

Fuel Economy Standards Versus a Gasoline Tax

Proponents of increasing corporate average fuel economy (CAFE) standards for passenger vehicles see the policy as a relatively low cost and proven way to decrease the United States' dependence on oil and emissions of carbon dioxide (the predominant greenhouse gas). Opponents argue that CAFE standards are a costly and cumbersome way to reduce gasoline consumption, that they interfere with the market and unduly burden U.S. business, and (because they may encourage more driving and alter vehicle design) that they may compromise the safety of motorists.

CAFE standards are currently 27.5 miles per gallon (mpg) for cars and 20.7 mpg for light trucks. The standard for cars has not changed since 1990, and the truck standard has been fixed since 1996 but is scheduled to increase to 22.2 mpg by 2007. The average fuel economy of each manufacturer's fleets of cars and light trucks must meet those standards, or the firm will be subject to a fine. All major automakers currently meet or exceed the standards.

This issue brief focuses on the economic costs of CAFE standards and compares them with the costs of a gasoline tax that would reduce gasoline consumption by the same amount. The Congressional Budget Office (CBO) estimates that a 10 percent reduction in gasoline consumption could be achieved at a lower cost by an increase in the gasoline tax than by an increase in CAFE standards. Furthermore, an increase in the gasoline tax would reduce driving, leading to less traffic congestion and fewer accidents. This analysis stops short of estimating the value of less congestion and fewer accidents and, therefore, does not draw any conclusions about whether an increase in the gasoline tax would be warranted. However, CBO does find that, given current estimates of the value of decreasing dependence on oil and reducing carbon emissions, increasing CAFE standards would not pass a benefit-cost test.

What Would It Cost to Raise CAFE Standards?

Raising CAFE standards would impose costs on both the producers and buyers of passenger vehicles. To comply, producers would need to incorporate technologies to boost the fuel economy of their vehicles, which would increase their cost of production. Consumers would face higher prices for new cars and trucks.¹ But consumers would also see lower operating costs for new vehicles because they would use less gasoline, offsetting some of the sting of the higher purchase prices.

CBO estimates that raising CAFE standards by 3.8 mpg (to 31.3 mpg for cars and 24.5 mpg for trucks)—enough to reduce the amount of gasoline consumed by new vehicles by 10 percent—would cost the U.S. economy a total of \$3.6 billion per year.²

That figure translates to about \$230 per new vehicle. Consumers would most likely bear about two-thirds of the costs. Although the average price of a new passenger vehicle would go up by nearly \$900, fuel savings would lower the additional costs to consumers to roughly \$150 per vehicle, on average. Automakers' lost profits would constitute the remaining \$80. Although a 3.8 mpg increase in CAFE standards would reduce gasoline use by new vehicles by 10 percent, it would take 15 years for total gasoline consumption (by both new and older cars and light trucks) to fall by 10 percent—only after all vehicles currently on the road were retired.

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1. Alternatively, producers could comply by raising the prices of their gas-guzzling vehicles and lowering the prices of their most fuel-efficient cars to encourage consumers to buy more of the latter, in which case consumers would still see higher vehicle prices on average. Or producers could offer new vehicles that provided better fuel economy in place of other attributes that consumers might prefer, such as additional horsepower or more interior space, in which case prices might not increase.
 2. That figure incorporates the value of gasoline savings; it also reflects the reduced profits, and reduced value, that producers and consumers would receive as a result of lower sales of new vehicles.

An important assumption underlying those cost estimates is that, without regulation, automakers would not use technological advances to improve gasoline mileage. That assumption stems from the observation that, in response to consumers' preferences over the past 15 years, automakers have increased vehicles' size, weight, and horsepower, while holding gasoline mileage ratings steady. Hence, regulatory intervention would be required to raise average mileage ratings, and any increase in the standards would impose costs on vehicle producers and consumers.

An Increase in CAFE Standards Could Be Designed to Cost Less

An increase in CAFE standards could be achieved at a lower cost if manufacturers were given more flexibility in how to comply than they have under current policy. A 2002 study by the National Research Council proposed a system of trading under which producers with high costs of improving their fleets' fuel economy could meet the standards by purchasing "fuel economy credits" from producers that generated credits by exceeding the standards.³ Producers that were able to increase their fleets' fuel economy at relatively low costs would have an incentive to generate credits because they could sell them at a profit to firms that had higher compliance costs.

