Alternative Fuel and Advanced Vehicle Technology Incentives: A Summary of Federal Programs

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June 12, 2012
Summary

A wide array of federal incentives support the development and deployment of alternatives to conventional fuels and engines in transportation. These incentives include tax deductions and credits for vehicle purchases and the installation of refueling systems, federal grants for conversion of older vehicles to newer technologies, mandates for the use of biofuels, and incentives for manufacturers to produce alternative fuel vehicles. The current array of incentives for alternative fuels and related technologies do not reflect a single, comprehensive strategy, but rather an aggregative approach to a range of discreet public policy issues, including goals of reducing petroleum consumption and import dependence, improving environmental quality, expanding domestic manufacturing, and promoting agriculture and rural development.

Current federal programs are administered by five key agencies: Department of the Treasury, Department of Energy, Department of Transportation, Environmental Protection Agency, and the U.S. Department of Agriculture. The incentives and programs described in this report are organized by the responsible agency.

- Treasury (through the Internal Revenue Service, IRS) administers tax credits and deductions for alternative fuel and advanced technology vehicle purchases, expansion of alternative fuel refueling infrastructure, and incentives for the production and/or distribution of alternative fuels. Many of these incentives have expired in recent years and may or may not be reinstated.

- DOE (mainly through the Office of Energy Efficiency and Renewable Energy, EERE) administers research and development (R&D) programs for advanced fuels and transportation technology, grant programs to deploy alternative fuels and vehicles, and a loan program to promote domestic manufacturing of high-efficiency vehicles.

- DOT (mainly through the Federal Highway Administration, FHWA, and Federal Transit Administration, FTA) administers grant programs to deploy “clean fuel” buses and other alternative fuel vehicles. DOT (through the National Highway Traffic Safety Administration, NHTSA) also administers federal Corporate Average Fuel Economy (CAFE) standards, which include incentives for production of alternative fuel vehicles.

- EPA (mainly through the Office of Transportation and Air Quality, OTAQ) administers the Renewable Fuel Standard, which mandates the use of biofuels in transportation. EPA also administers grant programs to replace older diesel engines with newer technology.

- USDA (mainly through the Rural Business-Cooperative Service, RBS) administers grant, loan, and loan guarantee programs to expand agricultural production of biofuel feedstocks, conduct R&D on biofuels and bioenergy, and establish and expand facilities to produce biofuels, bioenergy, and bioproducts.
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Introduction

A wide array of federal incentives support the development and deployment of alternatives to conventional fuels and engines in transportation. These incentives include tax deductions and credits for vehicle purchases and the installation of refueling systems, federal grants for conversion of older vehicles to newer technologies, mandates for the use of biofuels, and incentives for manufacturers to produce alternative fuel vehicles.

Many of the policy choices presented for alternative fuel and advanced vehicle technologies originated as a response to the nation’s interest in reducing petroleum imports, a goal first articulated at the time of the two OPEC oil embargoes in the 1970s. While President Richard Nixon is often cited as the first president to call for “energy independence,” successive presidents and Congresses have made efforts to reduce petroleum imports as well.

As shown in Figure 1, since peaking in 2005, net U.S. oil imports have fallen by one-third, and now represent 45% of domestic consumption, down from 60% seven years ago. Factors in this reversal have been the recent recession and the rise in petroleum prices in 2008, both of which reduced domestic demand, as well as a rise in the supply of U.S. oil and oil alternatives due to increased private sector investment and federal incentives, some of which are cited in this report. In addition, the U.S. has become a net exporter of petroleum products (while it remains a net importer of crude oil).

In addition to concerns over petroleum dependence, other factors have also driven policy on alternative fuels and advanced vehicle technologies. The current array of incentives does not reflect a single, comprehensive strategy but rather an aggregative approach to a range of discreet public policy issues, including improving environmental quality, expanding domestic manufacturing, and promoting agriculture and rural development.

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Factors Behind Alternative Fuels and Technologies Incentives

While a reliance on foreign sources of petroleum has been an overriding concern for the past 40 years, other factors, such as rural development, promotion of domestic manufacturing, and environmental concerns, have also shaped congressional interest in alternative fuels and technologies. A variety of programs affecting alternative fuels and technologies have been proposed and enacted, each with its own benefits and drawbacks. (This report does not evaluate the effectiveness of alternative fuel programs and incentives). Alternative fuels programs fall into one of the following six categories: expanding domestic ethanol production; establishing other alternative fuels; encouraging the purchase of non-petroleum vehicles; reducing fuel consumption and greenhouse gas emissions; supporting U.S. vehicle manufacturing; and funding U.S. highways.

Developing Domestic Ethanol Production

Ethanol has been seen as a homegrown alternative to imported oil and a number of programs were put in place to encourage its domestic development (instead of importing from other ethanol producers, such as Brazil). To spur establishment of this domestic industry, Congress has enacted a number of laws, which are also beneficial to states that have a large concentration of corn growers (corn being the raw material feedstock in most U.S. ethanol). Until recently, the incentives for ethanol production have most often been included in farm-related legislation and appropriations and hence have been administered by the U.S. Department of Agriculture (USDA), or in tax provisions administered by the Internal Revenue Service (IRS). Notably, the volumetric
ethanol excise tax credit (VEETC), which expired at the end of 2011, provided a tax credit to gasoline suppliers who blend ethanol with gasoline. The small ethanol producer tax credit provided a limited additional credit for small ethanol producers.

Establishing Other New Alternative Fuels

In addition to ethanol, Congress has sought to spur development of other alternative fuels, such as biodiesel, cellulosic biofuel, hydrogen, liquefied petroleum gas (LPG), compressed natural gas (CNG), and liquefied natural gas (LNG). Some of these fuels have been supported through tax credits (such as the biodiesel tax credit), federal mandates (mainly the Renewable Fuel Standard (RFS)), and R&D programs (such as the Biomass Research and Development Initiative, which provides grants for new technologies leading to the commercialization of biofuels).

Encouraging the Purchase of Non-Petroleum Vehicles

Congress has enacted laws that seek to boost consumer interest by providing tax credits for the purchase of some vehicles that consume far less petroleum or do not consume petroleum at all. These tax credit programs are generally limited in duration as a way to encourage early adopters to take a risk on new kinds of vehicles. The assumption behind these laws is that once a significant number of such new cars enter the mainstream, more and more car buyers would be attracted to them, prices would fall and the credits would no longer be needed. The credits have been available for plug-in vehicles (pure battery-electric and plug-in hybrid), hybrid vehicles, and those with fuel cells, advanced lean burn\(^2\) technology, and certain alternative fuels technologies. Congress has also enacted tax credits to spur the expansion of infrastructure to fuel such vehicles.

Reducing Fuel Consumption and Greenhouse Gases

Several agencies have been mandated by Congress and by the Obama Administration to address concerns over air quality through programs for alternative fuels, including the Environmental Protection Agency (EPA) and the Department of Transportation (DOT). The most significant and long-standing program to reduce vehicle fuel consumption is the Corporate Average Fuel Economy (CAFE) program administered by DOT.\(^3\) Under CAFE, manufacturers can accrue credits for the production and sale of certain types of alternative fuel vehicles. A new joint rulemaking process between DOT and EPA links future CAFE standards with Clean Air Act greenhouse gas (GHG) standards under the Clean Air Act. DOT also established the Congestion Mitigation and Air Quality Improvement Program (CMAQ) to fund programs that will reduce emissions in urban areas that may exceed certain air quality standards. At EPA, the Diesel Emission Reduction Act (DERA) was implemented with a goal of reducing diesel emissions by funding and implementing new technologies. In addition, EPA’s Renewable Fuel Standard (RFS) mandates the scalable use of renewable fuels in gasoline between 2006 and 2022.\(^4\) Under RFS, GHG emission reduction requirements apply to biofuels from newer refineries.

\(^2\) In general these are advanced diesel vehicles.

\(^3\) For more information, see CRS Report R40166, *Automobile and Light Truck Fuel Economy: The CAFE Standards*, by Brent D. Yacobucci.

