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ASIAN AFFAIRS

**America's oil dependence and its implications for
U.S. Middle East policy**

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Mr. Chairman, Members of the Committee, I would like to thank you for inviting me to brief you on the implications of U.S. growing dependence on Middle East oil for our foreign policy and national security.

As consumer of a quarter of the world's oil supply and holder of a mere three percent of global oil reserves the U.S. is heavily dependent on foreign oil and a growing share of this oil comes from the Persian Gulf. America's dependence on foreign oil has increased from 30 percent in 1973, when OPEC imposed its oil embargo, to 60 percent today. According to the Department of Energy this dependence is projected to reach 70 percent by 2025. In the wake of the war on terrorism, the rise of China and India and growing voices within the oil industry that "the era of easy oil is over" it has become apparent to many that America's oil policy is unsustainable and that such a policy subjects the nation to grave risks.

Since the 1945 meeting between President Franklin Roosevelt and King Abdul Aziz ibn Saud, the founder of the Saudi monarchy, U.S. foreign policy has been subservient to the nation's energy needs. Access to the Persian Gulf oil required robust and costly military presence in the region and frequent interventions. Worse, the U.S. has been forced to coddle some of the world's worst despots just because they held the key to our prosperity hence compromising American values and principles.

Of the 11 million barrels per day (mbd) the U.S. imports today close to 3mbd come from the Middle East. But in the years to come dependence on the Middle East is projected to increase by leaps and bounds. The reason is that reserves outside of the Middle East are being depleted at a much faster rate than those in the region. The overall reserves-to-production ratio -- an indicator of how long proven reserves would last at current production rates -- outside of the Middle East is about 15 years comparing to roughly 80 years in the Middle East. According to Exxon Corporation and PFC Energy, non-OPEC production, including Russia and West Africa will peak within a decade.¹ At that point the amount of oil found outside of the Middle East will decline steeply, putting OPEC in the driver seat of the world economy.

¹ Exxon president predicts non-OPEC peak in 10 years, *Oil and Gas Journal*, Dec 13, 2004

These projections require that we take a sober long term look at the impact of our growing dependence on our strategic posture in the Middle East.

Oil prices are not going down any time soon. The rise in oil prices will yield large financial surpluses to the Middle Eastern oil producers. This petrodollar windfall will strengthen the jihadists while undermining the strategic relationship the region's oil producers have with the U.S.

As President Bush said last April, U.S. dependence on overseas oil is a "foreign tax on the American people." Indeed, oil imports constitute a quarter of the U.S. trade deficit and are a major contributor to the loss of jobs and investment opportunities. According to a study on the hidden cost of oil by the National Defense Council Foundation, the periodic oil shocks the U.S. has experienced since the 1973 Arab oil embargo cost the economy almost \$2.5 trillion. More importantly, while the U.S. economy is bleeding, oil-producing nations increase their oil revenues dramatically to the detriment of our national security. The numbers speak for themselves: In November 2001, a barrel of oil was selling for \$18. In less than four years the price jumped to \$70. This means that Saudi Arabia, which exports about 10 mbd, receives an extra half billion dollars every day from consuming nations and Iran, which exports 2.5 mbd, an extra \$125 million. This windfall benefits the non-democratic governments of the Middle East and other producers and finds its way to the jihadists committed to America's destruction as petrodollars trickle their way through charities and government handouts to madrassas and mosques, as well as outright support of terrorist groups.

It is widely accepted that Saudi Arabia's oil wealth has directly enabled the spread of Wahhabism around the world. The Saudis use oil funds to control most of the Arabic language media and are now moving to gain growing control over Western media. Only last month Saudi Prince Al-Waleed bin Talal, the world's fifth richest man, purchased 5.46 percent of Fox News corporation.

Petrodollars garnered from the U.S. and other countries are also being used by Saudi Arabia systematically to provide social services, build "Islamic centers" and schools, pay preachers' salaries and, in some cases, fund terror organizations. In July 2005 undersecretary of the Treasury Stuart Levey testifying before the Senate Committee on Banking, Housing, and Urban Affairs noted "Wealthy Saudi financiers and charities have funded terrorist organizations and causes that support terrorism and the ideology that fuels the terrorists' agenda. Even today, we believe that Saudi donors may still be a significant source of terrorist financing, including for the insurgency in Iraq."

