Government Regulatory Initiatives Encouraging the Development and Sale of Gas/Electric Hybrid Vehicles: Transforming Hybrids from a Curiosity to an Industry Standard

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GOVERNMENT REGULATORY INITIATIVES
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STANDARD

DANIEL RAMISH*

INTRODUCTION

In 2001, White House Press Secretary Ari Fleischer was asked whether Americans should change their lifestyles to conserve energy.¹ He responded, "[t]hat's a big 'no.' The President believes that it's the goal of policymakers to protect the American way of life. The American way of life is a blessed one and we have a bounty of resources in this country."² Late in 2005, in the wake of two hurricanes and record gas prices,³ the cost and supply of energy has fully emerged as a central national issue.⁴ Suddenly the same Bush Administration is encouraging Americans to carpool

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² Polly Ghazi, Stars and Gripes: Rejection of the Kyoto Climate Treaty Triggered Alarm Bells, But How True Are Claims That President Bush Is Bad for the Health of the Planet?, GUARDIAN (LONDON), May 16, 2001, at 8.

³ Id.

⁴ See, e.g., Michael E. Kanell, Layoffs a Cloud on City's Horizon; Georgia State Forecast: Energy Only Minor Drag, ATLANTA J.-CONST., Nov. 17, 2005, at 1F. Some environmentalists suggest that the hurricanes were brought on by global warming, which is mostly the result of burning fossil fuel. Editorial, Is Global Warming the Culprit?, CHICAGO TRIB., Sept. 27, 2005, at C18.

⁵ Problems and Priorities, http://www.pollingreport.com/prioriti (last visited Nov. 18, 2005) (displaying poll results about important national priorities, many of which include energy or oil or gas). According to a NBC News/Wall Street Journal Poll conducted in early November, 2005, 8% of Americans think that the cost and supply of energy should be the federal government's top priority. Id.
and avoid nonessential travel, and conservatives in Congress have begun criticizing the oil industry. Conservation has become a bipartisan goal.

Polls indicate that after Hurricanes Rita and Katrina, 64% of Americans experienced "financial hardship" because of gas prices. According to the American Association of Retired persons ("AARP"), 13% of Americans over fifty said they ate less to cope with gas prices, and 6% had even reduced medical treatment or cut their prescriptions. With fuel prices threatening all-time highs adjusted for inflation, vehicle purchase habits nevertheless resisted change; only 22% of Americans considered purchasing more fuel efficient vehicles. Hybrid gas/electric vehicles were more popular in August and September of 2005 because of the storms, but when the price of gas fell to more moderate levels the total number of hybrids sold dropped to the lowest monthly total since June. As of November 14, 2005, even after hurricane effects had dissipated, a gallon of gas cost $2.258, representing an increase of 18% from the same week in 2004, $1.918, 54% from the

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6 Justin Blum, Oil Executives Face Scrutiny Today; Explanations Sought for Higher Profit, WASH. POST, Nov. 9, 2005, at D01.
7 See Bernasek, supra note 5; see also Amanda Griscom Little, Friedman Fighter, GRIST, Apr. 5, 2005, available at http://www.grist.org/news/maindish/2005/04/05/friedman.
9 Id.
13 Kanell, supra note 3.
14 Total US Hybrid Sales Drop in October, supra note 12.
same week in 2003, $1.464, and more than double the price of early 2002, e.g., March 4, $1.118. With gas prices promising to continue to increase every year, hybrids nevertheless have yet to amount to more than 1.48% of new cars purchased. Market forces are just not enough to induce Americans to invest in fuel-efficient vehicles.

Alan Greenspan, chairman of the Federal Reserve, declares that the era of cheap oil is over, a sentiment echoed by Ford, Chevron, and BP. Oil shortages will create worldwide economic instability, increase American dependence on oil from the Middle East, aggravate this nation's vulnerability to terrorist attacks, and intensify pressure on Congress to allow drilling in areas that have been hitherto safeguarded as environmental refuges.

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15 ECONOMAGIC.COM, U.S. Regular Conventional Retail Gasoline Prices (Cents per Gallon), http://www.economagic.com/em-cgi/data.exe/doewkly/day-mg_rco_us (last visited Nov. 18, 2005).
16 See Total US Hybrid Sales Drop in October, supra note 12.
17 Diane Carmen, Oil Prices Fuel Push for Alternatives, DENV. POST, Nov. 13, 2005, at C-01. Greenspan said that "the recent surge in energy prices will undoubtedly be a drag from now on." Id.
18 Editorial, Gas Taxes: Lesser Evil, Greater Good, N.Y. TIMES, Oct. 24, 2005, at A20. William Clay Ford, Jr., chairman and chief executive officer of Ford, said, "[w]e know that the days of unlimited, inexpensive gasoline are over." Id.
19 Marc Fisher, To See It Coming Is Not Enough, WASH. POST, Sept. 1, 2005, at B01. According to Chevron chairman David O'Reilly, "[t]he era of easy access to oil is over . . . . we are experiencing the convergence of geological difficulty with geopolitical instability." Id.
20 Brad Stone, How to Beat the Big Energy Chill, NEWSWEEK, Nov. 21, 2005, at 46. BP stands for "Beyond Petroleum," or so says the company's new advertising campaign. Id.
23 Justin Blum, Terrorists Have Oil Industry in Cross Hairs: Economic Disruption is a Key Goal, WASH. POST, Sept. 27, 2004, at A12.
24 See, e.g., Justin Blum, 51-49 Senate Vote Backs Arctic Oil Drilling: Longtime Bush Goal for Alaskan Wildlife Refuge Closer to Reality, WASH. POST, Mar. 17, 2005, at A1 (implying that record high oil prices as the impetus behind a vote to allow drilling in Alaska's Arctic National Wildlife Refuge ("ANWR")). ANWR is the second-largest wildlife refuge in America and concern for environmental damage to plant and animal life had previously shielded it from drilling. See
Roughly 50% of United States oil use may be attributed to motor vehicles.\textsuperscript{25} Automobile fuel economy in America has plateaued in the past eight years,\textsuperscript{26} while vehicle miles steadily increased,\textsuperscript{27} and automobiles continue to contribute heavily to air pollution.\textsuperscript{28} This note suggests that to avert the looming oil crisis and combat air pollution and global warming the federal government should promote hybrid gas/electric vehicles through three regulatory initiatives:

1. Reduce government fuel subsidies;
2. Allow hybrids to use all high occupancy vehicle ("HOV") lanes; and
3. Subsidize hybrid research and provide incentives for automobile manufacturers to produce hybrids.

\textbf{A. Fuel Crisis Concerns}

Energy experts have an ongoing debate about the future of oil.\textsuperscript{29} A vocal minority of experts support a theory known as 'peak oil.'\textsuperscript{30} In the 1950s a geophysicist named M. King Hubbert predicted

\begin{itemize}
\item \textsuperscript{25} INTERNATIONAL CENTER FOR TECHNOLOGY ASSESSMENT, GASOLINE COSTS AND EXTERNALITIES 1 (2005), \textit{available at} http://www.icta.org/doc/RPG%20security%20update.pdf.
\item \textsuperscript{26} Pamela Yip, \textit{MYTH, Gasoline Is Taking a Larger Bite Out of My Pocketbook. FACT, We’ve Paid Much More.}, DALLAS MORNING NEWS, May 30, 2004, at 22A.
\item \textsuperscript{27} See U.S. CENSUS BUREAU, STATISTICAL ABSTRACT OF THE UNITED STATES, Section 23. Transportation 1087 (2005), \textit{available at} http://www.census.gov/prod/2004pubs/04statab/trans.pdf (showing that vehicle miles have increased every year from 1970 to 2002).
\item \textsuperscript{28} ITALLADDSUP.GOV, Simple Steps for Drivers, http://www.italladdsup.gov/drivers/didyouknow.asp (last visited Nov. 18, 2005).
\item \textsuperscript{29} John Dillin, \textit{How Soon Will the World’s Oil Supplies Peak?}, CHRISTIAN SCI. MONITOR, Nov. 9, 2005, at 3.
\item \textsuperscript{30} David J. Lynch, \textit{Debate Brews: Has Oil Production Peaked?}, USA TODAY, Oct. 17, 2005, at 1A.
\end{itemize}
that American oil production would peak in the early 1970s.\textsuperscript{31} As it turns out, he was right.\textsuperscript{32} Since then, peak oil theorists have been trying to estimate when world oil production levels would reach their peak.\textsuperscript{33} Advocates of this theory do not suggest that all oil to be found on the globe will be depleted soon.\textsuperscript{34} Instead, they suggest that the most accessible oil is found and extracted first,\textsuperscript{35} and as the world pumps more oil the remaining oil will become increasingly more difficult and more expensive to find and extract.\textsuperscript{36} Moreover, as oil is increasingly difficult to capture, the process of searching for oil will itself demand more and more energy until the process of searching consumes more energy than it returns.\textsuperscript{37} Some experts estimate that world oil production will peak in late 2005;\textsuperscript{38} many more expect the peak to occur by 2010 or 2015.\textsuperscript{39} Both the American\textsuperscript{40} and French governments have given peak oil more consideration recently. As noted already, prominent economists and representatives from the automotive and oil industries have hinted at higher fuel prices in the future, suggesting that peak oil theory is not completely unfounded.\textsuperscript{41}

