### Transportation Key

#### Road Transportation is the largest contributor to global warming

Burwell 10 (David Dir of the Energy and Climate Program at the Carnegie Endowment, http://carnegieendowment.org/2010/04/15/transportation-leading-cause-of-global-warming/2fr2)

Road transportation is the greatest contributor to global warming for the next 50 years according to a recent study by NASA’s Goddard Institute for Space Studies. By analyzing the climate impact of each sector of the economy, the study determined that motor vehicles emit significant levels of pollutants that warm the atmosphere with few counteracting pollutants that create a cooling effect. In a video Q&A, David Burwell suggests steps U.S. policy makers can take to reduce emissions, promote green growth, and mitigate transportation’s harmful effects on climate. “We have to look at how much we drive and take actions to reduce the total demand for transportation—particularly driving,” says Burwell. By moving forward with a transportation bill that invests in a green transportation system, “the United States could show other countries—particularly China, India, and other emerging economies—that it is serious about reducing its transportation carbon and this would contribute to the likelihood of a global climate agreement.”

#### Cars are the leading cause of global warming

West 08 (Larry West; Journalist, University of Seattle, Washinton) “Small Cars Emit More Carbon Dioxide Than SUVs” http://environment.about.com/od/globalwarming/a/autoemissions.htm

The study by Environmental Defense found some other surprising facts: Despite the proliferation of SUVs, small cars such as compacts and subcompacts still account for 25 percent (77 million metric tons) of carbon dioxide emissions on the road. The reason is simple: small cars were the top-sellers for a long time, and cars tend to stay on the road for many years. Although SUVs currently trail small cars as sources of carbon dioxide emissions that contribute to global warming (67 million metric tons or 21 percent of all U.S. auto emissions), they will soon be in first place and will remain a leading cause of global warming on U.S. roads for many years. The average new car, led by personal trucks, emits more carbon dioxide than many older cars still in use, so the idea of simply getting rid of older cars to reduce on-road emissions won’t solve the problem. “Reducing global warming on the road is a shared responsibility,” DeCicco said in a press release. “By underscoring the magnitude of emissions from America's automobiles, this report shows that all actors – automakers, fuel providers, consumers, and various levels of government – can help solve the problem by addressing those aspects of CO2 emissions they can control.”

#### **Transportation is the leading cause of global warming**

CEI 12 (Clean Energy Ideas) “Causes Of Global Warming” https://www.google.com/search?hl=en&noj=1&biw=1068&bih=633&q=transportation+leading+%22cause+of+global+warming%22&oq=transportation+leading+%22cause+of+global+warming%22&gs\_l=serp.3...49383.70411.0.70578.60.55.5.0.0.3.159.4946.38j17.55.0...0.0...1c.JKuSvgYFfxs

There are numerous causes of global warming, each of which contributes to the increasing intensity of the effects that climate change has on our planet. If you are looking for information on global warming itself then our[what is global warming](http://www.clean-energy-ideas.com/global_warming/what_is_global_warming.html) article may be of use to you. The main cause of global warming is the increase of greenhouse gases in the earth's atmosphere. This creates what is known as the greenhouse effect which heats the earth by reducing the level of solar rays that are able to escape from our atmosphere. Although the greenhouse effect is essentially a vital factor in supporting life on earth by keeping our atmosphere warm enough to support life, human activities are contributing to the quantity of greenhouse gases providing an artificial increase in the intensity of the greenhouse effect. One of the key causes of global warming is pollution caused as a result of transportation. The use of aviation, public transport (buses, trains, taxis) and personal transport (cars, motorbikes etc) are all on the increase as our population increases.

#### Nusca 10 ( Andrew, Degree in Journalism from Columbia Univeristy) “NASA: **Road transportation a ‘key driver’ of global warming” http://www.smartplanet.com/blog/smart-takes/nasa-road-transportation-a-8216key-driver-of-global-warming/4401**

Analyzing impact by economic sector rather than chemical species, NASA scientists [have determined that](http://www.nasa.gov/topics/earth/features/road-transportation.html) motor vehicles are the greatest contributor to atmospheric warming, “now and in the near term.” In a new study led by Nadine Unger of NASA’s Goddard Institute for Space Studies, researchers used a climate model to analyze how 13 different sectors of the economy will impact global warming from the year 2000 to 2100. Each part of the economy “emits a unique portfolio of gases and aerosols that affect the climate in different ways and on different timescales,” the researchers write. The scientists based their calculations on real-world inventories of emissions collected by other scientists around the world. For each sector of the economy, they analyzed the effects of a wide range of chemicals — such as carbon dioxide, nitrous oxide, methane, organic carbon, black carbon, nitrate, sulfate and ozone — on the atmosphere, particularly clouds. Their findings? Cars, buses, and trucks release plenty of pollutants and greenhouse gases that facilitate global warming, but emit few aerosols that counteract them.

