



How Would Proposed Fuel Economy Standards Affect the Highway Trust Fund?

The federal government's surface transportation programs are financed mostly through the Highway Trust Fund. Revenues from a variety of transportation-related excise taxes are credited to the fund; the largest share comes from federal taxes on gasoline, including gasoline that is blended with ethanol. Those revenues are allocated to two separate accounts within the fund, one for spending on highways and one for spending on mass transit. Although the fund's balances were stable for many years, for much of the past decade its outlays have exceeded receipts. In recent years, the shortfall has been covered by transfers from the U.S. Treasury's general fund.¹ Policies that are designed to reduce gasoline consumption, including those that would impose stricter standards for the fuel economy of vehicles, could decrease revenues for the trust fund and thus could add to the shortfall.

In 2011, the National Highway Traffic Safety Administration (NHTSA) and the Environmental Protection Agency (EPA) jointly proposed a rule that would tighten corporate average fuel economy (CAFE) standards for light-duty vehicles (including cars, sport utility vehicles, pickup trucks, minivans, and crossover utility vehicles) manufactured over the period from 2017 through 2025. By the end of that time, the proposed standards are expected to raise the average fuel economy of the new-vehicle fleet from 34.1 miles per gallon (mpg)—the average anticipated for 2016 and beyond under current standards—to 49.6 mpg. The proposed rule also would require gradual reductions in greenhouse gas emissions

from light-duty vehicles, which would be accomplished primarily through reduced fuel consumption.²

The Congressional Budget Office (CBO) estimates that the proposed CAFE standards would gradually lower gasoline tax revenues, eventually causing them to fall by 21 percent. That full effect would not be realized until around 2040 because the standards would gradually increase in stringency (only reaching their maximum level in 2025) and because the vehicle fleet changes slowly as older vehicles are replaced with new ones.

To illustrate the eventual effect of the standards on the trust fund's cash flows, CBO has examined how a 21 percent reduction in gasoline tax collections would alter the agency's current projections for the trust fund, spanning the period from 2012 through 2022.³ CBO estimates that such a decrease would result in a \$57 billion drop in revenues credited to the Highway Trust Fund over those 11 years—a 13 percent reduction in the fund's total receipts from all sources. The full 21 percent reduction in gasoline tax revenues, however, would not occur for about 30 years.

Policymakers could consider several options to avoid adding to a shortfall in the Highway Trust Fund, including the following:

Note: Unless stated otherwise, all years are federal fiscal years, which begin on October 1 and continue until September 30. All amounts expressed in dollars are in nominal dollars. Numbers in text and tables may not add to totals because of rounding.

1. The general fund of the Treasury records receipts and spending that are not allocated by law to any other fund account.

2. See Department of Transportation, "Proposed Rule: 2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards," *Federal Register*, vol. 76, no. 231 (December 1, 2011), pp. 74854–75420, <http://go.usa.gov/EdH>. The standards established for 2022 through 2025 are subject to review by NHTSA and EPA to ensure that they are technologically and economically feasible.

3. For additional details on trust fund projections, see Congressional Budget Office, *The Budget and Economic Outlook: Fiscal Years 2012 to 2022* (January 2012), pp. 121–126.

- Reducing spending on highways and mass transit,
- Transferring additional money from the Treasury's general fund to the Highway Trust Fund, and
- Increasing the gasoline tax or raise revenue from other sources to provide receipts to the trust fund.

The Highway Trust Fund

The Highway Revenue Act of 1956 established the Highway Trust Fund, which records revenues collected from excise taxes on the sale of motor fuel, trucks and trailers, and truck tires; taxes on the ownership of trucks that weigh 55,000 pounds or more; and interest credited to the fund based on its balances. The fund also records cash outflows to pay for most highway and mass transit programs, although some transit projects receive appropriations from the Treasury's general fund.

The gasoline tax now generates about 60 percent of the receipts credited to the fund; the tax on diesel fuel (consumed mostly by heavy trucks, which would not be covered by the proposed standards discussed in this report) generates another 30 percent.⁴ The Highway Trust Fund receives 18.3 cents of the 18.4 cents-per-gallon tax on gasoline. (The other tenth of a cent goes to a trust fund established in 1986 to remediate damage caused by leaks from underground petroleum storage tanks.) About 85 percent of the fund's revenues from the gasoline tax goes to its highway account; the remaining 15 percent goes to the mass transit account. Spending from each account is controlled largely by annual appropriation acts that limit the amount that can be obligated each year for highway and transit programs.

