



Ending our

Dependence on Oil

A M E R I C A N S E C U R I T Y P R O J E C T

S I E R R A C L U B

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Memorial Day is the one day set aside by Congress on which we honor the sacrifices of those who have given their lives in defense of our country. Owing to its place at the end of May, it is also the start of the summer driving season. On Memorial Day weekend 2010, every American should take a moment to reflect on the increasingly profound connection between our security and the choices we all make, every day, about energy.

Phrases like “oil dependence” and “addicted to oil” have been tossed about for years. But sometimes the facts have been lost in the sound bites. Consider these few facts:

- The United States uses nearly 400 million gallons of gasoline every day.¹
- U.S. oil dependence is almost wholly a function of our transportation sector, which is 95 percent powered by petroleum products. We use 13 million barrels of oil every day for transportation – moving people in automobiles, goods on freight trucks, air travel, rail and transit. But it is cars and light trucks that use the lion’s share of this oil – some 9 million barrels of oil each day.
- Most of this oil comes from countries at high risk of instability, several of which work actively against U.S. interests worldwide. Our dependence complicates our foreign policy and embroils the United States in conflicts abroad, while we fund many of our own adversaries.
- Oil dependence threatens U.S. economic security. Most of our oil is produced overseas, and every day Americans send over \$1 billion abroad to pay for it. The result is lost jobs and increasing dollars in the hands of foreigners whom we rely upon to finance our deficits.
- Finally, oil consumption by the transportation sector contributes significantly to American greenhouse gas emissions, which contribute to climate change. Climate change will cost Americans hundreds of billions of dollars over the coming decades, as sea levels rise, weather patterns and agriculture shift, and societies adapt to a warmer planet.

In the Gulf of Mexico today, we see one of the more devastating, and immediate, consequences of America’s oil dependency. But the costs are much more profound than the consequences of any one devastating spill. Charting a course to end our dependence on oil is a challenge we should embrace when we consider the risks of inaction.

¹ U.S. Energy Information Administration. “Petroleum Basic Statistics,” July 2009. <http://www.eia.doe.gov/basics/quickoil.html> (accessed May 25, 2010).

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Meeting this challenge will not be easy, but nor will it require tremendous sacrifices. We can reduce our dependence on oil and address our national security and climate change concerns with a series of smart and interconnected policy options that will gradually transition the country to a post-oil economy. These actions include:

- Tightening fuel economy and emissions standards for all vehicles;
- Promoting the development and deployment of electric vehicles of all types;
- Investing in rail for freight and also passengers;
- Creating livable communities where transit, walking and biking are real, oil-free choices; and
- Exploring fuel choices such as advanced biofuels, hydrogen fuel cells and natural gas as alternatives to oil.

There is a powerful economic rationale for taking action now. We remain vulnerable to the effects of a price spike in oil. In 2008, the dramatic rise in oil prices helped create the devastating recession we are only now exiting. With increased consumption in India and China, it is likely that such price spikes will become more common in the future.

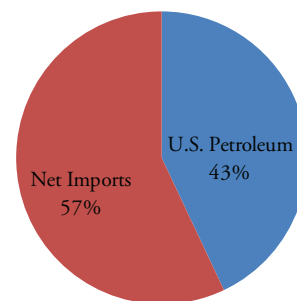
The U.S. Environmental Protection Agency has shown how the United States can save almost 7 million barrels per day of oil in 2030 as a result of adaptations to the transportation sector – a reduction of over 50 percent from 2010 levels.² As ambitious as this goal seems, we can surpass it with a coherent national strategy. This would send oil producers and oil markets a signal – America is serious about ending its addiction to oil.

This is a moment to take pause, chart a new course for the nation's transportation system, and set goals for reducing oil dependence. A new approach to a transportation system that cuts the connection to oil is required. This is not a war that can be fought with guns and bombs. Instead, this is a threat that we can address and defeat with America's other great strength, our innovative workers and entrepreneurs.

