

**BEFORE THE COMMITTEE ON FINANCE  
UNITED STATES SENATE**

HEARING ON  
THE ROLE OF TAX INCENTIVES IN ENERGY POLICY

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**JULY 10, 2001**

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Thank you Mr. Chairman and members of the committee. My name is Daniel Lashof, and I am the Science Director of the Natural Resources Defense Council's Climate Center. I appreciate the opportunity to appear before you today. My testimony will address tax incentives and other policies to reduce our nation's excessive dependence on petroleum.

The Natural Resources Defense Council (NRDC) is a national, non-profit organization of scientists, lawyers, and environmental specialists, dedicated to protecting public health and the environment. Founded in 1970, NRDC serves more than 500,000 members from offices in New York, Washington, Los Angeles, and San Francisco.

For over ten years I have been active on national energy policy issues. I was a coauthor of NRDC's recent report, *A Responsible Energy Policy for the 21<sup>st</sup> Century*, which I attach to this testimony for the record. I also served on the Energy Research and Development Panel of the Presidents' Committee of Advisers on Science and Technology, which produced a report to the President on *Federal Energy Research and Development for the Challenges of the Twenty-First Century*. Previously I served on the Federal Advisory Committee on Options for Reducing Greenhouse Gas Emissions from Personal Motor Vehicles. I hold a bachelor's degree in physics and mathematics from Harvard University and a doctorate in Energy and Resources from the University of California at Berkeley.

**I. Incentives Should be Used in Combination with Other Policies to Reduce Petroleum Consumption**

During the last decade annual consumption of gasoline increased by 17 percent to 120 billion gallons in the year 2000. Despite various programs intended to promote alternative fuels the U.S. transportation sector remains 97 percent dependent on petroleum to meet its energy requirements. Largely as a result of these facts, we now rely on imports to meet about half of our total demand for petroleum, and that share is expected increase to more than 60 percent over the next two decades.

The failure of U.S. energy and transportation policy to reduce demand for petroleum over the last decade has been extremely costly – both economically and environmentally. Last year U.S. consumers spent \$186 billion on gasoline. Driven largely by this demand for gasoline, foreign oil suppliers drained \$106 billion out of the U.S. economy. At the same time, petroleum combustion for transportation generated 20 million tons of smog-forming pollution (nitrogen oxides plus hydrocarbons) and 2.1 billion

tons of global warming pollution (carbon dioxide). Meanwhile domestic oil production has industrialized formerly pristine wilderness areas, and pollutes the air and water locally. For example, the average offshore oil production platform generates more than 50 tons per year of nitrogen oxides, 11 tons of carbon monoxide, 8 tons of sulfur dioxide and 38 tons of volatile organic hydrocarbons per year.<sup>1</sup> In addition, according to MMS statistics, some *3 million gallons* of oil spilled from outer continental shelf oil and gas operations in 73 incidents between 1980 and 1999.<sup>2</sup>

It's folly to think that we can drill our way out of the energy problems we currently face. Oil is a global commodity whose price is determined primarily by international markets. This will continue to be true regardless of the level of domestic oil production. In other words, as long as U.S. oil markets remain open, the price of gasoline in Chicago, Detroit and Washington will fluctuate with global oil prices, even if the United States does not import any oil. Therefore, changes in domestic oil production would only affect oil prices to the extent that they influenced the global supply-demand balance. Given that the United States produces only about 12 percent of global petroleum supplies, even major changes in domestic production would have a marginal effect on global markets. Over the long term, the U.S. share of global production will inevitably decline further. The United States has less than 3 percent of world oil reserves, while Gulf state OPEC members control about two-thirds of proven reserves. Additional domestic drilling would not appreciably change this situation. For example, opening the coastal plain of the Arctic National Wildlife Refuge to oil exploration, would likely expand global oil reserves by just 0.3 percent.<sup>3</sup>

By contrast, the United States accounts for about 25 percent of world petroleum demand.<sup>4</sup> The obvious conclusion is that the United States can have a much greater impact on oil prices worldwide by cutting American demand than it can by trying to increase American supply. Indeed, untapped energy efficiency is in great supply, while untapped U.S. oil is increasingly rare, because most of America's accessible oil resources have already been exploited.