Supporting U.S. Motor Vehicle Manufacturing

The Department of Energy (DOE), in partnership with U.S. automakers and academic institutions, has overseen research and development programs on vehicle electrification for nearly 40 years, in particular research focused on how to produce economical batteries that extend electric vehicle range. These R&D programs were supplemented in the American Recovery and Reinvestment Act (ARRA; P.L. 111-5) to include grants to build lithium-ion battery manufacturing plants in a bid to boost the international competitiveness of this sector. The Advanced Technology Vehicles Manufacturing (ATVM) loan program at DOE supports manufacturing plant investments to enable the development of technologies to reduce petroleum consumption, including the manufacture of electric and hybrid vehicles.5

Highway Funding and Fuels Taxes

As described below (see “Motor Fuels Excise Taxes”), one of the earliest fuels-related federal programs is the motor vehicle fuels excise tax first passed in the Highway Revenue Act of 1956 to fund construction and then maintenance of the interstate highway system.6 Originally, only gasoline and diesel were taxed, but as newer fuels became available (such as ethanol and compressed natural gas), they were added to the federal revenue program, but often at lower tax rates than gasoline or diesel. Lower tax burdens for some fuels or vehicles effectively incentivize those choices over conventional options. However, lower tax burdens for some vehicles or fuels could ultimately compromise federal highway revenue. The vehicles responsible for lower tax revenues include traditional internal combustion engine vehicles with higher mileage per gallon as well as new technology electric and hybrid cars.

Structure and Content of the Report

The federal tax incentives and programs discussed in this report aim to support the development and deployment of alternative fuels. There is no central coordination of how these incentives interact. In general, they are independently administered by separate federal agencies, including five key agencies: Treasury, DOE, DOT, EPA, and USDA.

This report focuses strictly on those programs that directly support alternative fuels or advanced vehicles, and does not address more general programs (e.g., general manufacturing loans, rural development loans.), or those that have been authorized but never funded. The programs are presented by agency, starting with those that generally address these issues, followed by those that are fuel- or technology-specific. Expired programs are included because there may be congressional interest in reinstating these programs or establishing similar programs in the future.

5 For more information, see CRS Report R42064, The Advanced Technology Vehicles Manufacturing (ATVM) Loan Program: Status and Issues, by Brent D. Yacobucci and Bill Canis.

6 The gasoline tax was originally enacted in 1932 and dedicated solely to reducing a federal budget deficit. It remained that way until the passage of the Federal Aid Highway Act of 1956 (P.L. 84-627) which established the Highway Trust Fund; the Highway Revenue Act was Title II of P.L. 84-627. For more details about the role of the fuels tax in funding the federal highway program, see CRS Report RL30304, The Federal Excise Tax on Gasoline and the Highway Trust Fund: A Short History, by James M. Bickley.
The Appendix contains three tables:

1. A summary of the programs discussed in the body of the report, listed by agency (Table A-1);
2. A listing of programs and incentives for alternative fuels, by fuel type (Table A-2); and
3. A listing of programs and incentives for advanced technology vehicles, by vehicle type (Table A-3).

Department of the Treasury

Motor Fuels Excise Taxes

- Administered by: Internal Revenue Service (IRS)
- Original authorizing legislation and legislative history: Most motor fuels taxes (some of which were initially enacted in 1932) were included in the Highway Revenue Act of 1956 (P.L. 84-627) primarily to support the Highway Trust Fund, except for the tax on compressed natural gas, which was enacted in 1993 (Omnibus Budget Reconciliation Act of 1993; P.L. 103-66). Taxes that support the Highway Trust Fund have been extended numerous times, most recently by P.L. 112-102, which also extended spending authority out of the Highway Trust Fund through June 30, 2012.7
- Joint Committee on Taxation (JCT) estimated tax expenditure for FY2012: N/A
- Scheduled termination: 4.3 cents per gallon of the gasoline/diesel fuel tax is permanent; the rest of the motor fuels taxes expire on June 30, 2012 when major parts of the current Highway Trust Fund expire.
- Description: The motor fuels taxes that were included in the Highway Revenue Act of 1956 (P.L. 84-627) were dedicated to supporting the Highway Trust Fund, except for the tax on compressed natural gas, which was enacted in 1993. The federal excise tax on most of these fuels was last raised by Congress in 1993. Taxes vary by fuel: gasoline, 18.4 cents per gallon; diesel fuel, 24.4 cents per gallon; biodiesel, 24.4 cents per gallon; ethanol, 18.4 cents per gallon; hydrogen, 18.4 cents per gallon equivalent; liquefied petroleum gas (LPG), 18.3 cents per gallon; compressed natural gas (CNG), 18.3 cents per gallon equivalent; liquefied natural gas (LNG), 24.3 cents per gallon equivalent. Electricity for electric vehicles is untaxed. Similarly, until recently other fuels (e.g., ethanol-blended gasoline) were subject to exemptions from, or credits against, these taxes. These exemptions/credits effectively incentivize selected fuels/vehicles relative to conventional options.

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7 Taxes dedicated to the Highway Trust Fund (HTF), authority to place those taxes into the HTF and to spend funds out of the HTF all have expiration dates which must be extended by Congress periodically.
• Qualified applicant/Covered entity: Manufacturers who produce applicable fuel types.8

• Applicable fuel/technology: Gasoline, diesel, hydrogen, liquefied petroleum gas, liquefied natural gas, compressed natural gas, ethanol and methanol (electricity is exempt).


Incentives for Alternative Fuel and Alternative Fuel Mixtures (other than Liquefied Hydrogen)

• Administered by: IRS


• JCT estimated tax expenditure for FY2012:9 $0

• Scheduled termination: Expired December 31, 2011.

• Description: This provision established a 50-cents-per gallon excise tax credit for certain alternative fuels used as fuel in a motor vehicle, motor boat, or airplane and a 50-cents-per gallon credit for alternative fuels mixed with a traditional fuel (gasoline, diesel or kerosene) for use as a fuel.

• Qualified applicant/Covered entity: Taxpayers who supplied or mixed qualifying fuel types.

• Applicable fuel/technology: Liquefied petroleum gas, P Series fuels, compressed or liquefied natural gas, any liquefied fuel derived from coal or peat, liquefied

8 The tax is imposed on the producer of such fuels.
hydrocarbons derived from biomass. (Ethanol, methanol, and biodiesel do not qualify for the alternative fuel or alternative fuel mixture credit).


**Alternative Motor Vehicle Credit**

- Administered by: IRS
- JCT Estimated Tax Expenditure for FY2012: Less than $50 million
- Scheduled termination: December 31, 2014 for fuel cell vehicles; expired December 31, 2010 or earlier for all other vehicles.
- Description: Enacted in the Energy Policy Act of 2005, the provision includes separate credits for four distinct types of vehicles: using fuel cells, advanced lean burn technologies, and qualified hybrid.
- Qualified applicant/Covered entity: Taxpayers purchasing a qualified fuel or technology.
- Applicable fuel/technology: Hybrid gasoline-electric; diesel; battery-electric; alternative fuel and fuel cell vehicles; and advanced lean-burn technology vehicles.
- For more information: See the IRS website for the Alternative Motor Vehicle Credit at http://www.irs.gov/businesses/corporations/article/0,,id=202341,00.html.

**Plug-in Electric Drive Vehicle Credit**

- Administered by: IRS
- JCT estimated tax expenditure for FY2012: $200 million
• Scheduled termination: Phased out when an automaker has sold a total of 200,000 qualified vehicles.

• Description: Purchasers of plug-in electric vehicles may file to obtain a tax credit of up to $7,500 per vehicle, depending on battery capacity. The vehicle must be acquired for use or lease and not for resale. Additionally, the original use of the vehicle must commence with the taxpayer and the vehicle must be used predominantly in the United States. For purposes of the 30D credit, a vehicle is not considered acquired prior to the time when title to the vehicle passes to the taxpayer under state law.

• Qualified applicant/Covered entity: Purchasers of qualified vehicles.

• Applicable fuel/technology: Plug-in electric vehicles.


Plug-in Electric Vehicle Credit

• Administered by: IRS


• JCT estimated tax expenditure for FY2012: Less than $50 million

• Scheduled termination: For Plug-in Electric Vehicles (IRC 30) vehicles must have been acquired after February 17, 2009, and before January 1, 2012.

• Description: Internal Revenue Code Section 30 provided a tax credit for qualified plug-in electric vehicles. The credit was equal to 10% of the cost of a qualified plug-in electric vehicle and limited to $2,500. Qualified vehicles included low-speed vehicles or vehicles that have two or three wheels. The vehicle must have been acquired for use or lease and not for resale. The original use of the vehicle must have commenced with the taxpayer and the vehicle must have been used predominantly in the United States.

