University of Nebraska - Lincoln
DigitalCommons@University of Nebraska - Lincoln

Congressional Research Service Reports | Congressional Research Service

1-1-2006

Alternative Fuels and Advanced Technology Vehicles: Issues in Congress

Brent D. Yacobucci
Congressional Research Service

Follow this and additional works at: http://digitalcommons.unl.edu/crsdocs

Part of the American Politics Commons

Yacobucci, Brent D., "Alternative Fuels and Advanced Technology Vehicles: Issues in Congress" (2006). *Congressional Research Service Reports*. Paper 5.
http://digitalcommons.unl.edu/crsdocs/5

This Article is brought to you for free and open access by the Congressional Research Service at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Congressional Research Service Reports by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

Order Code IB10128

CRS Issue Brief for Congress
Received through the CRS Web

Alternative Fuels and Advanced Technology Vehicles: Issues in Congress

Updated May 8, 2006

Brent D. Yacobucci
Resources, Science, and Industry Division

CONTENTS

SUMMARY

MOST RECENT DEVELOPMENTS

BACKGROUND AND ANALYSIS
- Congressional Interest
  - Legislative Background
  - Current Issues
- Fuel Tax Incentives
- Ethanol and MTBE
  - Issues in the Spring of 2006: MTBE Phase-Out and Ethanol Supply
- Ethanol Imports
- Vehicle Purchase Requirements
- Vehicle Purchase Tax Incentives
- Biodiesel
- Hydrogen and Fuel Cells
- Hybrid Vehicles

LEGISLATION

FOR ADDITIONAL READING

Alternative Fuels and Advanced Technology Vehicles: Issues in Congress

SUMMARY

Alternative fuels and advanced technology vehicles are seen by proponents as integral to improving urban air quality, decreasing dependence on foreign oil, and reducing emissions of greenhouse gases. However, major barriers — especially economics — currently prevent the widespread use of these fuels and technologies. Because of these barriers, and the potential benefits, there is continued congressional interest in providing incentives and other support for their development and commercialization.

In the 109th Congress, alternative fuels and advanced technology vehicles have received a good deal of attention, especially in the debate over omnibus energy legislation. High fuel prices, especially in response to hurricanes along the gulf coast, have focused that attention. Major topics of congressional interest include tax incentives for alternative fuel production; the future of ethanol and the fuel additive MTBE, including the establishment of a renewable fuels standard (RFS); and research and development of hydrogen fuel and fuel cells. Other topics include government vehicle purchase requirements; tax credits for vehicle purchases; promotion of biodiesel fuel; and incentives for hybrid electric vehicles.

The Energy Policy Act of 2005 (P.L. 109-58, H.R. 6) contains many provisions relevant to alternative fuels and advanced technology vehicles. Among its provisions, the bill expands existing tax incentives for the purchase of advanced vehicles; authorizes R&D funding for hydrogen fuel and fuel cells; and requires that gasoline contain ethanol or other renewable fuel. H.R. 6 was signed by President Bush August 8, 2005.

In the fall of 2005, hurricanes along the Gulf Coast led to disruptions in refining capacity and oil supply, which then led to higher gasoline and diesel prices. Since then, Members of Congress have been seeking ways to reduce the vulnerability of the fuel system. Several bills have been introduced to promote further development of alternative fuels and advanced technology vehicles or to mandate their sale and/or use. High crude oil and gasoline prices in spring 2006 have further increased interest in moving away from a petroleum-based transportation system.

Because of concerns over the energy bill in the 108th Congress, some alternative fuels provisions from that energy bill were inserted into other bills. Some tax provisions, including tax credits for ethanol and biodiesel, were inserted into the conference report on the American Jobs Creation Act of 2004 (P.L. 108-357). Among other provisions, the new law replaced an existing ethanol tax exemption with a tax credit, and established tax credits for biodiesel.

MOST RECENT DEVELOPMENTS

High crude oil and gasoline prices in spring 2006 have led to increased interest in the U.S. fuel supply. Congressional interest has focused on alternatives to petroleum, ways to improve the efficiency of our transportation sector, and ways to improve the stability and security of petroleum supply and refining sectors. High oil prices, a transition from winter to summer gasoline, and the phase-out of MTBE (a gasoline additive) have pushed gasoline pump prices to historic highs.

On August 10, 2005, President Bush signed the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA, P.L. 109-59, H.R. 3), which reauthorizes major highway and transit programs. Among other provisions, the bill provides funding for alternative fuel transit buses, and establishes a tax credit for the sale of alternative fuels.