There is no requirement that receipts credited to the fund in a particular year either match or exceed outlays in that year but, by law, the trust fund must maintain a positive balance. For about 30 years, annual receipts were roughly equal to annual outlays. Then, in the mid-1990s, receipts began to rise, primarily because of an increase in the gasoline tax rate (see Figure 1).⁵ By the end of 2000, the

fund's balance had reached \$31 billion. But starting in the late 1990s, various laws were enacted that led to a subsequent decline in the balance.⁶ From 2001 through 2011, the fund's outlays exceeded its receipts by \$44 billion. (In 2011, receipts amounted to \$37 billion, and outlays totaled \$46 billion.) By 2008, the balance had become insufficient to cover the shortfall in receipts relative to outlays, and over the past few years, lawmakers transferred almost \$35 billion from the Treasury to maintain a positive balance in the trust fund.

CBO's most recent baseline projections for the Highway Trust Fund span the period from 2012 through 2022.⁷ The agency's projections indicate that if the tax and spending policies in effect in 2012 continued through 2022, the receipts credited to the fund would total about \$442 billion, \$147 billion less than the fund's projected outlays of about \$589 billion (see Table 1).⁸ (The Congress is considering legislation that could affect the fund's outlays and receipts over that period.) According to CBO's baseline projections, outlays for the highway account from 2012 through 2022 would exceed receipts by \$93 billion, and outlays for mass transit would exceed receipts during that period by \$54 billion. In keeping with the requirement to maintain a positive balance, the Department of Transportation could spend those amounts only if the trust fund received additional revenues from the designated transportation-related excise taxes or was credited with additional funds from other sources.

4. EPA has issued fuel economy standards for heavy trucks that will take effect in 2014 and increase gradually through 2018. See Environmental Protection Agency, "EPA and NHTSA Adopt First-Ever Program to Reduce Greenhouse Gas Emissions and Improve Fuel Efficiency of Medium- and Heavy-Duty Vehicles," Regulatory Announcement EPA-420-F-11-031 (August 2011), <http://go.usa.gov/EdJ>.

5. That tax was increased by 4.3 cents per gallon in 1993, although until 1997 the additional receipts were directed to the general fund of the Treasury rather than to the Highway Trust Fund.

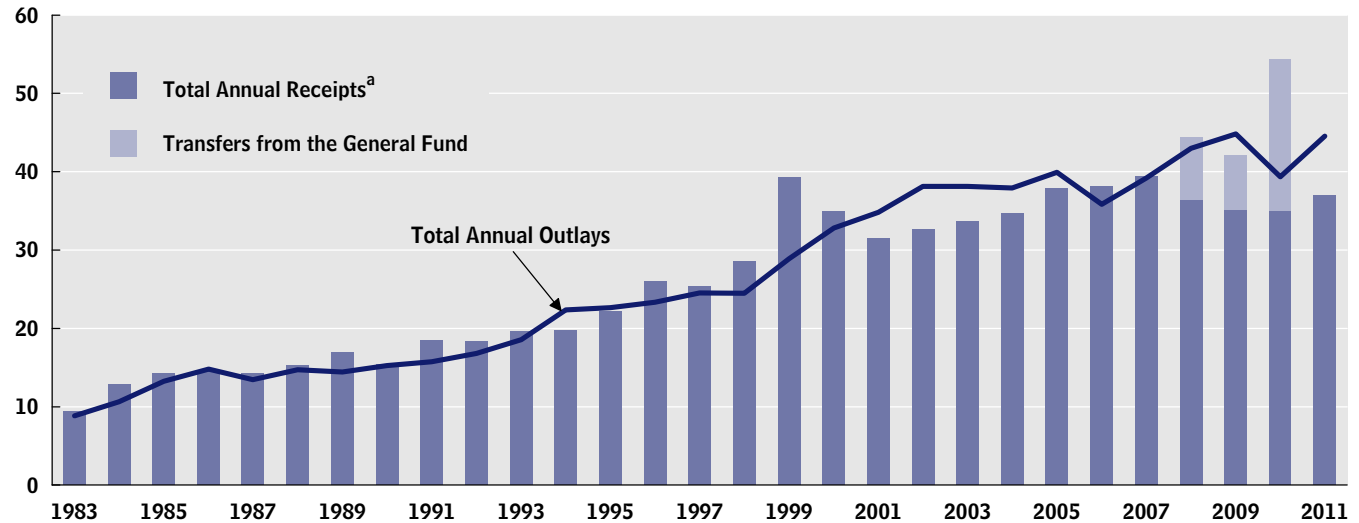
6. The first of those laws was the Transportation Equity Act for the 21st Century, enacted in June 1998. The most recent was the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, enacted in August 2005.

7. Congressional Budget Office, *Updated Budget Projections: Fiscal Years 2012 to 2022* (March 2012).

8. The baseline revenue amounts are derived from CBO's March 2012 baseline projections for real (inflation-adjusted) economic growth and from anticipated increases in vehicle fuel economy. As specified in the Balanced Budget and Emergency Deficit Control Act of 1985, CBO constructs its baseline under the assumption that the excise taxes on automobile fuel, some of which are scheduled to expire under current law, instead will be extended at their current rates. CBO projects highway spending over the next decade by assuming that obligation limitations in future years would equal those enacted in the 2012 appropriation act for the Department of Transportation, adjusted for inflation.