• Qualified applicant/Covered entity: Taxpayers purchasing qualifying vehicles.

• Applicable fuel/technology: Two- or three-wheeled plug-in electric vehicles or certain low-speed vehicles.


• Related CRS Reports: CRS Report R41154, The U.S. Motor Vehicle Industry: A Review of Recent Domestic and International Developments, by Bill Canis and
Conversion Kits

- Administered by: IRS
- Original authorizing legislation and legislative history: American Recovery and Reinvestment Act (P.L. 111-5, §1143)
- JCT estimated tax expenditure for FY2012: $0
- Scheduled termination: Expired December 31, 2011.
- Description: The credit was equal to 10% of the cost of converting a vehicle to a qualified plug-in electric drive motor vehicle and placed in service after February 17, 2009. The maximum amount of the credit was $4,000. The credit does not apply to conversions made after December 31, 2011. A taxpayer was able to claim this credit even if the taxpayer claimed a hybrid vehicle credit for the same vehicle in an earlier year.
- Qualified applicant/Covered entity: Taxpayers who purchased the applicable technology.
- Applicable fuel/technology: Qualified plug-in electric vehicle kits.
- For more information: See the IRS website at http://www.irs.gov/newsroom/article/0,,id=206871,00.html/.

Alternative Fuel Refueling Property Credit

- Administered by: IRS
- JCT estimated tax expenditure for FY2012: Less than $50 million
- Scheduled termination: December 31, 2014, for hydrogen refueling property; expired December 31, 2011, for all other fuels.
- Description: Consumers who purchased qualified residential non-hydrogen fueling equipment received a 30% tax credit of up to $1,000; businesses received a credit up to $30,000. Special rules in place for 2009 and 2010 increased the credit rate to 50% for non-hydrogen property. Credit limits were also temporarily increased to $2,000 for non-business property, $50,000 for business property. The
credit rate remained at 30% for hydrogen property in 2009 and 2010, but the maximum credit for businesses was increased to $200,000.

- Qualified applicant/Covered entity: Consumers or businesses who purchased qualifying equipment/property.
- Applicable fuel/technology: Natural gas, liquefied petroleum gas, hydrogen, electricity, E85, or diesel fuel blends containing a minimum of 20% biodiesel.

Volumetric Ethanol Excise Tax Credit

- Administered by: IRS
- JCT estimated tax expenditure for FY2012: Foregone revenue of approximately $6 billion\(^\text{10}\)
- Scheduled termination: Expired December 31, 2011.
- Description: Gasoline suppliers who blend ethanol with gasoline were eligible for a tax credit of 45 cents per gallon of ethanol. This credit replaced a long-standing partial tax exemption for ethanol-blended gasoline.
- Qualified applicant/Covered entity: Blenders of gasohol (i.e., gasoline suppliers and marketers).
- Applicable fuel/technology: Ethanol and other alcohol fuels.

\(^{10}\) Because of the nature of the credit, the actual tax expenditure is $0, although tax receipts are reduced by approximately $6 billion.
Small Ethanol Producer Credit

- Administered by: IRS

- JCT estimated tax expenditure for FY2012: $100 million
- Scheduled termination: Expired December 31, 2011.
- Description: The small ethanol producer credit was valued at 10 cents per gallon of ethanol produced through the end of 2011. The credit was claimed on the first 15 million gallons of ethanol produced by a small producer in a given year.
- Qualified applicant/Covered entity: Any ethanol producer with production capacity below 60 million gallons per year.
- Applicable fuel/technology: Ethanol.


Biodiesel Tax Credit

- Administered by: IRS

- JCT estimated tax expenditure for FY2012: $0
- Scheduled termination: Expired December 31, 2011.
- Description: Biodiesel producers (or producers of diesel/biodiesel blends) claimed a per-gallon tax credit through the end of 2011. The credit was valued at $1.00 per gallon. Before amendment by P.L. 110-343, the credit was valued at $1.00 per gallon of “agri-biodiesel” (biodiesel produced from virgin agricultural products such as soybean oil or animal fats), or 50 cents per gallon of biodiesel
produced from previously used agricultural products (e.g., recycled fryer grease). The tax credit expired at the end of 2009 and was not extended until the passage of P.L. 111-312, which retroactively applied the extension to fuel produced in 2010.

- **Qualified applicant/Covered entity**: Biodiesel producers and blenders.
- **Applicable fuel/technology**: Biodiesel.

### Small Agri-Biodiesel Producer Credit

- **Administered by**: IRS
- **JCT estimated tax expenditure for FY2012**: $0
- **Scheduled termination**: Expired December 31, 2011.
- **Description**: The small agri-biodiesel producer credit was valued at 10 cents per gallon of “agri-biodiesel” (see Biodiesel Tax Credit, above) produced. The credit was claimed on the first 15 million gallons of ethanol produced by a small producer in a given year through the end of 2011. The tax credit expired at the end of 2009 and was not extended until the passage of P.L. 111-312, which retroactively applies the extension to fuel produced in 2010.
- **Qualified applicant/Covered entity**: Any agri-biodiesel producers with production capacity less than 60 million gallons per year
- **Applicable fuel/technology**: Biodiesel.
- **Related CRS Reports**: CRS Report R41631, *The Market for Biomass-Based Diesel Fuel in the Renewable Fuel Standard (RFS)*, by Brent D. Yacobucci and
Renewable Diesel Tax Credit

- Administered by: IRS
- JCT estimated tax expenditure for FY2012: $0
- Scheduled termination: Expired December 31, 2011.
- Description: Producers of biomass-based diesel fuel (or producers of diesel/renewable biodiesel blends) claimed a $1.00 per gallon tax credit through the end of 2011. Renewable diesel is similar to biodiesel, but it is produced through different processes and thus was ineligible for the (above) biodiesel credits. The tax credit expired at the end of 2009 and was not extended until the passage of P.L. 111-312, which retroactively applied the extension to fuel produced in 2010.
- Qualified applicant/Covered entity: Renewable diesel producers and blenders.
- Applicable fuel/technology: Renewable diesel.

Credit for Production of Cellulosic Biofuel

- Administered by: IRS
- JCT estimated tax expenditure for FY2012: $0
• Description: Producers of cellulosic biofuel may claim a tax credit of $1.01 per gallon. For cellulosic ethanol producers, the value of the production tax credit is reduced by the value of the volumetric ethanol excise tax credit and the small ethanol producer credit—the credit is currently valued at $1.01 cents per gallon (the offsetting tax credits have expired).

• The credit applies to fuel produced after December 31, 2008.

• Qualified applicant/Covered entity: Cellulosic biofuel producers

• Applicable fuel/technology: Cellulosic biofuels

• For more information: see the Alternative Fuels and Advanced Vehicles Data Center’s (AFDC’s) Web page for the Cellulosic Biofuel Producer Tax Credit at http://www.afdc.energy.gov/afdc/laws/law/US/413; and IRS Publication 510 and IRS Forms 637 and 6478, which are available via the IRS website.


Special Depreciation Allowance for Cellulosic Biofuel Plant Property

• Administered by: IRS


• JCT estimated tax expenditure for FY2012: $0

• Scheduled termination: December 31, 2012.

• Description: A taxpayer may take a depreciation deduction of 50% of the adjusted basis of a new cellulosic biofuel plant in the year it is put in service. Any portion of the cost financed through tax-exempt bonds is exempted from the depreciation allowance. Before amendment by P.L. 110-343, the accelerated depreciation applied only to cellulosic ethanol plants that break down cellulose through enzymatic processes—the amended provision applies to all cellulosic biofuel plants.

• Qualified applicant/Covered entity: Any cellulosic ethanol plant acquired after December 20, 2006, and placed in service before January 1, 2013. Any plant that had a binding contract for acquisition before December 20, 2006, does not qualify.