Fuel economy credit trading could cut the cost of a 3.8 mpg increase in the CAFE standards by 16 percent, down to \$3.0 billion per year, CBO estimates. It would probably yield larger benefits for producers than for consumers; on average, costs for the former would fall by about \$35 per vehicle (from \$80 to \$45), and costs for the latter would drop by only about \$10 per vehicle (from \$150 to \$140). Average vehicle prices would increase by roughly \$860, instead of the \$900 that would occur from increasing CAFE standards but not incorporating credit trading. Under a system with trading, producers that purchased credits (primarily domestic firms) would have lower compliance costs than they would have had without the trading, and producers that sold credits (primarily foreign firms) would have higher profits.

3. See National Research Council, *Effectiveness and Impact of Corporate Average Fuel Economy (CAFE) Standards* (Washington, D.C.: National Academy of Sciences, 2002).

A Gasoline Tax Increase Could Cost Less Than an Increase in CAFE Standards

A gasoline tax is a good policy to compare with CAFE standards because it is the most direct way to reduce gasoline consumption. By raising the price of gasoline to consumers, a tax raises the cost of driving and encourages consumers to buy more-fuel-efficient vehicles.

The federal gasoline tax, which dates from 1932 and is used to support mass transit and highways, is currently 18.4 cents per gallon. The average tax on gasoline, including federal, state, and local taxes, is 41 cents per gallon.

By CBO's estimate, increasing the federal tax on gasoline by 46 cents per gallon would achieve a 10 percent reduction in gasoline consumption in the long run (once all existing vehicles were retired) at lower economic costs overall than either of the CAFE policies considered. The gasoline tax increase would cost the U.S. economy \$2.9 billion annually, 19 percent less than the increase in CAFE standards without trading and 3 percent less than the increase in the standards with trading. That \$2.9 billion incorporates costs for the inconvenience and expenditures that consumers might incur to reduce their gasoline consumption (including, for example, car-pooling or taking public transportation) as well as a reduction in gasoline producers' profits as a result of reduced sales. It does not include the tax payments because they would be transfers—from people who paid the tax to people who benefited from the increase in revenue (for example, through increased public expenditures or reductions in other tax payments)—and, as such, would not be costs to society as a whole. (See Table 1.)

The advantage of the gasoline tax over CAFE standards would be most apparent in the initial 14 years—that is, before all of the existing vehicles were retired. Although both approaches would produce fuel savings gradually as old passenger vehicles were replaced by more-fuel-efficient ones, the gas tax would provide greater immediate savings by also encouraging vehicle owners (of both new and older vehicles) to drive less. In contrast, higher CAFE standards would give new-vehicle owners an incentive to drive more—because higher fuel economy would decrease their gasoline cost per mile—and would not alter the driving incentives for owners of existing vehicles at all.

Table 1.

Total Long-Run Annual Costs to Achieve a 10 Percent Reduction in Gasoline Consumption Under Alternative Policies

(Billions of dollars)

Policy	CAFE Standards		Gasoline Tax
	Without Trading	With Trading	
	31.3 mpg for cars 24.5 mpg for light trucks		46-cent-per-gallon increase
Total Costs to the Economy ^a	3.6	3.0	2.9
Producers' costs	1.2	0.8	0.5
Consumers' costs	2.4	2.2	2.4

Source: Congressional Budget Office.

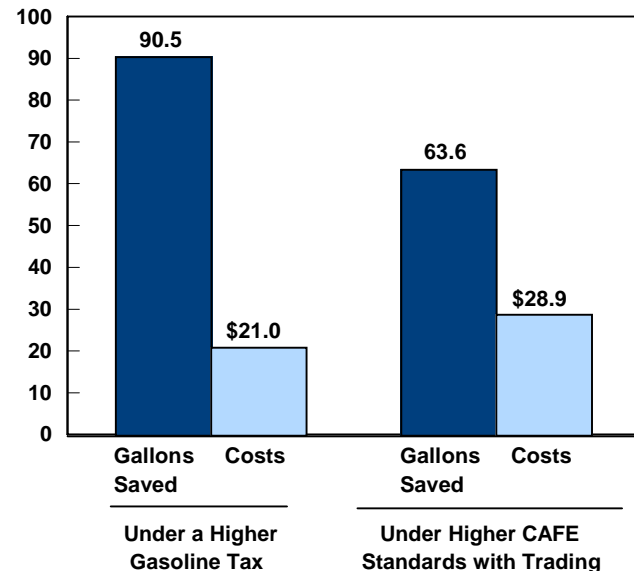
Note: CAFE = corporate average fuel economy; mpg = miles per gallon.

a. For producers, costs are measured as reductions in total profits, whereas for consumers, they include both higher prices and the reduction in welfare for consumers who chose not to buy a new vehicle because of the higher prices.