Figure 1.**The Highway Trust Fund's Outlays, Receipts, and Transfers**

(Billions of dollars)



Source: Congressional Budget Office based on data from the Department of Transportation.

Note: Beginning in 2006, total annual outlays reflect a change in accounting treatment for certain outlays from the mass transit account. That change slowed the rate of spending from that account and thus reduced the amount recorded for outlays from the Highway Trust Fund relative to amounts in earlier years; certain outlays that had been treated as outlays in a single year are now spread across several years.

a. Includes excise tax revenues, interest earned on balances, and receipts from other sources.

Proposed Changes in CAFE Standards

The standards proposed by NHTSA and EPA would increase fuel economy for new light-duty vehicles—passenger cars and light trucks, which include sport utility vehicles, crossover utility vehicles, minivans, and pickup trucks—culminating in an average fuel economy of 49.6 mpg for vehicles produced in 2025 (see Figure 2).⁹ The proposed standards would tighten current CAFE standards, which were finalized in April 2010. According to current standards, the combined average fuel economy for new cars and light trucks will rise from 29.7 mpg in 2012 to 34.1 mpg by 2016 and remain at that level thereafter. The existing standards replaced a system of separate, less stringent standards that applied to cars and light trucks manufactured before 2012.

Manufacturers that fail to comply with the CAFE standards are subject to fines.

Beginning in 2011, fuel economy targets apply to vehicles on the basis of size and type: Cars and light trucks of similar size are subject to different standards; within each vehicle type, the smaller the vehicle, the stricter its fuel economy target. As a result, each manufacturer's mandated average fuel economy depends on the mix of vehicles it produces. Thus, NHTSA can only *estimate* the average fuel economy of the new-vehicle fleet in any given year; the *actual* average fuel economy could differ from that estimate if automakers produced a different mix of vehicles than anticipated. (With 18 months' notice, NHTSA can recalibrate the standards if it decides that the maximum feasible targets are higher or lower than those currently set in the proposed rule.) This analysis by CBO is based on the assumption that the average fuel economy of the new-vehicle fleet will equal NHTSA's estimate of 49.6 mpg.

9. See Department of Transportation, *Federal Register*, vol. 76, no. 231 (December 1, 2011), p. 74859, <http://go.usa.gov/EdH>. For a previous CBO analysis comparing CAFE standards and a fuel tax, see Congressional Budget Office, *The Economic Costs of Fuel Economy Standards Versus a Gasoline Tax* (December 2003).

Table 1.

Projected Cash Flows of the Highway Trust Fund for Fiscal Years 2012 to 2022 If Gasoline Tax Revenues Fell by 21 Percent Below Current Projections

(Billions of dollars)

	Baseline ^a	If Gasoline Tax Revenues Fell by 21 Percent ^b	Change
Total Trust Fund			
Receipts	442	385	-57 ^c
Outlays	589	589	0
Difference	-147	-204	-57
Highway Account			
Receipts	386	339	-48
Outlays	480	480	0
Difference	-93	-141	-48
Mass Transit Account			
Receipts	56	47	-9
Outlays	109	109	0
Difference	-54	-62	-9

Source: Congressional Budget Office.

- a. Receipts include excise tax revenues, interest earned on balances, and miscellaneous revenues from other sources. The baseline receipt amounts are derived from CBO's March 2012 baseline projections for real (inflation-adjusted) economic growth and from anticipated increases in vehicle fuel economy. As specified in the Balanced Budget and Emergency Deficit Control Act of 1985, CBO constructs its baseline under the assumption that the excise taxes on automobile fuel, some of which are scheduled to expire under current law, will be extended at their current rates. CBO projected highway spending over the next decade by assuming that the obligation limitations in future years would equal those enacted in the 2012 appropriation act for the Department of Transportation, adjusted for inflation.
- b. For illustration, CBO examined the effects of a 21 percent reduction in revenues from taxes on gasoline and other fuels used by light-duty vehicles during fiscal years 2012 through 2022. That percentage reduction reflects the decline in revenues that CBO estimates would occur if most light-duty vehicles on the road were built subject to the proposed corporate average fuel economy standards for 2025 (resulting in an average fuel economy of 49.6 miles per gallon) as opposed to established standards for 2016 (resulting in an average fuel economy of 34.1 miles per gallon). The full effect of such a reduction would not be evident for about 30 years because of the gradual increase in the standards' stringency, beginning only in 2017, and because the vehicle fleet changes slowly as older vehicles are replaced with new ones.
- c. The \$57 billion decrease in receipts credited to the Highway Trust Fund reflects the 21 percent decrease in gasoline tax revenues that CBO used in its analysis. The decline in receipts credited to the Highway Trust Fund would be less than 21 percent because gasoline tax receipts constitute only about 60 percent of the fund's total receipts.