The Security, Economic, and Climate Consequences of Oil Dependence

Our national security is affected by oil consumption on a number of fronts. First, many countries which supply the United States with petroleum are politically unstable, leaving the American people particularly vulnerable to shocks in oil supply resulting from domestic or regional conflicts. Second, and related, is the strategic challenge presented by our dependence. Our reliance on countries whose actions do not best align with our interests impedes our leverage in the international arena. And third, there are risks to oil infrastructure, including the shipment of petroleum via waterways and the pipelines and facilities which funnel it around the globe.

Net Imports and Domestic Petroleum as Shares of U.S. Demand, 2008



Source: U.S. Energy Information Administration

² U.S. Environmental Protection Agency, *EPA Analysis of the Transportation Sector: Greenhouse Gas and Oil Reduction Scenarios* (2010), slides. <http://www.epa.gov/oms/climate/GHGtransportation-analysis03-18-2010.pdf> (accessed May 21, 2010).

Political Instability of Oil Exporters

While our largest single provider of petroleum, Canada,³ is a stable and friendly neighbor, the same cannot be said of the other countries responsible for our oil supply.⁴ Even Saudi Arabia, an ally and our fourth largest supplier of petroleum products,⁵ is rated as having a “high risk” for instability according to the *Economist’s* Political Instability Index.⁶

Of the petroleum Americans consume, 57 percent is imported, and of this, 68 percent is supplied by countries at “high risk” or “very high risk” for instability.⁷ In 2008, we received nearly 5 percent of our crude oil and products imports from Angola, a country with a corrupt, quasi-democracy still reeling from a lengthy civil war.⁸ Nigeria, providing just under 9 percent, has a long history of government corruption, military rule and social unrest. The same is true of Algeria, another top supplier whose brutal 11-year civil war ended in the last decade and a country which continues to be a breeding ground for militants and insurgents. Even Mexico, a country with which we have good relations, suffers from social unrest and rampant crime. It, too, has a “high risk” of instability.

An eruption of violence, government upheaval, or the like in any of these countries could lead to a spike in the global price of petroleum, as occurred in the 1970s following the Arab-Israeli conflict of 1973 and the Iranian Revolution in 1979. In both cases significant recessions followed. The cumulative cost of those recessions is on the order of several trillion dollars – a direct consequence of oil dependence. U.S. military involvement in such events may also become necessary to restore regional stability. Saddam Hussein’s threat to seize Kuwait’s oil reserves embroiled the United States in a cycle of conflict with Iraq that continues to this day and has cost thousands of American lives and three quarters of a trillion dollars.⁹

Strategic Challenge of Oil Exporters

Instability is not the only risk. Our dollars also undermine our efforts to support democratization and promote human rights around the world. Instead, in many instances, our oil imports fund governments actively hostile to our interests. Oftentimes, our oil purchases finance authoritarian regimes, strengthening and cushioning their power grab despite a lack of popular consent in their home country. Oil money furthers regional conflict and arms races.¹⁰

Among the direct recipients of our petrodollars is Venezuelan President Hugo Chavez. Chavez has steadily chipped away the democracy of Venezuela, and he has actively sought to spread anti-American sentiment throughout the hemisphere. Venezuela is third only to Canada and Mexico in providing petroleum and crude oil products to the United States.¹¹ Iranian President Mahmoud Ahmadinejad is pursuing nuclear weapons and funds international terrorism. While Iran does not supply significant quantities of oil to the United States, our purchases keep prices high and increase funds for that regime.