On August 8, 2005, President Bush signed the Energy Policy Act of 2005 (P.L. 109-58, H.R. 6), an omnibus energy bill. The final version contains provisions on renewable fuels, hydrogen R&D, and alternative fuel fleet requirements. Among other provisions, P.L. 109-58 establishes a renewable fuels standard requiring the use of 7.5 billion gallons of renewable fuel in gasoline by 2012. It also provides for cleanup of the fuel additive MTBE, authorizes hydrogen R&D, and provides tax credits for the purchase of advanced vehicles.

BACKGROUND AND ANALYSIS

Congressional Interest

Legislative Background. A combination of concerns — the oil crises of the 1970s, the rise in awareness of environmental issues, energy security, vehicle emissions, and fuel conservation goals — have increased interest in moving the United States away from petroleum fuels for transportation and toward alternative fuels and advanced technologies. Most notably, the 102nd Congress passed the Energy Policy Act of 1992 (EPAct, P.L. 102-486). Among other provisions, this law requires the purchase of alternative fuel vehicles by federal agencies, state governments, and alternative fuel providers. Under EPAct, a certain percentage — which varies by the type of fleet — of new passenger vehicles purchased for an agency's or company's fleet must be capable of operating on alternative fuels, including ethanol, methanol, natural gas, or propane. In addition, EPAct established a tax credit for the purchase of electric vehicles, as well as tax deductions for the purchase of alternative fuel and hybrid vehicles.

(For background on alternative fuels, including legislative history, see CRS Report RL30758, *Alternative Transportation Fuels and Vehicles: Energy, Environment, and Development Issues*, by Brent D. Yacobucci. For background on advanced vehicle technologies, see CRS Report RL30484, *Advanced Vehicle Technologies: Energy, Environment, and Development Issues*, Brent D. Yacobucci.)

Other laws affecting alternative fuel and advanced technology vehicles include the Energy Policy and Conservation Act (P.L. 94-163), which established fuel economy

standards for passenger cars and light trucks; the 1990 Amendments to the Clean Air Act (P.L. 101-549), which require cities with significant air quality problems to promote low emission vehicles; highway authorization bills, including TEA-21, (P.L. 105-178) which established and reaffirmed tax incentives for ethanol and other fuels; and numerous laws that authorize federal research and development on alternative fuels, advanced technologies, and enabling infrastructure.

Current Issues. Recent events have renewed interest in alternative fuels and advanced vehicles. For example, high pump prices for gasoline and diesel fuel have raised concerns over oil imports, energy security, and fuel conservation. In light of this, there is growing interest in more efficient vehicles or vehicles that abandon the use of petroleum altogether. This is especially true as the rapid growth in the sales of light trucks — these include sport utility vehicles (SUVs), mini-vans, and pickups — which tend to have lower fuel economy than passenger cars, has lowered the overall fuel economy of the new vehicle fleet.

Furthermore, ongoing developments in hybrid vehicles, fuel cells, and hydrogen fuel have raised key policy questions. These questions include whether more generous tax incentives for hybrid and fuel cell vehicles should be established; the costs associated with production of hydrogen as a major transportation fuel; and whether research and development funds should be focused on such potentially high-risk technologies as fuel cells or on near-term, conventional technologies, such as hybrids.

In light of these and other energy policy concerns, Congress has been working on comprehensive energy legislation since 2001. In the 107th Congress, an energy bill stalled in conference. The 108th Congress continued the debate over energy legislation. The conference report (H.Rept. 108-375) included provisions on vehicle tax credits, amendments to vehicle purchase requirements under EPAct, a requirement that gasoline contain ethanol or other renewable fuels, and tax credits for ethanol and biodiesel fuels. However, this bill also stalled. Many of these topics were addressed in the 109th Congress by the Energy Policy Act of 2005 (P.L. 109-58, H.R. 6), which was signed by President Bush on August 8, 2005. Hurricanes along the Gulf Coast in the fall of 2005 led to fuel supply disruptions and high pump prices, raising congressional interest in alternatives to petroleum. In addition, in spring 2006, high crude prices, issues with refining capacity, and concerns about ethanol supply led to high pump prices, further raising concerns about the United States' ability to supply fuel to the transportation sector.