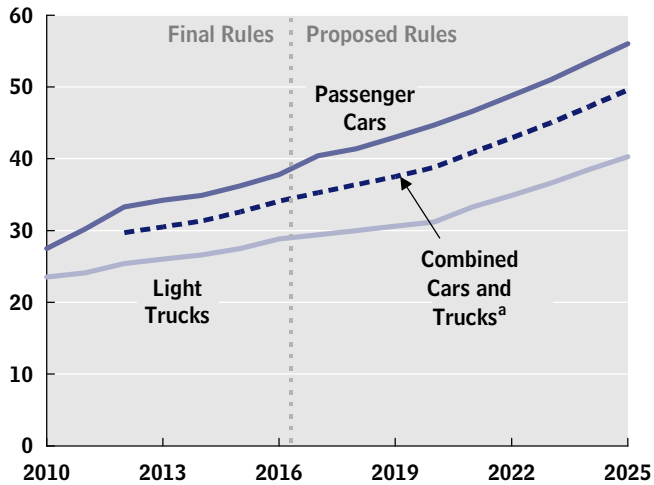
Under the proposed CAFE standards, manufacturers that exceed their corporate average fuel economy requirement in any particular year would be given credits for use in other years. Those credits may be carried back for as many as three years to achieve compliance for an earlier year in which the manufacturer fell short of its requirement or carried forward for as many as five years to count toward compliance in a future year. That would give manufacturers the flexibility to fall short of their required corporate average fuel economy in any particular year as

long as they made it up in another year. Manufacturers also would be permitted to trade credits: An automaker that fell short of its CAFE requirement could purchase credits from another automaker that exceeded its requirement. Finally, manufacturers could receive credits for making alterations to their vehicles (by installing high-efficiency headlights or rooftop solar panels, for example) that would reduce fuel consumption but that would not register as increases in fuel economy as measured by the government's CAFE test protocol.

Figure 2.

Estimated Average Fuel Economy of Light-Duty Vehicles Under CAFE Standards, 2010 to 2025

(Miles per gallon)



Sources: Congressional Budget Office based on data from the Department of Transportation.

Notes: CAFE standards are fuel economy targets that apply to vehicles on the basis of size and type; smaller vehicles have higher fuel economy targets. The average fuel economy of the fleet of new light-duty vehicles will depend on the mix of vehicles that is actually produced.

CAFE = corporate average fuel economy.

a. Combined standards were not calculated until 2012.

Under EPA's authority to administer the provisions of the Clean Air Act, the proposed rule also would require that greenhouse gas emissions from light-duty vehicles decline gradually from an estimated average of 241 grams per mile in 2016 (based on the fuel economy standards for that year) to 163 grams per mile by 2025. If manufacturers achieved that reduction solely by boosting miles per gallon, the fuel economy for an average vehicle would need to be about 54.5 mpg. However, the standard for greenhouse gas emissions would allow manufacturers to comply in part through measures that do not affect fuel economy, such as reducing leakage from vehicles' air-conditioning systems or using refrigerants that are less potent greenhouse gases than those currently in use. EPA anticipates that manufacturers will take full advantage of those relatively low-cost options, and that, as a result, meeting the greenhouse gas standard would lead to an

average fuel economy for the fleet of about 49.6 mpg in 2025, matching NHTSA's estimate of the average fuel economy under the proposed CAFE standards.

CAFE standards have been in place since the late 1970s, when proponents viewed them as a way to decrease the nation's dependence on oil; more recently, interest has expanded to include the standards' ability to reduce emissions of greenhouse gases. The proposed standards are expected to advance both goals. EPA estimates that the amount of gasoline consumed by cars and light trucks would fall by almost 2 percent in 2020 and by 25 percent in 2040 relative to the amount that would be consumed if the 34.1 mpg standard established for 2016 remained in place until 2040.¹⁰ EPA also estimates that, under the proposed rule, greenhouse gas emissions from cars and light trucks would fall by roughly 2 percent in 2020 and by 31 percent in 2040, reducing U.S. emissions of greenhouse gases from all sources by 0.4 percent in 2020 and by 5.8 percent in 2040.¹¹

Effects of the Proposed CAFE Standards on Fuel Consumption and the Highway Trust Fund

The proposed CAFE standards eventually would cause a significant reduction in fuel consumption. That reduction, in turn, would decrease receipts credited to the Highway Trust Fund.