Most scientists remain optimistic about oil supplies, however.\textsuperscript{42} The argument is that "[t]echnology and politics—not

\textsuperscript{31} Kenneth Deffeyes & Peter Huber, \textit{It's the End of Oil/Oil Is Here to Stay}, \textit{TIME}, Oct. 31, 2005, at 66.
\textsuperscript{33} Dillin, \textit{supra} note 29.
\textsuperscript{34} Steve Raabe, \textit{Analyst Sees End to Oil's Heyday}, \textit{DENV. POST}, Nov. 11, 2005, at C-01.
\textsuperscript{35} See Deffeyes & Huber, \textit{supra} note 31.
\textsuperscript{36} Raabe, \textit{supra} note 34.
\textsuperscript{37} MARYLAND CONFERENCE, \textit{supra} note 32.
\textsuperscript{38} See, e.g., Deffeyes & Huber, \textit{supra} note 31. Kenneth Deffeyes estimated that oil would peak on or around Thanksgiving, 2005. \textit{Id.}
\textsuperscript{39} Dillin, \textit{supra} note 29.
\textsuperscript{41} See \textit{supra} p. 233.
\textsuperscript{42} See Lynch, \textit{supra} note 30.
geology—determine how much [oil] we pump and what it costs."\textsuperscript{43} There is an inexhaustible supply of oil in the sands of Canada and Venezuela, in the hands-off parts of Alaska, beneath coastal waters, and in the Rocky Mountains.\textsuperscript{44} If drilling in those areas is not legally permissible or economically feasible it is only because of overbearing environmental restrictions we have placed on ourselves.\textsuperscript{45} The Bush Administration has already stripped away some of the environmental barriers impeding new production,\textsuperscript{46} and with more of the same and steadily improving extraction technologies, oil should fuel American vehicles for the foreseeable future.\textsuperscript{47} Such oil optimists assert too that even if peak oil were reached, production volumes would not drop off right away, but would hover around an "undulating plateau."\textsuperscript{48}

In a recent interview, Energy Secretary Samuel Bodman was asked about the future of oil, and the theory of peak oil.\textsuperscript{49} He posited that "[t]here's plenty of oil to deal with this over the near term, five years. But if you look out over the next 20, 25 years, we expect demand to grow 50% to 120 million barrels a day. I wouldn't want to opine that's available . . . . It could be, but I don't know."\textsuperscript{50} This raises two additional points about the possible fuel crisis. First, for countries like the United States that do not belong to the Organization of Petroleum Exporting Countries ("OPEC"),\textsuperscript{51} discussion about peak oil is mere conjecture; OPEC forbids independent audits of its reservoirs.\textsuperscript{52} Second, it is important to bear in mind that whatever the actual supply is, future demand

\textsuperscript{43} Deffeyes & Huber, supra note 31.
\textsuperscript{44} Id.
\textsuperscript{45} See id.
\textsuperscript{47} See id.
\textsuperscript{48} Lynch, supra note 30.
\textsuperscript{49} Id.
\textsuperscript{50} Id.
\textsuperscript{51} Their website explains, "[t]he Organization of the Petroleum Exporting Countries is made up of eleven developing nations, whose economies rely on oil export revenues." OPEC.COM, About Us, http://www.opec.org/aboutus (last visited Nov. 18, 2005).
\textsuperscript{52} Lynch, supra note 30.
will increase exponentially in the developing world. Goldman Sachs estimates, "the number of cars in China could rise from 12 million in 2004 to 500 million by 2050; in India, the number of cars could increase even faster, from 5 million to 600 million." To relate that to U.S. demand, if China and India started consuming at even half the per capita rate of the United States, worldwide demand would increase by 96%. It has begun already; demand grew 3.5% last year. Oil optimists have this new demand abroad to contend with in addition to the aforementioned increases in vehicle miles in the United States.

Notwithstanding, such optimists abound. By virtue of their belief in abundant oil, they often propose increased exploration and production capacity—that is, augmented supply—as the solution to elevated demand and prices. One of the central thrusts of The Energy Policy Act of 2005 is to increase production capacity, both by offering tax breaks to oil companies, and by curtailing environmental limitations on oil companies to make production more profitable. What Republicans try with a carrot, Democrats would like to do with a stick. As a reaction to record profits oil companies enjoyed because of heightened demand from the

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54 Id.
55 Lynch, supra note 30.
56 Id. This is appreciably higher than the normal rate of growth, 2%. Chris Seper & John Funk, Digging Deep to Head Off Oil Crisis, PLAIN DEALER (CLEVELAND), May 29, 2005, at A1.
57 See supra p. 234.
58 See Lynch, supra note 30.
59 See, e.g., Steve Milloy, Gas Price Madness, WASH. TIMES, Oct. 31, 2005, at A18 (advocating for reduced air quality standards to prevent "environmental extremism" from getting in the way of oil production capacity).
62 Agony and Energy, supra note 46.
hurricanes, Democrats proposed a 50% windfall profits tax on all oil profit that was not reinvested in exploration or drilling.\(^{63}\)

For two decades, nations worldwide have consumed more oil than they have pumped.\(^{64}\) Production has been declining 4 to 6% a year according to Stuart McGill, senior vice president of ExxonMobil, and "[r]eserve capacity—the ability to pump oil against a crisis—is estimated today at just 1 percent to 1.5 percent of total production" while 4% is the industry standard.\(^{65}\) Environmental regulations do pose a financial burden on oil companies,\(^{66}\) and overall costs of searching for and developing oil have risen 15% per year since 2000.\(^{67}\) However, some economists believe there is something else influencing oil supply.\(^{68}\) OPEC predicts demand and manages future capacity so as to maximize profits.\(^{69}\) American oil companies then find ways to coordinate their own production to take advantage of OPEC's uncompetitive supply strategy and in turn make more money without violating American antitrust laws.\(^{70}\)

In the first half of 2005, the U.S. imported 46.2% of its oil from OPEC countries, amounting to more than 5.6 million barrels per day.\(^{71}\) Many experts believe that OPEC will only gain a

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\(^{63}\) Milloy, supra note 59.

\(^{64}\) Jeffrey Ball, As Prices Soar, Doomsayers Provoke Debate on Oil's Future, WALL ST. J., Sept. 21, 2004, at A1.

\(^{65}\) Seper & Funk, supra note 56.


\(^{67}\) Lynch, supra note 30.

\(^{68}\) See Posting of Steven Pearlstein, in response to Akron, Ohio, http://www.washingtonpost.com/wp-dyn/content/discussion/2005/09/06/D12005090600718.html (Sept. 7, 2005; 11:00 a.m.).

\(^{69}\) Id. Maximizing profits is not as simple as charging as high a price as possible; oil producers charge as much as they can without inducing governments and companies to search for alternatives. See Gas Taxes, supra note 18.

\(^{70}\) Id.; see also, Steven Pearlstein, Our Puzzling Tolerance for Oil-Price Fixing, WASH. POST, Oct. 13, 2004, at E01.

stronger hold on the oil market, and that in fact production of oil in the entire non-OPEC world will peak soon after 2010.\textsuperscript{72} As long as demand in the U.S. remains strong, OPEC will have broad power to tighten supply and keep prices high.\textsuperscript{73}

While the high volume of U.S. oil imports makes the nation vulnerable, it also means that domestic demand accounts for a large share of OPEC's fuel sales.\textsuperscript{74} Our size and market share allow us to set global trends.\textsuperscript{75} If the U.S. conserves energy and manages domestic demand, it will not only save money by consuming less, but also force OPEC to reduce prices in an attempt to generate new demand.\textsuperscript{76} Chevron CEO Dave O'Reilly endorsed demand management measures as a solution to oil strife, observing that conservation is, "the cheapest source of additional energy supply."\textsuperscript{77}

A conservation plan should be tailored to American needs. American consumers enjoy vehicles that demand large quantities of gas;\textsuperscript{78} sport utility vehicles ("SUVs") and pickup trucks are still some of the most popular vehicles in America.\textsuperscript{79} Culture and psychology limit the effectiveness of public transportation and carpooling in this nation.\textsuperscript{80} Americans enjoy "alone time"

\textsuperscript{72} Dillin, supra note 29.
\textsuperscript{73} See Posting of Steven Pearlstein in response to Akron, Ohio, supra note 68.
\textsuperscript{74} See Little, supra note 7. "We consume 25 percent of the world's energy." Id.
\textsuperscript{75} Id.
\textsuperscript{76} See id.
\textsuperscript{77} Stone, supra note 20.
\textsuperscript{79} Best Selling, supra note 78.
\textsuperscript{80} Lathrop B. Nelson, Comment, Unclogging Virginia's Roads: Aligning Commuter Incentives in Northern Virginia, 28 TRANSP. L.J. 185, 192 (2000). "Most Americans prefer traveling in their private vehicles, with more privacy, convenience, comfort and speed than that of public transportation," and solo commuting has become, "engrained in the minds of the public," and has become the norm. Id.
in their cars, and mass transit and carpooling may be impractical for many in suburban areas. It seems unlikely, therefore, that the use of cars, specifically single-occupancy vehicles, will measurably decline. Statistics bear this truth out as well: Between 1970 and 1999, vehicle miles traveled increased by 143%, far outpacing the 33% raw national population growth. The logical conclusion is that efforts to cut back on automotive vehicle use are insufficient, and that while this nation must accept its use of motor vehicles, it must also work to make them more fuel-efficient and less harmful to the environment.