• Applicable fuel/technology: Cellulosic biofuels
Department of Energy

Advanced Technology Vehicle Manufacturing Loan Program

- Administered by: Loan Programs Office (LPO)
- FY2012 appropriated funds: $6 million (for program administration)
- Scheduled termination: Facilities funded must be placed in service by the end of 2020.
- Description: Advanced Technology Vehicle Manufacturing (ATVM) was established in 2007 to help automakers meet mandated vehicle fuel economy standards and to encourage domestic production of more fuel-efficient cars and light trucks. It provides up to $25 billion in revolving loans to qualified automakers for investment in their manufacturing operations. In FY2008, $7.51 billion was appropriated for the direct loans—$7.5 billion for the loan subsidies (available until expended) and $10 million for administration. Although appropriations are provided annually for administration, Congress only approved the program loan subsidy authority one time. Currently, loans have been made to five companies, using $8.4 billion of the $25 billion loan authority.
- Qualified applicant/Covered entity: an automotive manufacturer satisfying specified fuel economy requirements or a manufacturer of qualifying components. To be financially eligible for an ATVM loan, an applicant must be financially viable without the receipt of additional federal funding for the proposed project.
- Applicable fuel/technology: No limitations on specific technologies; rather, limits are stipulated for vehicle emissions and fuel consumption.
- For more information: DOE website, https://lpo.energy.gov/?page_id=43.
Vehicle Technologies Program

- Administered by: Office of Energy Efficiency and Renewable Energy (EERE)
- FY2012 appropriated funds: $329 million—of that $118 million for Batteries and Electric Drive Technology
- Scheduled termination: None.
- Description: Through research and development, VTP supports partnerships with other public and private organizations that will enhance energy efficiency and productivity, bring clean and affordable technologies to market, and enhance advanced technology vehicle choices for consumers. VTP supports, and works through, two major government-industry endeavors: the US DRIVE Partnership and the 21st century Truck Partnership.
- Qualified applicant/Covered entity: universities, vehicle and engine manufacturers, material suppliers, nonprofit technology organizations, energy suppliers, and national laboratories.
- Applicable fuel/technology: Advanced batteries, power electronics and electric motors, advanced combustion, lightweight materials, vehicle-to-grid interaction, and fuel cell and hydrogen technologies.
- Related CRS Reports: CRS Report R42064, The Advanced Technology Vehicles Manufacturing (ATVM) Loan Program: Status and Issues, by Brent D. Yacobucci and Bill Canis

Biomass and Biorefinery Systems Program

- Administered by: EERE

- FY2012 appropriated funds: $199 million
- Scheduled termination: None.
- Description: The Biomass Program primarily focuses on research, development, demonstration, and deployment (RDD&D) to ensure that cellulosic ethanol is commercially viable by 2012 and that biobased aviation fuel, diesel fuel, and gasoline are price competitive by 2017. However, other non-transportation applications for biomass and bioenergy systems are also studied under this program.
- Qualified applicant/Covered entity: universities and businesses.
- Applicable fuel/technology: Biofuels.
- For more information: See http://www1.eere.energy.gov/biomass/.
- Related CRS Reports: CRS Report R41985, Renewable Energy Programs and the Farm Bill: Status and Issues, by Randy Schnepf

Hydrogen and Fuel Cell Technologies Program

- Administered by: EERE

- FY2012 appropriated funds: $104 million
- Scheduled termination: None.
Alternative Fuel and Advanced Vehicle Technology Incentives

- Description: This program works with industry, national laboratories, universities, government agencies, and other partners to overcome barriers to the use of hydrogen and fuel cells. It includes a research and development (R&D) effort focused on advancing the performance and reducing the cost of these technologies. R&D applies to both transportation and stationary applications.

- Qualified applicant/Covered entity: Federal government; national laboratories; colleges and universities; and for-profit organizations.

- Applicable fuel/technology: Hydrogen, fuel cells.


Clean Cities Program

- Administered by: EERE and sponsored by the Vehicle Technologies Program.


- FY2012 appropriated funds: Approximately $30 million

- Scheduled termination: None.

- Description: Initially started in 1993 as a DOE program to promote alternative fuel vehicles among the states, it is now a broader program to reduce petroleum consumption in transportation, with 100 Clean Cities coalitions that focus on deployment of alternative and renewable fuels, idle-reduction measures, fuel economy improvements, and emerging transportation technologies. Clean Cities provides technical, informational, and financial assistance to communities.

- Qualified applicant/Covered entity: Businesses, fuel providers, vehicle fleets, state and local government agencies, and community organizations, led by nearly 100 Vehicle Technologies Program Clean Cities coordinators.

- Applicable fuel/technology: Electricity, natural gas, propane, bio-methane, ethanol, biodiesel, hydrogen.

- For more information: See the DOE Clean Cities website at http://www1.eere.energy.gov/cleancities/.

- Related CRS Reports: N/A
Department of Transportation

Corporate Average Fuel Economy Program Alternative Fuel Vehicle Credits

- Administered by: National Highway Traffic Safety Administration (NHTSA)
- Original authorizing legislation and legislative history: Corporate Average Fuel Economy (CAFE) program established in the Energy Policy and Conservation Act (EPCA) of 1975 (P.L. 94-163); alternative fuels incentives established in the Alternative Motor Fuels Act (P.L. 100-494); amended multiple times, most recently by the Energy Independence and Security Act of 2007, §109 (P.L. 110-140), to extend the expiration date through model year 2019 for dual fueled vehicles.
- FY2012 appropriated funds: N/A
- Scheduled Termination: No expiration for dedicated vehicles; after model year 2019 for dual fueled vehicles.
- Description: Automakers that sell passenger cars and light trucks in the United States must comply with federal CAFE standards. Those standards set fuel economy targets that automakers must meet, averaged across their car and light truck fleets. Those targets vary by vehicle class and size. To promote the production and sale of alternative fuel vehicles and provide flexibility in compliance, automakers may accrue CAFE credits by selling alternative fuel vehicles. For dedicated vehicles (i.e., vehicles that run solely on alternative fuel) credits are unlimited. For dual fueled vehicles (i.e., that may run on conventional or alternative fuel) credits are limited: The maximum fuel economy increase allowed through the use of dual fueled vehicle credits is 1.2 miles per gallon through model year (MY) 2014. After 2014 the credits are phased down and completely eliminated after MY 2019.
- Covered entity: Automakers that produce vehicles for sale in the United States
- Applicable fuel/technology: Incentives apply to vehicles capable of operating on methanol (at least 85%), ethanol (at least 85%), natural gas, liquefied petroleum gas, hydrogen, coal-derived liquid fuels, biologically-derived fuels, and electricity.
- For more information: See NHTSA’s CAFE website at http://www.nhtsa.gov/fuel-economy
- Related CRS Reports: CRS Report R40166, Automobile and Light Truck Fuel Economy: The CAFE Standards, by Brent D. Yacobucci

Congestion Mitigation and Air Quality Improvement Program

- Administered by: Federal Highway Administration (FHWA) and Federal Transit Administration (FTA)
• Original authorizing legislation and legislative history: Established by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991 (P.L. 102-240); reauthorized multiple times, most recently by the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) of 2005 (P.L. 109-59); extended multiple times, most recently by the Surface Transportation Extension Act of 2012 (P.L. 112-102).

• FY2012 appropriated funds (estimated): $1.35 billion

• Scheduled Termination: June 30, 2012.

• Description: Congestion Mitigation and Air Quality Improvement (CMAQ) provides funds to states for transportation projects designed to reduce traffic congestion and improve air quality, particularly in areas of the country that do not attain National Ambient Air Quality Standards. In particular, it authorizes funding for programs and projects intended to reduce carbon monoxide, particulate matter, and ozone. CMAQ funds are apportioned in accordance with a formula based largely on a state’s population and pollution reduction needs.

• Qualified applicant/Covered entity: State departments of transportation and metropolitan planning organizations (MPOs).

• Applicable fuel/technology: Any transportation project or technology that can lead to reductions in congestion or help improve air quality.

• For more information: See FHWA’s CMAQ website at http://www.fhwa.dot.gov/environment/air_quality/cmaq/


Clean Fuels Grant Program

• Administered by: Federal Transit Administration (FTA)

• Original authorizing legislation and legislative history: Established by the Surface Transportation and Uniform Relocation Assistance Act of 1987 (P.L. 100-17) §313; reauthorized and amended multiple times, most recently by the Safe, Accountable, Flexible, and Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) of 2005 (P.L. 109-59) §3010.

• FY2012 appropriated funds: $51.5 million

• Scheduled termination: June 30, 2012.