Fuel Consumption

By 2040, according to EPA's estimates, the proposed standards would reduce annual gasoline consumption by 25 percent—from 160 billion gallons without the proposed standards to 119 billion gallons with the proposed standards. By that time, nearly all light-duty vehicles on the road either will have been manufactured after 2025, and thus be subject to the 49.6 mpg standard,

10. Separate studies conducted by EPA and NHTSA of the effects of the proposed standards predicted similar reductions in gasoline consumption. CBO relied on EPA's projections because NHTSA did not report fuel savings by calendar year beyond 2025. See Department of Transportation, *Federal Register*, vol. 76, no. 231 (December 1, 2011), <http://go.usa.gov/EdH>. For EPA estimates see Table III-68, p. 75123; for NHTSA estimates see Table IV-39, p. 75258.

11. *Ibid.*, pp. 75090–75092, <http://go.usa.gov/EdH>.

or will be driven relatively little.¹² After reviewing the assumptions and methodology that underlie EPA's projections for reduced use of gasoline, CBO used those projections in its own calculations.

EPA reports only the effect the CAFE standards would have on gasoline consumption.¹³ Because CBO's objective is to estimate how receipts from the gasoline tax would change as a result of new standards, its calculations also include the consumption of other fuels subject to the gasoline tax—notably, renewable fuels, such as ethanol, that are blended into gasoline. The consumption of those fuels is largely governed by the terms of the Renewable Fuels Standard (RFS), which was created by the Energy Policy Act of 2005 and expanded by the Energy Independence and Security Act of 2007. The RFS requires that the use of renewable fuels in light-duty vehicles and heavy trucks increase from 15.2 billion gallons in 2012 to 36 billion gallons annually by 2022—although meeting the RFS will entail surmounting several obstacles (see Box 1).¹⁴

By accounting for that 36 billion gallons of renewable fuel, CBO estimates that *total* fuel consumption by light-duty vehicles in 2040 would shrink by 21 percent—from 196 billion gallons (160 billion gallons of gasoline plus 36 billion gallons of renewable fuel) under the current CAFE standards to 155 billion gallons (119 billion gallons of gasoline plus 36 billion gallons of renewable fuel) under the proposed standards.

Highway Trust Fund Revenues

The 21 percent decrease in fuel consumption by light-duty vehicles would result in a proportionate drop in gasoline tax receipts. Thus, once nearly all light-duty vehicles on the road were manufactured in 2025 or later, the proposed rule would reduce the gasoline tax revenues

credited to the Highway Trust Fund by 21 percent, CBO estimates. (That drop, in turn, would reduce total trust fund receipts—from the gasoline tax and other sources—by 13 percent.)

To illustrate the eventual effect of the standards on the trust fund's balances, CBO examined how the fund would be affected if gasoline tax revenues fell in the near term (for any reason) by 21 percent. Over the 11-year period covered by CBO's latest baseline projection of the fund's cash flows, such a reduction would translate into a \$57 billion decrease in gasoline tax collections.¹⁵ As a result, total receipts credited to the fund over that period would be \$385 billion instead of \$442 billion (see Table 1 on page 4). In that case, the fund's outlays would exceed its receipts by about \$204 billion, rather than by the \$147 billion that CBO estimated for its baseline projections (which did not include a 21 percent decrease in gasoline tax revenue). Consequently, trust fund receipts would equal only 65 percent of projected outlays, rather than 75 percent under the baseline projections. The \$57 billion decrease in gasoline tax revenue would reduce receipts credited to the highway account by \$48 billion and to the mass transit account by \$9 billion (see Figure 3).

The Basis of the Estimates

In calculating the eventual effect (for 2040 and beyond) of the proposed increase in CAFE standards on gasoline tax revenues, CBO relied on EPA's projections of gasoline

12. The new CAFE standards would not take effect until 2017, so they would reduce gasoline tax revenues between 2012 and 2022 by less than 1 percent, CBO estimates.

13. EPA and NHTSA project that less than 1 percent of the vehicle fleet will consume diesel fuel and that the number of diesel vehicles purchased will be unchanged by the proposed standards. The agencies have reported only on how consumption of *nonrenewable* fuel would be affected because their objective was to examine how the standard would change petroleum consumption and greenhouse gas emissions rather than how it would affect receipts from gasoline taxes.

14. NHTSA and EPA assume, as does CBO, that 36 billion gallons of renewable fuel will be consumed in 2040. If so, the RFS will increase gasoline tax revenues by about \$2.2 billion per year, with or without the proposed increase in CAFE standards. That increase will occur because renewable fuels have a lower energy content than gasoline; hence, 36 billion gallons of renewable fuel will displace only 24 billion gallons of gasoline and, consequently, 12 billion additional gallons of fuel will be subject to the 18.4 cent tax on gasoline-ethanol blends. A small fraction of the RFS is likely to be met through the use of biodiesel fuel (the amount will be determined by a future rulemaking). To the extent that occurs, the additional revenues resulting from the RFS would be diminished because biodiesel and gasoline have about the same energy content—biodiesel delivers more miles per gallon than other renewable fuels do, thus requiring less frequent refueling.