Reducing American dependence on foreign oil is important for political reasons. America and the world are vulnerable to the volatile Middle East because of its oil exports. In the first half of 2005, the Persian Gulf accounted for 19.5% of American oil imports. Beyond the Middle East, other primary oil exporters are also unstable, including Venezuela and Nigeria. America consumes 26% of the world’s oil while producing only 9%, and as such will always be at the mercy of outside influences as long as it remains so dependent on petroleum.

Oil dependence undermines American efforts to promote democracy abroad. Oil independence could prove a much more powerful tool than military force to drive the democratic agenda in the world. Governments in the Middle East, Russia, Latin America and Central Asia can avoid change because of their oil money. Reducing oil consumption would erode support for corrupt regimes and force current oil-producing nations to diversify their

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81 Id.
82 Simple Steps, supra note 28.
83 Ignatius, supra note 22.
84 U.S. IMPORTS OF CRUDE OIL BY COUNTRY, supra note 71.
87 Little, supra note 7.
economies, which facilitates democratic reform. New York Times columnist Thomas Friedman asserts that, "[y]ou could actually track on a graph the rise and fall of political reform in Iran that mirrors almost perfectly the rise and fall in oil price." 

Demand for oil also leaves this nation vulnerable to terrorist attacks. Since September 11, 2001, attacks on energy targets aimed at disrupting world oil markets have increased. These attacks could potentially destabilize the U.S. and other Western economies. Some commentators go further and suggest that American oil spending indirectly finances terrorism as well.

B. Long-Term Aim: Alternative Fuel Vehicles ("AFVs")

"The personal automobile is the single greatest polluter in numerous cities across the country." In the United States, motor vehicles account for a minimum of 29% of all air pollution emissions, including 34% of nitrogen oxides, 29% of volatile organic compounds, and 51% of carbon monoxide.

Economic and political vulnerability, national security, and air pollution call for the development of motor vehicles that use significantly less gasoline and emit fewer pollutants. AFVs use fuel other than traditional gasoline, and are capable of achieving these ends. In fact, many predict that hydrogen fuel cell technology could completely reshape the auto industry. Most large auto

89 Little, supra note 7.
90 Id.
91 Blum, supra note 23.
92 Id.
93 Id.
94 Gas Taxes, supra note 18; see also Set America Free, http://www.setamericafree.org/ (last visited Nov. 18, 2005) ("We are fighting a war against terror and paying for both sides of the war.").
95 Debra L. Hart-Munchel, Comment, Hybrid Cars: How They Can Reduce American Air Pollution and Oil Consumption, But Why They Are Not Replacing Traditional Gas Guzzling Cars and Trucks Just Yet, 10 PENN ST. ENVTL. L. REV. 35 (2001).
96 Simple Steps, supra note 28.
manufacturer's have already developed prototype fuel cell cars and are currently researching the technology.\(^9\)

Many obstacles still stand in the way of hydrogen-powered vehicles, however, including transportation and storage of the fuel, and the production of reliable and cost-effective fuel cells,\(^9\) and some experts question whether fuel cells are suited to power cars at all.\(^1\)\(^0\) Above and beyond the overwhelming costs of implementing existing hydrogen fuel cell technology,\(^1\)\(^0\) another concern is that hydrogen technology would necessitate importing natural gas from OPEC countries due to our limited domestic resources,\(^1\)\(^0\) thus failing to meet many of the political and economic objectives of the energy policy shift.

Some, instead, advocate full electric cars, or cars so heavily electric as to virtually eliminate petroleum dependency and emissions (for example, hybrids that plug into parking lots, making them almost exclusively electric).\(^1\)\(^0\)\(^3\) While environmentalists continue to find hope in the possibilities of hydrogen fuel cell technology, or developing fully electric cars, or any number of other cleaner gasoline alternatives, experts predict that the conventional internal combustion engine will remain the dominant force during the first half of this century.\(^1\)\(^0\)\(^4\)

In the interim, The United States must embrace intermediate solutions towards the goals of oil independence and lower emissions within the constraints of today's technology. There has been a lot of hype surrounding biofuels, but experts warn that

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\(^9\) Schneider, supra note 97; see also Hakim, supra note 98.

\(^1\)\(^0\) Hakim, supra note 98.

\(^1\)\(^0\) Study Creates Speed Bump for Hydrogen Vehicle Dream, DETROIT NEWS, Feb. 16, 2004, at 8A.


\(^1\)\(^0\) Peter Huber & Mark P. Mills, Dig More Coal, The Hybrids Are Coming, FORBES, May 24, 2004, at 106.

\(^1\)\(^0\) Id.
production of biofuel "requires more energy than the biofuel itself yields," making it unsustainable.\textsuperscript{105}

Diesel engines are commonplace in Europe, accounting for more than half of new cars sold, and they provide better fuel economy than traditional combustion engines.\textsuperscript{106} It is expensive, however, to make diesel engines that conform to modern emissions standards.\textsuperscript{107} Moreover, "now and for years to come, the U.S. refining industry cannot produce enough diesel fuel to accommodate a significant increase in the numbers of vehicles that burn it."\textsuperscript{108} Instead, the best short-term solution to the worldwide oil crisis and to environmental concerns is the gas/electric hybrid vehicle.\textsuperscript{109}

C. Present-Day Solution: Gas/Electric Hybrid

Hybrid technology uses an electric motor to supplement a traditional internal combustion engine and thereby minimize fuel consumption.\textsuperscript{110} Hybrid technology typically saves energy in three

\begin{thebibliography}{9}
\bibitem{105} C.F. D'Elia, \textit{Ethanol May Not Be A Good Answer To Our Energy Problems}, ST. PETERSBURG TIMES (FLORIDA), Oct. 20, 2005, at 12A.
\bibitem{107} \textit{Id. See also TOYOTA.COM, Hybrid Hype? Fact and Fiction Surrounding the New Technology}, http://www.toyota.com/about/environment/technology/2004/hybrid.html (last visited Nov. 18, 2005) (noting that "[t]he best diesels on US roads today are allowed more than 17 times more smog-forming emissions than Prius," and that diesels "are not available for sale in California, New York, Maine, Vermont and Massachusetts because they do not comply with even the most lenient emissions requirements for those states").
\bibitem{109} Yoshio Ishizaka, Executive Vice President of Toyota goes further to suggest that "[h]ybrid is really not an intermediate technology . . . . We think hybrid is the technology we have to see for the future." \textit{Id}.
\end{thebibliography}
First, it employs "regenerative braking," which harnesses energy normally wasted by coasting and braking. Second, the electric motor can "assist the engine in accelerating, passing or hill climbing" (when a vehicle needs extra power), allowing the use of "a smaller, more efficient engine." Third, rather than wasting energy by idling, many hybrid engines automatically shut off when stopped, and start up again with a press of the accelerator.

Two leading hybrids, the Honda Insight and Toyota Prius, already make great strides toward achieving the aims of AFVs. Each boasts impressive fuel economy, achieving fifty-one to sixty-three miles per gallon, or better, and both rank among the best automobiles in terms of low greenhouse gas emissions. The fuel economy of these hybrids dwarfs that of the best normal combustion engine (the Mini Cooper at twenty-eight miles per gallon in the city and thirty-six on highways) and even improves substantially on the better diesel offerings (led by the manual transmission diesel Volkswagon Jetta at thirty-six miles per gallon in the city and forty-three on highways).

The numbers for the leading SUV hybrid are also encouraging: the Ford Escape Hybrid averages better than thirty miles per gallon...
gallon, as compared to most other members of its class that fall in the fifteen to twenty miles per gallon range. Noteworthy too is its low 6.2-ton greenhouse emissions level, good for an 8 (out of 10) greenhouse gas ranking, and a 9.5 for air pollutants overall from the Environmental Protection Agency.

These statistics show the success of hybrids as both low-emissions vehicles (emitting fewer fog-forming pollutants) and high fuel efficiency vehicles (mitigating effects on global warming). They thereby provide a clear picture of the present-day hybrid as a major improvement over its normal combustion engine counterparts, and a realistic short-term solution to the nation's oil and environmental problems.