Figure 1.

The Effects of CAFE Standards with Trading Versus a Gasoline Tax Over the First 14 Years

(Billions)



Source: Congressional Budget Office.

Notes: CAFE = corporate average fuel economy.

The figure depicts effects over the first 14 years (after which all current vehicles are assumed to be retired) from policy changes that would bring about a 10 percent reduction in gasoline consumption in the 15th year.

Over the initial 14 years, a 46-cent-per-gallon increase in the tax on gasoline would save 91 billion gallons of gasoline, or 27 billion gallons (42 percent) more than a 3.8 mpg increase in CAFE standards would, even though both policies would cut gasoline consumption by the same amount once all existing vehicles were replaced (see Figure 1). Further, the tax increase would cost 27 percent less over those initial 14 years than higher CAFE standards would, even if firms were allowed to trade fuel economy credits.⁴

Would Increases in CAFE Standards or the Gasoline Tax Produce Benefits That Outweighed Their Costs?

Increasing CAFE standards or the gasoline tax would impose costs on both producers and consumers of vehicles and gasoline—direct costs that are estimated by CBO’s modeling. Would those costs be justified by the accompanying benefits? Unless current estimates of the benefits of reducing gasoline consumption are significantly understated, increasing CAFE standards would not pass a

4. Those calculations incorporate discounting, acknowledging that current cost reductions and savings of gasoline are worth more than those in later years.

benefit-cost test.⁵ Already, the existing tax on gasoline provides consumers with a more than adequate incentive to take those benefits into account when choosing how fuel efficient a vehicle to purchase. Increasing CAFE standards would force manufacturers to increase fuel efficiency at a cost that exceeded the benefits. In contrast, increasing the gasoline tax might pass a benefit-cost test if the test included benefits in addition to those associated with reducing gasoline consumption (for instance, the benefits arising from reduced traffic congestion or fewer accidents). Estimating the value of those additional benefits is beyond the scope of this analysis, however.

The primary benefit from reducing gasoline consumption would be the decrease in the external costs (that is, costs not borne by producers or consumers) that such consumption creates. The United States' dependence on oil brings the risk of economic losses resulting from higher oil prices when the world oil supply is disrupted; thus, gasoline consumption entails an energy security cost. In addition, carbon dioxide emissions are thought to contribute to climate change, and while the extent of and potential damage from climate change are still quite uncertain, it could ultimately cause extensive physical and economic harm in some regions.⁶ In its 2002 report, the National Research Council suggests that a reasonable, albeit uncertain, estimate of those external costs stemming from oil dependence and carbon emissions is 26 cents per gallon.⁷

The question of whether higher CAFE standards would be justified must be considered in relation to the effects of the current gasoline tax. That tax, regardless of the motivation for its existence, curbs gasoline consumption. The existing tax on gasoline—at 41 cents per gallon, on average—gives consumers an additional incentive to buy fuel-efficient vehicles and to reduce driving up to a cost of 41 cents for each gallon of gasoline saved.⁸ The tax thus induces consumers to buy more-fuel-efficient vehicles than they otherwise would (provided that a higher purchase price—or a decrease in other amenities, such as horsepower—is outweighed by the value of the tax savings from consuming less gasoline).

