NATIONAL CENTER FOR POLICY ANALYSIS

Tolling by Time Reduces Congestion and Improves Air Quality

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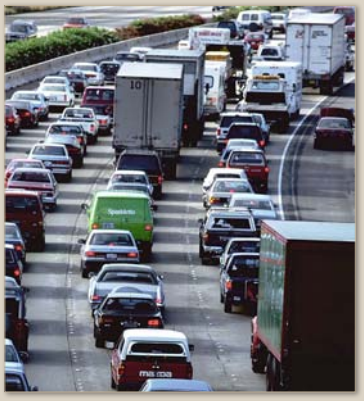
Traffic congestion is a growing problem in many metropolitan areas. Congestion increases travel time, air pollution, carbon dioxide (CO_2) emissions and fuel use because cars cannot run efficiently.



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Based on wasted time and fuel, the Texas Transportation Institute estimates that congestion in 439 urban areas cost the nation about $87.2 billion in 2007. The costs of congestion were concentrated in the most populous regions:

- Approximately 2.8 billion gallons of fuel were wasted — metropolitan areas with populations greater than 3 million accounted for more than half of the total, or 1.6 billion gallons.
- The amount of wasted fuel ranged from 11 gallons per traveler per year in smaller towns to 35 gallons per traveler per year in the largest urban areas.
- The average annual travel time delay during peak periods was 35 hours per driver, but ranged from 19 hours in small towns to 51 hours in the largest urban areas.
- The average cost per traveler due to wasted time and fuel was $757 in 2007, up from $680 in 2004 (measured in constant dollars).

An inordinate amount of air pollution is emitted from cars in rush hour traffic because trips take longer and car engines are operating inefficiently. For example, one gallon of gas produces about 8.8 kilograms of CO_2, according to the Environmental Protection Agency. Thus, in large urban areas, more than 300 kilograms of CO_2 per car is emitted into the air annually from wasted fuel alone.

Limits of Traditional Toll Roads. Revenue for highway construction and maintenance is declining, yet demand is increasing. Instead of building more traditional freeways, most state transportation departments are building toll roads or toll lanes beside or above traditional freeway lanes. Thanks to new technology, such as two-way radio receiver/transmitters programmed to respond to an activation signal, collecting tolls is economical and does not cause backup from tollbooths. Though toll roads almost always pay for their construction and maintenance, they are less effective at reducing congestion than they could be if they were managed more effectively.

Toll roads and toll lanes in locations already served by existing freeways are not useful in reducing congestion because people avoid them until traffic is bad. Thus, they do little to prevent traffic jams. In addition, toll fees must be high in order to pay for things such as road maintenance, because the lanes are used only a few hours a day by a fraction of all drivers. For example, Los Angeles must keep its toll charge at $10 per vehicle because the lanes are rarely used outside of rush hour.

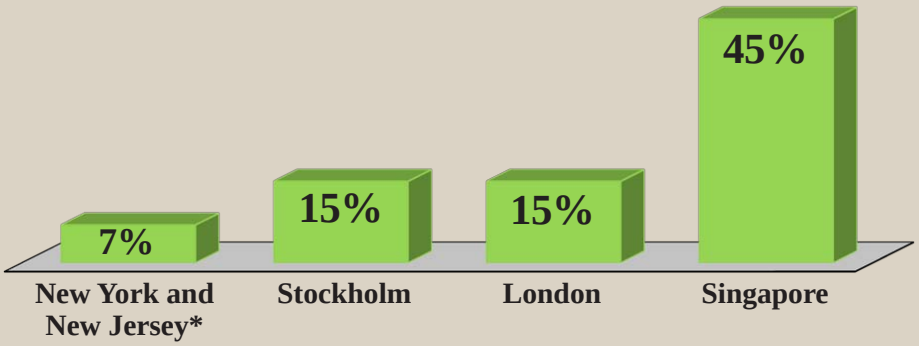
Because people avoid traditional toll roads and lanes for most of the day, fuel use, pollution and car maintenance costs are greater than they could be under a different policy.

Congestion Pricing. A better approach to handling increased highway demand is congestion pricing. Congestion pricing is a market mechanism that seeks to reduce the personal, economic and environmental costs associated with traffic congestion. These traffic management plans charge fees that vary by time for the use of a roadway. Fees are higher during peak hours, and lower or completely eliminated during off-peak times.

Road capacity is scarce only during peak traffic periods, so a low fee could be charged to all drivers who choose to use a specific highway in congested areas during peak times. The money from the toll could then be devoted to additional lanes of highway in the congested segments. During off-peak periods, all lanes would be free.

It is estimated that as many as 25 percent of rush hour trips are discretionary. Congestion pricing encourages drivers to shift discretionary trips to off-peak periods. It also encourages people to carpool, use public transit, combine multiple trips, find alternative routes, or change their work or living locations to avoid the charge. These behavioral changes could decrease traffic on all roads, which would also decrease the amount of pollution and CO_2 emitted from automobiles.

Congestion pricing has already successfully decreased traffic congestion in various locations:



*Reduction in traffic congestion between New York and New Jersey is 7 percent during the morning rush hour and 4 percent during the evening rush hour.

Sources: Iain Murray and H. Sterling Burnett, "10 Cool Global Warming Policies," National Center for Policy Analysis, Policy Report No. 321, June 2009. Available at http://www.ncpa.org/pdfs/st321.pdf. "Congestion Pricing," Environmental Defense Fund, April 1, 2009. Available at http://www.edf.org/page.cfm?tagID=6241.

- A congestion fee on bridges and tunnels between New York and New Jersey resulted in a decline in traffic of 7 percent during the peak morning period and 4 percent in the peak evening period.
- Plans in London and Stockholm resulted in a 15 percent traffic decline in each city.
- A congestion pricing plan in Singapore resulted in a 45 percent reduction in traffic. [See the figure.]

Congestion pricing not only improves traffic flow, it also improves air quality. Foreign countries with congestion pricing plans have been able to reduce air pollution and CO_2 considerably:

- Stockholm's congestion pricing plan resulted in about a 14 percent decline in CO_2 emissions.
- By some estimates, London's plan resulted in a 20 percent drop in CO_2, and a 12 percent decline in particulate matter and nitrogen oxides.

Conclusion. To encourage widespread adoption of congestion pricing and road construction, the federal government could restrict federal funding or devote a share of the gasoline tax to new roads implementing such systems. Alternatively, states could sell the right to build new roads — with congestion pricing — to private toll companies and collect taxes on the revenue generated. Allowing private companies to compete for value-added toll road construction and ownership would speed the pace of construction and reduce the need to increase gasoline taxes.

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