With that in mind, the government currently has regulatory incentives in place which encourage the use and development of hybrid vehicles. For example, qualifying gas/electric hybrid purchasers can enjoy a one-time tax deduction of up to $2000 in the year of purchase. The deduction is not as high as that for full electric cars ($4000 credit), but it does help bridge the price gap between hybrids and conventional internal combustion vehicles. The federal government also collects a “Gas Guzzler Tax,” ranging from $1000 to $7700, depending on the car’s relative inefficiency, to discourage the production and sale of very low fuel-efficiency

\[\text{119 Id. at 13-16. FUELECONOMY.GOV, Find and Compare Cars, http://www.fueleconomy.gov/feg/findacar.htm (last visited Nov. 18, 2005) (select model year 2005, then vehicle make, and finally model/configuration).} \]

\[\text{120 Id.} \]

\[\text{121 Greenhouse gas rankings assess a car's contribution to global warming through fossil fuel combustion. Id. (follow “Annual Greenhouse Gas Emissions” hyperlink).} \]

\[\text{122 GREEN VEHICLE GUIDE, supra note 117.} \]

\[\text{123 FUELECONOMY.GOV, TAX INCENTIVES FOR ELECTRIC AND CLEAN-FUEL VEHICLES, http://www.fueleconomy.gov/feg/tax_afv.shtml (last visited Nov. 18, 2005). Taxpayers need not itemize deductions to take advantage of the clean fuel deduction, and may treat it as an adjustment to income if they take the standard deduction. Id.} \]

\[\text{124 Id.} \]
The tax penalizes cars that average worse than 22.5 miles per gallon.

Some states allow single drivers in hybrid cars to use HOV lanes. The Federal Government currently has a cooperative agreement called FreedomCAR (Cooperative Automotive Research) with automotive companies to encourage them to research, develop, and produce fuel-efficient vehicles. The FreedomCAR partnership focuses on hydrogen fuel cell technology and other long term solutions, but does not adequately invest in development and production of existing hybrid technology.

The goal of regulatory incentives should be to make hybrid vehicles constitute a larger portion of total vehicle sales, but not go so far as to encourage persons not in need of a new car to replace their current vehicle with a hybrid. It would be ironic if another more effective alternative fuel technology emerged, but spread slowly because consumers were over-committed to hybrids. Intermediate solutions must not jeopardize the desired long-term goal of zero-emissions vehicles running on efficient alternative fuel.

D. Obstacles to Broad Use of Hybrids

Fuel efficiency for all car and truck models in 2004 remained the same 20.8 miles per gallon it was in 2003, and increased a

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126 Id.
129 Id.
meager 0.2 miles per gallon in 2005.\footnote{Ken Thomas, Average Fuel Economy for 2005 Models Increases Slightly, \textit{ASSOCIATED PRESS}, Jul. 28, 2005, available at http://www.miami.com/mld/state/business/12248417.htm.} Despite the government tax incentives and other regulatory measures, gas/electric hybrids make up less than 1.5\% of all new vehicle sales.\footnote{Total US Hybrid Sales Drop in October, supra note 12.} Dramatic savings in fuel cost has not drawn in a substantial number of consumers.\footnote{Toyota Prius’ estimated $491 annual fuel cost represents a cost savings of more than $400, or forty-five percent to even the best other model in the midsize class—the manual transmission Hyundai Elantra at $899. \textit{FUEL ECONOMY GUIDE}, supra note 118.} Hybrid growth predictions are not encouraging either; J.D. Power and Associates predicts hybrids will account for only 4.1\% of the vehicle market in 2012.\footnote{David Bird, \textit{Hybrid Sales May Triple By 2012}, \textit{WALL ST. J.}, Oct. 18, 2005, at D5.}

There are a variety of possible explanations for slow hybrid sales. There are a limited number of hybrid models currently available,\footnote{\textit{Id.}} meaning that a consumer may not be able to find a hybrid that meets his or her transportation needs. Hybrid models are available in 2-doors, midsize cars, luxury vehicles, SUVs and trucks,\footnote{\textit{Id.}} but hybrids are usually smaller and lighter and consequently have less cargo space than their non-hybrid counterparts. Also, a limited (albeit growing) number of car manufacturers sell hybrids, so brand loyalty to manufacturers that do not yet offer hybrids cuts against hybrid sales.\footnote{\textit{Id.}} Some might even suggest that available hybrids’ lack of aesthetic attractiveness limits their overall appeal.\footnote{“While not exactly ugly, the [hybrid Toyota] Prius’ looks are somewhere between bland and uninspired, like a visual rice cake. If you own a Prius, no one will ever look at it and say ‘Nice car.’” Neil Dunlop, \textit{Follow-Up Test: 2002 Toyota Prius}, \textit{EDMUNDS.COM}, Jan. 28, 2002, http://www.edmunds.com/reviews/roadtests/spin/48986/article.html.} Originally the “[Toyota] Prius was designed to accommodate the transmission, [but] the newest design of the
transaxle, with new planetary gear systems, is compact enough to fit in the footprint of a normal automatic transmission." The trend now is not to create hybrid models from thin air, but to offer hybrid versions of regular models; hybrids need not look different any longer.140

Hybrids are mechanically different, however. Another hindrance for hybrids is that “service and repair information has been slow to trickle down to the independent auto repair industry,” and “independent technicians have historically played a significant part in the public’s perception of new automotive technologies.”141

Perhaps the greatest barrier to hybrid expansion is that profit margins are slimmer for hybrids than for conventional combustion engine vehicles.142 Even if there is demand for fuel-efficient vehicles, manufacturers will drag their feet if there is not adequate money in it. If more hybrids were sold, manufacturers could capitalize on economies of scale and costs would decrease. However, some critics of the technology, including Nissan CEO Carlos Ghosn, suggest that hybrids are inherently more expensive to manufacture.143 Ghosn contends that as things stand today, “the value [of hybrids] is lower than their cost.”144 Honda executive John W. Mendel says that “to make it really work, the cost has to be cut in half . . . . the cost of batteries is very high.”145 Some of these costs are passed through to consumers, resulting in cars that are thousands higher than their combustion engine counterparts, limiting their appeal to consumers.146

140 Id.
143 Id.
144 Id. By way of example, Ghosn said that Nissan’s new hybrid Altima will be profitable, but not nearly to the extent of the combustion-engine Altima. Id.
145 Brooke, supra note 53.
146 Id.
The government needs to make strides toward transforming hybrid technology from a high-profile curiosity to an industry standard, to move hybrids vehicles from the fringe to the mainstream. Concerns for American economic and political stability, national security and environmental protection demand no less. The government must alter its regulatory policies now to protect these interests before the problems overwhelm our nation.

I. REDUCE GOVERNMENT FUEL SUBSIDIES

America provides as much as $14 billion of direct fossil fuel subsidies annually, and the Bush Administration is promoting even larger ones.\textsuperscript{147} Some estimate the true cost of oil for the U.S. at more than $100 a barrel,\textsuperscript{148} almost twice that of the recent price consumers complain about.\textsuperscript{149} The gradual complete halt of "fossil fuel subsidies is a \textit{sine qua non} of promoting renewable resources."\textsuperscript{150}

In addition to direct tax subsidies, some commentators cite indirect subsidies, including transportation funding, military costs of defending oil supply lines, and a wide variety of government energy and transportation programs.\textsuperscript{151} Some of the indirect costs arguably serve other purposes as well though,\textsuperscript{152} and because they are indirect they would be less likely to have an impact on fuel prices. Cuts should therefore focus on tax subsidies.

\begin{footnotes}
\footnote{148} Id. at 344.
\footnote{149} Justin Blum, \textit{Supply Fears Drive Oil's Price Higher}, WASH. POST, Mar. 4, 2005, at E01.
\footnote{150} Ottinger, \textit{supra} note 147, at 345-46.
\footnote{152} See, e.g., Posting of Steven Pearlstein in response to "We don't all want to eat brown rice," http://www.washingtonpost.com/wp-dyn/content/discussion/2005/04/26/ID200504260552.html (Apr. 27, 2005, at 11:00 a.m.) (explaining that highway funds do not merely support an environmentally undesirable lifestyle; they also stimulate the economy).
\end{footnotes}
Removing the federal buffer that masks the direct costs of oil would provide a strong incentive for American drivers to seek more fuel-efficient vehicles. Moreover, funds previously tied up in fossil fuel subsidies could then be redirected to research and development of hybrid technologies, or to the promotion of corporate production of more efficient and environmentally-friendly technologies.\(^{153}\)

There are two barriers to the removal of fossil fuel subsidies. First, it would be politically difficult to remove the subsidies because the resulting elevated gas prices would be unpopular.\(^{154}\) Second, powerful fossil fuel lobbyists, such as the American Petroleum Institute, will fight any measures that would adversely affect the industry.\(^{155}\) Decisionmakers might yet eliminate fuel subsidies if reductions were incremental and received the support of members of the automotive industry to counterbalance the weight of the petroleum lobby.

Some scholars advocate discouraging fossil fuel consumption by going a step further and enforcing a sharp tax on gas.\(^{156}\) Gas taxes are justifiable not only because they promote conservation, but because they purport to internalize actual externalities inherent in oil use—especially environmental costs to society.\(^{157}\) Critics of the idea point out that Europe has employed such a tax, and identify that fact as one of the reasons that United States gross domestic product outpaces that of the nearest European competitor, Switzerland, by 17%.\(^{158}\) What is more, the political opposition to gas taxes would be formidable,\(^{159}\) and far worse than

\(^{153}\) Ottinger, supra note 147, at 344.