Fuel Tax Incentives

There is ongoing interest in tax incentives for the production and purchase of alternative fuels. Supporters of this approach argue that the market favors conventional fuels, and that the widespread infrastructure and nearly ubiquitous use of conventional fuels in automobiles makes it difficult for alternative fuels to compete without economic incentives. Currently, some alternative fuels do receive incentives for their production or sale. Most notably, through the end of 2004, gasoline blended with ethanol received a partial exemption from the motor fuels excise tax. This exemption made ethanol-blended fuel (gasohol) price-competitive with regular gasoline. Because of this, more than 99% of ethanol produced in the United States is blended with gasoline, according to the Energy Information Administration.

However, the excise tax exemption was criticized because it reduced revenue for the federal Highway Trust Fund (HTF). Every gallon of gasoline sold in the United States is subject to a federal tax of 18.4 cents. However, before 2005 gasohol with 10% ethanol was taxed at a lower rate. For every gallon of 10% gasohol sold, the overall forgone revenue was 5.2 cents. (The exemption was prorated for blends with less ethanol.) The Joint Committee on Taxation estimates that the exemption resulted in about $7.5 billion in cumulative forgone revenue from FY1979 through FY2000, while the U.S. Treasury estimates the figure at about $11 billion. (The discrepancy in estimates arises from differing assumptions made by the Treasury and the Committee.)

Because of this concern, a Volumetric Ethanol Excise Tax Credit (VEETC) was proposed. This proposal was to replace the existing excise tax exemption with a tax credit. While the total value of the incentive to blenders might not change, the incentive would be paid from the general Treasury fund, as opposed to the federal Highway Trust Fund. Therefore, while overall revenue concerns would not be addressed, the effects of the ethanol tax incentive on the HTF would be eliminated.

The VEETC was discussed as part of the debate over the energy bill in the 108th Congress, and a version of this credit was inserted into the conference report on the bill. VEETC provisions were later inserted into the conference report on the American Jobs Creation Act of 2004 (P.L. 108-357), which became law on October 22, 2004. Under this law the new ethanol tax credit will expire at the end of 2010.

In addition to the credit for ethanol-blended gasoline, there is interest in promoting biodiesel fuel. In fact, the VEETC applies to biodiesel as well. Because the biodiesel market is in its infancy, there has been interest in creating a per-gallon tax credit for the production of biodiesel fuel as well. P.L. 108-357 provides a tax credit of up to $1.00 per gallon for the sale and use of biodiesel. Under P.L. 108-357 this biodiesel credit would have expired at the end of 2006, four years before the expiration of the ethanol credit; the Energy Policy Act of 2005 (P.L. 109-58) extends the biodiesel tax credit through 2008.

SAFETEA (P.L. 109-59), the highway reauthorization bill, established a 50-cent-per-gallon credit for the retail sale of alternative fuels.

(For more information on the ethanol tax incentives, see CRS Report RL32979, *Alcohol Fuels Tax Incentives*, by Salvatore Lazzari.)

Ethanol and MTBE

Outside of tax incentives, ethanol has been of key interest in recent Congresses, especially in its role as an alternative to MTBE (methyl tertiary butyl ether). MTBE and ethanol were used (among other purposes) to meet Clean Air Act requirements that reformulated gasoline (RFG), sold in the nation's worst ozone nonattainment areas, contain at least 2% oxygen (by weight), to improve combustion. Under the RFG program, areas with "severe" or "extreme" ozone pollution (90 counties with a combined population of 64.8 million) must use reformulated gas; areas with less severe ozone pollution may opt into the program as well, and many have. In all, portions of 17 states and the District of Columbia use RFG, and about 30% of the gasoline sold in the United States is RFG, according to the Environmental Protection Agency (EPA).

Before amendment by the Energy Policy Act of 2005, the Clean Air Act required that RFG contain at least 2% oxygen by weight. Refiners met this requirement by adding a number of ethers or alcohols, any of which contains oxygen and other elements. Until recently, the most commonly used oxygenate was MTBE. In 1999, 87% of RFG contained MTBE, a number reduced to about 46% in 2004, according to EPA. MTBE has also been used since the late 1970s in non-reformulated gasoline as an octane enhancer, at lower concentrations. As a result, gasoline with MTBE has been used throughout the United States, whether or not an area has been subject to RFG requirements.

