NATIONAL CENTER FOR POLICY ANALYSIS

Which Is Better for the Environment: Transit or Roads?

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Compared with driving, rail transit is slow, inconvenient and expensive. Although some rail lines may bypass congested roads, most people do not live and work right next to rail stations or transit stops, meaning door-to-door travel time for transit tends to be far longer than for driving.

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The solution, say transit advocates, is to rebuild American cities to higher densities so more people can live and work close to transit stops. This means a higher percentage of people will have to live in multifamily housing instead of single-family homes. Planners in Portland, Oregon, for example, have set a target of reducing the number of households living in single-family homes from 65 percent to 41 percent.[1]

Even if this goal could be achieved, the benefits are questionable and the costs would be high. Moreover, contrary to popular belief, transit is not more environmentally friendly than automobiles, and when all subsidies are counted, it actually costs several times more per passenger mile than driving.

Energy Consumption: Auto versus Rail. Energy consumption by autos and transit can best be compared using common units such as British Thermal Units (BTUs) per passenger mile. According to the most recent report from the Department of Energy [see figure]:

- In 2009 the average passenger car on the road used about 3,500 BTUs per passenger mile.
- The average light truck (pickup trucks, full-sized vans and sports utility vehicles) used about 3,900 BTUs per passenger mile.
- By comparison, the average urban transit bus used more than 4,200 BTUs per passenger mile.[2]

Rail transit uses less energy on average, but rail transit numbers are skewed by the fact that most rail riders live in New York City, which has the nation's most heavily used transit system. Rail systems in many cities used far more energy: In 2009, Baltimore's used around 6,000 BTUs per passenger mile; Cleveland's more than 8,000; Miami's 5,400; and Pittsburgh's more than 11,000.[3] Nationwide, light rail uses 3,500 BTUs per passenger mile, about the same as cars.

Moreover, transit energy efficiencies have been stagnant or declining over the past several decades, while auto energy efficiencies are improving. For example, cars such as the Prius use less energy per

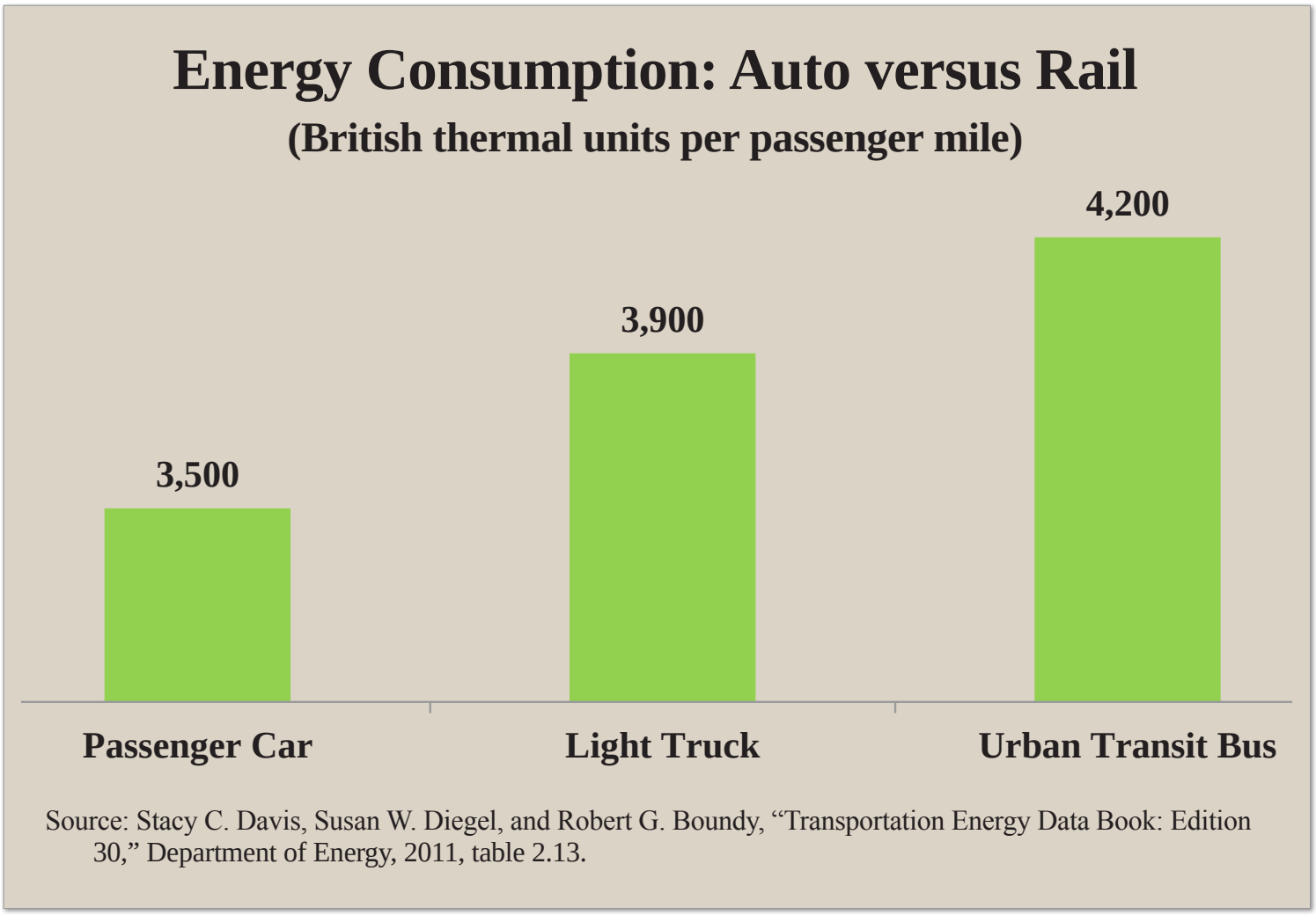
passenger mile than any transit system in the nation, and by 2025 the average car on the road will be greener than transit.