\(^{154}\) Id.


\(^{156}\) See, e.g., TODD LITMAN, VICTORIA TRANSP. POL’Y INST., APPROPRIATE RESPONSE TO RISING FUEL PRICES 1 (2005), available at http://www.vtpi.org/fuelprice.pdf (encouraging citizens to write their representatives to increase gas taxes).

\(^{157}\) See THE REAL PRICE OF GASOLINE, supra note 151.

\(^{158}\) Milloy, supra note 59.

\(^{159}\) See Robert J. Samuelson, Editorial, Oil Fantasies, WASH. POST, Oct. 6, 2004,
that for subsidy cuts. Even if gas taxes raised the price of gasoline to consumers no more than cuts, there would be much more criticism of the taxes because they come directly out of the pockets of consumers instead of from the pockets of oil companies.

Perhaps the greatest worry with measures that significantly increase the cost of gas is the adverse effect on low-income commuters. Most proponents of a gas tax would soften the impact on indigent drivers by providing tax breaks for them in other areas of the code, like augmenting earned income tax credits. Only one quarter of total car operation costs are attributed to gas, however, and three out of four trips are personal travels rather than work commutes. The government should not subsidize every trip when only 1/16th of the subsidy benefits travel for employment purposes. Moreover, other initiatives better target the needs of low-income commuters, including “improved walking and cycling conditions, improved public transit services, Pay-As-You-Drive vehicle insurance, carsharing, Location Efficient Housing and improved public service in lower income areas . . . .”

Reducing fuel subsidies is a perfect fit to encourage fuel efficiency. Other incentives reward especially fuel-efficient vehicles, but they do not differentiate between smaller differences in fuel economy. With fuel subsidy reductions, however, all drivers bear gas costs based on the amount of fuel they consume,

at A27 (observing that “fuel tax is a political showstopper”).

Litman, supra note 156.

See, e.g., Gas Taxes, supra note 18.

Litman, supra note 156.

Id.

Id.

Id.

Moreover, as emissions generally loosely correspond to fuel economy and public transportation provides overall low emissions, it is a good fit for encouraging low emissions as well. See Greenest and Meanest Cars, MSNBC.COM, http://www.msnbc.msn.com/id/6969339/ (last visited Nov. 18, 2005) (providing charts that allow comparisons of the most and least environmentally-friendly vehicles sold in America).

See, e.g., TAX INCENTIVES FOR ELECTRIC AND CLEAN FUEL VEHICLE SYSTEMS, supra note 123. The tax deduction for hybrids is a flat amount for all qualifying hybrids. Id.
and hence their burden directly corresponds to their share of the adverse effects of oil use on the environment, national security, and economic instability.

As a final qualification, the efficacy of subsidy cuts at promoting hybrids depends on the extent to which these cuts lead to increases in the price of fuel to consumers, and the extent that increases in fuel prices affect consumer behavior. Oil Companies will not allow the price of oil to get so high that companies and governments start looking hard for alternatives, so some of the cuts would be internalized by the industry rather than passed through to consumers. Also, demand for energy is relatively inelastic: "[a]t the gas pump, a 10 percent increase in price leads to a decline of about 2 percent demand." Experts suggest that gas prices would have to increase to $4 or $5 a gallon to dramatically impact hybrid sales. However, even if subsidy cuts themselves only modestly increased demand for hybrids, the money could be redirected to corporate incentives and research and development that would have a deeper impact.

II. ALLOW HYBRIDS TO USE HIGH OCCUPANCY VEHICLE ("HOV") LANES

Economic incentives should be a compelling motive for most American consumers, but wealthier suburban drivers may have enough disposable income not to be swayed by economic bait. Tax incentives for hybrids have not had a deep impact, and while decreasing fuel subsidies could persuade a large section of the population to drive hybrids, other targeted measures may be more effective in reaching affluent drivers.

167 Milloy, supra note 59.
168 Bernasek, supra note 5.
170 See discussion infra Part III, p. 258.
Until 2004, Virginia was the only state in the nation to provide for an HOV hybrid vehicle exception, allowing single-occupancy hybrids to use the lanes. Increasingly, however, other states are exploring similar exceptions. Virginia's exception continues to allow hybrids in HOV lanes at least until the middle of 2006. Pursuant to department task force reports from mid-2004 and early 2005, however, the Commonwealth might not renew its HOV hybrid exception in 2006.

California, which traditionally allowed HOV use only for super low emission vehicles ("SLEVs"), recently passed a bill that would allow use of HOV lanes by hybrids. Under the new state law, California will issue 75,000 decals permitting hybrids that enjoy better than 45 miles per gallon (presently only the Honda Insight and Toyota Prius) fuel economy to use HOV lanes. California has 40% of all American HOV lanes, and 29,000 of the 127,000 hybrids currently on America's roads, so many hybrid owners will enjoy the HOV perk.

The Federal Highway Bill passed in August, 2005, delineated rules for state hybrid vehicle exceptions: it provides that

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174 FAQs FOR VADOT HOV SYSTEMS, supra note 127.
175 Id.
176 Ackman, supra note 171.
177 Id.
180 Steven Ginsburg, Update: With U.S. Allowing Hybrids in HOV Lanes, States'
states may allow hybrids that meet certain fuel efficiency standards to use HOV lanes, as long as they are not a burden on traffic congestion. The formula for calculating fuel efficiency allows states to extend HOV access to hybrid SUVs and trucks as well as cars. States considering new exceptions for hybrids must consider these parameters.

There are a number of arguments for keeping single occupancy hybrids off HOV lanes. HOV lanes are designed to encourage carpooling, reduce traffic congestion, and decrease the total number of cars on the road. Hybrids might discourage rather than encourage carpooling. If hybrid drivers need not carpool to use the lanes, they may stop doing so, and others may purchase hybrids so they no longer have to go to the trouble of carpooling.

However, HOV lanes might not measurably encourage carpooling anyway, but merely offer bonus to those who are already carpooling. Slugging, essentially organized hitch-hiking to take advantage of HOV lanes, is one variety of carpooling that appears to take place only because of HOV. Even slugs might carpool out of necessity though (because they have no car, for example) and might not be foregoing solo driving for the HOV privilege. Supporters of Virginia's hybrid HOV exception suggest that it is not uncommon for hybrid owners to carpool even though they have the privilege of using the HOV lanes alone. Also, if

Battle Is Just Around the Bend, WASH. POST, Sept. 4, 2005, at C02.

184 Steven Ginsberg & Carol Morello, As Hybrid Cars Multiply, So Do Carpooling Gripes, WASH. POST, Jan. 7, 2005, at A01 (defining slugs as "people who form carpools at set spots so they can use high-occupancy vehicle lanes"). Slugs comprise about ten percent of traffic in the HOV Lanes of I-95. Lior Jacob Strahilevitz, How Changes in Property Regimes Influence Social Norms: Commodifying California's Carpool Lanes, 75 IND. L.J. 1231, n.36 (2000).
185 See, e.g., Chris L. Jenkins and Michael D. Shear, Va. Delegates Add Fines for
cold starts greatly diminish carpooling's environmental benefits," the reduced emissions of hybrids might justify their presence in the lanes.

Reducing congestion is an environmental and social priority too, however; each year "congestion costs U.S. travelers 4.5 billion hours of delay, 6.8 billion gallons of wasted fuel and $78 billion in wasted time and fuel." In Virginia, slugs and other carpoolers complain that hybrids clog up HOV lanes and render them useless for everyone. If HOV lanes crawl along at slow speeds, the reduced fuel efficiency that results from deviating sharply below the optimum fifty-five miles per hour velocity will adversely affect fuel economy and greatly reduce the environmental benefits of HOV lanes.

Others suggest, however, that the real problem is not hybrid drivers, but single-occupant vehicles in violation of HOV restrictions. If so, then at least part of the solution to congestion woes may simply be stricter HOV enforcement. Hybrid exception opponents rejoin that even if hybrids are not at fault for overcapacity

Driving Errors, WASH. POST, Feb. 6, 2005, at C01 (mentioning a woman who owns a hybrid saying that, although she is allowed to use the HOV lanes alone, she always picked people up because she believes in carpooling).

U.S. Dep't of Transp. Fed. Transit Admin., Re-thinking HOV—High Occupancy Vehicle Facilities and the Public Interest, http://ntl.bts.gov/DOCS/retk.html (last visited Nov. 18, 2005). "As much as half of an average trip's pollution is during the engine's warm-up ('cold start') and cool-down ('hot soak'). When people drive to meet a bus or carpool, their car emissions are still high enough that the air quality benefits of their ridesharing are minimal." Id.

Simple Steps, supra note 28.

For the definition of a 'slug' see supra note 184.

Ginsberg & Morello, supra note 184.


Ron Shaffer, A Plea to End Hybrid Exception, WASH. POST, Feb. 10, 2005, at PWO1.

