

**ALTERNATIVE ENERGY TAX SUBSIDIES:
AN EXAMINATION OF THE ALTERNATIVE ENERGY TAX INCENTIVES
OF THE 2005 ENERGY ACT**

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ABSTRACT

Domestic dependence upon foreign oil imports is a significant economic and foreign policy issue. In 2006, Congress passed a broad energy policy that included several income tax incentives to encourage domestic use of non-petroleum based energy production. This paper will examine the tax incentives available for both individuals and business to reduce petroleum consumption through the adoption of hybrid and alternative energy systems. Specifically the paper will examine the after-tax cost-benefit of several of the tax incentives with particular focus upon the adequacy of those programs to encourage a movement away from fossil fuels.

INTRODUCTION

With the spiking of petroleum product prices in early 2006, US dependence upon foreign oil imports has become a matter of serious economic and foreign policy concern. On August 8, 2005, President George W. Bush signed the Energy Tax Incentives Act of 2005 (the Act). A White House press release^{xiii} touted this as the first national energy plan in more than a decade.

**SUMMARY OF THE ENERGY TAX
INCENTIVES ACT OF 2005**

On August 8, 2005, President George W. Bush signed the Energy Tax Incentives Act of 2005^{xiv} (the Act). A White House press release^{xv} touted this as the first national energy plan in more than a decade. According to the press release, the President's national energy plan will encourage energy efficiency and conservation, promote alternative and renewable energy sources, reduce our dependence on foreign sources of energy, increase domestic production, modernize the electricity grid, and encourage the expansion of nuclear energy.

The Act is intended to impact four major energy-related areas: 1) Conservation, 2) Alternative energy, 3) Energy infrastructure, and 4) Domestic energy production. Conservation is aimed at encouraging the design and improvement of energy efficient homes and "green" vehicles. This is the area that will most affect individuals and small businesses and is a focus of this paper. The alternative energy portion of the law encourages the use of solar, wind, ethanol, biomass, and clean-coal technology. The energy

infrastructure portion is designed to ensure more reliable power grids, and grew from the August 2003 blackout of the East coast. The domestic energy production provision provides incentives to the oil, gas, and coal (fossil fuel) industry. This portion of the Act will affect small businesses so it is also addressed in this paper. Following is a synopsis of the conservation and domestic energy production portions of the Act, which are most likely to affect individuals and small businesses.

- Alternative Motor Vehicle Credits

The Act provides tax credits for the purchase of hybrid, fuel cell, advanced lean burn technology and other alternative power vehicles. The size of the credit varies depending on the weight class of the vehicle and the rated fuel economy. These credits are available for vehicles placed in service after 2005.

The maximum credit for hybrid passenger automobiles and light truck vehicles^{xvi} is \$3,400. This replaces the current deduction of up to \$2,000 allowed for the purchase of those hybrid vehicles^{xvii}. The credit will be phased out for each manufacturer once that manufacturer has sold 60,000 eligible vehicles on or after January 1, 2006. The IRS will monitor and announce when the 60,000th vehicle is sold for each manufacturer. In the calendar quarter following the quarter in which the 60,000th vehicle is sold, the credit will be reduced to 50 percent of the full amount. This reduced credit will be available for six months (two quarters), and then in the following two quarters the credit will be reduced to 25 percent of the full amount. The credit will end after that. Regardless of when or if the phase-outs are achieved, there will be no credit available after December 31, 2010.

For qualifying hybrid heavy trucks weighing more than 8,500 pounds but not more than 14,000 pounds, the maximum allowable credit is \$3,000. For qualifying hybrid heavy trucks weighing more than 14,000 pounds but not more than 26,000 pounds, the maximum allowable credit is \$6,000. For qualifying hybrid heavy trucks weighing more than 26,000, the maximum allowable credit is \$12,000.

Tax credits are also available for purchasing certain other vehicles. Fuel cell vehicles^{xviii} are eligible for a maximum allowable credit of \$12,000 for passenger automobiles or light trucks. Greater credits are available for heavier fuel cell vehicles. Alternative fuel vehicles^{xix} are eligible for a maximum allowable credit of \$4,000 for vehicles weighing 8,500 pounds or less. The alternative motor vehicle credits are claimed on IRS Form 8910 – Alternative Motor Vehicle Credit^{xx}.

- Residential Energy Credits

The purchase of energy efficient items that improve the energy efficiency of existing homes may qualify for a credit if certain energy efficiency requirements are met. The credit is available for purchases in 2006 and 2007. The Act provides a 10 percent credit for the purchase of qualified energy efficiency improvements. To qualify, a component must meet or exceed the criteria established by the 2000 International Energy Conservation Code^{xxi} (including supplements) and must be installed in the taxpayer's main home in the United States.

