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ENERGY POLICY

**Options to Reduce
Environmental and Other
Costs of Gasoline
Consumption**

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Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to appear before you today to discuss the contents of our report on major policy options for addressing the external costs of gasoline use in cars and light trucks.¹

Over the past two decades, the American people have voiced their desire for a cleaner environment and a more secure energy future. The Congress has responded with legislation to deal with these issues, but these efforts have been hampered, in part, by higher gasoline consumption associated with relatively low gasoline prices in recent years. Adjusted for inflation, the price of gasoline is lower now than it was in 1947, and it is significantly lower than the retail price paid in most other industrialized nations. Consumers respond to lower gasoline prices by using more gasoline. However, increased gasoline consumption can result in poorer air quality and greater vulnerability to oil price shocks. These are commonly cited as examples of "external costs" associated with gasoline use in cars and light trucks.

At your request, we examined several policy options that could address the external costs of gasoline consumption--namely, how to make the best out of a situation in which the American consumer benefits from low gasoline prices but suffers from poorer environmental quality and greater economic vulnerability to oil price shocks. These options include higher gasoline taxes, tailpipe emissions taxes, higher Corporate Average Fuel Economy (CAFE) standards, increased subsidies for alternative fuels, and fee-rebate and old-vehicle scrappage programs. In evaluating the impact of these options on external costs, we also considered other relevant policy concerns such as economic growth, equity, petroleum conservation, visibility of costs, traffic congestion, competitiveness and administrative feasibility.

Specifically, we found the following:

- All of the options reviewed are likely to reduce the nation's dependence on oil and all could reduce air pollution.
- None of the options satisfies all important policy objectives. Even the two policy options that address more objectives than any of the other options--raising gasoline taxes and instituting a tax on tailpipe emissions--have shortcomings: They could slow economic growth and impose a financial burden on low-income groups and rural populations.

¹Energy Policy: Options to Reduce Environmental and Other Costs of Gasoline Consumption (GAO/RCED-92-260, Sept. 1992).

-- On a more positive note, each of these options, in theory, could be modified or combined with other options to better address the external costs of gasoline consumption and meet more policy objectives. For example, revenues from gasoline or tailpipe emissions taxes could be used to reduce payroll or income taxes to counter negative effects on economic growth and disproportionate burdens on the poor. CAFE standards could be combined with gasoline taxes or feerebates to be more cost effective.

BACKGROUND

The current low price of gasoline does not include all external costs associated with gasoline use, such as costs associated with the health and environmental impacts of air pollution. Furthermore, according to some economists, the current price of gasoline does not include the economic costs that may result from the nation's vulnerability to oil price shocks.

Cars and light trucks account for about two-thirds of the U.S. transportation sector's petroleum consumption and about 40 percent of all U.S. petroleum use. Heavy use of gasoline by these vehicles raises a host of concerns related to air quality and vulnerability to oil price shocks. In 1987, for example, cars and light trucks accounted for about 45 percent of hydrocarbon and nitrogen oxide (NOx) emissions and 80 percent of carbon monoxide emissions in U.S. urban areas. Hydrocarbons, NOx, and other trace gases interact in the presence of sunlight to form tropospheric ozone, or smog, which can cause adverse health effects, particularly for people with respiratory ailments. As of October 1991, 98 metropolitan areas, with a total population of 140 million people, did not meet ozone air quality standards set by the Clean Air Act; 42 areas did not meet carbon monoxide standards. Cars and light trucks also contribute about one-fifth of total U.S. emissions of carbon dioxide, a greenhouse gas. Besides damaging the environment, heavy gasoline consumption by cars and light trucks increases the economy's vulnerability to sudden increases in the price of oil because of disruptions in its supply. The economy is especially vulnerable to the effects of such a price shock because the transportation sector relies on petroleum for 97 percent of its energy use.

Recent legislation and policy proposals point to reducing gasoline consumption and related emissions as an important policy objective. For instance, the Clean Air Act Amendments of 1990 place additional restrictions on emissions from new cars and light trucks, effective in the mid-1990s, and the 1991 National Energy Strategy and comprehensive energy legislation currently under consideration by the Congress call for accelerated introduction of alternative transportation fuels and vehicles.