The U.S. in an odd situation in which it is funding both sides in the war on terrorism. We finance the defense of the Free World against its sworn enemies through our tax dollars. And at the same time we support hostile regimes through the transfer of petrodollars. If we don't change course we will bleed more dollars each year as our enemies gather strength. Steady increase in world demand for oil means further enrichment of the corrupt and dictatorial regimes in the Persian Gulf and continued access of terrorist groups to a viable financial network which allows them to remain a lethal threat to the U.S. and its allies.

The Middle East is gradually shifting from being a unipolar region in which the U.S. enjoys uncontested hegemony to a multipolar region. The U.S. will face more competition from China and India over access to Middle East oil.

Throughout its history, the Middle East has been the center of an imperial tug of war with major implications for the region's inhabitants. This was the case during the Cold War years. In the decade after the fall of the Soviet Union the U.S. enjoyed uncontested hegemony in a unipolar Middle East. The rise of China and India is driving the Middle East back to multipolarity. In the coming years the Middle East will turn increasingly to Asia to market its oil and gas. By 2015 it will provide 70% of Asia's oil. By far the most important growth market for countries like Iran and Saudi Arabia is China. With 1.3 billion people and an economy growing at a phenomenal rate, China is today the world's second largest oil consumer and is becoming heavily dependent on imported oil. By 2030 China is expected to import as much oil as America does today. To fuel its growing economy China is following America's footsteps, subjugating its foreign policy to its energy needs. China attempts to gain a foothold in the Middle East and build up long-term strategic links with countries with which the U.S. is at odds like Iran, Saudi Arabia and Sudan. Though some optimists think that China's pursuit of energy could present an opportunity to enhance cooperation, integration and interdependence with the U.S., there are ample signs that China and the U.S. are already on a collision course over oil. This will have profound implications for the future and stability of the Middle East and for America's posture in the region.

For China the biggest prize in the Middle East is Saudi Arabia, home of a quarter of the world's reserves. Since 9/11, a deep tension in U.S.-Saudi relations has provided the Chinese with an opportunity to win the heart of the House of Saud. The Saudis fear that if their citizens again perpetrate a terror attack in the U.S., there would be no alternative for the U.S. but to terminate its long-standing commitment to the monarchy — and perhaps even use military force against it. The Saudis realize that to forestall such a scenario they can no longer rely solely on the U.S. to defend the regime and must diversify their security portfolio. In their search for a new patron, they might find China the most fitting and willing candidate.

China has also set its sights on Iran. Last year China and Iran entered a \$70 billion natural gas deal that Beijing sees as critical to continued economic expansion. China has already announced that it will block any effort to impose sanctions against Iran in the UN Security Council. No doubt that as China's oil demand grows so will its involvement in Middle East politics. China is likely to provide not only a diplomatic support but also weapons, including assistance in the development of WMD.

In sum, the prospect of a region, scarred by decades of rivalries, turning once again into an arena of competition between two or more of the major powers could well be one of the most important geo-strategic developments of the 21-Century, with profound implications for U.S. national security.

The sudden enrichment of OPEC members will undercut efforts to promote democracy and political and economic reforms in the Middle East.

It is a sad fact of life that most of the world's leading oil producing countries are either politically unstable and/or at serious odds with the U.S. With the exception of Canada and Norway, all major oil-exporting countries suffer from severe social illnesses due to their failure to absorb the shock of an oil jackpot and distribute the wealth on an equitable basis. This is not an accident. Countries rich in easily extracted and highly lucrative natural resources do not have to invest in education, productivity, or economic diversification. In addition, the government does not feel obligated to be accountable or transparent to its people and it denies them representation. They also have no imperative to educate women and grant them equal rights. While their oil wealth allows them to be the strategic pivot of world politics and economy, these “trust fund states” record on human rights, political stability and compliance with international law is abysmal. Only three of the world's ten largest oil producers are democracies and only 9 percent of the world's proven oil reserves are in the hands of countries ranked free by Freedom House.