There are three basic approaches to reducing petroleum consumption in the transportation sector that should be promoted by public policy:

- Reduce the distance that people feel they need to drive by promoting smart growth and by providing convenient alternatives.
- Reduce the energy needed to travel a given distance by increasing vehicle fuel efficiency.
- Reduce the petroleum needed per unit of fuel consumed by increasing the use of environmentally-friendly alternative fuels.

Tax policy has an important role to play in advancing each of these goals. Tax policy will be most effective, however, as part of a comprehensive strategy that employs all of the following policy tools:

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<sup>1</sup> MMS, 2000. Gulf of Mexico OCS Oil and Gas Lease Sale 181, Draft Environmental Impact Statement (DEIS), p. IV-40.

<sup>2</sup> *Id.*, p. IV-50.

<sup>3</sup> Energy Information Administration, *U.S. Crude Oil, Natural Gas, and Natural Gas Liquids Reserves*. 1999 Annual Report DOE/EIA-0216(99) (December 2000).

<sup>4</sup> Energy Information Administration.

- Research on energy efficiency technologies and systems. Federally funded research plays a key role in creating a stream of economically attractive options.
- Targeted incentives for more efficient technologies and systems based on performance. Performance-based tax incentives can play a key role in commercializing advanced technologies by helping them cross the chasm, sometimes called the “valley of death,” between research and development (often supported by direct federal expenditures), on the one hand, and commercial-scale mass production on the other.
- Efficiency standards, including higher Corporate Average Fuel Economy (CAFE) standards. Across-the-board codes and standards are critical for improving the overall performance of the vehicle (and buildings) fleet. These programs are the foundation of any cost-effective public policy for improving the energy efficiency of the U.S. economy. They are strongly complementary to targeted incentives, which help commercialize advanced technology that can contribute to achieving higher standards over time.
- Education and outreach on energy efficiency. Educational programs are needed to inform consumers about the choices that they have, and work best in conjunction with financial incentives.

Economic incentives have proven to be an effective policy for providing advances in energy efficiency technology and for making markets begin to work at supplying energy efficiency. Most of the effective incentives have been applied through the utility system; numerous third-party studies of these programs have shown that they typically have benefit/cost ratios of 2-1 or better.

Incentives have been even more effective at bringing major technological advances into the marketplace and getting them widely accepted. This process is called market transformation. Market transformation incentive programs tend to require longer lead-times and more consistent availability of funding. This is what manufacturers have asked for, and this is what has worked in the modest number of examples where programs have been implemented. The scope of such programs can be vastly expanded by adding programs that operate through the tax system.

## **II. The Energy Policy Act Will Not Achieve Its Goals**

The ultimate goal of the alternative fuel vehicles provisions in the Energy Policy Act of 1992 (EPACT) was to “promote the replacement of petroleum motor fuels with replacement fuels to the maximum extent practicable.”<sup>5</sup> The Act set a tentative goal of replacing at least 10 percent of the petroleum motor fuels projected to be used in 2000 and at least 30 percent of the petroleum motor fuels projected to be used in 2010.<sup>6</sup> In reality, alternative fuel use accounted for only 0.2 percent of motor fuel use in the year 2000. Total “replacement fuel” use amounted to 2.8 percent -- less than one-third of the statutory goal -- and this was primarily MTBE used to comply with the Clean Air Act’s oxygen mandate. Unfortunately, the use of MTBE is contaminating groundwater nationwide and NRDC believes that its

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<sup>5</sup> 42 U.S.C.A. § 13252(a). Replacement fuels include oxygenates (MTBE and ethanol in gasohol) and alternative fuels.

<sup>6</sup> 42 U.S.C.A. § 13252(b)(2).

use should be capped and phased out as quickly as possible while maintaining the clean air benefits that it has contributed to. The Energy Information Administration (EIA) projects that alternative fuel use in 2010 (including use by EPACT and non-EPACT vehicles) will amount to 3.9 percent of gasoline use.<sup>7</sup> If MTBE is phased out by that time, total replacement fuel use is likely to be no more than about 6 percent of gasoline consumption – only one-fifth of EPACT’s statutory goal.

The goals of EPACT are not being achieved for three main reasons.