15. The decrease in gasoline tax collections also would reduce the interest credited to the fund. In the 2012–2022 period covered by CBO's projections, however, interest accounts for less than \$300 million of the \$442 billion in total receipts.

Box 1.**Challenges in Meeting the Renewable Fuels Standard**

The Renewable Fuels Standard (RFS), enacted under the Energy Policy Act of 2005 and expanded under the Energy Independence and Security Act of 2007, was designed to promote the use of renewable fuels and to achieve reductions in greenhouse gas emissions.¹ This Congressional Budget Office (CBO) analysis was developed under the assumption that the RFS would be met in 2040. (CBO also assumed that by 2040 most vehicles on the road would be built subject to the proposed corporate average fuel economy, or CAFE, standards for 2025, resulting in an average fuel economy of 49.6 miles per gallon.) To meet the RFS, however, fuel refiners would need to boost production of fuel from renewable resources and contend with limitations in the ability of most vehicles to operate on fuel blends with greater concentrations of ethanol. The proposed CAFE standards would exacerbate the latter challenge: By reducing fuel consumption, the standards would increase the concentration of renewable fuels in the supply of gasoline because the RFS requires that sales of renewable fuels meet a certain minimum number of gallons.²

The RFS specifies that by 2022, at least 36 billion gallons of renewable fuels per year must be blended into the motor fuel supply.³ The standard further requires that no less than 16 billion gallons of that total be cellulosic biofuel (made from wood chips, prairie grasses, fast-growing trees, or agricultural harvest waste). That requirement could be difficult to attain because cellulosic biofuel has not yet been

produced commercially in the United States. Systems still must be developed to transport and store the bulky feedstock, and demonstration plants for processing the fuel must be scaled up for commercial production. Because of those impediments, the Environmental Protection Agency (EPA) has several times reduced its near-term annual targets for cellulosic biofuel, which are considerably less stringent than the 2022 requirement: For 2012, EPA scaled back the originally mandated 500 million gallons to 8.65 million gallons.

Blending in the required amounts of renewable fuel poses a second challenge: Most gasoline-powered engines cannot run on fuel that is more than 10 percent or 15 percent ethanol without risking corrosive engine damage. That constraint, called the blend wall, limits the amount of ethanol the U.S. market can accommodate—currently between 10 percent and 15 percent of the amount of motor fuel sold in the United States. If the proposed standards are not adopted, EPA estimates that 160 billion gallons of gasoline will be consumed in 2040; if they are adopted, the estimate is around 119 billion gallons of gasoline. Meeting the RFS requirement of 36 billion gallons of renewable fuel in 2040 would require average ethanol concentrations in gasoline blends of 21 percent without the proposed CAFE standards or 30 percent with them.

The constraint posed by the blend wall can be eased by means of relatively inexpensive modifications to engines. Because most vehicles manufactured after 2001 can run on E15 fuel blends (containing up to 15 percent ethanol), as older vehicles are retired an increasing share of the fleet will be able to run on that fuel. Higher ethanol concentrations also are possible with engine modifications. Cars in Brazil, for example, run on fuel that is at least 20 percent ethanol. Flexible-fuel vehicles in the United States can operate on E85 fuel (containing up to 85 percent ethanol), although fewer than 2 percent of all filling stations in the United States currently offer it.