America’s current oil policy is inconsistent with the hallmark of the Bush Administration’s foreign policy: bringing democracy and political reform to areas where democracy is in deficit. Oil revenues help despots sustain anti democratic social and political systems giving them disincentives to embrace social and economic reforms. Our dependence on foreign oil often prevents the U.S. from expressing its true feelings about the some of the conducts and practices of oil producing countries. Only last month the Bush Administration waived sanctions against Saudi Arabia, Kuwait and Ecuador, three of the world’s worst offenders in human trafficking. In the case of Saudi Arabia and Kuwait the administration’s explanation was that it was “in U.S. interest to continue democracy programs and security cooperation in the war on terrorism.” One could only wonder if those two countries would have received the same treatment had they been major exporters of watermelons.

While in many cases the U.S. can turn a blind eye to human rights violations by major energy producers, in some cases the violations are so blunt and atrocious that a strong castigation is unavoidable. But with China joining the great oil game such incidents result in significant weakening of U.S. geopolitical posture. In the most recent incident when the U.S. had to choose between oil and its values the cost was high: the U.S. publicly expressed dismay over the killing of hundreds of demonstrators in Uzbekistan only to be asked to remove its military forces from there within 180 days. A \$600 million gas deal signed between Uzbekistan and China bolstered Islam Karimov’s confidence in China’s diplomatic support to the degree that he was willing to show the U.S. the door.

The Uzbek case is a harbinger of things to come. Unlike the U.S. which bars companies from doing business with some unsavory regimes China’s state-owned companies turn a blind eye to the way petrodollars are used by the local governments. In the global contest for oil the U.S. loses ground as a result of its pressure for government reform. Dictators who view democracy with suspicion don’t like to be pressured to reform especially when U.S. pressure can bring an end to their regimes. They much more prefer selling their oil to countries which turn a blind eye to the way petrodollars are used and who are willing to pay top dollars for oil and not lecture to them on democracy and human rights.

The growing economic power of OPEC producers enables them to resist U.S. pressure on a variety of issues from human rights to nuclear proliferation. As the second largest oil producer and holder of 10 percent of the world's proven oil reserves Iran is fully aware of the power of its oil. Its supreme leader Ayatollah Ali Khamenei warned in 2002: "If the west did not receive oil, their factories would grind to a halt. This will shake the world!" The Iranians also know that oil is their insurance policy and that the best way to forestall U.S. efforts in the UN is by bedding themselves with energy hungry powers such as Japan and the two fastest growing energy consumers—China and India. After securing the support of a third of humanity the Iranians are unfazed by the pressure coming from the U.S. and the EU. Last month Iran's President Mahmoud Ahmadinejad warned that Iran could wield the oil weapon if Tehran's case was sent to the Security Council for possible sanctions.

Mr. Chairman,

Four years after September 11 it is essential that we view our geopolitical situation in the context of our oil dependence and realize that it will be extremely difficult to win the war on terror and spread democracy around the world as long as we continue to send petrodollars to those who do not share our vision and values. **As long as the U.S. remains dependent on oil to the degree that it does today, its dependence on the Middle East will grow.** The U.S. can no longer afford to postpone urgent action to strengthen its energy security and it must begin a bold process toward reducing its demand for oil.

In order to achieve this it is important to dispel two myths:

Myth 1: The U.S. can end its dependence on the Middle East by diversifying its sources beyond the region.

Since oil is a fungible commodity, it does not matter what proportion of the oil the U.S. imports comes from the Middle East, what matters is the share of Middle East producers in overall supply. The oil market is like a huge pool: producers pour in oil while consumers draw it out. Prices and supply levels are determined in the international markets. If all we do is shuffle around our sources of oil supply, but demand for oil does not drop, the influx of petrodollars to proliferators and apologists for radical Islam as well as the vulnerability of the U.S. to international oil terrorism would remain the same even if the U.S. did not import a drop of oil from the Middle East.

Myth 2: The U.S. can drill its way out of its energy problem.