1. EPACT did not include policies to significantly improve the overall fuel efficiency of the vehicle fleet. As a result the overall fuel efficiency of the passenger vehicle fleet is now declining and gasoline consumption increased by 17 percent over the last decade. This increase in the total volume of gasoline consumption makes it more difficult for alternative fuels to make a given percentage contribution to the fuel supply.
2. EPACT did not include a comprehensive program to increase the availability of alternative fuels. The lack of infrastructure to deliver alternative fuels continues to constitute a chicken-or-egg barrier to their wider use.
3. The implementation of EPACT’s alternative fuel vehicle fleet requirements has been incomplete at best. EPACT’s primary approach to promoting alternative fuels was to require that government fleet vehicle purchases include an increasing percentage of vehicles capable of running on alternative fuels. Although most government agencies appear to be complying, they have done so largely through purchasing dual fuel capable vehicles that in fact run primarily on gasoline. EPACT also required the Department of Energy (DOE) to expand the fleet purchase requirements to private fleets if necessary to achieve the goals of Act. Although it is obvious that the alternative fuel use goals will not be met in the absence of greatly expanded use of alternative fuels by private fleet operators, DOE has not completed the required rulemaking. (See the appendix for a more complete review of the implementation of EPACT’s alternative fuel provisions).

Taking a step back from evaluating EPACT’s failure to achieve its specific goals for the use of alternative fuels, I believe that the goals themselves were off target. The use of alternative fuels should not be an end in itself. Rather, the goals for transportation policy should be to cost-effectively reduce overall petroleum consumption and the environmental and public health impacts of our excessive reliance on petroleum to fuel our mobility. Focusing only on alternative fuels and relying on limited requirements directed at vehicle fleet owners – as EPACT did – is a fundamentally inadequate response to the economic and environmental problems created by our current transportation system.

### **III. Policies to Reduce Petroleum Dependence and Protect the Environment and Public Health**

#### *A. Pass the CLEAR Act: Tax Incentives for Advanced Technology Vehicles and Alternative Fuels*

The CLEAR Act (S. 760) provides a comprehensive set of performance-based tax incentives to accelerate the commercialization of advanced technology vehicles and alternative fuels. This bill is a major advance over previous vehicle tax credit proposals because it is the first proposal to link publicly-

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<sup>7</sup> Department of Energy, Office of Transportation Technologies. October 2000. Replacement Fuel and Alternative Fuel Vehicle Technical and Policy Analysis: Pursuant to Section 506 of the Energy Policy Act of 1992. Available at <http://www.ccities.doe.gov/pdfs/section506.pdf>. p. 33.

funded incentives directly to the public benefits provided by the vehicles that get the incentive, in this case the amount of petroleum and carbon dioxide displaced. This is accomplished by linking the amount of the tax credit it offers in part to the actual fuel economy of the qualifying vehicles. The bill also includes important provisions to ensure that public support only goes to truly advanced vehicles that reduce local air pollution as well as global warming pollution and petroleum consumption.

The policy advances incorporated into CLEAR reflect the collective advice of a unique coalition of environmental advocates and automakers. Public interest organizations that have joined NRDC in endorsing the CLEAR Act include the Union of Concerned Scientists, Environmental Defense, the American Council for an Energy-Efficient Economy, the Ecology Center of Ann Arbor, Michigan and the Michigan Environmental Council.

The performance based approach adopted in the CLEAR Act should also be applied to the design of tax incentives to promote efficiency in other energy using sectors of our economy. For example, “The Energy-efficient Buildings Incentives Act” (S. 207), introduced by Sens. Robert Smith and Diane Feinstein would provide tax breaks for building energy-efficient commercial buildings, schools, rental housing and new homes, cutting their energy needs by 30 percent to 50 percent. It also would provide tax incentives for the purchase of energy-efficient air conditioners, heating and cooling systems, and solar water heating and photovoltaic systems.

*B. Establish Incentives to Promote Smart Growth Development Patterns*

Gasoline use also can be reduced by directing real estate development away from urban sprawl and toward “smart growth.” Smart-growth suburbs reduce the need to drive by 30 percent or more, cutting household expenditures on transportation.<sup>8</sup> An important incentive for smart growth is to establish mortgage qualification rules that recognize the increased affordability of homes that have low transportation costs because they are located in areas with good access to public transportation.