In addition to imposing these external costs, continued use of cars and light trucks has led to traffic congestion, resulting in wasted energy and lost productivity. Given expected population and economic growth, further increases in miles traveled by these vehicles will likely make these problems worse.

Furthermore, all of these problems are aggravated when gasoline prices are relatively low because drivers consume more gasoline and travel more than they otherwise would. A growing number of experts have expressed concern about these relatively low prices. The Council of Economic Advisors reported to the President last year that private market forces are unlikely to give adequate weight to national security and environmental considerations when setting energy prices. Similarly, the National Academy of Sciences recently suggested that a policy of increasing fuel costs be considered because it would internalize the costs associated with fuel usage and provide a market signal "to channel consumer behavior in a direction consistent with societal objectives."²

The six policy options GAO evaluated were the following: a higher gasoline tax, a tax on vehicles' tailpipe emissions, subsidies for alternative fuels, higher fuel economy standards for new vehicles, a fee-rebate program whereby consumers receive a rebate for the purchase of new vehicles that operate more efficiently and pollute less and pay a surcharge for the purchase of vehicles that are less fuel-efficient and pollute more, and a program that financially rewards people who voluntarily scrap older vehicles.

POLICY OPTIONS VARY IN THEIR EFFECTIVENESS

Our analysis indicates that each of the policy options we reviewed varies in its potential effectiveness in reducing the external costs of gasoline consumption in cars and light trucks and in meeting other important policy objectives.

A higher federal gasoline tax would reduce gasoline consumption and pollutants from new and old vehicles but could lead to slower economic growth and may place disproportionate costs on the poor.³ Like gasoline taxes, a tailpipe emissions tax can

²Automotive Fuel Economy: How Far Should We Go?, National Research Council, National Academy Press, Washington, D.C., 1992, p. 11.

³Some modeling studies have predicted a decline in economic growth from higher gasoline taxes. However, there could be a potentially positive effect on economic growth from reducing pollution. For instance, less pollution could lead to higher
(continued...)

reduce gasoline consumption and pollutants from new and old vehicles. However, it holds out other potential advantages because it would tax emissions regardless of the fuel used, and different tax rates could be applied to different pollutants on the basis of their relative harm. On the other hand, a tailpipe tax could be difficult to implement because of potential difficulties in measuring emissions and enforcement and, particularly, in estimating the relative harm of different pollutants.

Subsidies for alternative fuels could also reduce national consumption of gasoline and emissions of some air pollutants that pose health hazards in urban areas. However, depending on the fuel subsidized and the feedstock used in its production, subsidies could also result in greater greenhouse gas emissions. For example, subsidies encouraging the use of compressed natural gas and methanol could reduce emissions of carbon monoxide and hydrocarbons but, if made from coal, could result in increased greenhouse gas emissions. In addition, alternative fuels have varying emissions characteristics, and thus not all fuels will necessarily lead to significant reductions in emissions. For instance, use of compressed natural gas and methanol may not significantly reduce NOx emissions. Furthermore, if gasoline prices remain low, such subsidies might have to be large and sustained to encourage the widespread use of alternative fuels. One difficulty in evaluating alternative fuel subsidies is that, unlike the other options we evaluated, this option can take many different forms. It could be fuel neutral, such as a tax credit or deduction for the purchase of an alternative-fueled vehicle. Or, it could be fuel specific, such as a lower excise tax on a particular alternative fuel. The fact that alternative-fuel subsidies can take many forms also makes it difficult to judge the administrative ease of implementing this option.

Higher CAFE standards could improve fuel economy and reduce greenhouse gas emissions in new vehicles but could impose additional costs on U.S. automobile manufacturers. Similarly, a fee-rebate program could improve fuel economy and reduce emissions in new vehicles. Neither higher CAFE standards nor a fee-rebate program, however, would influence how a vehicle is driven or maintained once it is purchased. In contrast to CAFE standards and fee-rebate programs, a scrappage program would target old vehicles and could achieve higher reductions in emissions of air pollutants and greenhouse gases from these sources. However, a scrappage program would have no impact on emissions from newer vehicles and could impose additional costs on lower-income groups in the form of higher used-car prices. Because actual use of fee-rebate and old-

³(...continued)

productivity of the labor force, greater crop and forest yields, and less expense to maintain the nation's infrastructure of roads and buildings.

vehicle scrappage programs has been limited, not much information is available on their administrative feasibility.