Tapping our domestic reserves which, all included, amount to less than 3% of the world's reserves, is no more than a stopgap solution. Considering America's vast long term needs our domestic reserves are a drop in the bucket. Assuming that all the oil that is claimed to be in Alaska is indeed there, the U.S.' share of world oil would increase by less than half of a percent. No doubt unconventional petroleum sources available in the Western Hemisphere like Canadian tar sands and Venezuelan extra heavy crude could provide

some relief but by no means can they significantly reduce America's dependence on the Middle East.

While there is no alternative to dependence on Middle Eastern oil, there are clearly alternatives to oil, particularly in the transportation sector, where two-thirds of U.S. oil is consumed.

America needs an out-of-the-barrel energy policy, one that will gradually diminish the role of oil in world politics. The U.S. should embark on an accelerated shift, enabled by modern technology, toward an economy based on indigenously produced next-generation fuels, meaning non-oil based transportation fuels such as methanol, ethanol, biodiesel, electricity and others derived from abundant domestic energy resources such as coal, biomass, and municipal waste. In Brazil ethanol made from sugar cane accounts for at least 25% of the liquid fuel used in most cars. Many cars run on pure ethanol. As a result sugar cane ethanol comprises 40% of Brazil's fuel needs and the country is moving rapidly toward energy independence.

Flexible fuel vehicles can run on any combination of gasoline and alcohols such as ethanol and methanol. Nearly four million flexible fuel cars have been manufactured since 1996 and are already on the road, though many of the people driving them don't even know their cars can tolerate other fuels. The marginal additional cost associated with the production of a flexible fuel vehicle is currently under \$150 -- less than the cost of a typical CD player. That cost would be reduced further as the volume of production of such cars increases. Since most of the flexible fuel cars sold in Brazil are made by American auto manufacturers like Ford and GM there is no reason why every new car sold in the U.S. should not have such fuel flexibility.

Without doubt, as long as corn is the main feedstock used to make ethanol the domestic ethanol industry will never be able to supply the needs of the U.S. transportation sector. In the coming years if the production of ethanol from cellulosic material becomes commercially feasible it could add significant amount of ethanol into the transportation fuel market. But until the technology is ready for deployment the U.S. will have to rely on its sugar growing neighbors in Latin America. Sugar cane is by far the most efficient crop for ethanol production but today stiff import tariffs imposed by Congress prevent large scale imports of sugar cane ethanol. **To strengthen energy security Congress and free trade champions must open the U.S. ethanol market to imports. It simply does not make sense to tax ethanol coming in from our neighbors when we do not tax oil imported from Saudi Arabia.**

Methanol is another alcohol that can be used in flexible fuel vehicles. Today, this liquid fuel is produced mostly from natural gas. Greatly expanded domestic production can be achieved, however, by producing methanol from coal, a resource the U.S. has in abundance. The commercial feasibility of coal-to-methanol technology has been demonstrated as part of the Department of Energy's "clean coal" technology effort. Currently, methanol is being cleanly produced from coal at a commercial scale for around 50 cents a gallon. Methanol can also be produced from agricultural waste.

Unlike in the 1970s when a significant portion of U.S. electricity was generated from oil, today only about 2% of electricity is generated from oil. Electricity produced from coal, nuclear power, natural gas, solar, wind and hydropower can also be a substitute to oil. Hundreds of thousands of hybrid gasoline-electric cars which improve fuel efficiency by 30-50% will be coming onto our roads in the coming years.

Hybrid technology can be taken one step further allowing consumers to tap into our electricity grid. Plug-in hybrid electric vehicles (PHEVs) are souped-up hybrids that can optionally be plugged in. Like regular hybrids, plug-ins have a liquid fuel tank and internal combustion engine, so they have the same driving range as a standard car. Although they look and perform much like regular hybrid cars, they can in addition be plugged into a 120-volt outlet at home or a parking garage and recharged, thus allowing cars to be fueled on made in America electricity.

The attached Blueprint for Energy Security: “Set America Free” endorsed by a bipartisan coalition of foreign policy thinktanks, environmental groups, religious groups and prominent scientists holds that if by 2025, all cars on the road are hybrids and half are plug-in hybrid vehicles, and if all of these cars were also flexible fuel vehicles, U.S. oil imports would drop by as much as 12 mbd, which is more than the U.S. imports today. The Set America Free blueprint also holds that vehicles can be powered by any blend of alcohol fuels, gasoline, and electricity. If a plug-in vehicle is also a flexible fuel vehicle fueled with 80% alcohol and 20% gasoline, fuel economy could reach *500 miles per gallon of gasoline* compared to 22 today.