Id. Critics point out that because hybrid drivers need not have passengers they are more difficult to distinguish from violators, complicating enforcement. Id.
at present an influx of hybrids would overrun the HOV lanes. Proponents answer that such fears admit that the exception works very well to encourage more environmentally-friendly car purchasing in Virginia; the exception could always be revoked later in the event of future overcrowding. Both sides acknowledge that many hybrid owners occupy the roads in Northern Virginia, many of whom purchased the vehicles to take advantage of the HOV hybrid vehicle exception.

Hybrid HOV use would actually reduce congestion in locations with below capacity HOV lanes. If hybrids move out of overburdened general purpose lanes and into lighter volume HOV lanes, traffic is spread more evenly and congestion levels improve. Proponents of hybrid HOV might point out too that single-occupant motorcycles are often allowed to access HOV lanes despite the fact that they do not combat congestion, and so hybrids should be able to as well. Notwithstanding hybrid ability or inability to achieve the aims of HOV, some voice concerns that hybrids buy the rich a quicker commute. While hybrids are not too much more expensive than other comparable new cars, the poor are more likely to buy used cars. The impressive environmental benefits of


\[195\] Editorial, *The Hybrid's Free Ride*, WASH. POST, Jan. 16, 2005, at B06. Virginia sales of hybrids are second only to those of California because the HOV incentive has been so effective in encouraging the use of new hybrids. Id.

\[196\] Id. According to Toyota Dealer Jay Taye, “[approximately] 95 percent of the people who buy a [Toyota] Prius—one of the hybrid models with HOV privileges—‘say it’s to get into [the] HOV [lane].’”); Dave Diamond, Letter to the Editor, *Giving Hybrids a Break*, WASH. POST, Jan. 27, 2005, at A18. (“While some people are willing to pay a premium for the satisfaction (or status) of helping the environment, the average car buyer, short of additional incentives, will still buy the car that costs less.”).

\[197\] See, e.g., FAQs FOR VADOT HOV SYSTEMS, supra note 125 (declaring that motorcycles may use Virginia HOV lanes, though the commonwealth’s HOV Task Force suggests the Virginia General Assembly discontinue the Hybrid HOV exception when it comes up in 2006).
hybrids\textsuperscript{198} should, however, be enough to compensate for these social concerns.

States should promulgate exceptions for single occupancy hybrids to allow them to use HOV lanes. The environmental benefits of hybrid-driving are on par with those of carpooling. Hybrid drivers should be allowed to drive solo in HOV lanes, but because hybrids do not reduce congestion, carpoolers should take precedence if there is insufficient capacity to support both groups. In the event that HOV lanes are overrun with hybrids, the federal government could allow for hybrid use only during periods of low traffic volume.\textsuperscript{199}

Hybrids vary significantly in emissions control design, fuel efficiency and other environmental performance measures, and only the most effective should qualify.\textsuperscript{200} These exceptions should not extend to hybrid trucks and SUVs until those vehicles are as efficient fuel-efficient as hybrid cars. There is no good reason to justify allowing a hybrid SUV with a single occupant into HOV lanes while denying that access to someone in a compact car with comparable or greater fuel efficiency.\textsuperscript{201} Hybrid HOV exceptions should not persist indefinitely, and must have rigorous standards updated frequently. Standards should focus on providing benefits to fuel efficiency outliers.

A hybrid HOV exception would be a big draw to people in suburban areas, especially those with high income who might not be swayed by economic incentives. To some, time is more valuable

\textsuperscript{198} See supra pp. 245-46.

\textsuperscript{199} The Virginia Department of Transportation task force proposed this as a possibility. HOV Task Force, Second Report of the High Occupancy Vehicle Task Force 11-12 (2004), available at http://www.virginiadot.org/infoservice/resources/HOV%20Task%20Force%20Report%201-4-05.pdf. Other possibilities the task force raises include charging fees for hybrid tags or limiting the number of hybrids to get the exception (either first-come, first-serve or by lottery). Id. at 11-12.

\textsuperscript{200} See Gerry Malloy, Hot Wheels for Friends of the Earth, TORONTO STAR, Nov. 10, 2005, at K02.

\textsuperscript{201} See Warren Brown, Oil Companies Deserve An Honest Grilling, WASH. POST, Nov. 13, 2005, at G02 (making a parallel argument that hybrid SUVs should not be allowed tax breaks over more efficient compact traditional gasoline cars).
than money, and the HOV exception could therefore attract a different set of drivers.

III. SUBSIDIZE HYBRID RESEARCH AND PROVIDE INCENTIVES FOR AUTOMOBILE MANUFACTURERS TO PRODUCE HYBRIDS

The Clinton Administration created the Partnership for New Generation Vehicles ("PNGV") as its government automotive technology cooperative. This program aspired to encourage fuel-efficient car production without sacrificing "safety performance, affordability or compliance with emission standards."203

George W. Bush's FreedomCAR, the successor to PNGV, specifically encourages the development of hydrogen fuel cells, rather than the improvement of available technologies.204 The ultimate goal of FreedomCAR is to develop a cost-effective hydrogen fuel cell car by the year 2020.205 FreedomCAR is flawed in two ways: it allocates a disproportionate amount of resources to hydrogen research over hybrid research, and it provides a wholly inadequate budget.206

203 Id.
205 Speed Bump for Hydrogen, supra note 101.
206 DEP'T OF ENERGY, OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY, FY 2006 BUDGET REQUEST 16-17 (2005), available at http://www.eere.energy.gov/ba/pdfs/fy07_budget_request.pdf. The 2005 Department of Energy Budget allotted roughly $169 million to hydrogen research, and only $45 million to hybrid and electric propulsion research. Id. Anne Korin, director of policy and strategic planning for the Institute for the Analysis of Global Security, captured the situation well, noting that, "[t]he President outlined a moonshot . . . . but to get to that moonshot there are a lot of things we need to do along the way . . . . [w]e don't have time to wait for perfect solutions." John J. Fialka, Unlikely Allies Fight US Oil Dependence, WALL ST. J., Mar. 28, 2005, at A4.
207 Cook, supra note 102. According to Amy Meyers Jaffe of Rice University, "the amount of money we're spending is small compared to the magnitude of the
Focusing on hydrogen fuel cell technology fails to address a major concern with current petroleum economy: eliminating dependence on imports from the Middle East. Almost all of the hydrogen used worldwide today is refined from natural gas, and because this the cheapest way to produce hydrogen, it is the likely source for hydrogen fuel cells for some time to come. Even at America’s present rate of natural gas usage, President Bush’s National Energy Plan (“NEP”) projects that “demand for natural gas will likely exceed domestic production” by the year 2020. Beset with new demands from natural gas for hydrogen fuel cells, America would find herself again forced to import fuel from the Middle East.

Provided that the country could find a way around reliance on natural gas imports, the technology gap between present hydrogen prototypes and the cost-efficient and consumer-friendly hydrogen automobile remains enormous. Current fuel cells “cost at least [ten] times more than a gasoline engine,” and current “fuel-cell vehicles have half the driving range of a conventional vehicle.” Larry Burns, GM’s Vice President for Research and Development described it as “[trying] to literally reinvent the automobile.”

Beyond the vehicle cost, the cost of infrastructure changes necessary to support a fleet of hydrogen automobiles is daunting. Shell Oil Company estimates that adding hydrogen to its 44,000 existing gas stations would cost $19 billion and could even then

challenge.” Id.

Id.


Joyce, supra note 24.

Cook, supra note 102.

Speed Bump for Hydrogen, supra note 101.


Hydrogen Research, supra note 209.

Speed Bump for Hydrogen, supra note 101.
support only two percent of American vehicles. \(^{216}\) Finally, hydrogen fuel itself—even when produced most cheaply from natural gas—costs three to four times as much as gasoline. \(^{217}\)

To accomplish these Herculean scientific feats, The Department of Energy's 2006 Budget Proposal requests approximately $183 million for hydrogen and fuel cell research. \(^{218}\) The Department requests less than $49 million for hybrid research. \(^{219}\) America imports 11 million barrels of oil a day, \(^{220}\) and current prices range between $50-55 a barrel. \(^{221}\) America therefore spends twice its annual hydrogen and hybrid research and development budget on imported oil every day. \(^{222}\) The antidote is not proportional to the poison.

Admittedly, part of the problem is that the Bush plan targets a breakthrough within fifteen years, \(^{223}\) and other estimates for the realization of hydrogen-fueled vehicles suggest that it will take longer. \(^{224}\) The FreedomCAR Initiative is in every sense an investment in the future of the automotive industry. Hydrogen fuel cells will likely eventually revolutionize transportation, but the industry is facing challenges that need to be addressed today. \(^{225}\) To that end, the federal government must allocate much more extensive funds for hybrid technology, and either offer incentives for automobile manufacturers to sell fuel-efficient vehicles or deterrents to companies falling behind.

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\(^{216}\) *Id.* GM is even less optimistic, estimating a cost of $10-15 billion for just 12,000 hydrogen filling stations. *Id.*


\(^{218}\) *Id.* at 17.

\(^{219}\) *PRESIDENT'S HYDROGEN FUEL INITIATIVE,* *supra* note 213.

