**TRB Special Report 307: Policy Options for Reducing Energy Use and Greenhouse Gas Emissions from U.S. Transportation**

**TABLE S-1 Scope, Scale, and Timing of Impacts of Major Policy Approaches to Reduce Transportation's Petroleum Use and GHG Emissions**

| Policy Approach | Scope of Application and Impacts | | Timing and Scale of Impacts | |
|---|---|---|---|---|
| | **Applicability Across Transportation Modes** | **Impacts[a]** | **Prospects for Early Policy Implementation** | **Scale of Impacts[b]** |
| **Fuel taxes** | Taxes can be assessed on all fuels used in all modes of transportation. | Taxes that raise the price of fuel will prompt consumer and carrier interest in energy-efficient vehicles and operations as well as alternatives to energy-intensive transportation activity. A tax structure favoring low-GHG fuels can also foster interest in alternative fuels and more emissions-efficient vehicle types. | Because taxes are already imposed on fuels used in most transportation modes, higher fuel taxes would be straightforward to administer. The major challenge to early implementation is to find innovative ways to engender and sustain public support for higher taxes, which have been resisted during the past two decades. | If fuel taxes can be sustained and continually raised, they can generate increasing impacts on transportation energy use and emissions over time as consumers and suppliers of vehicles and energy adjust their purchases, behavior, travel activity, and products offered. Complementary policies that facilitate fuel- and emissions-saving responses, such as compatible land use and transportation infrastructure planning, may make the higher fuel taxes more acceptable to consumers. |
| **Vehicle efficiency standards** | Efficiency standards already exist for cars and light trucks. They are based on energy consumed or emissions per vehicle mile. Establishing standards for larger passenger and freight-carrying modes is more complicated because of the variability in vehicle types and uses. The standard must account for the work performed by these vehicles (volume or tonnage of freight, volume of passengers). | Vehicle energy and emissions efficiency standards are one-dimensional in that they do not cause vehicle operators to seek out operating efficiencies (e.g., energy-saving routing) or to reduce the volume of transportation activity. The resultant lowering of the fuel cost of transportation may lead to some additional travel activity, offsetting a portion of the energy and emissions savings from the increased vehicle energy and emissions efficiency. | Vehicle energy and emissions efficiency standards are in effect and being tightened for cars and light trucks. While vehicles in other modes are candidates for standards, instituting them presents technical and administrative challenges. | Continued tightening of standards that yield smaller reductions in energy use and emissions will test consumer acceptance. In the absence of higher fuel prices, purchase incentive programs such as feebates may be needed to motivate consumer interest in higher levels of vehicle efficiency. |

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**TABLE S-1** (*continued*) **Scope, Scale, and Timing of Impacts of Major Policy Approaches to Reduce Transportation's Petroleum Use and GHG Emissions**

| Policy Approach | Scope of Application and Impacts | | Timing and Scale of Impacts | |
|---|---|---|---|---|
| | **Applicability Across Transportation Modes** | **Impacts[a]** | **Prospects for Early Policy Implementation** | **Scale of Impacts[b]** |
| **Low-carbon fuel standards** | Low-carbon fuel standards can be applied to the entire transportation fuel supply. | The main effect of a low-carbon fuel standard is to reduce the GHGs generated by the fuel supply (during consumption and production) by increasing the demand for and supply of alternative fuels. If fuel prices increase as a consequence, the standards will also cause some reduction in transportation activity and greater interest in energy-efficient vehicles and operations. | The prospects for early implementation are unclear since there is limited experience with such programs. If the standards raise the price of fuel, as would be expected, the implementation challenge will be similar to that of raising fuel taxes. As with other policies to control GHG emissions, the ability to account for and verify emissions will affect implementation potential. | Low-carbon fuel standards may be helpful in attracting and sustaining investment in alternative fuels, potentially lowering the cost of supplying them over time. If fuel prices remain high as a consequence, the challenge will be in maintaining public support for the program. |
| **Land use controls and travel demand management measures** | These measures apply mainly to travel in metropolitan areas, especially by cars and light trucks. They have limited applicability to other modes and to travel in rural areas. | The main effect of these policies is to reduce the amount of energy- and emissions-intensive transportation activity. They would need to be accompanied by other policies, such as efficiency standards and fuel taxes, to affect the efficiency of vehicles and the GHG profile of the fuel supply. | Because land use planning and many travel demand measures are traditionally the responsibility of local governments, states will likely need to take a more active role in coordinating and aligning these decisions. The early implementation challenge will entail establishing these state and regional programs to influence and coordinate local decisions. | Because the built environment changes only gradually over time, many decades will be required for land use planning to have national effects on transportation energy use and emissions. Once in place, however, a more compact built environment may have lasting impacts on energy use and emissions and align well with other policies such as higher fuel taxes. |

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| Policy Approach | Scope of Application and Impacts | | Timing and Scale of Impacts | |
|---|---|---|---|---|
| | **Applicability Across Transportation Modes** | **Impacts[a]** | **Prospects for Early Policy Implementation** | **Scale of Impacts[b]** |
| **Public investments in infrastructure operating efficiencies** | Applicable to all modes in which governments own and operate the transportation infrastructure, such as the highways, airways, and waterways. | Investments in transportation infrastructure can make operations more efficient in terms of energy use and emissions. However, capacity-expanding investments that reduce the fuel and time cost of travel may lead to an increase in total travel activity, offsetting some of the energy and emissions savings. | The prospects for early implementation will depend in large part on motivations other than energy and emissions savings, especially congestion relief and safety enhancement. Because adding physical capacity to transportation systems is becoming more costly and time-consuming, the more likely investments will be in measures that control traffic and allocate use of the systems more effectively. | Fundamental changes in the operations and structure of the transportation system, such as through the introduction of the Next Generation Air Transportation System and intelligent transportation system technologies, could lead to more far-reaching energy and emissions benefits over time. |

[a]Ability to affect the amount of energy-intensive transportation activity, the efficiency of vehicles and their operations, and the GHG profile of the energy supply.
[b]Potential to generate large energy and emissions savings from the transportation sector over the next 25 to 50 years.

Source: TRB Special Report 307: Policy Options for Reducing Energy Use and Greenhouse Gas Emissions from U.S. Transportation, 2011