Despite polls showing that over 90% of Americans view our energy dependence as a serious issue that needs to be addressed with urgency, Congressional activity to advance such solutions has been insufficient. The recent energy bill and the follow up gasoline bill do little to address America’s growing dependence on foreign oil. In fact, a provision in the Senate energy bill to do as little as reducing oil dependence by 1mbd by 2015 was shamefully rejected by the House. In the wake of Hurricanes Katrina and Rita, when gas prices are historically high, there is a new momentum and a renewed opportunity for action. A new bipartisan Oil and National Security Caucus has been announced in the House to advance new ideas to reduce the nation’s dependence on oil. On October 7, Senator Joseph Lieberman unveiled in a speech at Georgetown University a package of legislative proposals along the lines of Set America Free to help America break its dangerous dependence on foreign oil. In his speech he mentioned his collaboration on this bill with Senators Brownback, Bayh and Sessions. The proposal has been applauded by many energy experts including a leading expert in the National Science Foundation who called it “the biggest really solid accomplishment coming from any part of the U.S. government in this area and the most sane proposal for legislation.” On the grounds of national security it is imperative that such bold bi-partisan initiatives will be supported by lawmakers from both parties with the strongest enthusiasm. We cannot afford to do less.



AN OPEN LETTER TO THE AMERICAN PEOPLE

For decades, the goal of reducing the Nation's dependence upon foreign energy sources has been a matter on which virtually all Americans could agree. Unfortunately, differences about how best to accomplish that goal, with what means, how rapidly and at what cost to taxpayers and consumers have, to date, precluded the sort of progress that might have been expected before now.

Today, we can no longer afford to allow such differences to postpone urgent action on national energy independence. After all, we now confront what might be called a "perfect storm" of strategic, economic and environmental conditions that, properly understood, *demand* that we affect over the next four years a dramatic reduction in the quantities of oil imported from unstable and hostile regions of the world.

America consumes a quarter of the world's oil supply while holding a mere 3% of global oil reserves. It is therefore forced to import over 60% of its oil, and this dependency is growing. Since most of the world's oil is controlled by countries that are unstable or at odds with the United States this dependency is a matter of national security.

At the **strategic level**, it is dangerous to be buying billions of dollars worth of oil from nations that are sponsors of or allied with radical Islamists who foment hatred against the United States. The petrodollars we provide such nations contribute materially to the terrorist threats we face. In time of war, it is imperative that our national expenditures on energy be redirected away from those who use them against us.

Even if the underwriting of terror were not such a concern, our present dependency creates unacceptable vulnerabilities. In Iraq and Saudi Arabia, America's enemies have demonstrated that they can advance their strategic objective of inflicting damage on the United States, its interests and economy simply by attacking critical overseas oil infrastructures and personnel. These targets are readily found not only in the Mideast but in other regions to which Islamists have ready access (e.g., the Caspian Basin and Africa). To date, such attacks have been relatively minor and their damage easily repaired. Over time, they are sure to become more sophisticated and their destructive effects will be far more difficult, costly and time-consuming to undo.

Another strategic factor is China's burgeoning demand for oil. Last year, China's oil imports were up 30% from the previous year, making it the world's No. 2 petroleum user after the United States. The bipartisan, congressionally mandated U.S.-China Economic and Security Review Commission reported that: "China's large and rapidly growing demand for oil is putting pressure on global oil supplies. This pressure is likely to increase in the future, with serious implications for U.S. oil prices and supplies."

Oil dependence has considerable **economic implications**. Shrinking supply and rising demand translate into higher costs. Both American consumers and the U.S. economy are already suffering from the cumulative effect of recent increases in gas prices. Even now, fully one-quarter of the U.S. trade deficit is associated with oil imports. By some estimates, we lose 27,000 jobs for every billion dollars of additional oil imports. Serious domestic and global economic dislocation would almost certainly attend still-higher costs for imported petroleum and/or disruption of supply.