Four percent of our oil comes from Russia, a country which has continued to stall multilateral diplomatic efforts with Iran. Russia is also guilty of growing increasingly authoritarian in recent years. Two other beneficiaries: President Muammar Qaddafi of Libya and President Omar al-Bashir of Sudan, whose government and violent non-

3 Canadian oil is not wholly unproblematic since significant Canadian oil reserves are in oil sands, which cause significant environmental damage in extracting the oil. National Energy Board. “Canada’s Oil Sands: Opportunities and Challenges to 2015 – Questions and Answers, March 12, 2010. <http://www.neb.gc.ca/clf-nsi/rnrgynfmitn/nrgyrprt/lsnd/pprntnsndchllngs20152004/qapprntnsndchllngs20152004-eng.html> (accessed May 24, 2010).

4 *The Economist*. “Political Instability Index,” March 25, 2009. http://www.economist.com/markets/rankings/displaystory.cfm?story_id=13349331

5 U.S. Energy Information Administration, “Crude Oil and Petroleum Imports Top 15 Countries.” http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/company_level_imports/current/import.html (accessed May 21, 2010).

6 *The Economist*. “Political Instability Index.”

7 Ibid.

8 U.S. Energy Information Administration. *Table 31a. Net Imports of Crude Oil and Petroleum Products into the United States by Country, 2008.* http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_annual/psa_volume1/current/pdf/table31.pdf (accessed May 21, 2010).

9 Anita Dancs. “Since 2003, the Iraq War has cost U.S. taxpayers three-quarters of a trillion dollars,” *Hamsayeh*, May 21, 2010. http://www.hamsayeh.net/hamsayehnet_iran-international%20news1262.htm (accessed May 24, 2010).

10 Jeff Colgan. “Oil and Revolutionary Regimes: A Toxic Mix.” Paper prepared for International Political Economy Society Annual Meeting, Philadelphia, 2008.

11 U.S. Energy Information Administration, “Crude Oil and Petroleum Imports Top 15 Countries.”

state actors have created a massive humanitarian disaster in that country. And while Saudi Arabia has stemmed its financial support to radical Islamist organizations, our fourth-largest supplier of petroleum products¹² continues to funnel money to schools and charities that propagate radical and extremist views.

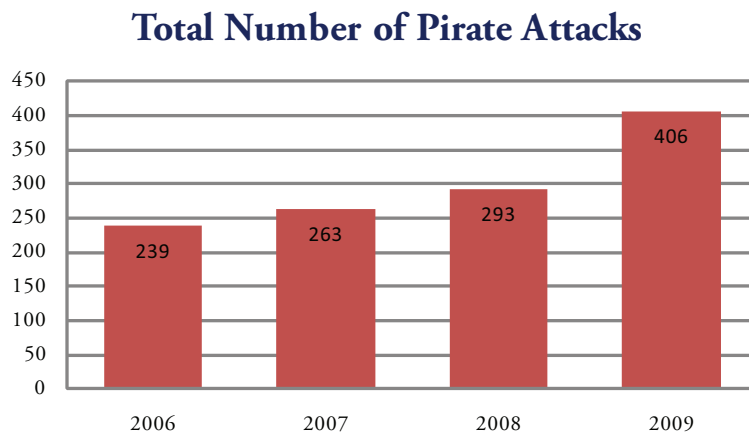
To put it simply: achieving energy independence would help resolve a variety of foreign policy challenges we currently face.

Risk to Oil Infrastructure

Grave risks to oil infrastructure also exist. These risks present themselves most often and have proven increasingly prevalent in parts of the world that are already unstable – and responsible for a large percentage of America’s petroleum supply. First, narrow passageways, through which oil-carrying vessels must pass, can be closed at a moment’s notice by the state in control of the waterway or by outside, non-state actors with both the will and capacity. Between 1967 and 1975, the Arab-Israeli conflict caused the closing of the Suez Canal. Today, 4.5 million barrels of oil travel this route each day.¹³ Pirates, an ever-growing force and international threat, endanger transport ships, which are particularly vulnerable given their predictable routes. Pipelines, the alternative to ships, provide no escape from threats; stationary, they are a likely – and relatively easy – target for attack.