*C. Modify the Ethanol Tax Credit to Make it Performance-Based*

The largest incentive currently going to alternative fuels is the excise tax credit provided for ethanol. Unfortunately, the environmental benefits generated by this tax credit are ambiguous because it does not currently incorporate performance criteria. Most ethanol is currently produced from corn and requires high levels of chemical and fossil fuel inputs that are similar to those for conventional gasoline over the full fuel cycle of production and use. The existing tax incentive for ethanol could be reformed by linking the amount of the credit to the net reduction in global warming pollution or fossil fuel consumption achieved by the ethanol producer. This would encourage ethanol producers to shift to less energy intensive feedstocks, such as agricultural wastes and perennial crops, and to improve the efficiency of their conversion processes.

*D. Close the Light Truck Loophole and Raise Fuel Economy Standards to 40 Miles per Gallon*

Incentives for advanced technology vehicles will be most effective if enacted in combination with updated fuel economy standards. This can be accomplished in two steps. First, congress should quickly

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<sup>8</sup> David Goldstein, “Mortgages Can Remove the Incentive for Sprawl,” *Earthword: The Journal of Environmental and Social Responsibility*, Issue #4.

eliminate the light truck loophole in the current fuel economy standards. The share of new vehicles that are classified as light trucks (SUVs, minivans, and pickups) has increased dramatically from 20 percent of sales when the CAFE law was first enacted in 1975 to nearly 50 percent of the market today. Yet the vast majority of vehicles currently regulated as light trucks are in fact used in exactly the same way as passenger cars. EPA recognized the need to eliminate the light truck loophole in its Tier II tailpipe standards beginning in 2004. Congress should follow this lead and eliminate the light truck loophole in fuel economy regulations in the same time frame. Congress should steadily raise the overall fuel economy standard for the entire light vehicle fleet over a longer time period. A recent report by the Union of Concerned Scientists shows that the combined passenger fleet average efficiency could be increased to 40 miles per gallon (mpg) by 2012 and at least 55 miles per gallon by 2020. The 40 mpg standard could be achieved through incremental improvements to vehicles with conventional drive trains, although hybrid vehicles would likely contribute to achieving this efficiency level. The 55 mpg standard could be achieved by applying hybrid technology more extensively along with further improvements in streamlining, mass reduction, plus tire and accessory efficiency.<sup>9</sup>

Congress should also set standards for replacement tires. It is a little known fact that auto manufacturers use highly-efficient tires to comply with current CAFE requirements, but comparable tires are not available to the consumers as replacements. Congress should require replacement tires to meet the same specifications as those sold on new cars. This measure alone would save over 70% more oil than is likely to be found if drilling were permitted in the Arctic National Wildlife Refuge.

#### **IV. Benefits of a Comprehensive Policies to Promote Advanced Technology Vehicles and Alternative Fuels**

The economic and environmental benefits of enacting the comprehensive set of policies described here would be profound. The Environmental Protection Agency (EPA) estimates that the average light truck on the road today produces 164 pounds of smog-forming pollution (hydrocarbons plus nitrogen oxides) and 8.0 tons of global warming pollution in traveling 14,000 miles each year. This does not include upstream emissions associated with producing the fuel, which would add about 11 pounds of smog-forming pollution and 2 tons of global warming pollution, bringing the totals to 175 pounds of smog-forming pollution and 10 tons of global warming pollution. A conventional new vehicle is substantially cleaner than this average with respect to smog-forming pollution, but has roughly the same fuel economy and therefore the same global warming pollution emissions as the existing vehicle it is likely to replace. For example, a vehicle meeting the National Low Emission Vehicle standard would emit only 12 pounds of smog-forming pollution from its tailpipe, but upstream emissions would still add 11 pounds, bringing its total impact to 23 pounds of smog-forming pollution and 10 tons of global warming pollution. In contrast, a hybrid vehicle qualifying for a \$3000 tax credit under the CLEAR Act would emit less than 1 pound of smog-forming pollution from its tailpipe and would use only half as much fuel. As a result, its total impact would be only 6 pounds of smog-forming pollution and 5 tons of global warming pollution. (See table 1).