\(^{220}\) *Id.*

\(^{221}\) Blum, *supra* note 149.

\(^{222}\) *Id.*

\(^{223}\) *PRESIDENT'S HYDROGEN FUEL INITIATIVE, supra* note 213.

\(^{224}\) See *Speed Bump for Hydrogen, supra* note 101.

\(^{225}\) Hybrids are the current solution for environmental agendas too. Sierra Club global warming specialist Daniel F. Becker said that hydrogen fuel cell technology is a "long-term hope, but in the meantime we want to use the technology available today to make clean hybrids." Hakim, *supra* note 98.
A. Hybrid Research Subsidies

Government funding for hybrid research and development can directly promote the implementation of hybrid technology in two ways that consumer incentives cannot. First, it can reduce the costs of hybrids and improve profit margins for manufacturers which, as an added benefit, would eventually pass savings through to consumers. Second, it can improve the handling and functionality of hybrid vehicles and facilitate the effective integration of hybrid technology into every class of vehicle on the road.

Though automobile manufacturers turn a profit selling hybrids, the profit margin for hybrids is substantially slimmer than that for their traditional internal combustion counterparts. This is true even with some of the extra costs passed through to consumers in the form of higher sticker prices. Until costs for hybrids become more comparable to those of normal combustion vehicles, manufacturers will be reluctant to increase production to match demand. Hybrids do not require nearly as dramatic cost reductions as hydrogen fuel cells do. The requisite modest cost cuts should be achievable, especially if expedited by federal funding. For a government-subsidized research and development success story, one need look no further than to the pioneers in hybrid technology, the Japanese automobile industry. Leading hybrid manufacturers Honda and Toyota benefitted from Japanese

226 Ghosn Not Sold, supra note 142 (Nissan CEO Carlos Ghosn, a skeptic of hybrids, nevertheless admits that the Altima hybrid will be profitable).
227 Id.
228 PRESIDENT'S HYDROGEN FUEL INITIATIVE, supra note 213. Hydrogen fuel cells are currently a full ten times the cost of combustion engines. Hybrids are far ahead, capable of making a profit even at low production levels without the benefit of economies of scale. Id.
230 Cook, supra note 102.
government subsidies, and the automobile industry in America stands to benefit similarly from American research funds.

B. Corporate Incentives

Major cost breakthroughs for hybrids might not materialize until after years of research and development, even with the benefit of federal funding. Hybrid technology should not be put on hold while overdue research plays catch-up. With demand burgeoning from consumers seeking HOV incentives and others who cannot handle gas prices without the cushioning of government fuel subsidies, the federal government should bridge the gap to make hybrid technology a good business risk for manufacturers to take right now.

In the short term, corporate tax breaks for hybrid revenue could help compensate for slimmer profit margins. Broader patent coverage or extended patent duration for automotive breakthroughs might induce companies to take a chance on hybrids. Such incentives should be tailored specifically to vehicles that reflect a substantial improvement over their normal combustion counterparts.

In addition to redirecting funds from fuel subsidies, the federal government should also fund corporate tax incentives by redirecting tax cuts now earmarked for individuals. $2000 tax deductions are available this year for purchasers of hybrid vehicles. Beginning in 2006 when the deductions expire, the Energy Policy Act of 2005 provides for new tax credits for hybrids, ranging from $1700 to $3000 depending on the model.

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231 See id.
233 See TAX INCENTIVES FOR ELECTRIC AND CLEAN-FUEL VEHICLES, supra note 123.
234 Chris Woodyard & Sandra Block, Energy Bill Offers Rich Rewards for Hybrids, USA TODAY, Aug. 1, 2005, at 1B.
However, the bill caps the number of taxpayers that can take advantage of the tax breaks for each manufacturer. The result is that industry leaders Toyota and Honda, Japanese companies that already sell many hybrids, will exhaust consumers' tax incentives very rapidly. This measure does not even-handedly promote hybrid technology, but instead assists domestic hybrids manufactured by Ford and General Motors in their attempts to catch up with Japanese hybrid manufacturers.

Another unfortunate feature of the tax credit is that it provides incentives for hybrid SUVs and trucks as well as cars. It is desirable to encourage the sale of hybrid trucks and SUVs over their gas-guzzling kin, but the conundrum is that to do so in the form of tax breaks to consumers might also lead members of the public to purchase a hybrid SUV or truck instead of a compact normal combustion car that gets even better mileage. Moreover, it seems unfair to deny tax breaks to poor people who drive efficient compact cars and cannot afford the price of a hybrid in favor of providing breaks for affluent people buying hybrid SUVs.

Individual tax incentives in the Energy Policy Act of 2005 cost $874 million. The government should use that money to structure tax incentives for corporations in such a way that the money is directed toward reducing the cost of hybrids and the price to consumers. By passing such savings through the corporations, the government may be able to give consumers the benefit of lower prices while at the same time encouraging automobile manufacturers to invest in hybrids to the exclusion of their traditional internal combustion models. This would also encourage consumers to buy hybrid trucks and SUVs instead of normal combustion versions of

236 Id.
237 See id.
239 See id.
240 Id.
241 Id.
those lines, and without the tacit endorsement inherent in the SUV tax deduction, consumers may be less likely to switch from the compact car they would otherwise buy.

As demand responds to the more competitive prices of hybrids, greater sales will allow manufacturers to take advantage of economies of scale, thereby reducing costs. Once cost parity is achieved for hybrid technology, corporate incentives can be rolled back, having served their purpose. In the meantime though, corporate incentives have the potential to be a catalyst for the hybrid revolution.

IV. LOOKING FORWARD: CAFE STANDARDS

As hybrids become more popular, the government must act to ensure that they ultimately replace gas-guzzlers. Corporate Average Fuel Economy ("CAFE") standards were once the other side of the corporate incentive coin, enforcing fuel economy levels for automobile manufacturers to limit the power of OPEC and to achieve environmental objectives.243

A. The Old CAFE System

From 1978 to 1987, "the average fuel efficiency of new American-made cars rose by over two-fifths,"244 and "[f]rom 1977 to 1985, America's GDP rose by 27%, but its oil use dropped 17% by volume . . . [and] net oil imports fell by nearly 50% during that time."245 After raising the CAFE standard to 27.5 miles per gallon in 1985, Congress left the standard unchanged for twenty years.246 Further undermining the program's effectiveness, a provision in the original 1975 act which holds light trucks to a less stringent standard because "they were used mostly by farmers and small

244 Id.
245 Id.
246 Cook, supra note 102.
businesses,” now allows SUVs and other light trucks (which currently make up 54.5% of the market) to dodge the brunt of the standards.

The original conception of the CAFE program was controversial, even when it seemed effective. Detractors dismiss the improvements in fuel efficiency during the period CAFE was kept up-to-date, characterizing them as changes that would have occurred in response to consumer demand anyway. When the government forced automobile manufacturers to improve fuel efficiency, manufacturers reflected that burden in the price of their vehicles, so car purchasers ultimately bore the cost of the improvements. Critics blame CAFE for “limit[ing] manufacturers’ design choices, hamper[ing] the automobile industry’s ability to respond to ensuing energy cycles and concomitant consumer demand, and contribut[ing] to a fleet of older, less efficient vehicles on the country’s roadways.”

B. The New CAFE System

In mid-2005, the Bush Administration finally proposed a new CAFE system with new standards to take effect in 2008.

249 Middleton, supra note 247, at 206-07.
250 See id. at 430.
251 Id.
254 Zachary Coile, New Auto Standards Fuel Debate, SAN FRANCISCO CHRON.,
With traditional fleet averages, automakers did not need to adhere to fuel economy rules for individual vehicle models, but were judged based upon the average performance of their fleet as a whole. The new rules instead provide separate standards for cars and trucks, and within the truck segment provide six different size classes, each with a corresponding fuel efficiency standard. Some reformists had advocated closing the “SUV loophole" by raising fuel economy demands of light trucks to the same standard enforced on cars. Experts cautioned that excessive fuel economy demands could make trucks and SUVs much less safe. Taking this concern to heart, the Bush Administration's recent proposal promotes modest, targeted increases in fuel efficiency, "encourag[ing] manufacturers not to reduce weight to improve mileage, but to take steps like putting better technology under the hood, from hybrid electric systems to more efficient transmissions, or perhaps de-emphasizing horsepower." This new configuration also means, however, that nothing is to stop a manufacturer from having an entire fleet of heavy trucks...