#### Transportation is the leading contributor to global warming – aerosols cannot counter act warming

Proefrock 10 (Philip Proefrock, Architect, photographer, green building consultant, writer for EcoGeek.org (& other sites). SE Michigan) “Road Transportation Is the Greatest Culprit in Global Warming ” <http://www.ecogeek.org/monitoring-pollution/3100-road-transportation-is-the-greatest-culprit-in-glo>

A new study from NASA's Goddard Institute for Space Studies has identified on-road transportation as the most significant overall source contributing to global warming. Power generation, while having the greatest total impact, also includes a large number of compounds that increase cloud reflectivity and provide other effects to offset some of the warming they are responsible for. In the study, rather than looking at specific chemicals and compounds, the range of airborne pollutants is broken down by economic sector. The study looks at the range of gases and aerosols that are released by each of 13 sectors of the economy, and finds that on-road transportation has the greatest overall effect on global warming. The intent of this study is to make the information about climate change more accessible and understandable. "We wanted to provide the information in a way that would be more helpful for policy makers," according to Nadine Unger, leader of the research team. "This approach will make it easier to identify sectors for which emission reductions will be most beneficial for climate and those which may produce unintended consequences." No one should mistake the point of this study to indicate that coal burning and other power-generation and industrial processes are benign and therefore do not need to be scaled back. Although industrial processes mitigate their adverse effects with regard to global warming, the sulfates and aerosols that are beneficial in this one manner are responsible for a range of other, negative environmental impacts.

#### Transit emissions are the greatest contributor to global warming

White 12 (Deborah White, Journalist; About.com, M.B.A. from California State University, Long Beach) “The Causes of Global Warming” http://usliberals.about.com/bio/Deborah-White-14542.htm

The scientific community as a whole has concluded that naturally occurring greenhouse gases have remained fairly constant over the past several hundred years. Greenhouse gases directly and indirectly generated by mankind, though, have increased radically for the past 150 years, and especially in the past 60 years. Major sources of greenhouse gases generated by mankind are: Burning of fossil fuels, which includes oil and gas, coal and natural gas. Chlorofluorocarbons, commonly used in refrigeration, cooling and manufacturing applications. Methane, which is caused by emissions from landfills, livestock, rice farming (which uses methane-emitting bacteria), septic processes, and fertilizers. Deforestation Per Rainforests.com, "The largest (manmade)contributor to the greenhouse effect is carbon dioxide gas emissions, about 77 percent of which comes from the combustion of fossil fuels and 22 percent of which is attributed to deforestation." The largest single contributer to the rise of man-made greenhouse gases is, of course, the burning of oil and gas to power vehicles, machinery, and produce energy and warmth. TheUnion of Concerned Scientists observed in 2005: "Motor vehicles are responsible for almost a quarter of annual U.S. emissions of carbon dioxide (CO2), the primary global-warming gas. The U.S. transportation sector emits more CO2 than all but three other countries' emissions from all sources combined. And motor vehicle emissions will continue to increase as more vehicles hit America's roads and the number of miles driven grows. "Three factors contribute to CO2 emissions from cars and trucks: Amount of fuel used Amount of CO2 released when a particular fuel is consumed Number of vehicle miles traveled."

#### Fossil Fuel emissions from cars are the greatest contributer to warming

EPA 10 (Environmental Protection Agency) “Trends in Greenhouse Gas Emissions” http://www.epa.gov/climatechange/emissions/downloads12/US-GHG-Inventory-2012-Chapter-2-Trends.pdf

As the largest contributor to U.S. greenhouse gas emissions, carbon dioxide (CO2) from fossil fuel combustion has accounted for approximately 78 percent of global warming potential (GWP) weighted emissions since 1990, from 77 percent of total GWP-weighted emissions in 1990 to 79 percent in 2010. Emissions from this source category grew by 13.7 percent (649.5 Tg CO2 Eq.) from 1990 to 2010 and were responsible for most of the increase in national emissions during this period. From 2009 to 2010, these emissions increased by 3.5 percent (181.6 Tg CO2 Eq.). Historically, changes in emissions from fossil fuel combustion have been the dominant factor affecting U.S. emission trends. Changes in CO2 emissions from fossil fuel combustion are influenced by many long-term and short-term factors, including population and economic growth, energy price fluctuations, technological changes, and seasonal temperatures. On an annual basis, the overall consumption of fossil fuels in the United States fluctuates primarily in response to changes in general economic conditions, energy prices, weather, and the availability of non-fossil alternatives. For example, in a year with increased consumption of goods and services, low fuel prices, severe summer and winter weather conditions, nuclear plant closures, and lower precipitation feeding hydroelectric dams, there would likely be proportionally greater fossil fuel consumption than in a year with poor economic performance, high fuel prices, mild temperatures, and increased output from nuclear and hydroelectric plants. In the longer-term, energy consumption patterns respond to changes that affect the scale of consumption (e.g., population, number of cars, and size of houses), the efficiency with which energy is used in equipment (e.g., cars, power plants, steel mills, and light bulbs) and behavioral choices (e.g., walking, bicycling, or telecommuting to work instead of driving). Energy-related CO2 emissions also depend on the type of fuel or energy consumed and its carbon (C) intensity. Producing a unit of heat or electricity using natural gas instead of coal, for example, can reduce the CO2 emissions because of the lower C content of natural gas.