MTBE leaks, generally from underground gasoline storage tanks, have been implicated in numerous incidents of ground water contamination. The substance creates taste and odor problems in water at very low concentrations, and some animal studies indicate it may pose a potential cancer risk to humans. For these reasons, 25 states have taken steps to ban or limit its use, according to the Renewable Fuels Association. The most significant of the bans (in California and New York) took effect at the end of 2003, leading many to suggest that Congress revisit the issue to modify the oxygenate requirement and set more uniform national requirements regarding MTBE and its potential replacements, principally ethanol.

Support for eliminating the oxygenate requirement on a nationwide basis is widespread among environmental groups, the petroleum industry, and states. In general, these stakeholders have concluded that gasoline can meet the same low emission performance standards as RFG without the use of oxygenates. But agricultural interests present a potential obstacle to enacting legislation to remove the oxygen requirement. According to the U.S. Department of Agriculture, roughly 13% of the nation's corn crop is used to produce the competing oxygenate, ethanol. If MTBE use were reduced or phased out, but the oxygen requirement remained in effect, ethanol use would soar, increasing demand for corn. (In fact, according to EPA, ethanol use is already growing as MTBE begins to be phased out.) Conversely, if the oxygen requirement were waived by EPA or through legislation, not only would MTBE use decline, but so, likely, would demand for ethanol. Thus, some Members of Congress and governors from corn-growing states have taken a keen interest in MTBE legislation and related oxygenate requirements.

To help promote the market for ethanol if the oxygen standard were eliminated, a renewable fuels standard (RFS) was suggested. This would require that all gasoline contain ethanol or other renewable fuel. This concept was supported by agricultural interests, the oil industry, and some environmental groups. Opponents included states that do not produce ethanol, due to fears that the mandate could raise gasoline prices.

The final version of the Energy Policy Act of 2005 (P.L. 109-58) contains numerous MTBE and ethanol provisions. It repeals the Clean Air Act requirement to use MTBE or other oxygenates. In place of this requirement, the bill establishes a renewable fuels standard (RFS). Under the RFS, annual production of gasoline is required to contain 7.5 billion gallons of ethanol or other renewable fuel by 2012. To prevent "backsliding" on air quality, the bill requires that reductions in emissions of toxic substances achieved by RFG be maintained; and it authorizes funds for MTBE cleanup

Not included in the final version was a particularly controversial provision in an earlier version of the bill, a "safe harbor" from product liability lawsuits for producers of MTBE, ethanol, and other renewable fuels (product liability lawsuits have been used to force

petroleum and chemical companies to pay for cleanup of ground and surface water contaminated by releases of fuels containing MTBE). A disagreement over the safe harbor provision for MTBE is seen as one of the issues that led to the failure an energy bill in the 108th Congress.

Issues in the Spring of 2006: MTBE Phase-Out and Ethanol Supply. As a result of P.L. 109-58, the oxygen requirement for RFG was eliminated on May 6, 2006. This requirement, which gasoline suppliers asserted was a de facto MTBE requirement, was used by gasoline suppliers as a defense against liability for MTBE contamination. Therefore, although P.L. 109-58 actually gives the industry more flexibility, the industry moved quickly to eliminate MTBE from the gasoline supply in spring 2006. This increased pressure on already tight refining capacity. The loss in volume and energy from eliminating MTBE increased demand for gasoline, as well as ethanol. Exacerbating the problem was the fact that the industry was making the transition from winter gasoline to more stringent summertime specifications, which adds competition for the highest-quality gasoline components. These pressures, along with historically high crude oil prices, have led to historically high gasoline prices. Further, some localized areas (e.g., Norfolk, VA) faced short-term supply disruptions as refineries made the transition.

(For a detailed comparison of the renewable fuels legislation, see CRS Report RL32865, *Renewable Fuels and MTBE: A Comparison of Selected Provisions in the Energy Policy Act of 2005 (H.R. 6)*, by Brent D. Yacobucci, Mary Tiemann, James E. McCarthy, and Aaron M. Flynn. For additional background on the MTBE issue, see CRS Report RL32787, *MTBE in Gasoline: Clean Air and Drinking Water Issues*, by James E. McCarthy and Mary Tiemann. For information on ethanol, see CRS Report RL30369, *Fuel Ethanol: Background and Public Policy Issues*, by Brent D. Yacobucci and Jasper Womach.)

Ethanol Imports

There is growing concern among some stakeholders over ethanol imports. Because of lower production costs and/or government incentives, ethanol prices in Brazil and other countries can be significantly lower than in the United States. To offset the U.S. tax incentive that all ethanol (imported or domestic) receives, most imports are subject to a 54-cent-per-gallon tariff. This tariff effectively negates the tax incentive for covered imports, and has been a significant barrier to fuel ethanol imports.