Choke Points

There are a variety of choke points though which vessels must travel, providing many countries with the opportunity to attack, and have the capacity to harm our ships. More than 50 states possess large stockpiles of anti-ship missiles.¹⁴ Lebanon’s Hezbollah, a terrorist group, employed such weapons against Israel in 2006.¹⁵ Iranian missiles threaten nearly 20 percent of the world’s oil transit vessels which travel through the 21 mile-wide Strait of Hormuz.¹⁶ The same percentage of petroleum travels the 1.7 mile-wide Strait of Malacca between Malaysia and Indonesia. The Strait of Malacca is not only under a constant threat from militants and pirates, but many ships fall victim to poor visibility causing numerous collisions and near misses that threaten environmentally disastrous spills.¹⁷



Source: ICC Commercial Crime Services

environmentally disastrous spills.¹⁷

Terrorists are also suspected of targeting the Turkish Straits, Bad El-Mandeb, and the Panama Canal. Bad El-Mandeb, a narrow strait between Yemen and the Horn of Africa, has been the site of successful attacks on oil freight both against the Americans and French in the recent past.¹⁸

¹² Ibid.

¹³ Energy Information Administration. “World Oil Transit Chokepoints.” *Country Analysis Briefs*. January 2008. http://www.eia.doe.gov/cabs/World_Oil_Transit_Chokepoints/Full.html (accessed May 12, 2010).

¹⁴ “Lethal Sting.” *Anti-Ship Missiles*. http://www.global-defence.com/2003/anti_ship.htm (accessed July 24, 2009).

¹⁵ Mark Mazzetti and Thom Shanker. “Hezbollah’s unexpected firepower.” *The New York Times*. July 19, 2006. <http://www.nytimes.com/2006/07/19/world/africa/19iht-missile.2238629.html> (accessed July 23, 2009).

¹⁶ Energy Information Administration. “World Oil Transit Chokepoints.”

¹⁷ Ibid.

¹⁸ Ibid.

Pirate Attacks

Pirate attacks doubled from 2007 to 2008,¹⁹ and in 2009 the number of attacks surpassed 400 for the first time in six years.²⁰ Nearly triple the number of ships were fired upon in 2009 compared to the year before.²¹

What is more, most attacks are made in close proximity to three main sea lanes used by oil tankers. This list includes the Somali coast, at the exit to the Persian Gulf and Red Sea; it includes waters close to the Strait of Malacca; and, it includes the Caribbean, home to numerous shipments headed to the American Gulf Coast.²² In 2008, pirates captured the *Sirius Star*, a 1,000-foot long, 350,000-ton ship, in the Gulf of Aden.²³ With over 2,600 tankers transporting oil globally, there is no shortage of options for those seeking targets.²⁴

Pipelines and Other Facilities

Moreover, pipelines, the only existing alternative for oil transport, are a highly attractive and susceptible target for terrorists. Attacks on Iraq's pipelines and oil facilities, over 450 in five years, provide only one country's example of such attacks.²⁵ Vulnerabilities are not limited to politically unstable communities across the ocean. In 2001, a drunken hunter shot an Alaskan pipeline, resulting in a \$7 million dollar clean-up.²⁶

Some experts place costs to protect this infrastructure at \$50 billion annually.²⁷ Other analysts believe annual costs to be as high as \$132.7 billion.²⁸ Despite the disparity, and be it choke points, pirates or pipelines, additional risks impose additional – and significant – costs both to our national security and to our economy.

Economic Vulnerability – Oil Shocks and Economic Growth

Economic disruptions have a variety of sources. In 1973 and 1979, energy prices spiked as a result of events in the Middle East and Persian Gulf. American economic growth during this time suffered by trillions of dollars.²⁹ Increasing demand worldwide will also result in price increases – and other, more serious issues.