Finally, **environmental considerations** argue for action to reduce imports of foreign oil. While experts and policy-makers disagree about the contribution the burning of fossil fuels is making to the planet's temperatures, it is certainly desirable to find ways to obtain energy while minimizing the production of greenhouse gases and other pollutants.

The combined effects of this "perfect storm" require concerted action, at last, aimed at reducing the Nation's reliance on imported oil from hostile or unstable sources and the world's dependence on oil at large. Fortunately, with appropriate vision and leadership, we can make major strides in this direction by exploiting *currently available* technologies and infrastructures to greatly diminish oil consumption in the transportation sector, which accounts for two thirds of our oil consumption.

The attached **Blueprint for Energy Security: "Set America Free"** spells out practical ways in which real progress on "fuel choice" can be made over the next four years and beyond. To be sure, full market transformation will take a longer time. In the case of the transportation sector, it may require 15-20 years. That is why it is imperative to begin the process without delay.

We call upon America's leaders to pledge to adopt this Blueprint, and embark, along with our democratic allies, on a multilateral initiative to encourage reduced dependence on petroleum. In so doing, they can reasonably promise to: deny adversaries the wherewithal they use to harm us; protect our quality of life and economy against the effects of cuts in foreign energy supplies and rising costs; and reduce by as much as 50% emissions of undesirable pollutants. In light of the "perfect storm" now at hand, we simply can afford to do no less.

Signatories

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Milton Copulos, President, National Defense Council Foundation

Cong. Eliot Engel, Co-chair, Oil and National Security Caucus

Frank Gaffney, President, Center for Security Policy

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‘SET AMERICA FREE’ A BLUEPRINT FOR U.S. ENERGY SECURITY

Introduction

Historically, the United States has pursued a three-pronged strategy for minimizing the vulnerabilities associated with its dependency on oil from unstable and/or hostile nations: diversifying sources of oil, managing inventory in a strategic petroleum reserve and increasing the efficiency of the transportation sector’s energy consumption. In recent years, the focus has been principally on finding new and larger sources of petroleum globally.

Rapidly growing worldwide demand for oil, however, has had the effect of largely neutralizing this initiative, depleting existing reserves faster than new, economically exploitable deposits are being brought on line. Under these circumstances, diversification among such sources is but a stop-gap solution that can, at best, have a temporary effect on oil supply and, hence, on national security. Conservation can help, but with oil consumption expected to grow by 60% over the next 25 years, conservation alone will not be a sufficient solution.

The ‘Set America Free’ Project

Long-term security and economic prosperity requires the creation of a fourth pillar – technological transformation of the transportation sector through what might be called “fuel choice.” By leading a multinational effort rooted in the following principles, the United States can *immediately* begin to introduce a global economy based on next-generation fuels and vehicles that can utilize them:

- **Fuel diversification:** Today, consumers can choose among various octanes of gasoline, which accounts for 45% of U.S. oil consumption, or diesel, which accounts for almost another fifth. To these choices can and should promptly be added other fuels that are domestically produced, where possible from waste products, and that are clean and affordable.
- **Real world solutions:** We have no time to wait for commercialization of immature technologies. The United States should implement technologies **that exist today and are ready for widespread use.**
- **Using existing infrastructure:** The focus should be on utilizing competitive technologies that do not require prohibitive or, if possible, even significant investment in changing our transportation sector’s infrastructure. Instead, “fuel choice” should permit the maximum possible use of the existing refueling and automotive infrastructure.
- **Domestic resource utilization:** The United States is no longer rich in oil or natural gas. It has, however, a wealth of other energy sources from which transportation fuel can be safely, affordably and cleanly generated. Among them: hundreds of years worth of coal reserves, 25% of the world’s total (especially promising with Integrated Gasification and Combined Cycle

technologies); billions of tons a year of biomass, and further billions of tons of agricultural and municipal waste. Vehicles that meet consumer needs (e.g., “plug-in” hybrids), can also tap America’s electrical grid to supply energy for transportation, making more efficient use of such clean sources of electricity as solar, wind, geothermal, hydroelectric and nuclear power.