Aggregating from emission reductions from individual vehicles to emission reductions for the passenger vehicle fleet as a whole, the Union of Concerned Scientist (UCS) estimates that the combination of tax incentives and higher fuel economy standards advocated here would save 540 million barrels of oil in the year 2010, reduce upstream smog-forming pollution by 320 million pounds, and reduce global warming pollution by 273 million tons. By 2020 the savings would be even more dramatic:

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<sup>9</sup> Union of Concerned Scientists, *Drilling in Detroit: Tapping Automaker Ingenuity to Build Safe and Efficient Automobiles* .(June 2001). Available from <http://www.ucsusa.org/>

1.8 billion barrels of oil, 1000 pounds of smog-forming pollution, and 890 million tons of global warming pollution. All of these benefits would be achieved while saving consumers billions of dollars: nearly \$10 billion in 2010 and \$28 billion in 2020 according to UCS.

In conclusion, appropriate federal policies can dramatically improve the economic and environmental performance of our transportation system. Tax incentives can play an important role in achieving this result, in combination with updated fuel economy standards, investments in research and development and effective consumer education programs. In particular, I believe that this committee should consider favorably the approach taken by the CLEAR Act, which ties incentives to environmental performance.

Thank you for your consideration.

Table 1. Annual Emissions per Vehicle (based on 14,000 miles per year)

	<i>Average Light Truck</i>	<i>New NLEV</i>	<i>Hybrid</i>
<b>Smog Total</b> (pounds HC + NO <sub>x</sub> )	<b>175</b>	<b>23</b>	<b>6</b>
Tailpipe	164	12	1
Upstream	11	11	5
<b>Global Warming Total</b> (tons carbon dioxide)	<b>10</b>	<b>10</b>	<b>5</b>
Tailpipe			
Upstream	8	8	4
	2	2	1

## Appendix. Implementation of the Alternative Fuels Provisions of EPACT

The ultimate goal of the alternative fuel vehicles provisions in the Energy Policy Act of 1992 (EPACT) was to “promote the replacement of petroleum motor fuels with replacement fuels to the maximum extent practicable.”<sup>10</sup> The Act set a tentative goal of replacing at least 10 percent of the petroleum motor fuels projected to be used in 2000 and at least 30 percent of the petroleum motor fuels projected to be used in 2010.<sup>11</sup> The main means that the Act provided to achieve those goals were alternative fuel vehicle (AFV) acquisition mandates. The Act also authorized various incentive and educational programs.

The mandates likely were not intended to achieve the petroleum fuel replacement goals by themselves. However, the mandates have largely failed to achieve even the more modest goal of spurring more private AFV purchases by helping to achieve economies of scale in the production of AFVs and the provision of alternative fuels. Recent analyses by GAO and DOE have highlighted these failures and the shortcomings in existing policies that caused them.

### A. *EPACT’s AFV Provisions and DOE’s Implementation Measures*

#### (1) Mandated acquisitions of alternative fuel vehicles for federal government fleets

EPACT requires each federal fleet to ensure that alternative fuel vehicles comprise a specified percentage of the total number of vehicles it purchases in a given year.<sup>12</sup> The annual AFV acquisition mandates are: 25 percent in 1996, 33 percent in 1997, 50 percent in 1998, and 75 percent in 1999 and every year thereafter. The Secretary can reallocate the required AFV purchases across fleets as long as the percentage goal is met in aggregate.<sup>13</sup>

Initially, there were no enforcement or reporting requirements in the federal program. However, under the Energy Conservation Reauthorization Act of 1998 (ECRA) all federal agencies subject to EPACT AFV purchase requirements must prepare and submit an annual report to Congress stating whether the agency is meeting its AFV purchase requirements, and, if not, how it intends to meet them.<sup>14</sup>

In April, 2000, President Clinton bolstered the effect of EPACT’s federal AFV acquisition requirements by issuing Executive Order 13149. The Order mandates each federal agency operating a fleet of 20 or more vehicles to reduce its annual petroleum fuel consumption by 20 percent below FY 1999 levels by FY 2005. The Order also requires agencies to meet their AFV acquisition targets and to

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<sup>10</sup> 42 U.S.C.A. § 13252(a). Replacement fuels include oxygenates (MTBE and ethanol in gasohol) and alternative fuels.