Our economic vulnerabilities as they concern the Persian Gulf have been especially exploited during the last couple of decades. War in 1991 in the Persian Gulf was waged to prevent Saddam Hussein from controlling Kuwait's oil reserves, which would have brought what today constitutes approximately 30 percent of the world's proven oil reserves under his control.³⁰ Nearly two decades and another war in the region later, we are still fighting to bring stability to Iraq and spending billions to do so. Today, over 21 percent of our imports arrive from this region.³¹

Sky-rocketing oil prices in 2007 and 2008 provide another example of our vulnerability to shocks in the oil market. Increasing global demand, particularly in developing nations, will affect global oil prices and the American consumer significantly. Current projections suggest that prices will likely continue to rise, easily surpassing the 2008 highs in coming years, though these projections vary based on assumptions about the value of the dollar,

19 ICC Commercial Crime Services. "IMB Live Piracy Map." 2009. http://www.icc-ccs.org/index.php?option=com_fabrik&view=visualization&cer=visualization.googlemap&Itemid=219 (accessed July 27, 2009).

20 ICC Commercial Crime Services, "2009 Worldwide piracy figures pass 400," January 14, 2010. http://www.icc-ccs.org/index.php?option=com_content&view=article&id=385:2009-worldwide-piracy-figures-surpass-400&catid=60:news&Itemid=51 (accessed May 21, 2010).

21 Ibid.

22 Sharon Otterman. "Pirates Briefly Rattle Oil Market." *The New York Times*, November 17, 2008.

23 Lee Glendinning and James Sturcke. "Pirates take over oil tanker with British crew on board." *Guardian*. November 17, 2008. <http://www.guardian.co.uk/world/2008/nov/17/oil-tanker-pirates> (accessed July 20, 2009).

24 "International Tanker." OSG. <http://www.osg.com/index.cfm?pageid=46> (accessed July 15, 2009).

25 IAGS. *Iraqi Pipeline Watch*. March 27, 2008. <http://www.iags.org/iraqipipelinewatch.htm> (accessed July 23, 2009).

26 Sam Howe Verhovek. "Crude Leak Plugged in Alaska Pipeline," March 9, 2006. <http://articles.latimes.com/2006/mar/09/nation/na-spill9> (accessed May 20, 2010).

27 Mark A Delucchi and James J. Murphy. "U.S. military expenditures to protect the use of Persian Gulf oil for motor vehicles." *Energy Policy* 36 (April 2008): 2253-2264.

28 Milton R. Copulos. *Testimony for the Senate Foreign Relations Committee* Washington DC, (March 30, 2006). <http://foreign.senate.gov/testimony/2006/CopulosTestimony060330.pdf>.

29 John G Ikenberry. "The Irony of State Strength: Comparative Responses to the Oil Shocks in the 1970s." *International Organization* 40, no. 1 (Winter 1986): 107-109.

30 U.S. Energy Information Administration, *World Proved Reserves of Oil and Natural Gas, Most Recent Estimates*, March 3, 2009. <http://www.eia.doe.gov/emeu/international/reserves.html> (accessed May 21, 2010).

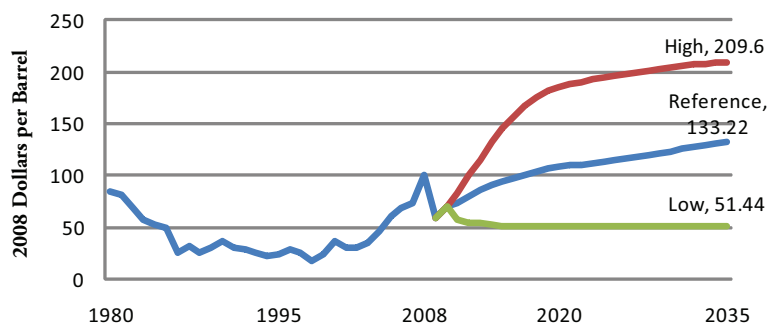
31 U.S. Energy Information Administration, "Crude Oil and Petroleum Imports Top 15 Countries."

annual interest, inflation and unemployment rates.³²

The U.S. military has also expressed concern over our oil dependence. Global energy demand, the military projects, will increase by 50 percent by the 2030s. Fossil fuels, at 80 percent, will constitute a majority of the energy supply – barring, of course, significant investment in alternative sources before this time. Sixty percent of fossil fuel usage, the Joint Operating Environment 2010 Report predicts, will be in the form of gas and oil.