Pollution. For petroleum-powered vehicles, greenhouse gas emissions are proportional to fuel consumption, so bus transit is worse than driving. For electric-powered vehicles, greenhouse gas emissions depend on the source of electricity. Since most states get most of their electricity from burning coal or other fossil fuels, electric-powered transit is no greener than driving and often much less green. Even in states that have hydroelectric dams or other sources of renewable energy, it is probably more cost-effective to use that energy for other purposes than to dedicate it to transportation.[4]

Cars also emit toxic pollutants such as carbon monoxide, nitrogen oxides and volatile organic compounds. Economists call pollution and other side-effects externalities because their costs or benefits are external to the user. Before 1970, automotive air pollution was a serious problem, significantly reducing visibility in many cities and creating health hazards for many people.

In 1970, Congress passed the Clean Air Act requiring automakers to add pollution-control equipment to new cars. The Environmental Protection Agency has steadily tightened the pollution standards so that many new cars today only pollute about 1 percent as much as cars made in 1970. As a result, even though Americans drive more than two-and-one-half times as many miles today as in 1970, total automotive pollution emissions have declined by 80 percent. Since cars are getting cleaner every year, total pollution will soon be only about 5 percent of 1970's auto emissions.[5]

Cost. In addition to the fact that transit is generally slower and less convenient than driving, its cost is much



Source: Stacy C. Davis, Susan W. Diegel, and Robert G. Boundy, "Transportation Energy Data Book: Edition 30," Department of Energy, 2011, table 2.13.

greater — a fact that is disguised by the much larger subsidies given to transit. Moreover, several studies have shown that rail transit projects consistently cost an average of 40 percent more than the cost projections made at the time they were originally approved.[6] By comparison, highway projects, which are usually funded out of user fees and need less political support, go over budget by an average of just 8 percent.[7]

According to the Bureau of Economic Analysis, Americans spent about $943 billion buying, operating, maintaining and insuring motor vehicles in 2010.[8] When added to annual subsidies to highways, mostly from local governments, the total cost of driving is about $975 billion a year. That is a lot of money, but in exchange Americans drove cars and light trucks more than 2.6 trillion miles in 2010.[9]

That means the average cost of driving was about 37 cents per mile. Surveys conducted by the Department of Transportation indicate that cars carry, on average, 1.67 passengers, so the cost of driving per passenger mile is about 22 cents.[10] Of course, someone driving a brand new Mercedes or Cadillac will spend more than someone driving a used Ford or Toyota.

"Transit costs more per passenger mile than driving."

Transit is far more expensive per passenger mile. In 2010, American transit systems carried about 52.6 billion passenger miles and collected $12.2 billion in fares, for an average fare of 23 cents per passenger mile, about the same as the cost of driving. Transit fares, however, cover less than a quarter of the cost of transit. Total subsidies to transit in 2010 were nearly $40 billion, which adds 75 cents to the average cost of each passenger mile. This means transit costs about four times as much as driving. Even in the New York urban area, where 40 percent of all transit rides take place, transit costs more than 80 cents per passenger mile.[11] With its high capital and maintenance costs, rail transit tends to be far more costly than bus transit.