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257 Debra J. Saunders, Close SUV Loophole, San Francisco Chron., May 10, 2001, at A29 (stating that light trucks weigh more than cars, and so would need disproportionally more fuel efficiency than cars).
258 Id.
259 Danny Hakim, Does Lighter Equal Deadlier?, N.Y. Times, Aug. 20, 2005, at 4; see also Gary Witzenburg, Time Out at the No Free Lunch CAFE: What Has CAFE Really Done to Our Driving Habits?, Car Connection, Apr. 25, 2004 (explaining that most of the easy improvements in vehicle efficiency have been made already, adding that additional changes are more likely to cut into qualities that consumers value, including safety, cargo capacity, and performance).
260 Hakim, supra note 259.
that would only need to meet the lowest efficiency threshold.\textsuperscript{261} Extra large trucks and SUVs that exceed 8500 pounds, like the Hummer H2 and the Ford Excursion, are assumed to be for commercial use whether they actually are or not, and are thereby excluded from all regulation.\textsuperscript{262} The tiered structure for trucks might encourage manufacturers to alter the dimensions of vehicles to make them fit into larger vehicle classes rather than improve fuel economy.\textsuperscript{263} The fuel economy level for passenger cars is unchanged by the new rules, remaining 27.5 miles per gallon.\textsuperscript{264}

The new bill is predicted to have little or no effect on oil demand,\textsuperscript{265} and is seen by some as a victory for American automobile manufacturers and their gas guzzlers.\textsuperscript{266} While the new CAFE plan may not be designed to conserve energy, with a few adjustments it could serve to supplement other incentives by keeping the worst gas guzzlers off the road. If the floor were more demanding for some of the larger truck categories, and if the exception for non-commercial extra large sport utility vehicles was eliminated, then the new CAFE standards would tie up some loose ends in the quest for fuel conservation.

The benefits of a more robust, revamped CAFE would not accrue immediately, as many used cars on the road today would be the worst offenders, and are not subject to the CAFE standards as

\textsuperscript{261} See Coile, supra note 254.
\textsuperscript{262} Id. These extra-large vehicles enjoyed the same exception under the old system as well. Id.
\textsuperscript{263} Id.
\textsuperscript{264} Id.
\textsuperscript{265} CAFE Proposal Unlikely to Reduce Oil Use, supra note 256. The Transportation Secretary predicted that over two decades the new standards would save 10 billion gallons of oil—less than the United States consumes in a month. Hakim, supra note 259.
\textsuperscript{266} Coile, supra note 254. American automobile manufacturers retort that the old system strongly favored the foreign manufacturers; because the foreign companies like the Japanese sold so many smaller vehicles, they were free to sell trucks as large and inefficient as they wanted without jeopardizing their average. Id. Meanwhile, to be able to sell the large SUVs that were in demand, American automakers sometimes had to sell small trucks at a loss to have their average work out right. Id.
new cars are. Average vehicle life is roughly fourteen years, so most dated gas guzzlers would die off within a decade and a half, replaced by more environmentally-friendly vehicles.

V. ARGUMENTS AGAINST HYBRID SUBSIDIES

Some critics argue that government regulatory incentives run the risk of promoting inferior technologies. There is a sense that the market produces smarter results than government incentives do; the latter may attempt to jump-start technologies that will never become profitable. Indeed, some have suggested that car manufacturers are secretly taking losses on the production and sale of hybrids, but the leading producer, Toyota, has specifically denied this. As admitted above, hybrids do not yet boast profit margins like those of normal combustion engines, but those costs will come down with government investment in hybrid technology research and development. Even so, some would suggest that the fuel economy alone should sell the hybrids and, if not, the government should not force them on the consumer.

Other critics suggest that hybrids do not live up to the fuel efficiency hype. EPA estimates are always overstated though.
not just for hybrids but for all vehicles. The optimism is just magnified slightly with more fuel efficient vehicles. The overall effect is undiminished—the top hybrids still outperform their traditional combustion engine cousins by a very wide margin.

Scaling back incentives for fossil fuels reduces a long-standing market slant, and should thus actually be more desirable to those who believe in the market. While allowing hybrids to use HOV lanes is an incentive, it does not require the outlay of funds by the government, and in systems operating below capacity would improve congestion by shifting traffic from overburdened general public highways to underutilized high-occupancy vehicle lanes. Finally, cutting the fossil fuel subsidy could provide funding to promote hybrid technology to bridge the gap to more distant alternative fuels. Applying research funds to hybrids as well as to alternative fuel vehicles would diversify the investments in technological research, providing a more flexible position with regard to which technologies are implemented.

As a final concern, some hybrid critics fear that a push for fuel efficiency will make vehicles less safe. In Competitive Enterprise Institute v. National Highway Traffic Safety Administration, plaintiff citizens group brought suit against the National Highway Traffic Safety Administration ("NHTSA") for hindering automotive safety by enforcing CAFE standards of 27.5 miles per gallon instead of the 26.5 the group advocated. The group alleged the CAFE standards "force carmakers to produce smaller, less safe...

EPA mileage estimates outdated so that sticker rates can overstate actual mileage by as much as 34%); see also James R. Healey, Fudging Overall Fuel Economy, USA TODAY, Aug. 18, 2004, at 2B (explaining how mileage is stated differently by companies than the way it is evaluated under the CAFE standards).

Healey, supra note 274.

Id.

Id.


Id. at 322-23.
cars, thus making it more difficult and expensive for consumers to buy larger, safer cars." The court found the plaintiff's argument persuasive, especially because the NHTSA admitted that "as a general matter small cars are less safe than big ones." The court "order[ed] NHTSA to reconsider the matter and provide a genuine explanation for whatever choice it ultimately makes [between vehicle safety and efficiency standards]."

Other authorities have been less convinced that larger cars are safer. One theory is that "[l]ighter vehicles might pose a greater threat to occupants when they strike objects like trees and utility poles, but may reduce the severity of injuries when lighter vehicles collide." In any event, to the extent that hybrid technology makes all vehicles driving on highways proportionally smaller, the decrease in protection from the mass of a driver's car should be offset by the decrease in mass of other cars with which he might collide.

CONCLUSION

The forces fueling conservation could scarcely be more potent. Peak oil theorist Kenneth Deffeyes predicts an oil crisis could lead to "a hard landing [and] global recession worse than the 1930's," or "[t]he worst case borrows from the Four Horsemen of the Apocalypse: war, famine, pestilence and death." Chemicals derived from petroleum are necessary to produce pesticides and fertilizers to maintain crop yield, so oil shortages could indeed result in food shortages. Escalating world oil demand could lead to war with China over the resource. Oil also makes us vulnerable to our enemies; in his 2004 video, Osama bin Laden urged his followers,

281 Id. at 323.
282 Id. at 326.
283 Competitive Enter. Inst., 956 F.2d at 327.
284 Bryner, supra note 278, at 371.
285 Id.
286 Lynch, supra note 30.
287 Id.
288 Id.; see also Little, supra note 7.
One of the main causes for our enemies' gaining hegemony over our country is their stealing our oil; therefore, you should make every effort in your power to stop the greatest theft in history of the natural resources of both present and future generations, which is being carried out through collaboration between foreigners and [native] agents . . . Focus your operations on it [oil production], especially in Iraq and the Gulf area, since this [lack of oil] will cause them to die off [on their own].

The Sierra Club suggests that "[t]he biggest single step the United States can take to reduce consumption of fossil fuels and the threat of global warming is to raise the fuel economy of our cars and light trucks." The organization further stresses that while alternative technologies hold promise, the solution for today is the gas/electric hybrid vehicle. Ten years ago in 1995, large SUVs had 1.5% of the market share, the largest market share they had ever enjoyed. Seven years later, in 2002, they accounted for 12.6% of the market. Hybrids make up roughly 1.5% of the market now, and are predicted to only amount to 4% in 7 years. It should be cheaper and easier for automobile companies to accommodate greater hybrid demand, because hybrids can be made on the same assembly line as traditional internal combustion engine vehicles. The federal government must take action and make hybrids a priority.

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291 See supra note 225.
293 Id.
294 Total US Hybrid Sales Drop in October, supra note 12.
295 Bird, supra note 134.
Eliminating fuel subsidies will provide a broad-based incentive for drivers to purchase hybrids. The hybrid HOV lane exception will specifically target affluent drivers for whom a swift commute is more effective bait. Federal funds for research and development will ultimately hold the key to reducing the costs of hybrids. In the meantime, corporate incentives should be just enough for automobile manufacturers to invest in the technology. Fuel economy standards will ensure that the environmental and fuel-efficiency improvements of hybrid technology achieve maximum effect by replacing outdated and environmentally-detrimental vehicles. If automobile manufacturers provided an across-the-board improvement of as little as 3 miles per gallon, EPA estimates that "consumers would save as much as $25 billion per year in fuel costs, reduce their carbon dioxide emissions by 140 million metric tonnes per year, and reduce [American] reliance on foreign oil by a million barrels of oil each day."  

Conservation is and must be a bipartisan objective. It is not a matter of self-denial or a fight against the "American way of life." Encouraging vehicle technologies is the best means of conservation for America, because it achieves the ends of conservation without burdening transportation, which is one of the driving forces of our economy. Modern conservation revolves around promoting efficiency, and that is a virtue to which everyone can agree we should aspire.

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298 Bernasek, supra note 5; see also Fialka, supra note 206 (describing a bipartisan coalition of former security advisers, and their work with the automotive industry and environmentalists to promote conservation.  
299 Bernasek, supra note 5.  
300 Ghazi, supra note 1.  
301 Posting of Steven Pearlstein, supra note 152.  
302 Bernasek, supra note 5.