If the National Research Council's estimate of 26 cents for external costs is roughly correct, then the existing 41-cent tax on gasoline already provides consumers with an incentive to reduce gasoline consumption up to a cost that exceeds the benefits of those reductions by 15 cents per gallon saved. In that case, raising the CAFE standards to achieve additional reductions would impose unwarranted costs on automakers and buyers of new vehicles and would reduce social welfare.⁹

Because both a gasoline tax and CAFE standards reduce gasoline consumption by increasing vehicles' fuel efficiency, the estimated costs of each policy have to take into account the effects of the other. Not doing so could result in underestimating policy costs. For example, some analysts have proposed that higher CAFE standards could be justified if the gasoline tax was first increased, but that approach fails to account for the cumulative costs of the

5. This discussion assumes that consumers receive adequate information about the fuel savings offered by different vehicles and that they correctly value those savings. If that were not the case, then the advantages of an increase in CAFE standards could be greater than assumed here.

6. Although improving fuel efficiency would lessen carbon dioxide emissions, it would not necessarily reduce other pollutants emitted by passenger vehicles—such as carbon monoxide, nitrogen oxides, and hydrocarbons—because the Environmental Protection Agency's maximum emission rates for those pollutants are defined in terms of grams per mile rather than per gallon. Thus, levels of those pollutants are, in principle, independent of gasoline mileage. In practice, though, vehicles that get better mileage may pollute less than the agency's standards allow. Reducing gasoline consumption could also reduce releases of hydrocarbons and toxic chemicals that occur within the gasoline supply chain (from exploration and recovery through retail sales). However, because those releases are now tightly regulated, the environmental costs that they impose are small.

7. See National Research Council, *Effectiveness and Impact of CAFE Standards*, pp. 85-88. That estimate of external costs per gallon of gasoline consumed includes 12 cents attributable to oil dependence, 12 cents for carbon emissions, and 2 cents for releases of hydrocarbons and toxic chemicals in the gasoline supply chain, including oil exploration and recovery, oil refining, and distribution (by tanker, pipeline, and tanker truck and through retail sales).

8. Producers of gasoline might bear part of the tax. In that case, the price of gasoline would increase by less than the amount of the tax. In either case, however, the incremental cost of the tax (borne by producers and consumers) would be 41 cents.

9. An increase in CAFE standards would not impose costs if firms' average fuel economy was above the new standards because of, say, a shift in consumers' preferences toward more-fuel-efficient vehicles. However, in that case, the standards would also not produce gasoline savings.

two policies.¹⁰ That is, raising CAFE standards would seem to cost less because the higher tax would cause consumers to want greater fuel economy, with or without the increase in the standards. Such a policy would shift the cost of increasing fuel economy from CAFE standards to the gasoline tax but would not then justify higher CAFE standards.

Even though the National Research Council's estimate of the external costs associated with consuming gasoline is uncertain (indeed, the council itself considers the figure of 26 cents to be tentative) higher CAFE standards would have the potential to improve social welfare only if those external costs were significantly higher than that—that is, if they exceeded the average tax of 41 cents.

In addition, higher CAFE standards could further reduce social welfare by worsening traffic congestion and increasing the number of traffic accidents. Those undesirable outcomes could occur because such standards would lower the per-mile cost of driving, providing new-vehicle owners with an incentive to drive more. Although the increase in driving associated with higher CAFE standards could be relatively small, some studies suggest that the resulting costs of the increased congestion and greater number of traffic accidents might nevertheless be large. (Crit-

10. See David Gerard and Lester B. Lave, *The Economics of CAFE Reconsidered: A Response to CAFE Critics and A Case for Fuel Economy Standards* (Washington, D.C.: AEI-Brookings Joint Center for Regulatory Studies, September 2003).

ics of CAFE standards have also argued that design changes made to vehicles so that they comply have increased the severity of injuries in accidents, but that contention remains controversial.)

Although the existing tax on gasoline exceeds the National Research Council's estimate of the external costs associated with consuming gasoline, the current tax is not necessarily too high. The gasoline tax serves purposes other than encouraging gasoline buyers to take the external costs of gasoline consumption into account—it also discourages driving. Setting the “optimal” tax on gasoline would require estimating all of the external costs associated with driving—including those resulting from traffic congestion and accidents as well as from oil dependence and carbon emissions. Such an assessment could conclude that increasing the tax on gasoline would improve social welfare if those costs, on average, exceeded the existing tax.

This brief, prepared by Terry Dinan and David Austin, is based on *The Economic Costs of Fuel Economy Standards Versus a Gasoline Tax* (December 2003). A related CBO publication is *Reducing Gasoline Consumption: Three Policy Options* (November 2002). Those studies are available at the agency's Web site (www.cbo.gov).