However, under certain conditions imports of ethanol from Caribbean Basin Initiative (CBI) countries are granted duty-free status. This is true even if the ethanol was produced in a non-CBI country. In this scenario the ethanol is produced in another country (historically Brazil or a European country), dehydrated in a CBI country, then shipped to the United States. This avenue for imported ethanol to avoid the tariff has been criticized by some stakeholders, including some Members of Congress. In the spring and summer of 2004, two companies announced plans to construct new dehydration facilities in CBI countries and shipping ethanol from Brazil. With the establishment of a renewable fuel standard, as well as high U.S. gasoline and ethanol prices, there may be more interest in importing ethanol, either through CBI countries or directly from ethanol producers.

(For more information on ethanol imports from CBI countries, see CRS Report RS21930, *Ethanol Imports and the Caribbean Basin Initiative*, by Brent D. Yacobucci.)

Vehicle Purchase Requirements

The Energy Policy Act of 1992 (EPAct, P.L. 102-486) established mandatory alternative fuel vehicle purchase requirements for various vehicle fleets. Under the law, 75% of the passenger vehicles purchased by federal and state vehicle fleets must be capable of operating on alternative fuels; 90% of the vehicles purchased by alternative fuel providers must be alternative fuel vehicles.

The alternative fuel vehicle provisions of EPAct have been criticized as ineffective because, while EPAct requires the purchase of vehicles, it does not mandate the use of alternative fuels. In most cases, the vehicles purchased to meet the requirement are dual-fuel vehicles (i.e., they can operate on either a conventional fuel or an alternative fuel). Further, those vehicles are primarily fueled using gasoline, because gasoline tends to be less expensive and more widely available than alternative fuels. In addition, despite the vehicle purchase mandate, many agencies have failed to meet their statutory obligation. As a result, in 2002 the Center for Biological Diversity filed a lawsuit with the U.S. District Court for the Northern District of California. In July 2002, the court ruled that several federal agencies failed to meet their quotas and ordered those agencies to prepare reports on their compliance with EPAct (*Center for Biological Diversity v. Abraham, N.D. Cal., No. CV-00027*).

In addition to the requirements for federal, state, and fuel provider fleets, EPAct grants the Department of Energy (DOE) the authority to extend the requirements to local government and private fleets. However, as of 2002, DOE had not made a determination on requirements for local and private fleets. As part of the above lawsuit, the Center for Biological Diversity also asked the court to force DOE to promulgate new rules. In ruling on the above case, the U.S. District Court for the Northern District of California ordered DOE to establish a timeline for a new rulemaking. DOE compiled a timeline, and on March 4, 2003, DOE issued a proposed rulemaking determining that such a program would not promote the goals of EPAct, neither reducing dependence on foreign oil nor leading to greater use of alternative fuel vehicles (*68 Federal Register 10319*).

The Energy Policy Act of 2005 modified the requirements for EPAct compliance. All dual-fuel vehicles purchased to meet the EPAct quotas are required to operate on alternative fuels, unless an agency is granted a waiver by the Secretary of Energy. In addition, the Secretary of Energy is required to conduct a study of the effectiveness of the EPAct requirements.

(For more information on vehicle purchase requirements, see CRS Report RL30758, *Alternative Transportation Fuels and Vehicles: Energy, Environment, and Development Issues*, by Brent D. Yacobucci.)

Vehicle Purchase Tax Incentives

Some supporters of alternative fuel and advanced technology vehicles argue that tax incentives for the purchase of vehicles and fuels are more effective than any purchase mandate. In addition to the mandatory purchase requirements, EPAct established a tax credit for the purchase of electric vehicles and a tax deduction for "clean-fuel vehicles," including alternative fuel vehicles and hybrid vehicles. In 2005, taxpayers may claim a credit of 10% of the vehicle purchase cost, up to $4,000, for the purchase of a new electric vehicle. The

clean fuel vehicle deduction is a maximum of $2,000 for passenger vehicles, $5,000 for heavy-duty vehicles up to 26,000 pounds, and $50,000 for the heaviest vehicles. Both the tax credit and the deduction are in the process of a phase-out, reaching zero after 2006. Opponents of the purchase incentives see them as supporting an already profitable industry — automakers — without significantly decreasing petroleum use.