- **Environmentally sensible choices:** The technologies adopted should improve public safety and respond to the public’s environmental and health concerns.

Key Elements of the ‘Set America Free’ Project

► ***Vehicles:***

- **Hybrid electric vehicles:** There are already thousands of vehicles on America’s roads that combine hybrid engines powered in an integrated fashion by liquid fuel-powered motors and battery-powered ones. Such vehicles increase gas-consumption efficiency by 30-40%.
- **Ultralight materials:** At least two-thirds of fuel use by a typical consumer vehicle is caused by its weight. Thanks to advances in both metals and plastics, ultralight vehicles can be affordably manufactured with today’s technologies and can roughly halve fuel consumption without compromising safety, performance or cost effectiveness.
- **“Plug-in” hybrid electric vehicles:** Plug-in hybrid electric vehicles are also powered by a combination of electricity and liquid fuel. Unlike standard hybrids, however, plug-ins draw charge not only from the engine and captured braking energy, but also directly from the electrical grid by being plugged into standard electric outlets when not in use. Plug-in hybrids have liquid fuel tanks and internal combustion engines, so they do not face the range limitation posed by electric-only cars. Since fifty-percent of cars on the road in the United States are driven 20 miles a day or less, a plug-in with a 20-mile range battery would reduce fuel consumption by, on average, 85%. **Plug-in hybrid electric vehicles can reach fuel economy levels of 100 miles per gallon of gasoline consumed.**
- **Flexible fuel vehicles (FFVs):** FFVs are designed to burn on alcohol, gasoline, or any mixture of the two. About four million FFV’s have been manufactured since 1996. The only difference between a conventional car and a flexible fuel vehicle is that the latter is equipped with a different control chip and some different fittings in the fuel line to accommodate the characteristics of alcohol. The marginal additional cost associated with such FFV-associated changes is currently under \$100 per vehicle. That cost would be reduced further as volume of FFVs increases, particularly if flexible fuel designs were to become the industry standard.
- **Flexible fuel/plug-in hybrid electric vehicles:** If the two technologies are combined, such vehicles can be powered by blends of alcohol fuels, gasoline, and electricity. If a plug-in vehicle is also a FFV fueled with 80% alcohol and 20% gasoline, fuel economy could reach **500 miles per gallon** of gasoline.

If by 2025, all cars on the road are hybrids and half are plug-in hybrid vehicles, U.S. oil imports would drop by 8 million barrels per day (mbd). Today, the United States imports 10 mbd and it is projected to import almost 20 mbd by 2025. If all of these cars were also flexible fuel vehicles, U.S. oil imports would drop by as much as 12 mbd.

► *Fuels:*

- **Fuel additives:** Fuel additives can enhance combustion efficiency by up to 25%. They can be blended into gasoline, diesel and bunker fuel.
- **Electricity as a fuel:** Less than 2% of U.S. electricity is generated from oil, so using electricity as a transportation fuel would greatly reduce dependence on imported petroleum. Plug-in hybrid vehicles would be charged at night in home garages -- a time-interval during which electric utilities have significant excess capacity. **The Electric Power Research Institute estimates that up to 30% of market penetration for plug-in hybrid electric vehicles with 20-mile electric range can be achieved without a need to install additional electricity-generating capacity.**
- **Alcohol fuels: ethanol, methanol and other blends:**

Ethanol (also known as grain alcohol) is currently produced in the U.S. from corn. The industry currently has a capacity of 3.3 billion gallons a year and has increased on the average of 25% per year over the past three years. Upping production would be achieved by continuing to advance the corn-based ethanol industry and by commercializing the production of ethanol from biomass waste and dedicated energy crops. *P-Series* fuel (approved by the Department of Energy in 1999) is a more energy-efficient blend of ethanol, natural gas liquids and ether made from biomass waste.

Methanol (also known as wood alcohol) is today for the most part produced from natural gas. Expanding domestic production can be achieved by producing methanol from coal, a resource with which the U.S. is abundantly endowed. The commercial feasibility of coal-to-methanol technology was demonstrated as part of the DOE's "clean coal" technology effort. Currently, methanol is being cleanly produced from coal for under 50 cents a gallon.