Supply, however, is unlikely to keep pace with demand – but not for the reasons one might suspect. Even with conservative growth estimates, if we continue business as usual, insufficient refining capacity, as well as a shortage of drilling platforms and engineers – not a lack of petroleum reserves – will make it impossible to meet worldwide demand.³³

Average Annual Oil Prices in Three Cases



Source: U.S. Energy Information Administration

Oil Imports and the Trade Deficit

Despite the amount of attention paid to the American trade deficit as it concerns China, it is actually oil imports which make up the largest fraction of the U.S. trade deficit.³⁴ In fact, the United States is the world's largest importer of oil.³⁵ As the United States is home to less than two percent of proven global oil reserves,³⁶ American demand necessitates the import of 57 percent of its petroleum supply.³⁷ We send \$1 billion overseas every day.³⁸ Americans spent more than \$700 billion on oil in 2008 – over half this amount was spent importing petroleum.³⁹

Global Warming

Our climate has also suffered – and continues to – as a result of burning fossil fuels. Human-induced global warming was increasingly severe throughout the 20th century, raising the global temperature by about 1.0 to 1.7 degrees Fahrenheit between 1906 and 2005.⁴⁰ Carbon emissions, a major contributor to climate change, doubled between 1900 and 1950, and increased nearly four-fold in the second half of the century. Today, human activity emits 20 billion tons of carbon dioxide each year,⁴¹ of which 45 percent remains in the atmosphere.⁴²

32 U.S. Energy Information Administration, "Oil: Crude and Petroleum Products Explained, Oil Prices and Outlook," February 19, 2010. http://tonto.eia.doe.gov/energyexplained/index.cfm?page=oil_prices (accessed May 21, 2010).

33 United States Joint Forces Command, *The Joint Operating Environment*, February 18, 2010. http://www.jfcom.mil/newslink/storyarchive/2010/JOE_2010_o.pdf (accessed May 21, 2010).

34 Economic Policy Institute, "China dominates U.S. non-oil trade deficit in 2009," July 23, 2009. <http://www.epi.org/publications/entry/intlpic20090723/> (accessed May 21, 2010).

35 U.S. Energy Information Administration, "Oil: Crude and Petroleum Products Explained, Oil Imports and Exports," February 23, 2010. http://tonto.eia.doe.gov/energyexplained/index.cfm?page=oil_imports (accessed May 21, 2010).

36 Central Intelligence Agency, "Country Comparison: Oil-Proved Reserves." *The World Factbook*. January 1, 2008. <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2178rank.html> (accessed July 20, 2009).

37 U.S. Energy Information Administration, *Renewable & Alternative Fuels*. <http://www.eia.doe.gov/fuelrenewable.html> (accessed June 15, 2009).

38 "U.S. Oil Import Bill to Top \$400 billion the Year, Says Petroleum Intelligence Weekly," *Business Wire*, March 7, 2008. http://findarticles.com/p/articles/mi_m0EIN/is_2008_March_7/ai_n24380607/ (accessed May 21, 2010).

39 Rob McCulloch, Philip Faustmann and Jessica Darmawan, *Getting on Track: Record Transit Ridership Increases Energy Independence*, Environment America Research and Policy Center. September 2009. <http://cdn.publicinterestnetwork.org/assets/z9tyaVMScYPVSGCH8XLUJw/Getting-On-Track---Transit-Increases-Energy-Independence-9-22-09.pdf> (accessed May 21, 2010).

40 U.S. Energy Information Administration, "Gasoline Explained: Gasoline and the Environment," January 26, 2010. http://tonto.eia.doe.gov/energyexplained/index.cfm?page=gasoline_environment (accessed May 21, 2010).