<sup>11</sup> 42 U.S.C.A. § 13252(b)(2).

<sup>12</sup> 42 U.S.C.A. § 13212(b)(1). The requirement does not apply to fleets of certain types of vehicles, such as emergency vehicles, enforcement vehicles, and vehicles held for lease or rental to the public. 42 U.S.C.A. § 13212(b)(3).

<sup>13</sup> 42 U.S.C.A. § 13212(b)(2).

<sup>14</sup> 42 U.S.C.A. § 13218(b).

use alternative fuels to meet the majority of the fuel requirements of those motor vehicles by the end of FY 2005. Finally, it mandates modest improvements in overall fuel efficiency of federal fleets by 2005.

(2) Mandated AFV acquisitions for state government fleets and alternative fuel providers

EPACT also establishes AFV acquisition requirements for state fleets and alternative fuel providers.<sup>15</sup> DOE implemented those provisions in 1996.<sup>16</sup> Under the regulations, certain alternative fuel vehicle providers must ensure that 90 percent of the new vehicles that they acquire be alternatively fueled by 2000; and state government fleets must ensure that 75 percent of the vehicles that they acquire each year are alternatively fueled by 2001.

DOE's implementing regulations also establish a marketable credit program. Under the program, regulated entities that voluntarily acquire vehicles in excess of mandated requirements or before the requirements take effect can obtain credit from DOE for the "excess" or early AFV purchases, and can transfer the credit to other regulated parties. Those parties can then use the credits to demonstrate compliance with the AFV acquisition requirements. Such a program is authorized by 42 U.S.C.A. § 13258.

Finally, the regulations for state fleets and alternative fuel providers include reporting requirements and enforcement provisions. The enforcement provisions would also apply to mandates for private and municipal fleets, should DOE establish those mandates.

(3) AFV acquisition requirements for private and municipal fleets

EPACT also established a tentative AFV acquisition schedule for private and municipal fleets.<sup>17</sup> The tentative schedule could take effect only if DOE confirms it in a rule; and the Act gives DOE the discretion to impose less stringent acquisition mandates or to conclude that it is not appropriate to impose the requirements at all. In 1997, DOE determined that it would not promulgate regulations to implement alternative fueled vehicle requirements for certain private and local government fleets according to § 13257(a)(1).<sup>18</sup> However, another EPACT provision requires DOE to establish such a program should it prove necessary to achieve the Act's petroleum fuel replacement goals.<sup>19</sup> In 1998, DOE held hearings on whether it needs to establish such a program to meet the petroleum fuel replacement goals.<sup>20</sup> In 2000,

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<sup>15</sup> 42 U.S.C.A. §§ 13251 and 13257(o). Alternative fuel providers are defined as businesses that are involved in (1) producing, refining, storing, processing, transporting, distributing, importing, or selling at the wholesale or retail level alternative fuels other than electricity; (2) generating, transmitting, importing, or selling wholesale or retail electricity; or (3) producing or importing an average of 50,000 barrels per day of petroleum.

<sup>16</sup> 61 Fed. Reg. 10622.

<sup>17</sup> 42 U.S.C.A. § 13257(a).

<sup>18</sup> 62 Fed. Reg. 19701.

<sup>19</sup> 42 U.S.C.A. § 13257(g).

<sup>20</sup> 63 Fed. Reg. 19372.

DOE first extended its rulemaking deadline and then paused its rulemaking effort to complete a consultation process.<sup>21</sup> The agency has not yet issued a final decision.

(4) Other programs

ECRA also established a biodiesel fuel use credit program.<sup>22</sup> Under the program, fleets or individuals subject to AFV acquisition requirements can obtain credit from DOE for using specified amounts of biodiesel fuel in conventional, heavy duty vehicles. The biodiesel fuel use credits then count toward the AFV acquisition requirements for the fleet. DOE implemented the credit program in 1999.<sup>23</sup>

To help meet EPACT's petroleum fuel replacement goals, DOE has also implemented the Clean Cities Program. The program establishes local, public-private partnerships to "develop local plans for creating an alternative fuels market."<sup>24</sup> By mid-1999, the Clean Cities Program had created partnerships in 72 cities; and participating fleet operators within those Clean City Programs are operating or planning to be operating over 200,000 AFVs by 2003.<sup>25</sup>

Finally, DOE has established various education programs, incentive programs, recognition programs, grant programs and low-interest loan programs to help federal and state agencies fulfill the Act's goals. These programs do not impose additional requirements, however.