• Description: The program provides grants for the purchase of alternative fuel and advanced technology transit buses. Under conventional bus grants, FTA will fund up to 80% of the cost of a bus; under the Clean Fuels Grant Program, FTA funds 90% of the incremental cost of a “clean fuel” bus. The incremental cost is the difference between the cost of the clean fuel bus and a comparable conventional bus.
• Qualified applicant/Covered entity: Tribes, states, state departments of transportation, and metropolitan planning organizations.

• Applicable fuel/technology: buses run on compressed natural gas, liquefied natural gas, biodiesel, battery electric, ethanol, methanol, fuel cells, and clean diesel (clean diesel projects limited to 25% of total funding).

• For more information: See FTA, Clean Fuels Grant Program website at http://www.fta.dot.gov/grants/13094_3560.html.


Environmental Protection Agency

National Clean Diesel Campaign

• Administered by: Office of Transportation and Air Quality (OTAQ)


• FY2012 appropriated funds: $30 million

• Scheduled termination: September 30, 2016.

• Description: EPA’s National Clean Diesel Campaign (NCDC) promotes clean air strategies by working with manufacturers, fleet operators, air quality professionals, environmental and community organizations, and state and local officials to reduce diesel emissions. States are allocated funds for their clean diesel programs through the Diesel Emission Reduction Act (DERA).

• Qualified applicant/Covered entity: Manufacturers, fleet operators, air quality professionals, environmental and community organizations, and state and local governments.

• Applicable fuel/technology: Technologies that significantly reduce emissions (EPA maintains a list of verified retrofit technologies and emerging technologies at http://www.epa.gov/cleandiesel/verification/verif-list.htm/).

• For more information: See EPA’s National Clean Diesel Campaign website at http://www.epa.gov/cleandiesel/.

• Related CRS Reports: CRS Report R42520, Environmental Protection Agency (EPA): Appropriations for FY2013, by Robert Esworthy et al.
Renewable Fuel Standard

- Administered by: Office of Transportation and Air Quality (OTAQ)
- FY2012 appropriated funds: N/A
- Scheduled termination: None.
- Description: The Energy Policy Act of 2005 established a renewable fuel standard (RFS) for automotive fuels. The RFS was expanded by the Energy Independence and Security Act of 2007. The RFS requires the use of renewable fuels (including ethanol and biodiesel) in transportation fuel. In 2011, fuel suppliers were required to include 13.95 billion gallons of renewable fuels in the national transportation fuel supply; this requirement increases annually to 36 billion gallons in 2022. The expanded RFS also specifically mandates the use of “advanced biofuels”—fuels produced from non-corn feedstocks and with 50% lower lifecycle greenhouse gas emissions than petroleum fuel—starting in 2009. Of the 36 billion gallons required in 2022, at least 21 billion gallons must be advanced biofuels. There are also specific quotas for cellulosic biofuels and for biomass-based diesel fuel. On May 1, 2007, EPA issued a final rule on the original RFS program detailing compliance standards for fuel suppliers, as well as a system to trade renewable fuel credits between suppliers. On March 26, 2010, EPA issued final rules for the expanded program (RFS2), including lifecycle analysis methods necessary to categorize fuels as advanced biofuels, and new rules for credit verification and trading. While this program is not a direct subsidy for the construction of biofuels plants, the guaranteed market created by the RFS is expected to stimulate growth of the biofuels industry and to raise prices above where they would have been in the absence of the mandate.
- Covered entity: Gasoline and diesel fuel suppliers—generally refiners, but other entities may also be covered.
- Applicable fuel: All biofuels (conventional ethanol, biodiesel, renewable diesel, cellulosic biofuels, advanced biofuels).
Department of Agriculture

Biorefinery Assistance

- Administered by: Rural Business-Cooperative Service (RBS)
- FY2012 appropriated funds: Mandatory funding of $74 million in FY2009 and $245 million in FY2010 was authorized for loan guarantees; no discretionary funding has been appropriated through FY2012
- Description: Grants to biorefineries that use renewable biomass to reduce or eliminate fossil fuel use.
- Qualified applicant: Biorefineries in existence at the date of enactment.
- Related CRS Reports: CRS Report R41985, Renewable Energy Programs and the Farm Bill: Status and Issues, by Randy Schnepf

Repowering Assistance

- Administered by: RBS
- FY2012 appropriated funds: Discretionary funding of $15 million was appropriated only in FY2010
- Description: Grants to biorefineries that use renewable biomass to reduce or eliminate fossil fuel use. RBS issued a Notice of Funding Availability June 12, 2009, at http://www.rurdev.usda.gov/rbs/busp/9004%20FR%20NOFA.pdf.
- Qualified applicant: Biorefineries in existence at the date of enactment.
- Related CRS Reports: CRS Report R41985, Renewable Energy Programs and the Farm Bill: Status and Issues, by Randy Schnepf

For program details, see CRS Report R41985, Renewable Energy Programs and the Farm Bill: Status and Issues, by Randy Schnepf.
Bioenergy Program for Advanced Biofuels

- Administered by: RBS
- FY2012 appropriated funds: No discretionary funding has been appropriated through FY2012; mandatory funding for FY2012 of $65 million
- Description: Provides payments to producers to support and expand production of advanced biofuels refined from sources other than corn kernal starch. RBS issued a Notice of Contract Proposal June 12, 2009, at http://www.rurdev.usda.gov/rbs/busp/NOCP%20FR%209005.pdf.
- Qualified applicant: Producers of advanced biofuels.
- Related CRS Reports: CRS Report R41985, Renewable Energy Programs and the Farm Bill: Status and Issues, by Randy Schnepf

Biomass Crop Assistance Program

- Administered by: Farm Service Agency (FSA)
- FY2012 appropriated funds: Mandatory Commodity Credit Corporation (CCC) funds of such sums as necessary are made available for each of FY2008-F2012. In FY2012, Biomass Crop Assistance Program (BCAP) mandatory spending was limited to $17 million
- Description: Two separate payment programs for the establishment and supply of advanced biofuel feedstocks: (1) Establishment and annual payments, including a one-time payment of up to 75% of the cost of establishment for perennial crops, and annual payments for up to five or 15 years depending on the type of crop; and (2) dollar-for-dollar matching payments for collection, harvesting, storage, and transportation (CHST) of biomass to qualified biofuel production facilities (as well as bioenergy or biobased products), up to $45 per ton.
- Qualified applicant: Individuals who establish and produce qualified perennial biomass feedstock crops; individuals who deliver eligible biomass to a qualified facility.
- Related CRS Reports: CRS Report R41985, Renewable Energy Programs and the Farm Bill: Status and Issues, by Randy Schnepf
Rural Energy for America Program

- Administered by: RBS
- FY2012 appropriated funds: $25 million ($22 million in mandatory funds are available and $3 million in discretionary funds)
- Description: Provides grants and loans for a variety of rural energy projects, including efficiency improvements and renewable energy projects. Although REAP is not exclusively aimed at biofuels projects, the program could be a significant source of loan funds for such projects.
- Qualified applicant/Covered entity: Rural small businesses and agricultural producers.
- Applicable fuel/technology: Biofuels (see description above), among other technologies.
- For more information: See the program website at http://www.rurdev.usda.gov/rbs/farmbill/.
- Related CRS Reports: CRS Report R41985, Renewable Energy Programs and the Farm Bill: Status and Issues, by Randy Schnepf

Biomass Research and Development

- Administered by: National Institute of Food and Agriculture (NIFA)
- FY2012 appropriated funds: $40 million in mandatory funding
- Description: Grants are provided for biomass research, development, and demonstration projects. Eligible projects include ethanol and biodiesel demonstration plants.
- Qualified applicant: Wide range of possible applicants.
U.S. Customs and Border Protection—Import Duty on Fuel Ethanol

- Administered by: U.S. Customs and Border Protection
- FY2012 appropriated funds: N/A
- Scheduled termination: Expired December 31, 2011.
- Description: A 2.5% ad valorem tariff and a most-favored-nation duty of $0.54 per gallon of ethanol (for fuel use) applied to imports into the United States from most countries through the end of 2011; most ethanol from Caribbean Basin Initiative (CBI) countries imported duty-free.
- Covered entities: Fuel ethanol importers.
- Applicable fuel: Ethanol (from all feedstocks).
- For more information: See Senate Finance Committee, Summary of House-Senate Agreement on Tax, Trade, Health, and Other Provisions, December 7, 2006, at http://www.finance.senate.gov/newsroom/ranking/release/?id=97221a88-8b93-4000-b51c-5b03be06e6fb
- Related CRS Reports: CRS Report RS21930, Ethanol Imports and the Caribbean Basin Initiative (CBI), by Brent D. Yacobucci
Appendix. Summary Tables