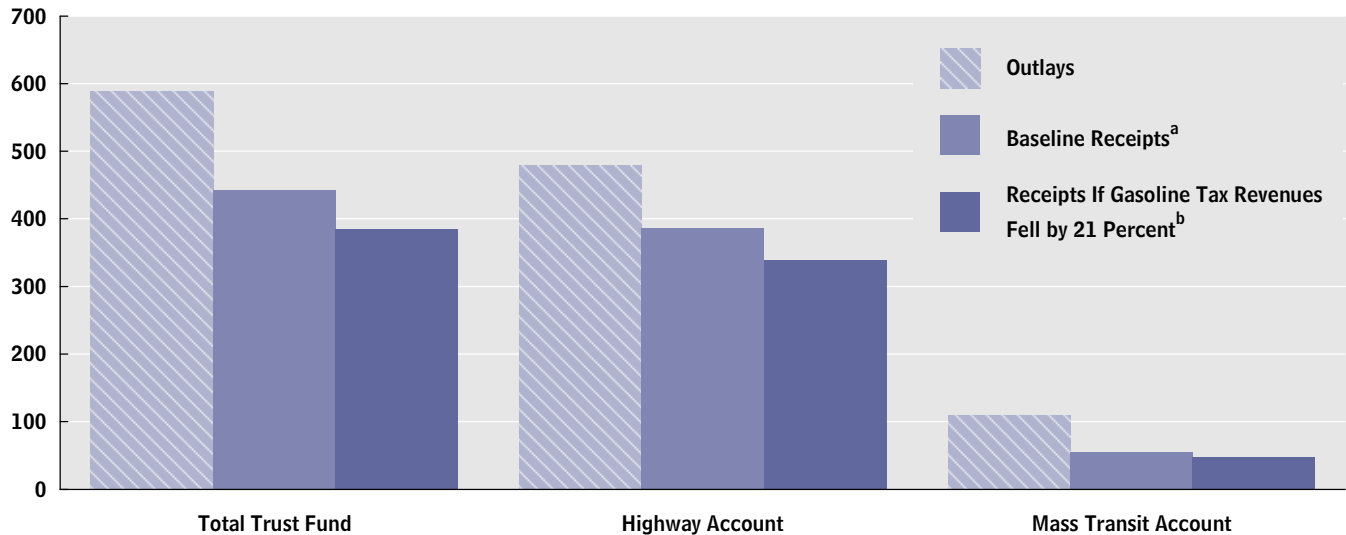
1. For more information, see Environmental Protection Agency, “Renewable Fuel Standard (RFS),” <http://go.usa.gov/EAJ>.

2. For discussion of other issues associated with the increased use of ethanol, see Congressional Budget Office, *Using Biofuel Tax Credits to Achieve Energy and Environmental Policy Goals* (July 2010); and *The Impact of Ethanol Use on Food Prices and Greenhouse-Gas Emissions* (April 2009).

3. See Randy Schnepf and Brent D. Yacobucci, *Renewable Fuel Standard: Overview and Issues*, CRS Report for Congress R40155 (Congressional Research Service, January 23, 2012).

Figure 3.**Projected Outlays and Receipts of the Highway Trust Fund, by Account, 2012 to 2022**

(Billions of dollars)



Source: Congressional Budget Office.

- a. Receipts include excise tax revenues, interest earned on balances, and miscellaneous revenues from other sources. The baseline receipt amounts are derived from CBO's March 2012 baseline projections for real (inflation-adjusted) economic growth and from anticipated increases in vehicle fuel economy. As specified in the Balanced Budget and Emergency Deficit Control Act of 1985, CBO constructs its baseline under the assumption that the excise taxes on automobile fuel, some of which are scheduled to expire under current law, will be extended at their current rates. CBO projected highway spending over the next decade by assuming that the obligation limitations in future years would equal those enacted in the 2012 appropriation act for the Department of Transportation, adjusted for inflation.
- b. For illustration, CBO examined the effects of a 21 percent reduction in revenues from taxes on gasoline and other fuels used by light-duty vehicles during fiscal years 2012 through 2022. That percentage reduction reflects the decline in revenues that CBO estimates would occur if most light-duty vehicles on the road were built subject to the proposed corporate average fuel economy standards for 2025 (resulting in an average fuel economy of 49.6 miles per gallon) as opposed to established standards for 2016 (resulting in an average fuel economy of 34.1 miles per gallon). The full effect of such a reduction would not be evident for about 30 years because of the gradual increase in the standards' stringency, beginning only in 2017, and because the vehicle fleet changes slowly as older vehicles are replaced with new ones.

consumption both with and without the new standards (while making adjustments for renewable fuels). In its projections, EPA assumed that without the proposed standards, average vehicle fuel efficiency would rise to meet the current CAFE standard for light-duty vehicles of 34.1 mpg in 2016 and remain there indefinitely. EPA also assumed that automakers would fully comply with the proposed standards, although historically some manufacturers (chiefly those that export luxury or sports cars to the United States) have chosen to pay fines instead. EPA's analysis was governed by several additional assumptions:

- The pace at which tighter CAFE standards would be reflected in the vehicle fleet is based on the fraction of each model year's vehicles still on the road in each suc-

ceeding year as derived from vehicle registration data for 2008.

- Future gasoline prices and total miles traveled by light-duty vehicles will follow the projections published by the Energy Information Administration (EIA) in its *Annual Energy Outlook 2011* (for example, EIA estimated that gasoline will cost \$3.38 per gallon in 2020, measured in 2009 dollars).¹⁶ Although the forecast extends only through 2035, EPA assumed that the rates of increase for gasoline prices and miles traveled would remain constant through 2050.