The following items are eligible:

- Insulation systems that reduce heat loss/gain
- Exterior windows (including skylights)
- Exterior doors
- Metal roofs (meeting applicable Energy Star requirements).

In addition to credits for the above items, the law provides a credit for costs relating to residential energy property expenses. To qualify as residential energy property, the property must meet certification requirements and must be installed in the taxpayer's main home in the United States. The following items are eligible:

- \$50 for each advanced main air circulating fan
- \$150 for each qualified natural gas, propane, or oil furnace or hot water boiler
- \$300 for each item of qualified energy efficient property.

The maximum credit for all taxable years is \$500, and no more than \$200 of the credit can be attributable to expenses for windows.

The Act also makes a credit available to those who add qualified solar panels, solar water heating equipment, or a fuel cell power plant to their homes in the United States. In general, a qualified fuel cell power plant converts a fuel into electricity using electrochemical means, has an electricity-only generation efficiency of more than 30 percent and generates at least 0.5 kilowatts of electricity. Taxpayers are allowed one credit equal to 30 percent of the qualified investment in a solar panel up to a maximum credit of \$2,000, and another equivalent credit for investing in a solar water heating system. The credit may not exceed \$500 for each .5 kilowatt of capacity. No part of either system can be used to heat a pool or hot tub. Costs allocable to a swimming pool, hot tub, or any other energy storage medium that has a function other than the function of energy storage do not qualify for the residential energy efficiency credit. These items must be placed in service after December 31, 2005 and before January 1, 2008.

The Act provides a business tax credit for the construction of new energy efficient homes. A maximum \$1,000 credit applies to manufactured homes meeting a 30% energy reduction standard and a maximum \$2,000 credit for other homes meeting a 50% standard. These credits apply to homes sold after 2005 and before 2008. The home energy credits are claimed on Form 8909 - Energy Efficient Home Credit^{xxii}.

In addition to the purchase and construction of energy efficient home products and houses, the Act provides a deduction for qualified energy-saving improvements to commercial buildings that meet a 50% energy reduction standard. The maximum deduction is \$1.80 per square foot of the building, and applies to improvements made after 2005 and before 2008. There is also a provision for a manufacturers' tax credit for energy efficient dishwashers, clothes washers, and refrigerators manufactured in 2006 and 2007.

- Credits for Oil and Gas Production and Distribution

The Act attempts to aid the fossil fuel industry by reducing the depreciation period for natural gas distribution lines from 20 years to 15 years for lines placed in service through December 31, 2010. The Act also allows two-year amortization of geological and geophysical costs incurred in connection with oil and gas exploration in the United States. Finally, the Act clarifies uncertainty under present law by providing that natural gas gathering lines are subject to seven-year depreciation (consistent with recent court cases).

ANALYSIS OF COSTS AND BENEFITS

Hybrid vehicles. As mentioned previously, the tax credit for the purchase of a hybrid vehicle varies depending upon the energy efficiency of the vehicle. For purposes of this analysis, it is assumed that the 60,000 vehicle threshold has not been reached and that the taxpayer is entitled to the full credit.^{xxiii} This paper will examine cost benefit for the Toyota Prius, Ford Escape, and the Honda Civic.

The Toyota Prius has the largest of any of the automotive hybrid-electric passenger cars. The tax credit is \$3150. Unfortunately it is not possible to directly analyze the cost-benefit of this credit because the Toyota Prius is only manufactured as a hybrid vehicle. However, the Toyota Solara was chosen for comparison purposes because it is approximately the same size as the Prius.

The procedure to analyze the cost-benefit of purchasing a hybrid vehicle was analyzed using the following initial assumptions. First, the stated EPA mileage for the hybrid and the non-hybrid were assumed to be accurate. Several articles have criticized the EPA estimates as being too optimistic and over-estimates. Also assumed for purposes of this analysis is that the error of estimation of the mileage for the hybrid and the non-hybrid version would be the same. Consequently, the difference in mileage between the hybrid and non-hybrid versions is assumed to be constant. The accuracy of the EPA estimate would not, therefore, material. Gasoline was assumed to be the price of \$2.25 per gallon on October 1, 2006. The average mileage driven was assumed to be 15,000 miles annually. The average life of the vehicle was assumed to be seven years. The maintenance costs were assumed to be equivalent between the hybrid and non-hybrid models. Finally, the taxpayer's cost of capital is assumed to be 10% to reflect the average return on stock market investments. A net present value was calculated using the above assumptions with the cost difference used as the initial cash outflow. Below is a table of the results:

Model	Net Present Value
Toyota Prius	\$2,183.66
Ford Escape	-\$1,175.95
Honda Civic	\$301.82