This appendix contains three tables:

- **Table A-1** provides a summary of the programs discussed in the body of the report, listed by agency;
- **Table A-2** lists programs and incentives for alternative fuels, by fuel type; and
- **Table A-3** lists programs and incentives for advanced technology vehicles, by vehicle type.
### Table A-1. Federal Programs by Agency

<table>
<thead>
<tr>
<th>Program</th>
<th>Description</th>
<th>FY2012 Appropriation or JCT Estimated Expenditure</th>
<th>Expiration Date</th>
<th>Eligible Fuels or Technologies</th>
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<tbody>
<tr>
<td><strong>Internal Revenue Service</strong></td>
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<tr>
<td><strong>Motor Fuels Excise Taxes</strong></td>
<td>Most motor fuels taxes were enacted in the Highway Revenue Act of 1956 primarily to support the Highway Trust Fund, except for the tax on compressed natural gas, which was enacted in 1993. The federal excise tax on most of these fuels was last raised by Congress in 1993. Taxes vary by fuel: gasoline, 18.4 cents per gallon; diesel fuel, 24.4 cents per gallon; biodiesel, 24.4 cents per gallon; ethanol, 18.4 cents per gallon; hydrogen, 18.4 cents per gallon equivalent; liquefied petroleum gas, 18.3 cents per gallon; compressed natural gas, 18.3 cents per gallon equivalent; liquefied natural gas, 24.3 cents per gallon equivalent. Electricity for electric vehicles is exempt from taxation, and exemptions for other fuels existed until recently. Differences between tax rates effectively incentivizes certain options over others.</td>
<td>N/A</td>
<td>4.3 cents per gallon of the gasoline/ diesel fuel tax is permanent; the rest of the motor fuels taxes expire on 6/30/12 when the current Highway Trust Fund authorization expires</td>
<td>Gasoline, diesel, liquefied petroleum gas, liquefied natural gas, fuels with methanol from natural gas, and compressed natural gas.</td>
</tr>
<tr>
<td><strong>Incentives for alternative fuel and alternative fuel mixtures (other than liquefied hydrogen)</strong></td>
<td>This provision established a 50-cents-per gallon excise tax credit for certain alternative fuel used as fuel in a motor vehicle, motor boat, or airplane and a 50-cents-per gallon credit for alternative fuel mixed with a traditional fuel (gasoline, diesel or kerosene) for use as a fuel.</td>
<td>$0</td>
<td>Expired 12/31/2011</td>
<td>Liquefied petroleum gas, P Series fuels, compressed or liquefied natural gas, liquefied hydrogen, any liquefied fuel derived from coal or peat, liquefied hydrocarbons derived from biomass. (Does not include ethanol, methanol or biodiesel.)</td>
</tr>
<tr>
<td><strong>Alternative Motor Vehicle Credit</strong></td>
<td>This provision includes separate credits for four distinct types of vehicles: using fuel cells, advanced lean burn technologies, qualified hybrid technology or qualified alternative fuels technologies.</td>
<td>Less than $50 million</td>
<td>12/31/2014 for fuel cell vehicles, expired 12/31/2010 or earlier for all other vehicles</td>
<td>Compressed natural gas, liquefied natural gas, liquefied petroleum gas, hydrogen, any liquid that is at least 85% methanol or a mixture of one of these fuels with a petroleum fuel.</td>
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<td>Program</td>
<td>Description</td>
<td>FY2012 Appropriation or JCT Estimated Expenditure</td>
<td>Expiration Date</td>
<td>Eligible Fuels or Technologies</td>
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<tr>
<td>Plug-in Electric Drive Vehicle Credit</td>
<td>Purchasers of plug-in electric vehicles may file to obtain a tax credit of up to $7,500 per vehicle, depending on battery capacity.</td>
<td>$200 million</td>
<td>The credit is phased out when an automaker has sold a total of 200,000 qualified vehicles</td>
<td>Plug-in electric vehicles.</td>
</tr>
<tr>
<td>Plug-in Electric Vehicle Credit</td>
<td>A maximum credit of $2,500 was allowed for certain types of new vehicles.</td>
<td>Less than $50 million</td>
<td>Expired 12/31/11</td>
<td>Two- or three-wheeled plug-in electric vehicles or certain low-speed vehicles.</td>
</tr>
<tr>
<td>Conversion Kits</td>
<td>A credit of up to $4,000 was allowed for purchasing a kit to convert a vehicle to a plug-in electric drive vehicle.</td>
<td>$0</td>
<td>Expired 12/31/11</td>
<td>Qualified plug-in electric vehicle kits.</td>
</tr>
<tr>
<td>Alternative Fuel Refueling Property Credit</td>
<td>Consumers who purchased qualified residential non-hydrogen fueling equipment received a 30% tax credit of up to $1,000; businesses received a credit up to $30,000 (maximum credits were increased for 2009 and 2010, except for hydrogen property). Hydrogen refueling property may receive respective credits of up to $1,000 and $200,000.</td>
<td>Less than $50 million</td>
<td>12/31/2014 for hydrogen refueling property; expired 12/31/11 for all other fuels</td>
<td>Natural gas, liquefied petroleum gas, hydrogen, electricity, E85, or diesel fuel blends containing a minimum of 20% biodiesel.</td>
</tr>
<tr>
<td>Volumetric Ethanol Excise Tax Credit</td>
<td>Gasoline suppliers who blend ethanol with gasoline were eligible for a tax credit of 45 cents per gallon of ethanol.</td>
<td>$6 billion in foregone tax receipts</td>
<td>Expired 12/31/2011</td>
<td>Ethanol (and other alcohol fuels).</td>
</tr>
<tr>
<td>Small Ethanol Producer Credit</td>
<td>An ethanol producer with less than 60 million gallons per year in production capacity could claim a credit of 10 cents per gallon on the first 15 million gallons produced each year.</td>
<td>$100 million</td>
<td>Expired 12/31/2011</td>
<td>Ethanol.</td>
</tr>
<tr>
<td>Biodiesel Tax Credit</td>
<td>Producers of biodiesel or diesel/biodiesel blends could claim a tax credit of $1.00 per gallon of biodiesel.</td>
<td>$0</td>
<td>Expired 12/31/2011</td>
<td>Biodiesel.</td>
</tr>
<tr>
<td>Small Agri-Biodiesel Producer Credit</td>
<td>An agri-biodiesel (produced from virgin agricultural products) producer with less than 60 million gallons per year in production capacity could claim a credit of 10 cents per gallon on the first 15 million gallons produced in a year.</td>
<td>$0</td>
<td>Expired 12/31/2011</td>
<td>Biodiesel.</td>
</tr>
<tr>
<td>Renewable Diesel Tax Credit</td>
<td>Producers of renewable diesel (similar to biodiesel, but produced through a different process) could claim a tax credit of $1.00 per gallon of renewable diesel.</td>
<td>$0</td>
<td>Expired 12/31/2011</td>
<td>Renewable diesel.</td>
</tr>
<tr>
<td>Program</td>
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<tr>
<td>Credit for Production of Cellulosic Biofuel</td>
<td>Producers of cellulosic biofuel may claim a tax credit of $1.01 per gallon. For cellulosic ethanol producers, the value of the production tax credit is reduced by the value of the volumetric ethanol excise tax credit and the small ethanol producer credit—the credit is currently valued at 46 cents per gallon. The credit applies to fuel produced after December 31, 2008.</td>
<td>$0</td>
<td>12/31/2012</td>
<td>Cellulosic biofuels.</td>
</tr>
<tr>
<td>Special Depreciation Allowance for Cellulosic Biofuel Plant Property</td>
<td>Plants producing cellulosic biofuels may take a 50% depreciation allowance in the first year of operation, subject to certain restrictions.</td>
<td>$0</td>
<td>12/31/2012</td>
<td>Cellulosic biofuels.</td>
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<tr>
<td>Department of Energy</td>
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<tr>
<td>Advanced Technology Vehicles Manufacturing (ATVM) Program</td>
<td>ATVM was established in 2007 to help automakers meet mandated vehicle fuel economy standards and to encourage domestic production of more fuel-efficient cars and light trucks. It was first funded in 2008 to provide $25 billion in revolving loans to qualified automakers for investment in their manufacturing operations. In FY2008, $7.51 billion was appropriated for the direct loans—$7.5 billion for the loan subsidies (available until expended) and $10 million for administration. Currently, loans have been made to five companies, using $8.4 billion of the $25 billion loan authority.</td>
<td>$6 million (for administration)</td>
<td>Facilities funded must be placed in service by 12/31/2020</td>
<td>No limitations on specific technologies; rather, limits are stipulated for vehicle emissions and fuel consumption.</td>
</tr>
<tr>
<td>VTP</td>
<td>Through research and development, VTP supports partnerships with other public and private organizations that will enhance energy efficiency and productivity, bring clean and affordable technologies to market, and enhance advanced technology vehicle choices for consumers.</td>
<td>$329 million – of that $118 million for Batteries and Electric Drive Technology</td>
<td>None</td>
<td>Advanced batteries, power electronics and electric motors, advanced combustion, lightweight materials, vehicle-to-grid interaction, and fuel cell and hydrogen technologies.</td>
</tr>
<tr>
<td>Biomass and Biorefinery Systems Program</td>
<td>The Biomass Program primarily focuses on research, development, demonstration, and deployment (RDD&amp;D) to ensure that cellulosic ethanol is commercially viable by 2012 and that biobased aviation fuel, diesel fuel, and gasoline are price competitive by 2017.</td>
<td>$199 million</td>
<td>None</td>
<td>Biofuels.</td>
</tr>
<tr>
<td>Program</td>
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<tr>
<td>Hydrogen and Fuel Cell Technologies Program</td>
<td>The DOE Hydrogen Program works with industry, national laboratories, universities, government agencies, and other partners to overcome the barriers to the use of hydrogen and fuel cells. It includes a research and development (R&amp;D) effort focused on advancing the performance and reducing the cost of these technologies.</td>