These examples illustrate some of the trade-offs to be considered in implementing policy options to reduce gasoline consumption and air pollution in cars and light trucks. These trade-offs suggest the need to consider ways to modify these options to improve their effectiveness.

POLICY OPTIONS CAN BE MODIFIED OR COMBINED

While none of the policy options we reviewed meets all important policy objectives, in theory these options could be made more effective in either of two ways. First, some of them could be modified to offset negative impacts while still achieving desired objectives. Second, some could be combined in a coordinated strategy to better meet more policy objectives.

Tax and CAFE Options Can Be Modified

To meet more policy objectives, tax and CAFE options could be redesigned. Revenues from both gasoline and tailpipe emissions taxes could be redirected to offset any negative effects on economic growth and any disproportionate costs on the poor. In addition, the administrative complexities of a tailpipe tax could be eased by taking advantage of promising new technologies for measuring emissions and enforcement. Finally, CAFE could be improved by incorporating credit trading, a strategy first used in the environmental area to reduce the costs of command and control regulation.

The effect of taxes on economic growth could be improved by using gasoline or tailpipe emission tax revenues to reduce other taxes, such as income or payroll taxes. Reducing these other taxes could encourage more savings, work effort, and investment-- activities that are critical to long-term economic growth. Thus, using revenue collected from a higher gasoline or tailpipe tax to reduce these other taxes could have a positive effect on economic growth, without adding to the budget deficit. In addition, a portion of the revenue could be earmarked for low-income groups or rural populations to offset the regressivity of higher gasoline or tailpipe taxes.⁴ Possible negative effects of gasoline and tailpipe taxes on economic growth could also be tempered by gradually phasing in these taxes.⁵

⁴Because some people in these groups pay no income taxes, such tax reform could entail the payment of negative income taxes.

⁵For example, an inflation-adjusted gasoline tax could start at an initial level and increase annually up to a designated amount.

The tax changes envisioned would represent a significant transformation of the tax system. As a result, prospects for such reform are problematic. However, other fiscal concerns tied to the budget deficit, estimated at nearly \$370 billion for fiscal year 1992, could make such tax reform more palatable. Some of the revenues collected from higher gasoline and tailpipe taxes could be earmarked for deficit reduction.

Administering a tailpipe emissions tax could be complex because current testing equipment measures emissions only while a vehicle is idling and does not detect all pollutants. In addition, enforcement is difficult because drivers can tamper with their emissions control equipment in between tests. However, new technology has been developed that can test vehicles under a wide range of operating conditions and detect more pollutants of concern. The Environmental Protection Agency has proposed, in response to the 1990 Clean Air Act Amendments, using this technology in improved inspection programs in 80 areas where smog is worst. Vehicle emissions would be tested during a cycle designed to mimic typical city driving, including acceleration and braking. The new test would detect NOx, a pollutant not measured by current equipment, in addition to carbon monoxide and hydrocarbons. The test could also measure evaporative emissions from each vehicle.⁶

Technology also exists to deal with some potential compliance problems associated with implementing a tailpipe emissions tax. For example, vehicles whose emissions-control equipment had been disabled after passing an inspection program could be identified by remote sensing devices. Such devices can measure emissions from vehicles as they pass a checkpoint and can photograph license plates. Vehicles emitting too much pollution could be identified and the owners fined. Remote sensing devices are being used in Southern California as part of a study of heavily polluting vehicles and are being considered to enhance inspection programs.