Changing the assumptions on the average mileage driven to 10,000 miles yields the following results:

Model	Net Present Value
Toyota Prius	\$1,372.03
Ford Escape	-\$1,744.99
Honda Civic	-\$124.96

Changing the assumption on the price of gasoline to reflect the price of \$3.00 during the summer of 2006, yields the following results:

Model	Net Present Value
Toyota Prius	\$2,995.30
Ford Escape	-\$606.91
Honda Civic	\$728.60

Finally, changing the taxpayer's cost of capital to 5% reflecting a certificate of deposit rate yields the following results:

Model	Net Present Value
Toyota Prius	\$2,898.49
Ford Escape	-\$787.55
Honda Civic	\$676.29

FUEL CELL TECHNOLOGY

It is interesting that Congress included significant tax credits for fuel cell power generation. It seems that the credit might have been to encourage research rather than to actually replace traditional fossil fuel generation. Commercially available residential systems are not yet available. A telephone conversation with Charles Pimentel, Northern Regional Sales Manager for PlugPower confirmed that all residential systems of a size necessary to provide power to an average home are only of a prototype variety. The prototypes cost in excess of \$75,000 each and the taxpayer would still need to pay for the fuel and maintenance. At the time of this writing, there are not sufficient cost and operation statistics available for analysis.

SOLAR PANEL SYSTEMS

Unlike fuel cell technologies, solar panel systems are readily available. For purposes of this analysis, the present value of an average household electric bill was calculated with the following assumptions. The average life of a solar panel display is assumed to be twenty-five years. Again the tax-payer's cost of capital is assumed to be 10%. Next, the taxpayer's electrical bill savings is assumed to be \$200 per month. Finally, the system is assumed to be a grid-tied system in a net metering

environment.^{xxiv} Consequently, the present value of the electrical bill savings is \$22,009. The cost of a typical Solar array system providing the necessary power for an average household is currently about \$42,000. Even with the full \$2000 tax credit, the system is not yet cost effective. Off grid systems may be cost competitive if the cost of running the electric utility to the site exceeds \$20,000.

CONCLUSION

The Energy Act of 2005 may well do some structural things to reduce our dependence upon foreign oil. In addition, there are some successes with the encouragement of hybrid fuel-saving automobiles—the most notable being the Toyota Prius—the only car to exceed its 60,000 vehicle target. The act may also provide modest encouragement to improve the energy efficiency of a home through the 10% credit. When it comes to the encouragement of the use of alternative energy, however, the Act was a dismal failure.

The Energy Act totally ignores any tax credit support of wind turbine power generation. It is the closest in many areas of the country to being economically feasible to implement. Instead, the Act gives tax credits for solar systems that will not even break even in Florida. More shockingly, it gives tax credits for fuel cells for home use—a technology that is not even commercially available in the near term future.

Congress should add some meaningful alternative energy legislation to provide enough financial incentives to make switching to alternative energy sources economically efficient. Until then, we would appear to be locked into fossil fuels.

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<http://www.whitehouse.gov/news/releases/2005/08/20050808-4.html>

^{xiv} Public Law 109-58

^{xv}

<http://www.whitehouse.gov/news/releases/2005/08/20050808-4.html>

^{xvi} For a list of applicable Ford, General Motors, Honda, and Toyota vehicles see http://www.fueleconomy.gov/feg/tax_hybrid_new.shtml

^{xvii} For a list of vehicles eligible for the \$2,000 deduction see http://www.fueleconomy.gov/feg/tax_hybrid_old.shtml

^{xviii} Fuel cell vehicles are propelled by power derived from one or more cells that convert chemical energy directly into electricity by combining oxygen with hydrogen fuel.

^{xix} Alternative fuel vehicles include those fueled by compressed natural gas, liquefied natural gas, liquefied petroleum gas, hydrogen, and any liquid that is at least 85 percent methanol.

^{xx} Form 8910 is available on the IRS website at <http://www.irs.gov/pub/irs-pdf/f8910.pdf>

^{xxi} For information on the International Energy Conservation Codes see the following Department of Energy website: <http://www.eere.energy.gov/>

^{xxii} Form 8909 is available on the IRS website at <http://www.irs.gov/pub/irs-pdf/f8908.pdf>

^{xxiii} Actually, as of October 1, 2007, the tax credit on the Prius has been reduced by 50%.

^{xxiv} A net metering environment is one where the utility company charges only for the net amount of energy consumed in the household. When the solar array is producing surplus energy, the meter is, in effect, run backwards. Not all states require net metering from their utility companies. Some states allow the utility companies to pay only the wholesale price for the surplus power. (This is only about one-third of the retail price.)

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