16. Energy Information Administration, *Annual Energy Outlook 2011* (January 2012), <http://go.usa.gov/yAf>.

- People would drive more as a result of the higher CAFE standards because those standards would reduce the costs of operating a vehicle. EPA assumed that this “rebound effect” would amount to a 1 percent increase in miles traveled for every 10 percent reduction in operating costs.
- Automakers would make some use of methods that reduce fuel consumption but that do not translate into increases in fuel efficiency as measured in the government’s CAFE test protocol.
- Drivers’ actual fuel economy would be 20 percent less than their vehicles’ rated fuel economy as determined for purposes of CAFE compliance. (For electric vehicles, the agencies assume that the difference is 30 percent.)¹⁷

To determine how sensitive the estimates of fuel savings were to those and other assumptions, EPA systematically varied its assumptions to include a range of plausible alternatives. Those variations changed outcomes by less than 10 percent in all but two cases: one in which the rebound effect was twice the size assumed (so that total miles driven increased by 2 percent, rather than by 1 percent, for every 10 percent reduction in the cost of driving) and one in which future gasoline prices were much higher or much lower than originally assumed.¹⁸ With a larger rebound effect or with higher gasoline prices, the fuel savings that could be attributed to the proposed increases in CAFE standards would fall short of EPA’s projections by more than 10 percent. If fuel savings were lower than predicted, the decline in gasoline tax receipts *resulting from the proposed standards* would be smaller than the amounts shown in Table 1 on page 4. If

17. The increase in the amount of renewable fuel (resulting from the RFS) blended into gasoline would cause the gap between on-road fuel economy and fuel economy as measured in the government’s test to exceed 20 percent because renewable fuel has a lower energy content than does gasoline. EPA believes that many factors could affect the gap—some, unlike the RFS, would narrow it—so the agency assumed that the 20 percent gap would remain constant for the period covered by its projections. To the extent that the gap was greater than 20 percent, the reduction in fuel consumption by light-duty vehicles, and the resulting decline in gasoline tax receipts, would be less than CBO has estimated.

18. See Department of Transportation, *Federal Register*, vol. 76, no. 231 (December 1, 2011), p. 75307, <http://go.usa.gov/EdH>.

the diminished effects from the proposed standards were the result of higher gasoline prices, however, the *ultimate effect* on tax receipts could be the same: Less of the decline would be attributable to the proposed standards and more would be caused by a decrease in fuel purchases, a result of fuel prices that were higher than EPA had assumed.

Ways to Mitigate the Proposed Standards’ Effects on Cash Flows

To make up the shortfall in revenue projected as a result of the proposed CAFE standards, lawmakers could consider various options, including spending reductions, transfers from the general fund, and increases in the gasoline tax or in revenues obtained from other sources dedicated to the Highway Trust Fund.¹⁹

In the illustrative example covering the period from 2012 to 2022, spending from the trust fund would have to be reduced by about 10 percent to offset the 21 percent reduction in gasoline tax revenues. Lawmakers could allocate such reductions in various ways between the highway and mass transit accounts. Regardless of which methods were chosen, the decrease in the authority to obligate resources from each account would probably have to be greater than the required decrease in outlays—or would have to start before the shortfall occurred—because it usually takes several years to spend a single year’s obligations. (Decreasing spending by 10 percent would offset a 21 percent decrease in gasoline tax receipts, but it would not affect the underlying imbalance between the trust fund’s receipts and outlays, which amounts to \$147 billion from 2012 through 2022 in CBO’s baseline projection.)

Transferring more money from the general fund to the Highway Trust Fund is the action the Congress took to address the shortfall each year from 2008 to 2010. Those actions ensured that the fund maintained a positive balance, but they weakened the relationship between spending on highways and the taxes imposed on users of those highways. Furthermore, with such transfers, the

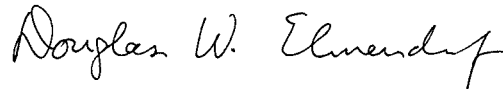
19. For a discussion, see the statement of Joseph Kile, Assistant Director for Microeconomic Studies, Congressional Budget Office, before the Senate Committee on Finance, *The Highway Trust Fund and Paying for Highways* (May 17, 2011).

trust fund will, over time, contribute to budget deficits rather than yield a balance between receipts from the designated transportation-related excise taxes and outlays for federal highway and transit programs.

An increase of about 5 cents per gallon in the gasoline tax would be required to make up the shortfall in revenue projected as a result of the proposed CAFE standards. (That estimate takes into account a decline in gasoline consumption that would be caused by the tax increase.) However, fuel taxes impose a proportionately larger burden, as a share of income, on middle- and lower-income households (particularly in areas that are not well served by public transit) than they do on higher-income households. Moreover, most of the social costs of using a highway—including pavement damage, congestion, accidents, and noise—are more closely tied to the number of miles a vehicle travels than to the amount of fuel it consumes. As a result, a combination of fuel taxes and per-mile charges, sometimes called vehicle-miles-traveled

taxes, could better offset the full costs that highway users impose on society. However, the systems necessary to administer vehicle-miles-traveled taxes would be more complex than those used to collect the existing excise taxes on fuels.

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