*B. Effectiveness of the Mandatory AFV Acquisition Provisions*

The actual replacement of petroleum motor fuels has fallen well below EPACT's 10 percent goal for 2000. The total use of replacement and alternative fuels as a percentage of gas and diesel fuel use is shown in Table 2.

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<sup>21</sup> 65 Fed. Reg. 1831; 65 Fed. Reg. 44987.

<sup>22</sup> 42 U.S.C.A. § 13220.

<sup>23</sup> 64 Fed. Reg. 27169.

<sup>24</sup> Department of Energy, Office of Transportation Technologies. October 2000. *Replacement Fuel and Alternative Fuel Vehicle Technical and Policy Analysis: Pursuant to Section 506 of the Energy Policy Act of 1992*. Available at <http://www.cities.doe.gov/pdfs/section506.pdf> (hereinafter DOE).

<sup>25</sup> DOE at 24.

Table 2: Estimated Use of Conventional and Replacement Vehicle Fuels in the U.S., 1997-2001<sup>26</sup>  
(Thousand Gasoline-Equivalent Gallons)

	1997	1998	1999	2000	2001 (projected)
Total alternative fuel use	312,589	324,826	339,340	353,760	366,331
Total replacement fuel use (including oxygenates)	4,117,726	4,117,726	4,627,240	4,469,760	4,369,831
Total gasoline and diesel use (excluding oxygenates)	147,037,781	152,721,460	156,619,900	157,314,340	159,861,510
Alternative fuel use as a percentage of gas and diesel use	0.21	0.21	0.22	0.22	0.23
Replacement fuel use as a percentage of gas and diesel use	2.80	2.70	2.95	2.84	2.73

Substantial, additional measures are clearly needed if EPACT's 30 percent petroleum fuel replacement goal is to be achieved by 2010. EIA projects that alternative fuel use in 2010 (including use by EPACT and non-EPACT vehicles) will amount to 3.9 percent of gasoline use, and that total replacement fuel use in 2010 would amount to 7 to 8 percent of total gasoline use if the Clean Air Act oxygenate mandate remains unchanged.<sup>27</sup>

Although the use of alternative fuels as a percentage of total motor fuel use has not increased recently, the number of alternative fuel vehicles has risen steadily. The number of AFVs used by the federal government has increased from 18,500 in 1997 to 24,007 in 1999, and is expected to reach 35,002

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<sup>26</sup> Energy Information Administration. 2000. *Alternatives to Traditional Transportation Fuels 1999*. 2000 Update. Available at [http://www.eia.doe.gov/cneaf/alternate/page/datatables/atf1-13\\_00.html](http://www.eia.doe.gov/cneaf/alternate/page/datatables/atf1-13_00.html) (hereinafter EIA).

<sup>27</sup> DOE at 33.

in 2001.<sup>28</sup> The number of AFVs in use by state and local governments increased from 85,355 in 1997 to 101,485 in 1999, and is expected to reach 116,342 in 2001.<sup>29</sup>

Despite those positive trends, it is not clear whether EPACT's AFV acquisition mandates are being fulfilled. DOE does not have a complete inventory of all fleets for each group that are subject to the mandates; and the agency does not audit or survey the groups to fill that information gap.<sup>30</sup> DOE is least certain about the level of compliance among alternative fuel providers. It is fairly clear that the federal government met its acquisition goal in 1998, and DOE believes that most state fleets are in compliance.<sup>31</sup> Even if full compliance were achieved and the local and private fleet mandates were put in place, however, alternative fuel use by EPACT-mandated fleets would account for no more than about 1.5 percent of all replacement fuel use.<sup>32</sup>

### C. *Reasons for Failure*

The AFV acquisition mandates by themselves likely were never intended to achieve the petroleum fuel replacement goals. Instead, the mandates were intended to spur private purchases by making AFVs more familiar and by helping to achieve economies of scale in vehicle production and alternative fuel provision. By DOE's own admission, however, the programs have failed to fulfill even those goals.<sup>33</sup> The main reasons for the failures are outlined below. As discussed in Section I of this appendix, some of these problems were addressed by Executive Order 13149. The Order did not significantly address infrastructure problems, however; and it reached only the AFV provisions concerning the federal government.