However, because supporters see tax incentives as a key tool in promoting vehicle purchases, there is interest in extending the existing incentives or establishing new incentives. The Energy Policy Act of 2005 significantly expands the vehicle purchase incentives, establishing tax credits for the purchase of fuel cell, hybrid, alternative fuel, and advanced diesel vehicles. For passenger vehicles, the credit is worth as much as $3,400 for hybrids and advanced diesels, and as much as $4,000 for alternative fuel vehicles, depending on vehicle attributes.

(For more information on vehicle tax incentives, see CRS Report RS22351, *Tax Incentives for Alternative Fuel and Advanced Technology Vehicles*, by Brent D. Yacobucci.)

Biodiesel

Biodiesel is a synthetic diesel fuel produced from oils, including soybean and canola oils, animal fats, and recycled cooking grease. It can be blended with conventional diesel fuel and used in diesel engines with few or no modifications. Further, with some engine modifications, it can be used in nearly pure form. Because biodiesel can displace conventional diesel without the use of new (and in many cases costly) vehicles, there is growing interest in its use. Further, because it can be produced from agricultural products, there is keen interest in its development by farmers (especially soybean and canola farmers) and some environmentalists as a way to promote rural economies, reduce agricultural wastes, and limit greenhouse gas emissions. However, biodiesel production is currently expensive: wholesale biodiesel from virgin oils costs roughly two to three times conventional No. 2 diesel; biodiesel from recycled grease is less expensive but still costs considerably more than conventional diesel.

The cost barriers for biodiesel production have generated interest in providing tax incentives for biodiesel, either in the form of production tax credits or an excise tax exemption, or both. Further there is interest in developing new technologies to help reduce production costs. However, the organic oils used as raw materials are one of the largest costs in production. Therefore, to significantly reduce biodiesel production costs, the costs of soybean oil and other oils would need to decrease substantially.

As was stated above, the American Jobs Creation Act (P.L. 108-357, H.R. 4520) provides a tax credit of up to $1.00 per gallon for the sale and use of biodiesel for virgin agricultural products. The credit is $0.50 per gallon for biodiesel from recycled grease. In addition, the law provides an excise tax credit for biodiesel blends (i.e. biodiesel and conventional diesel). Producers are eligible for one credit or the other, but not both. (see "fuel tax incentives" above). These credits were set to expire at the end of 2006. The Energy Policy Act of 2005 (P.L. 109-58) extends these credits through 2008.

(For more information on biodiesel, see CRS Report RL32712, *Agriculture-Based Renewable Energy Production*, by Randy Schnepf; and CRS Report RL30758, *Alternative*

Transportation Fuels and Vehicles: Energy, Environment, and Development Issues, by Brent D. Yacobucci.)

Hydrogen and Fuel Cells

Over the past few years, interest has grown substantially in hydrogen fuel and fuel cells. Hydrogen fuel can be produced using any energy source, and has thus been touted as a way to limit dependence on energy imports. Further, when hydrogen is used in a fuel cell (a device that produces electricity by converting hydrogen to water), only heat and water are produced, drastically reducing vehicle emissions. However, hydrogen fuel production is currently very expensive, as are fuel cells. In addition, depending on the original fuel source, overall fuel-cycle emissions can be a key concern.

Because of the potential benefits from hydrogen and fuel cells, and because of the existing barriers to their commercialization, the Bush Administration has strongly supported research and development (R&D). In January 2002, the Administration announced the FreedomCAR initiative, which promotes cooperative R&D between the "Big Three" American auto manufacturers (DaimlerChrysler, Ford, and General Motors) and the federal government. While the partnership is conducting research on many technologies, hydrogen and fuel cell vehicles are a key focus. Further, in his January 2003 State of the Union address, President Bush announced the Hydrogen Fuel Initiative, which increased federal spending on hydrogen fuel and stationary fuel cell R&D. Overall, the President requested $1.8 billion between FY2004 and FY2008 for both initiatives, including $720 million in new funding.

Opponents of the initiatives argue that hydrogen fuel and fuel cells may never be commercialized and that the initiatives draw funding away from near-term technologies such as hybrid vehicles. Further, some argue that research and development alone will not reduce petroleum dependence and that Congress should instead consider tightening fuel economy standards for all vehicles.

Congress agreed to increase funding for this research from $185 million in FY2003 to $231 million in FY2004, $254 million in FY2005, and $258 million in FY2006. The Energy Policy Act of 2005 authorizes a total of $3.3 billion through FY2010 for fuel cell and hydrogen R&D.