What Lessons Does Europe Offer? Many Americans who have visited Europe and used urban rail transit and intercity trains wonder why the United States cannot have similar transportation systems. The reality is that transit systems do not work in Europe any better than they do in the United States.

More European cities have rail transit than American cities, but Europeans do not use that transit any more than Americans. Rail transit can be found in 130 European urban areas and only about 30 American ones. The average American rides rail transit about 96 miles a year, while the average European rides it 108 miles a year — just 12.5 percent more.[12] Moreover, all of the spending on expensive, high-speed trains in Europe has failed to keep rail's share of travel from falling from 8.2 percent in 1980 to 6.2 percent in 2006.[13]

The main difference between Europe and the United States is not that Europeans ride trains and buses more, but that they drive less. Indeed, while Americans drove for 85 percent of their motorized travel in 2006, Europeans drove for 74 percent of theirs, and buses and trains account for 14 percent of European travel but only 3 percent in America.[14] This is mainly due to Europe's high fuel taxes, much of which are used to subsidize European transit and intercity rail systems. But buses and trains do not make up for the reduction in driving: the average American travels more than twice as many miles per year as the average European.[15] Attempts to replace auto travel with other forms of travel only end up suppressing mobility.

Conclusion. If transit costs far more than driving and does not save energy or reduce air pollution or greenhouse gas emissions, then there is little justification for increasing federal subsidies to transit infrastructure. In fact, those federal subsidies may be one reason why transit has become so costly and ineffective. Since transit agencies get most of their money from taxpayers rather than transit riders, they cater to elected officials rather than their customers, building expensive transit projects that the elected officials can take credit for even though those projects do little to improve actual transit service.

Endnotes

1. "Region 2040 Recommended Alternative Technical Appendix," Metro, Portland, Ore., September 15, 1994, Table 11.

2. Stacy C. Davis, Susan W. Diegel and Robert G. Boundy, "Transportation Energy Data Book: Edition 30," Department of Energy, Oak Ridge, Tenn., 2011, Table 2.13.

3. Calculations based on 2009 National Transit Database. For methodology, see Randal O'Toole, "Does Rail Transit Save Energy or Reduce Greenhouse Gas Emissions?" Cato Institute Policy Analysis No. 615, April 14, 2008.

4. Randal O'Toole, "Does Rail Transit Save Energy or Reduce Greenhouse Gas Emissions?" Cato Institute Policy Analysis No. 615, April 14, 2008.

5. "1970-2011 Average Annual Emissions, All Criteria Pollutants," Environmental Protection Agency, 2011. Available at tinyurl.com/6rhhta8. Reductions by pollutant are: carbon monoxide, 79.7%; nitrogen oxides, 71.2%; particulates (PM10), 80.3%; sulfur dioxide, 88.4%; volatile organic compounds, 82.6%; lead, 99.99%.

6. See, for example, Nasiru A. Dantata, Ali Touran and Donald C. Schneck, *Trends in U.S. Rail Transit Project Cost Overrun*, paper presented to the Transportation Research Board, 2006, Table 2. Available at tinyurl.com/34g9rd; See also *The Predicted and Actual Impacts of New Starts Projects – 2007* (Washington, D.C.: Federal Transit Administration, 2008), page 11. Available at tinyurl.com/8kpnyr.

7. Bent Flyvbjerg, Mette Skamris Holm and Søren Buhl, "Underestimating Costs in Public Works Projects: Error or Lie?" *Journal of the American Planning Association*, Volume68, Number 3, 2002,, page 285.

8. Bureau of Economic Analysis, "Personal Incomes Expenditures by Type of Expenditure," Table 2.5.5. Available at bea.gov.

9. *Highway Statistics 2010* (Washington, D.C.: Federal Highway Administration, 2011), Table VM-1.

10. Adelia Santos, Nancy McGuckin, Hikari Yukiko Nakamoto, Danielle Gray, and Susan Liss, "Summary of Travel Trends: 2009 National Household Travel Survey," Federal Highway Administration, 2011, page 33. Available at nhts.ornl.gov/2009/pub/stt.pdf.

11. 2010 National Transit Database, Federal Transit Administration, operating cost, capital cost and service spreadsheets. Available at http://www.ntdprogram.gov.

12. "Panorama of Transport," European Commission, Brussels, 2009, page 108.

13. *Key Facts and Figures about the European Union* (Brussels: European Union, 2004), page 52.

14. "Panorama of Transport," European Commission, Brussels, 2009, page 100.

15. Ibid.

About the Author

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