#### Transportation greatest source of anthropogenic emissions

Fuglestvedt 07 (Jan Fuglestvedt, Terje Berntsen, Gunnar Myhre, Kristin Rypdal, Ragnhild Bieltvedt Skeie Center for International Climate and Environmental Research–Oslo; Department of Geosciences) “Climate forcing from the transport sectors” http://www.pnas.org/content/105/2/454.full.pdf

We use results from published studies to establish current emissions of WMGHGs and the short-lived gases and past emissions of WMGHGs for 1850–2000. We include emissions from energy consumed from tank to wheel, and we exclude emissions of halocarbons from air conditioning and road dust. Because railways may use electricity rather than fossil fuels, to enable a fair comparison with the other transport subsectors the emissions associated with the production of electricity have been included. For fossil fuels, the indirect component (well-to-tank) constitutes a smaller share of well-to-wheel emissions (19) and has not been included in the analysis. Emissions data for 2000 are taken from the EDGAR database (1), except for aviation (20), shipping, and BC and OC (21). Transport is the most important source of man-made emissions of NOx (37%). It is also a major contributor of CO2 (21%), VOC (19%), CO (18%), and BC (14%). For other substances, the transport sector’s share of total man-made emissions is 10% or less. With respect to the subsectors, road transport is the largest contributor of emissions of all substances except SO2, for which shipping is the most important (56% of transport emissions). For BC in particular, the contribution of off-road mobile machinery to total emissions is high, but in this article these sources are not considered part of transport. Estimates of BC and OC emissions from transport are generally more uncertain than estimates of the other substances. SI Table 1 shows the emission data for 2000 used in our calculations.

#### **Road Transport among the highest**

Fuglestvedt 07 (Jan Fuglestvedt, Terje Berntsen, Gunnar Myhre, Kristin Rypdal, Ragnhild Bieltvedt Skeie Center for International Climate and Environmental Research–Oslo; Department of Geosciences) “Climate forcing from the transport sectors” http://www.pnas.org/content/105/2/454.full.pdf

The adoption of 100 years as time horizon has implications involving value judgments, and it may be argued that other horizons should be applied (30). If the main concern is the near-term impacts of climate change, a shorter horizon is more appropriate. Fig. 3B shows the effect of the current emissions from the transport subsectors, relative to the effect of road transport for three time horizons. The uncertainties in the estimates of current emissions and in the RF calculations are accounted for (see SI Methods) and form the basis for the 1 SD uncertainty bars. Because of the critical role of sulfate, the impact of shipping switches from negative in a short and medium time perspective to positive on a scale of several centuries. The RF caused by sulfate (directly and indirectly) is strong and short-lived. Because this approach integrates the RF over the time horizon, the effect of sulfate is still significant in a 100-year perspective. For still longer time horizons, the effect of CO2 becomes dominating. This is also the case for rail. The integrated RF from road transport and aviation, however, is positive for all three time horizons. For all three horizons, road transport dominates, with aviation as the second largest contributor to warming. Shipping switches to a positive net forcing for a time horizon of 500 years, but with an uncertainty range that still includes negative RF. In general, the longer the time horizon, the less uncertain is the net effect because of the decreasing influence of the short-lived components that have high uncertainty.

#### Transportation is the largest contributor to warming

Fuglestvedt 07 (Jan Fuglestvedt, Terje Berntsen, Gunnar Myhre, Kristin Rypdal, Ragnhild Bieltvedt Skeie Center for International Climate and Environmental Research–Oslo; Department of Geosciences) “Climate forcing from the transport sectors” http://www.pnas.org/content/105/2/454.full.pdf

This analysis has shown that there are large differences between the transport subsectors in terms of sign and magnitude of forcing, as well as in terms of the mix of contributions from shortand long-lived substances to the net RF and thus its temporal characteristics. Our calculations show that transport contributes significantly to man-made RF for some components. We find that, since preindustrial times, transport has contributed 15% and 31% of total man-made CO2 and O3 forcing, respectively. The current emissions from transport are responsible for 16% of the integrated net forcing over the next 100 years for all current man-made emissions. The dominating contributor to positive forcing (warming) is CO2, followed by tropospheric O3. By subsector, road transport is the largest contributor to warming. Shipping causes net cooling, except on future time scales of several centuries. As discussed above, a variety of perspectives may be used in the evaluation and comparison of climate forcing from the transport sectors. We have used the integrated RF concept, which puts equal weight on all forcings over time, up to the chosen time horizon, and does not account for the thermal inertia of the climate system. This choice of metric is in line with the adoption of GWPs in the Kyoto Protocol and IPCC 2007 (34). Other metrics may also be used (e.g., change in global annual mean surface temperature at a chosen time).