(For more information on the Administration's initiatives, see CRS Report RS21442, *Hydrogen and Fuel Cell Vehicle R&D: FreedomCAR and the President's Hydrogen Fuel Initiative*, by Brent D. Yacobucci. For background information on hydrogen and fuel cells, see CRS Report RL32196, *A Hydrogen Economy and Fuel Cells: An Overview*, by Brent D. Yacobucci and Aimee E. Curtright.)

Hybrid Vehicles

Hybrid gasoline/electric (and diesel/electric) vehicles are becoming increasingly popular in the United States. Hybrids combine a gasoline (or diesel) engine with an electrical motor system to improve efficiency. If their use becomes more widespread, they could help improve the overall efficiency of the vehicle fleet and could help limit oil consumption. Further, they could do so without significant changes to existing infrastructure, which has

been a key barrier to the expanded use of alternative fuel vehicles. In model year 2006 Ford, General Motors, Honda, Nissan, and Toyota will offer vehicles with hybrid powertrains. At the present time, only hybrid passenger cars, sport utility vehicles (SUVs), and pickups are available in the United States, but hybrid versions of other vehicle models and classes are expected in the near future.

Because of their energy and environmental benefits, some states have provided drivers of hybrid vehicles an exemption from high occupancy vehicle (HOV) lane requirements. Under TEA-21 (which expired on September 30, 2003), states had the authority to grant HOV exemptions for so-called "Inherently Low Emission Vehicles" (ILEVs). The ILEV standard requires that a vehicle have no evaporative emissions, a standard that is not met by any current hybrid. However, because of the reduced emissions and improved fuel economy of hybrid vehicles, there is congressional interest in explicitly granting states the right to exempt them from HOV lane requirements. While not addressing hybrids directly, the final version of highway reauthorization (P.L. 109-59) permits states to exempt certain high-efficiency vehicles from HOV restrictions.

Further, as was stated above, the Energy Policy Act of 2005 expanded the incentives for the purchase of hybrid vehicles (see "Vehicle Purchase Tax Incentives" above).

(For more information on hybrid vehicles, see CRS Report RL30484, *Advanced Vehicle Technologies: Energy, Environment, and Development Issues*, by Brent D. Yacobucci.)

LEGISLATION

109th Congress

P.L. 109-59 (H.R. 3, Young)

Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users. A bill authorizing funding for federal highway programs, transit programs, and highway safety. Among other provisions, the bill allows states to exempt certain alternative fuel and high-efficiency vehicles from HOV restrictions. The bill also provides assistance to municipalities for the purchase of alternative fuel buses and refueling infrastructure. Introduced February 9 , 2005; passed House March 10, 2005; passed Senate May 17, 2005; became P.L. 109-59.

P.L. 109-58 (H.R. 6, Barton)

Energy Policy Act of 2005. Title VII modifies existing requirements for alternative fuel fleets. Title VIII authorizes $3.3 billion over five years for hydrogen and fuel cell R&D. Title XV requires renewable fuels in gasoline (4.0 billion gallons in 2005, increasing to 7.5 billion gallons in 2012); eliminates RFG oxygen requirement, and authorizes funding for MTBE cleanup. Passed House April 21, 2005; passed Senate June 28, 2005; became P.L. 109-58.

H.R. 626 (Camp)

Volume Enhancing Hardware Incentives for Consumer Lowered Expenses (VEHICLE) Technology Act of 2005. Extends existing tax credit for electric vehicles. Establishes

purchase tax credits for alternative fuel and hybrid vehicles. Modifies the tax deduction for alternative fuel refueling infrastructure. Similar language inserted into H.R. 6. Introduced February 8, 2005; referred to House Ways and Means.

S. 606 (Thune)

Reliable Fuels Act. Among other provisions: Establishes a renewable fuels standard of 6 billion gallons by 2012; bans the use of MTBE; authorizes funding for MTBE cleanup; provides a safe harbor from defective product liability for renewable fuels. Introduced March 11, 2005; ordered reported by Senate Environment and Public Works March 16.

S. 650 (Lugar)

Fuels Security Act of 2005. Among other provisions: Establishes a renewable fuels standard for 8 billion gallons by 2012; requires federal agencies to use biodiesel and ethanol-blended gasoline wherever possible. Introduced March 17, 2005; referred to Senate Environment and Public Works.

