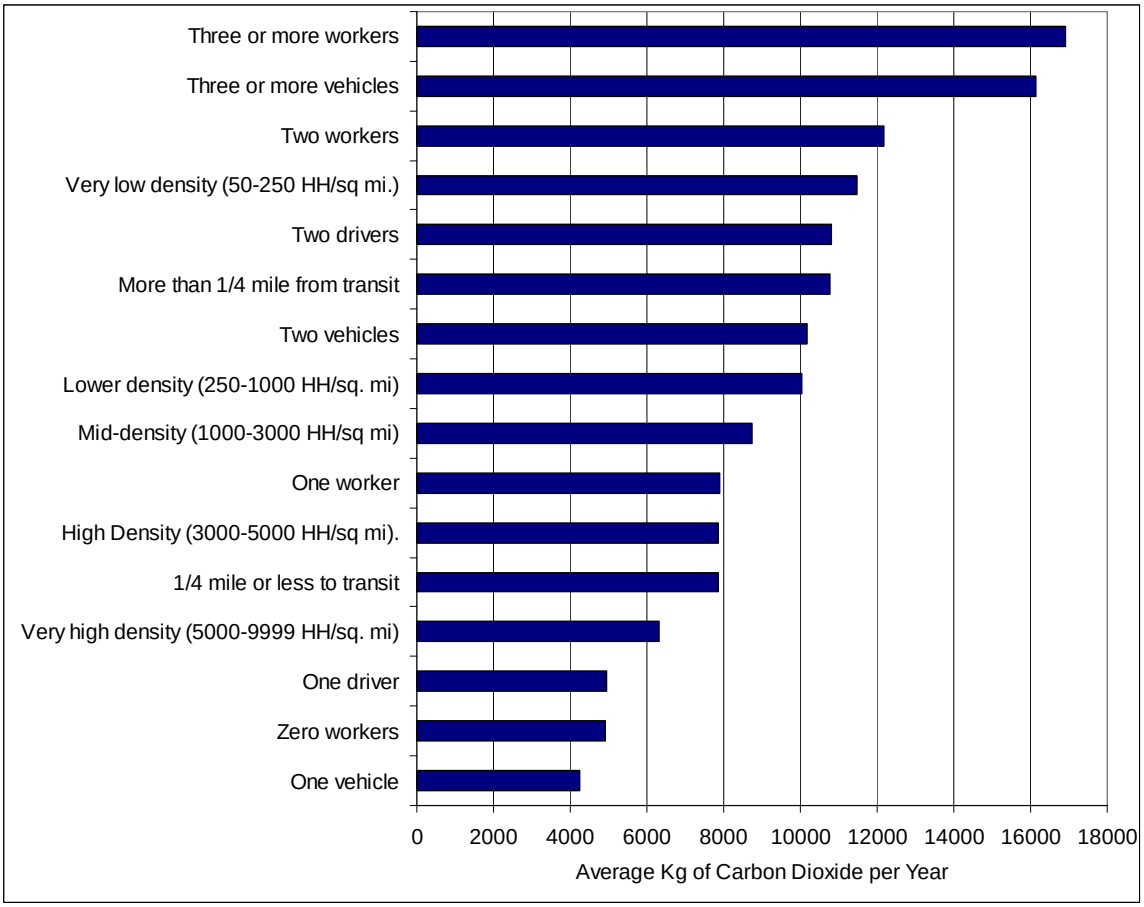


Exhibit 2 also shows that household density and distance to transit are related to carbon emissions. For instance, households in very high density (5000-9999 households per square mile) produce about half the CO_2 than households in very low density (0-50 households per square mile). And households very close to transit lines produce about one-quarter less CO_2 than households not near transit.

Between 1978 and 1987 fleet fuel efficiency rose dramatically as a result of the Energy Conservation Policy Act of 1978 which tried to double fleet efficiency by 1987. However, since 1987, the fuel economy of the household fleet has slowly declined as vehicles have gotten larger and heavier, and as light-duty trucks (SUV's primarily) grew as a share of the passenger fleet.

Using the NHTS one can estimate the relative impact of changes in the vehicle mix and use of the fleet. Exhibit 3 shows a ranked series of scenarios and the relative impact on the amount of CO_2 emissions from daily travel. 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 (see Policy Briefs: "Rising Fuel Costs—A Big Impact" and 'Energy Use and Fuel Efficiency").

For instance, using the NHTS information on vehicle use, we can estimate that if 20 percent (each) of all cars, vans, SUVs and pick-ups were hybrid and got 55 miles to a gallon of gasoline, CO_2 emissions from daily vehicle travel would be reduced by 2.5 percent (see Exhibit 3). Since cars get over 22 miles per gallon but are driven fewer miles per year, while SUVs and pick-ups get less than 18 mpg but are driven more miles per year, if all travel in vans, SUVs and Pick-ups were made in an average car instead, we would reduce carbon emissions by 11.6 percent.

Exhibit 3 – Relative Impact of Fleet Changes on CO_2 Emissions from Vehicle Travel

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%

As shown in Exhibit 3, if we doubled fuel efficiency in each class of vehicle we could halve the carbon emissions from daily vehicle travel. Currently, the average vehicle is nearly 9 years old, so incentives might be necessary to encourage a faster turn-over of the household fleet. In addition, public education can encourage people to include fuel efficiency and CO_2 impacts when purchasing a vehicle.

To reduce the carbon footprint of daily vehicle travel, individual households can drive fewer miles, use more fuel efficient vehicles, carpool, chain trips, and use alternate modes such as transit and walking. Policy makers and planners can help reduce carbon emissions by increasing the fuel efficiency of the fleet, providing more efficient network operations, reducing congestion and idling, and providing viable alternatives to driving.

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