<td>$104 million</td>
<td>Hydrogen, fuel cells.</td>
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<tr>
<td>Clean Cities Program</td>
<td>Initially started in 1993 as a DOE program to promote alternative fuel vehicles among the states, it is now a broader program to reduce petroleum consumption in transportation, with 100 Clean Cities coalitions that focus on deployment of alternative and renewable fuels, idle-reduction measures, fuel economy improvements, and emerging transportation technologies. Clean Cities provides technical, informational, and financial assistance to communities.</td>
<td>Approximately $30 million</td>
<td>Electricity, natural gas, propane, bio-methane, ethanol, biodiesel, hydrogen.</td>
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<tr>
<td>Department of Transportation</td>
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<td>$1.35 billion</td>
<td>Not limited to alternative fuels or advanced technologies.</td>
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</tr>
<tr>
<td>Congestion Mitigation and Air Quality Improvement Program (CMAQ)</td>
<td>Congress directed the DOT to establish the CMAQ program to provide funds for projects and programs that may reduce the emissions of transportation-related pollutants that may cause an area within a state to exceed certain air quality standards.</td>
<td>Extended through 6/30/2012, by P.L. 112-102</td>
<td>Methanol (at least 85%), ethanol (at least 85%), natural gas, liquefied petroleum gas, hydrogen, coal-derived liquid fuels, biologically derived fuels, and electricity.</td>
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</tr>
<tr>
<td>Corporate Average Fuel Economy (CAFE) Incentives for Alternative Fuel Vehicles</td>
<td>Automakers subject to Corporate Average Fuel Economy (CAFE) standards may accrue credits under that program for the production and sale of alternative fuel vehicles. For dedicated vehicles (i.e., vehicles that run solely on alternative fuel) credits are unlimited. For dual fueled vehicles (i.e., that may run on conventional or alternative fuel) credits are limited: The maximum fuel economy increase allowed through the use of these credits is 1.2 miles per gallon through model year (MY) 2014. After 2014 the credits are phased down and completely eliminated after MY 2019.</td>
<td>N/A</td>
<td>Methanol (at least 85%), ethanol (at least 85%), natural gas, liquefied petroleum gas, hydrogen, coal-derived liquid fuels, biologically derived fuels, and electricity.</td>
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<tr>
<td>Clean Fuels Grant Program</td>
<td>This program provides grants to state departments of transportation and metropolitan planning organizations (among others) to purchase “clean fuel” transit buses. Federal Transit Administration (FTA) grants for conventional buses cover 80% of the cost, while Clean Fuels grants cover 90% of the incremental cost of clean fuel buses over conventional buses. Alternative fuels and advanced technologies qualify, including advanced diesel: however, only 25% of funding may be used for advanced diesel projects.</td>
<td>$51.5 million</td>
<td>Buses powered by compressed natural gas, liquefied natural gas, biodiesel, batteries, ethanol, methanol, fuel cells, and clean diesel.</td>
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<tr>
<td>Program</td>
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<tr>
<td>National Clean Diesel Campaign</td>
<td>EPA’s National Clean Diesel Campaign (NCDC) promotes clean air strategies by working with manufacturers, fleet operators, air quality professionals, environmental and community organizations, and state and local officials to reduce diesel emissions. States are allocated funds for their clean diesel programs through the Diesel Emission Reduction Act (DERA).</td>
<td>$30 million</td>
<td>9/30/2016</td>
<td>Primarily for technologies which significantly reduce emissions (EPA maintains a list of verified retrofit technologies and emerging technologies at <a href="http://www.epa.gov/cleandiesel/">http://www.epa.gov/cleandiesel/</a>).</td>
</tr>
<tr>
<td>Renewable Fuel Standard (RFS)</td>
<td>Mandated use of renewable fuel in gasoline and diesel fuel: 4.0 billion gallons in 2006, increasing to 36 billion gallons in 2022. There are specific sub-mandates for advanced biofuels (fuels other than corn-based ethanol), cellulosic biofuels, and biomass-based diesel fuels. Greenhouse gas emission reduction requirements apply to all advanced biofuels and to conventional biofuels from refineries built after 2007.</td>
<td>N/A</td>
<td>None</td>
<td>Biofuels (specific requirements for advanced biofuels, cellulosic fuels, and biomass-based diesel fuels).</td>
</tr>
<tr>
<td>Biorefinery Assistance</td>
<td>The Biorefinery Assistance Program (BAP) assists in the development of new and emerging technologies for advanced biofuels. BAP provides competitive grants and loan guarantees for construction and/or retrofitting of demonstration-scale biorefineries to demonstrate the commercial viability of one or more processes for converting renewable biomass to advanced biofuels. Biorefinery grants can provide for up to 30% of total project costs. Each loan guarantee is limited to $250 million or 80% of project cost. BAP provides competitive grants and loan guarantees for construction and/or retrofitting of demonstration-scale biorefineries to demonstrate the commercial viability of one or more processes for converting renewable biomass to advanced biofuels. Biorefinery grants can provide for up to 30% of total project costs. Each loan guarantee is limited to $250 million or 80% of project cost.</td>
<td>No FY2012 appropriation, but any mandatory funding unspent from the FY2010 allocation of $245 million remains available in FY2012.</td>
<td>9/30/2012</td>
<td>Advanced biofuels.</td>
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<tr>
<td>Program</td>
<td>Description</td>
<td>FY2012 Appropriation or JCT</td>
<td>Estimated Expenditure</td>
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<tr>
<td>Repowering Assistance</td>
<td>The Repowering Assistance Program (RAP) makes payments to eligible biorefineries (those in existence on the date of enactment of the 2008 farm bill, June 18, 2008) to encourage the use of renewable biomass as a replacement for fossil fuels used to provide heat for processing or power in the operation of these eligible biorefineries. Not more than 5% of the funds shall be made available to eligible producers with a refining capacity exceeding 150 million gallons of advanced biofuel per year.</td>
<td>$15 million in FY2010 was appropriated through FY2012. Any mandatory funding unspent from the FY2009 allocation of $35 million remains available in FY2012.</td>
<td>9/30/2012</td>
<td>Renewable biomass.</td>
</tr>
<tr>
<td>Bioenergy Program for Advanced Biofuels</td>
<td>To support and ensure an expanding production of advanced biofuels by providing payments to eligible advanced biofuel producers</td>
<td>Mandatory Commodity Credit Corporation (CCC) funding of $105 million for FY2012 was authorized to remain available until expended. P.L. 112-55 limits mandatory spending to $65 million.</td>
<td>9/30/2012</td>
<td>Advanced biofuels.</td>
</tr>
<tr>
<td>Biomass Crop Assistance Program (BCAP)</td>
<td>The Biomass Crop Assistance Program (BCAP) provides financial assistance to owners and operators of agricultural land and non-industrial private forest land who wish to establish, produce, and deliver biomass feedstocks. BCAP provides two categories of assistance: 1. establishment and annual payments, including a one-time payment of up to 75% of the cost of establishment for perennial crops, and annual payments (i.e., rental rates based on a set of criteria) of up to 5 years for non-woody and 15 years for woody perennial biomass crops; and 2. matching payments, up to $45 per ton, which may be available to help eligible material owners with collection, harvest, storage, and transportation (CHST) of eligible material for use in a qualified biomass conversion facility.</td>
<td>In the FY2012 Agriculture appropriations act (P.L. 112-55), BCAP mandatory spending was limited to $17 million.</td>
<td>9/30/2012</td>
<td>Feedstocks for the production of advanced biofuels.</td>
</tr>
<tr>
<td>Program</td>
<td>Description</td>
<td>FY2012 Appropriation or JCT Estimated Expenditure</td>
<td>Expiration Date</td>
<td>Eligible Fuels or Technologies</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------------------------------</td>
<td>-----------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Rural Energy for America Program (REAP)</td>
<td>Provides grants and loans for a variety of rural energy projects, including efficiency improvements and renewable energy projects.</td>
<td>$25 million ($22 million in mandatory funds, $3 million discretionary)</td>
<td>9/30/2012</td>
<td>Rural energy projects broadly.</td>
</tr>
<tr>
<td>Biomass Research and Development Initiative (BRDI)</td>
<td>Provides competitive funding in the form of grants, contracts, and financial assistance for research, development, and demonstration of technologies and processes leading to significant commercial production of biofuels, biobased energy innovations, development of biobased feedstocks, biobased products, and other such related processes, including development of cost-competitive cellulosic ethanol.</td>
<td>$40 million</td>
<td>9/30/2012</td>
<td>Biomass energy and biobased products (not limited to transportation applications).</td>
</tr>
<tr>
<td>Import Duty on Fuel Ethanol</td>
<td>A 2.5% ad valorem tariff and a most-favored nation duty of $0.54 per gallon of fuel ethanol applied to imports from most countries.</td>
<td>N/A</td>
<td>Expired 12/21/2011</td>
<td>Imported ethanol for fuel use.</td>
</tr>
</tbody>
</table>