S. 971 (Hatch)

Clean Efficient Automobiles Resulting from Advanced Car Technologies (CLEAR ACT) Act of 2005. Extends existing tax credit for electric vehicles. Establishes purchase tax credits for alternative fuel and hybrid vehicles. Modifies the tax deduction for alternative fuel refueling infrastructure. Similar language inserted into H.R. 6. Introduced April 28, 2005; referred to Senate Finance.

S. 1232 (Lautenberg)

Fuels Security Act of 2005. Establishes a renewable fuels standard of 8.25 billion gallons by 2012; requires the use of 1 billion gallons of cellulosic fuel by 2015. Introduced June 14, 2005; referred to Senate Environment and Public Works.

S. 1609 (Cantwell)

20/20 Biofuels Challenge Act of 2005. Establishes a renewable fuels standard of 20 billion gallons by 2020; requires all vehicles manufactured after model year 2010 to be flexible fuel vehicles capable of fueling on renewable fuels. Introduced July 29, 2005; referred to Senate Finance.

108th Congress

H.R. 6 (Tauzin)

Energy Policy Act of 2003. Title VII establishes an excise tax credit for ethanol and biodiesel fuels, establishes a tax credit for biodiesel production, and establishes tax credits for the purchase of alternative fuel, fuel cell, and hybrid vehicles. Title VIII authorizes $2.15 billion over five years for hydrogen and fuel cell R&D. Title XV requires renewable fuels in gasoline (3.1 billion gallons in 2005, increasing to 5.0 billion gallons in 2012), bans MTBE after 2014 unless the President determines otherwise (states can choose to authorize its use); eliminates RFG oxygen requirement, and authorizes funding for MTBE cleanup. Introduced April 7, 2003; referred to several committees; passed House April 11; passed Senate July 31; conference Report (H.Rept. 108-375) adopted by House November 18, 2003. Motion to invoke cloture failed in Senate November 21, 2003.

H.R. 4520, P.L. 108-357 (Thomas)

American Jobs Creation Act of 2004. Amends the tax code to comply with World Trade Organization rulings on the Foreign Sales Corporation (FSC). Conference report includes provisions on ethanol and biodiesel tax incentives. Introduced June 4, 2004; passed House June 17, 2004; passed Senate July 15, 2004; conference report approved in House October 7, 2004; conference report approved in Senate October 11, 2004.

FOR ADDITIONAL READING

California Energy Commission. *ABCs of AFVs: A Guide to Alternative Fuel Vehicles.* Sacramento, CA. November 1999.

Electric Drive Transportation Association. *Electric Drive Technologies and Products*. Washington, DC. Updated January 2004. [http://www.electricdrive.org]

Fuel Cells 2000. *Online Fuel Cell Information Center*. Washington, DC. Updated January 2004. [http://www.fuelcells.org/]

Methanol Institute. *Methanol Institute Homepage*. Washington, DC. Updated January 2004. [http://www.methanol.org/]

National Biodiesel Board. *Biodiesel Basics.* Jefferson City, MO. Updated January 2004. [http://www.biodiesel.org/resources/biodiesel_basics/]

National Hydrogen Association. *Hydrogen Quick Facts*. Washington, DC. Updated January 2004. [http://www.hydrogenus.org/hydrogen-basics.asp]

Natural Gas Vehicle Coalition. *About NGVs*. Washington, DC. Updated May 2003. [http://www.ngvc.org/ngv/ngvc.nsf/bytitle/fastfacts.htm]

Propane Vehicle Council. *Propane Vehicle Council*. Washington, DC. Updated January 2004. [http://www.propanevehicle.org/]

Renewable Fuels Association. *Ethanol Industry Outlook 2005*. Washington, DC. February 2004. [http://www.ethanolrfa.org/outlook2003.shtml]

U.S. Department of Energy, Clean Cities Program. *Alternative Fuels Data Center*. Washington, DC. Updated May 2004. [http://www.eere.energy.gov/afdc//]

U.S. Department of Energy. *Fuel Cell Report to Congress*. Washington, DC. February 2003.

——. *National Hydrogen Energy Roadmap*. Washington, DC. November 2002.

U.S. General Accounting Office. *Energy Policy Act of 1992: Limited Progress in Acquiring Alternative Fuel Vehicles and Reaching Fuel Goals*. Washington, DC. February 2000.

——. *Tax Incentives for Petroleum and Ethanol Fuels*. Washington, DC. September 2000.