While higher CAFE standards might impose disproportionate costs on "full line" automobile manufacturers (including some U.S. manufacturers) whose product lines include larger, less fuel-efficient vehicles, these costs could be reduced with a system for trading fuel economy credits. Under such a system, manufacturers that meet CAFE standards at less cost could earn credits by exceeding the standards and then either save the credits for future years or sell the credits to manufacturers that find it more costly to improve the fuel economy of their fleets. Similar credit

⁶EPA's preliminary analysis of the new equipment suggests that it will improve upon traditional testing equipment and fail more vehicles. On the other hand, several factors, including the high cost of the equipment, could limit its use.

trading programs have been used to meet ambient air quality standards at less cost.

Policy Options Can Be Combined

In some cases, a combination of policy options could be more effective. Possibilities include combining subsidies for alternative fuels with a tailpipe emissions tax, combining a fee-rebate program or a higher gasoline tax with higher CAFE standards, and combining vehicle scrappage and fee-rebate programs.

Subsidies for alternative fuels could be more effective in promoting the use of cleaner alternative fuels and vehicles that run on cleaner fuels if the subsidies were combined with a tailpipe emissions tax. Some alternative fuels may increase emissions of certain pollutants, and alternative fuel blends may not always improve air quality. Yet cleaner alternatives, such as electricity and hydrogen, are not commercially feasible at present because they are expensive to produce and operate. By increasing the cost of using fuels and vehicles that pollute, a tailpipe emissions tax could also encourage consumers to use fuels and purchase vehicles that cause less pollution. The increased demand for such alternatives could spur manufacturers to spend more on research and development (R&D) because the expected payoff from R&D in cleaner fuels and vehicles could be higher. For instance, more R&D funding might be available for overcoming technological stumbling blocks in developing cleaner fuels to the extent that an emissions tax discourages scarce R&D funding in other, more polluting alternatives. Under a combination of subsidies for alternative fuels and a tailpipe emissions tax, then, government subsidies and private investment could bring cleaner alternatives to the marketplace--perhaps more quickly than if either policy were implemented alone. As a result, such a combination could reduce the amount of subsidy needed.

Higher CAFE standards combined with a fee-rebate program or a higher gasoline tax could increase the demand for more fuel-efficient vehicles. CAFE standards require that manufacturers produce and sell vehicles with fuel economy levels that may be higher than consumers desire at low gasoline prices. Relatively low gasoline prices encourage consumers to choose attributes such as vehicle size and engine performance that are associated with fuel inefficiency. As a result, higher fuel economy standards may be less effective when gasoline prices are low. Furthermore, higher standards can be costly to manufacturers to the extent that consumers avoid buying the fuel-efficient vehicles manufacturers must sell to meet the standards. A fee-rebate program or higher gasoline taxes could complement higher CAFE standards by providing the financial incentive consumers would need to purchase more fuel-efficient vehicles and to avoid fuel-inefficient vehicles.

Combining a vehicle scrappage program and a fee-rebate program could reduce gasoline consumption and pollution from old and new vehicles. Alone, a vehicle scrappage program would affect only older vehicles, and a fee-rebate program only new vehicles. Together, these programs could increase use of newer, more fuel-efficient vehicles that pollute less and remove from the road the older, less fuel-efficient vehicles that pollute more. A combination of the two programs could be designed so that the fees charged on sales of the less fuel-efficient vehicles could be used to fund rebates for sales of newer, more fuel-efficient vehicles that cause less pollution and to provide a bounty to automobile owners who voluntarily retire their older vehicles.

CONCLUSIONS

Policy options can be modified or combined to more effectively reduce gasoline consumption and air pollution from cars and light trucks and to meet other important policy objectives. Options that send consumers clear market signals, such as higher gasoline or tailpipe taxes, could help ensure that the costs of gasoline use in these vehicles are visible and fully considered by consumers when they make decisions about purchasing, maintaining, driving, and retiring vehicles. Options that send clear market signals adopted in combination with existing or proposed programs, such as current CAFE standards or pending legislative requirements for the use of alternative-fuel vehicles, could increase the demand for more fuel-efficient and alternatively fueled vehicles.

Relying on a single option to meet multiple and sometimes conflicting policy objectives can be difficult and costly. In turn, this could mean less chance that any policies will be adopted. An eclectic strategy incorporating and combining the best designs of individual policy options may be desirable.

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This concludes my prepared statement. I would be glad to answer any of the questions that you or other members of the Committee may have.