**Source:** CRS Analysis

**Notes:** N/A = not applicable
<table>
<thead>
<tr>
<th>Fuel</th>
<th>Excise Tax Rate (¢ per gallon)</th>
<th>Production Incentive</th>
<th>Incentive for Blending and/or Fuel Use</th>
<th>Federal R&amp;D</th>
<th>Other Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biofuels</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conventional</td>
<td>18.4</td>
<td>None</td>
<td>$0.54 per gallon [expired]</td>
<td></td>
<td>Majority of RFS met through use of conventional (corn-based) ethanol.</td>
</tr>
<tr>
<td>Ethanol</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biodiesel and</td>
<td>24.4</td>
<td>$1.00 plus $0.10 for small producers [expired]</td>
<td>$1.00 per gallon (may not claim this and the producer credit) [expired]</td>
<td>DOE and USDA biomass programs focused on cellulosic biofuel development.</td>
<td>Specific carve-out in RFS for biomass-based diesel—1 billion gallons in 2012.</td>
</tr>
<tr>
<td>Renewable Diesel</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cellulosic Biofuels</td>
<td>Varies</td>
<td>$1.01 per gallon, plus accelerated depreciation of plant property</td>
<td>$0.54 per gallon for cellulosic ethanol (producer credit reduced by this amount plus the small producer credit) [expired]</td>
<td>DOE and USDA biomass programs focused on cellulosic biofuel development.</td>
<td>Specific carve-out in RFS for cellulosic biofuels—8.65 million gallons in 2012.</td>
</tr>
<tr>
<td>Advanced Biofuelsc</td>
<td>Varies</td>
<td>Varies</td>
<td>Varies</td>
<td>DOE Biomass Program.</td>
<td>USDA Farm Bill programs, including Biorefinery Assistance, Repowering Assistance, Bioenergy Program, Biomass Crop Assistance Program (BCAP).</td>
</tr>
<tr>
<td>Hydrogen</td>
<td>18.4</td>
<td>None</td>
<td>$0.50 per gallon [expired]</td>
<td>DOE Hydrogen and Fuel Cell Technologies Program—$104 million in FY2012.</td>
<td></td>
</tr>
<tr>
<td>Liquefied Petroleum Gas (LPG)</td>
<td>18.3</td>
<td>None</td>
<td>$0.50 per gallon [expired]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Gas</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compressed Natural Gas (CNG)</td>
<td>18.3</td>
<td>None</td>
<td>$0.50 per gallon [expired]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Liquefied Natural Gas (LNG)</td>
<td>24.3</td>
<td>None</td>
<td>$0.50 per gallon [expired]</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: CRS Analysis.
Notes: For more details, see Table 1. Italics indicate expired provisions.

a. Program not exclusively for transportation biofuels—also covers bioenergy (i.e., stationary sources) and bioproducts.

b. Program not exclusively for transportation biofuels—also covers bioenergy (i.e., stationary sources) and bioproducts.

c. This category generally encompasses others, including cellulosic biofuels, algae-based biofuels, and biomass-based diesel fuels.

d. Program not exclusively focused on transportation.
### Table A-3. Federal Incentives for Alternative Fuel and Advanced Technology Vehicles

<table>
<thead>
<tr>
<th>Vehicle Technology or Fuel Type</th>
<th>Manufacturing Incentive</th>
<th>Purchase Incentive</th>
<th>Federal R&amp;D</th>
<th>Other Programs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrified Vehicles</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hybrid</td>
<td>ATVM loan program generally applies.</td>
<td>Up to $3,400 for passenger vehicles [expired]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery Electric</td>
<td>Credits under CAFE program; ATVM loan program generally applies.</td>
<td>Up to $7,500 for passenger vehicles; up to $4,000 for conversion kits; up to $2,500 for two- and three-wheeled and low-speed vehicles [expired]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Plug-in Hybrid</td>
<td>Credits under CAFE program; ATVM loan program generally applies.</td>
<td>Up to $7,500 for passenger vehicles; up to $4,000 for conversion kits; up to $2,500 for two- and three-wheeled and low-speed vehicles [expired]</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Ethanol Flexible Fuel Vehicle (FFV)</strong></td>
<td>Credits under CAFE program expire after 2019 model year.</td>
<td>None</td>
<td>Limited</td>
<td>National Clean Diesel Campaign (NCDC), Clean Cities.</td>
</tr>
<tr>
<td><strong>Fuel Cell Vehicles</strong></td>
<td>Credits under CAFE program; ATVM loan program generally applies.</td>
<td>Up to $8,000 for passenger vehicles</td>
<td>DOE Hydrogen and Fuel Cell Technologies Program—$104 million in FY2012.</td>
<td>National Clean Diesel Campaign (NCDC), Clean Cities.</td>
</tr>
<tr>
<td><strong>Natural Gas Vehicles</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Compressed Natural Gas (CNG)</td>
<td>Credits under CAFE program; ATVM loan program generally applies.</td>
<td>Up to $4,000 for passenger vehicles [expired]</td>
<td></td>
<td>National Clean Diesel Campaign (NCDC), Clean Cities.</td>
</tr>
<tr>
<td>Liquefied Natural Gas (LNG)</td>
<td>Credits under CAFE program; ATVM loan program generally applies.</td>
<td>Up to $4,000 for passenger vehicles [expired]</td>
<td></td>
<td>National Clean Diesel Campaign (NCDC), Clean Cities.</td>
</tr>
</tbody>
</table>

**Source:** CRS Analysis.

**Notes:** For more details, see Table 1. Italics indicate expired provisions.

a. Program not exclusively focused on transportation.
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