

The U.S. can learn from Germany's successful transport policies to reduce CO2 emissions and petroleum dependence.

In the past decade, the U.S. government has made renewed attempts to lower the CO2 emissions of its vehicle fleet through stricter fuel economy and emission standards regulations. Ralph

Buehler writes that these policies have met with little success. He argues that the U.S. should look to Germany for examples of successful policies which have reduced emissions by reducing the demand for car transport by making walking, cycling, and public transport more attractive modes of transport.



Countries across the world are struggling with the challenge to reduce CO₂ emissions and the petroleum dependence of ground passenger transport. Since 1975 the U.S. has relied on fuel economy standards for newly sold cars and light trucks (called Corporate Average Fuel Efficiency (CAFE) standards) to reduce fuel consumption and, more recently, CO₂ emissions from passenger cars. Under this program fuel efficiency initially increased strongly, but progress has been slower since the mid-1980s and especially since early 1990s for at least two reasons. First, for over two decades government regulation was not significantly updated to reflect improvements in vehicle technology. Second, the initial legislation failed to foresee that many Americans would use light trucks and SUVs as private vehicles for everyday trips—and thus lawmakers set lower fuel economy standards for heavy vehicles that today account for a large share of the U.S. passenger car fleet.

Since the mid-2000s, in a renewed attempt to improve fuel efficiency and lower CO₂ emissions, the U.S. federal government has again chosen the regulation of fuel economy/CO₂ emissions standards for passenger vehicles over other policy tools.

However, a comparison with Germany—a wealthy car-oriented country without government fuel efficiency regulations between 1990 and 2010—shows that government mandated technology standards for private vehicles may not be the best approach to significantly curb CO₂ emissions and fuel use in urban transport. In 2010 CO₂ emissions from ground passenger transport were greater in the U.S. than in Germany: 11.7 times for total CO₂ emissions, 3.1 times per capita, 2.1 times per passenger kilometer, and 2.4 times per unit of gross domestic product (GDP). Additionally, between 1990 and 2010, Germany reduced CO₂ emissions from passenger transport at a faster rate than the USA—even controlling for population growth, economic activity, and travel demand.

Both Germany and the U.S., have put in place several other programs to promote fuel efficiency, such as incentives for the purchase and registration of less polluting cars, cash-for-clunker programs during the recent economic crisis, or mandated the mixing of fuels with ethanol. However, these programs have only had a small impact on overall CO₂ emissions and fuel use.

Lower CO₂ emissions and less gasoline consumption from ground passenger transport in Germany is explained by a more fuel efficient vehicle fleet (about 40-50 percent more fuel efficient), less driving (11,000km per person per year vs. 21,000) and a greater share of trips by foot, bicycle, and public transport (42 percent vs. 14 percent).

Germany achieved greater efficiency of its passenger vehicle fleet (35 vs. 23 mpg or 7.5 vs. 11.2 l per 100km) without fuel efficiency standards, but with higher taxes on gasoline. In 2010, the cost of one liter of gasoline (95 Research Octane Number (RON) unleaded) was \$1.75 in Germany compared to \$0.74 in the USA. Most of the difference was due to gas taxes that were eight times higher in Germany than in the U.S. In 2010, taxes accounted for 62 percent of the retail price of gasoline in Germany compared to only 18 percent in the USA. The higher cost of driving shifts consumer demand towards more fuel efficient vehicles. The difference in gasoline retail price between Germany and the USA has been increasing over the last two decades due to Germany's environmental tax reform that increased gasoline taxes annually by €0.03 per liter (\$0.14 per gallon) between

1998 and 2003—totaling €0.15 per liter (\$0.71 per gallon) over 5 years.

Less car use and more walking, cycling and public transport use in Germany can be explained by a package of many different policies that have the overall effect of promoting driving in the USA, but make car use less attractive in Germany and improve the appeal of walking, cycling, and public transport (see Table 1 below). Importantly, as the table shows, besides better and more attractive public transport, walking and cycling in Germany, most German cities have made driving less attractive.

Table 1 – Public Transport and Car Use policies in Germany and the United States

Policies That Make Car Use Less Attractive in Germany than in the United States	
Sales tax for new cars	United States: State sales taxes for new car purchases range from 0% to 8.25%, with an average of 4.9% Germany: 19% in all states
Driver's license and cost	United States: Easy and cheap driver training and licensing, costing about \$100 in many states Germany: Strict and expensive driver training and licensing, costing over \$1,500 per license
Policies That Make Public Transport More Attractive in Germany than in the United States	
Quantity of service	United States: 20 vehicle km of service per capita per year: regional rail and metro: 6 km; bus and light rail: 14 km Germany: 59 vehicle km of service per capita per year: regional rail and metro: 28 km; bus and light rail: 31 km
Region wide integration	United States: Fares and ticketing rarely integrated across operators and jurisdictions; regional transport planning authorities in most cities, but with less integration of services than in Germany Germany: Regional public transport authorities integrate fares, ticketing, operations, and financing across operators and jurisdictions; statewide coordination of schedules, fares, and tickets
Policies That Make Walking and Cycling More Attractive in Germany than in the United States	
Pedestrian facilities	United States: Lack of pedestrian facilities in many developments and along many urban roads; new complete streets policies in many cities consider the needs of all modes Germany: Universal provision of sidewalks in urban areas; priority for pedestrians in car-free zones in downtowns in almost all cities
Bikeway networks	United States: Only few cities have integrated network of bicycling facilities Germany: Majority of cities with comprehensive, region wide integrated networks of separate facilities for cyclists
Planning and Policies That Facilitate More Dense and Mixed Land Uses to Encourage Walking, Cycling, and Public Transport Use	
Coordination with public	United States: Little coordination of transport with land use planning, except for some transit-oriented developments Germany: Strict land use controls limit low density sprawl and encourage compact development around public transport stops
Planning process	United States: No federal land use planning; limited state land use planning; uncoordinated, and often conflicting land use planning by local jurisdictions Germany: Coordination of land use plans among levels of government and across jurisdictions; integration of land use, transport, and environmental planning at all levels of government

The analysis suggests that Germany achieved higher fuel economy of its vehicle fleet and greater reductions in CO₂ emissions from transport than the USA without fuel economy or CO₂ emission standards. This indicates that policies focusing on technological improvements can only be part of a policy package geared at reducing CO₂ emissions from transport. Technological improvements alone are prone to the potential rebound effect of heavier vehicles, larger engines, and greater car travel demand. Germany's experience shows that public policies can also help reduce car travel demand while making walking, cycling, and public transport more attractive modes of transport.

*This article is based on the paper, ‘[Daily Travel and Carbon Dioxide Emissions from Passenger Transport Comparison of Germany and the United States](#)’ in the *Transportation Research Record: Journal of the Transportation Research Board*.*

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About the author

Ralph Buehler – Virginia Tech

Ralph Buehler is an Associate Professor in Urban Affairs and Planning at Virginia Tech. Most of his research has an international comparative perspective, contrasting transport and land-use policies, transport systems, and travel behavior in Western Europe and North America.

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