*A lack of refueling stations providing alternative fuels has hindered the use of those fuels.* GAO noted that state and federal officials regard the lack of refueling stations as the single greatest barrier to the increased use of alternative fuels. Owners of refueling stations cite the lack of demand for alternative fuels and the high cost of providing some alternative fuels (like CNG) at refueling stations as the main barriers that they face. DOE recently estimated that 60,000 to 69,300 refueling stations for alternative fuels—more than 10 times the number that were available in 1999—are needed to meet the Act's 30 percent reduction goal for 2010.<sup>34</sup>

*The higher relative cost of alternative fuel vehicles remains a barrier to widespread AFV purchases.* The purchase price of many types of AFVs is substantially higher than that of comparable, conventional vehicles. CNG vehicles typically cost \$3,000 to \$5,000 more than their conventional

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<sup>28</sup> EIA, Table 9.

<sup>29</sup> EIA, Table 8.

<sup>30</sup> General Accounting Office. February 2000. *Energy Policy Act of 1992: Limited Progress in Acquiring Alternative Fuel Vehicles and Reaching Fuel Goals*. GAO/RCED-00-59. Available at [http://www.access.gpo.gov/su\\_docs/aces/aces160.shtml](http://www.access.gpo.gov/su_docs/aces/aces160.shtml).

<sup>31</sup> GAO at 9-10.

<sup>32</sup> DOE at 35.

<sup>33</sup> DOE at 20.

<sup>34</sup> GAO at 13.

counterparts, and electric vehicles start in the \$30,000s.<sup>35</sup> In addition, the low price of gasoline contributes to the higher life-cycle cost of AFVs to vehicle owners. Alternative fuels often are more expensive, particularly if the additional time required to reach a refueling station is taken into account.<sup>36</sup>

*There are mismatches between the Energy Policy Act's goals and the nature of its mandates.* Although the Act's goal is to replace petroleum fuel use with alternative fuel use, it mandates only the acquisition of vehicles that can use alternative fuels rather than the actual use of alternative fuels. Since the law does not require otherwise, many alternative fuel vehicles are run on gasoline. Fleet managers cite the lack of refueling stations and safety concerns as reasons for making this choice.<sup>37</sup>

Alternative fuel use targets are not the only provisions missing from the Act. The goal of replacing a certain proportion of the petroleum fuels used with alternative fuels can be furthered both by increasing the absolute amount of alternative fuel used and by reducing the total amount of petroleum fuels used. As the numbers in Table 2 suggest, the lack of progress in meeting petroleum fuel replacement goals has been driven in part by steady, significant increases in the total use of gasoline and diesel fuel. Yet the Act does not mandate purchases of highly efficient vehicles or other measures that would encourage regulated fleets to increase their fuel efficiency.

*The EPACT programs are too small to overcome infrastructure and economic barriers to alternative fuel use.* As noted above, DOE estimates that alternative fuel use by EPACT-mandated fleets would account for no more than about 1.5 percent of replacement fuel use, even if mandates for private and local government were put in place. Even if federal agencies, state governments, and alternative fuel providers fully complied with EPACT's AFV acquisition requirements, their use of replacement fuels would amount to only about 1 percent of petroleum fuels in 2010.<sup>38</sup> EPACT's AFV acquisition mandates have had at best a marginal effect on the replacement of petroleum fuels. Recent experience suggests that the mandates' effect is likely to remain marginal in the absence of broader measures to address the infrastructure and economic barriers to the increased use of AFVs and alternative fuels.

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<sup>35</sup> GAO at 16.

<sup>36</sup> GAO at 12.

<sup>37</sup> GAO at 16-17.

<sup>38</sup> GAO at 10.