It only costs about \$60,000 to add a fuel pump that serves one of the above fuels to an existing refueling station.

- **Non-oil based diesel:** Biodiesel is commercially produced from soybean and other vegetable oils. Diesel can also be made from waste products such as tires and animal byproducts, and is currently commercially produced from turkey offal. Diesel is also commercially produced from coal.

► *Policy Recommendations:*

- Provide incentives to auto manufacturers to produce and consumers to purchase, hybrid vehicles, plug-in hybrid electric vehicles and FFVs across all vehicle models.
- Provide incentives for auto manufacturers to increase fuel efficiency of existing, non-FFV auto models.
- Conduct extensive testing of next-generation fuels across the vehicle spectrum to meet auto warranty and EPA emission standards.
- Mandate substantial incorporation of plug-ins and FFVs into federal, state, municipal and covered fleets.
- Provide investment tax incentives for corporate fleets and taxi fleets to switch to plug-ins, hybrids and FFVs.
- Encourage gasoline distributors to blend combustion enhancers into the fuel.
- Provide incentives for existing fueling stations to install pumps that serve all liquid fuels that can be used in the existing transportation infrastructure, and mandate that all new gas stations be so equipped.
- Provide incentives to enable new players, such as utilities, to enter the transportation fuel market, and for the development of environmentally sound exploitation of non-traditional petroleum deposits from stable areas (such as Canadian tar sands).
- Provide incentives for the construction of plants that generate liquid transportation fuels from domestic energy resources, particularly from waste, that can be used in the existing infrastructure.
- Allocate funds for commercial scale demonstration plants that produce next-generation transportation fuels, particularly from waste products.
- Implement federal, state, and local policies to encourage mass transit and reduce vehicle-miles traveled.
- Work with other oil-consuming countries towards distribution of the above-mentioned technologies and overall reduction of reliance on petroleum, particularly from hostile and potentially unstable regions of the world.

A New National Project

In 1942, President Roosevelt launched the Manhattan Project to build an atomic weapon to be ready by 1945 because of threats to America's and to explore the future of nuclear fission. The cost in today's prices was \$20 billion. The outcome was an end to the war with Japan, and the beginning of a wide new array of nuclear-based technologies in energy, medical treatment, and other fields.

In 1962, President Kennedy Launched the Man to the Moon Project to be achieved by 1969 because of mounting threats to U.S. and international security posed by Soviet space-dominance and to explore outer space. The cost of the Apollo program in today's prices would be well over \$100 billion. The outcome was an extraordinary strategic and technological success for the United States. It engendered a wide array of spin-offs that improved virtually every aspect of modern life, including but not limited to transportation, communications, health care, medical treatment, food production and other fields.

The security of the United States, and the world, is no less threatened by oil supply disruptions, price instabilities and shortages. It is imperative that America provide needed leadership by immediately beginning to dramatically reduce its dependence on imported oil. This can be done by embracing the concepts outlined above with a focus on fuel choice, combined with concerted efforts at improving energy efficiency and the increased availability of energy from renewable sources.

The estimated cost of the 'Set America Free' plan over the next 4 years is \$12 billion. This would be applied in the following way: \$2 billion for automotive manufacturers to cover one-half the costs of building FFV-capability into their new production cars (i.e., roughly 40 million cars at \$50 per unit); \$1 billion to pay for at least one out of every four existing gas stations to add at least one pump to supply alcohol fuels (an estimated incentive of \$20,000 per pump, new pumps costing approximately \$60,000 per unit); \$2 billion in consumer tax incentives to procure hybrid cars; \$2 billion for automotive manufacturers to commercialize plug-in hybrid electric vehicles; \$3 billion to construct commercial-scale demonstration plants to produce non-petroleum based liquid fuels (utilizing public-private cost-sharing partnerships to build roughly 25 plants in order to demonstrate the feasibility of various approaches to perform efficiently at full-scale production); and \$2 billion to continue work on commercializing fuel cell technology.

Since no major, new scientific advances are necessary to launch this program, such funds can be applied towards increasing the efficiencies of the involved processes. The resulting return-on-investment – in terms of enhanced energy and national security, economic growth, quality of life and environmental protection – should more than pay for the seed money required.