41 Energy Information Agency. *Greenhouse Gases, Climate Change, and Energy*. May 2008. <http://www.eia.doe.gov/bookshelf/brochures/greenhouse/Chapter1.htm> (accessed June 30, 2009).

42 Intergovernmental Panel on Climate Change. *Are the Increases in Atmospheric Carbon Dioxide and Other Greenhouse Gases During the Industrial Revolution Caused by Human Activities?* March 27, 2008. http://ipcc-wg1.ucar.edu/wg1/FAQ/wg1_faq-7.1.html (accessed June 10, 2009).

Oil's Contribution to Climate Change

In the United States, burning fossil fuels – for electricity and transportation – is the largest contributor to carbon in the atmosphere. Releasing 19 pounds of carbon dioxide into the atmosphere for every gallon burned, we emit over 7.2 billion pounds of carbon daily⁴³ – even more when taking into consideration upstream emissions from refining and transport. Today, carbon released into the atmosphere as a result of burning gasoline amounts to 28 percent of total U.S. emissions,⁴⁴ up from 20 percent only three years ago.⁴⁵

U.S. Oil Consumption per Capita

The U.S. is second only to China in total carbon dioxide emissions.⁴⁶ The American population contributes significantly to this number by burning through approximately three gallons of oil per day per capita.⁴⁷

Continuing on a business-as-usual basis will deplete global natural resources and cause or exacerbate humanitarian disasters around the world. The ripple effects of hitting the most impoverished, unstable communities and countries will add to the pile of national security and economic costs to America.

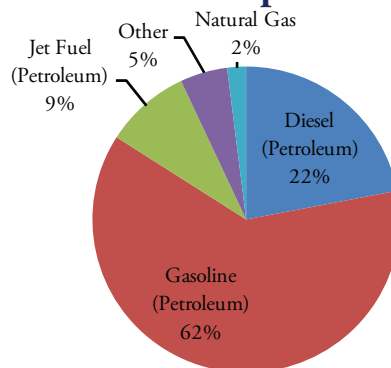
The Challenge of the U.S. Transportation Sector

Investing in a 21st century transportation system that will set a course for reducing oil dependence is necessary. Looking at how we use oil in transportation – part of which is illustrated below – and making the transition toward a less oil-reliant transportation system is undoubtedly a daunting task, but doing so is equally vital to the preservation of our security, economy and climate.

Transportation's Comparative Reliance on Oil

In the United States, the transportation sector was responsible for nearly 30 percent of energy use in 2008.⁴⁸ And if we look at what that energy supply is, it is almost entirely oil driven – seventy-one percent of America's petroleum supply was used in transportation, and 95 percent of the transportation sector is powered by oil. The U.S. transportation sector alone uses nearly twice as much oil as we produce domestically.⁴⁹ Particularly concerning is the fact that the demand for energy within the transportation sector has the highest growth rate.⁵⁰ And while the rest of the economy has continued to grow, it has also become increasingly energy efficient – energy consumption per

Fuel Used for Transportation, 2007



Note: Due to rounding, data may not sum to 100%.

Source: U.S. Department of Energy, Transportation Energy Data Book, Edition 28 (2009).

43 U.S. Energy Information Administration, "Gasoline Explained: Gasoline and the Environment."

44 U.S. Environmental Protection Agency, *EPA Analysis of the Transportation Sector: Greenhouse Gas and Oil Reduction Scenarios* (2010), slides. <http://www.epa.gov/oms/climate/GHGtransportation-analysis03-18-2010.pdf> (accessed May 21, 2010).

45 U.S. Energy Information Administration, "Gasoline Explained: Gasoline and the Environment."

46 U.S. Energy Information Administration. "Environment FAQs," June 30, 2009. http://tonto.eia.doe.gov/ask/environment_faqs.asp (accessed May 21, 2010).

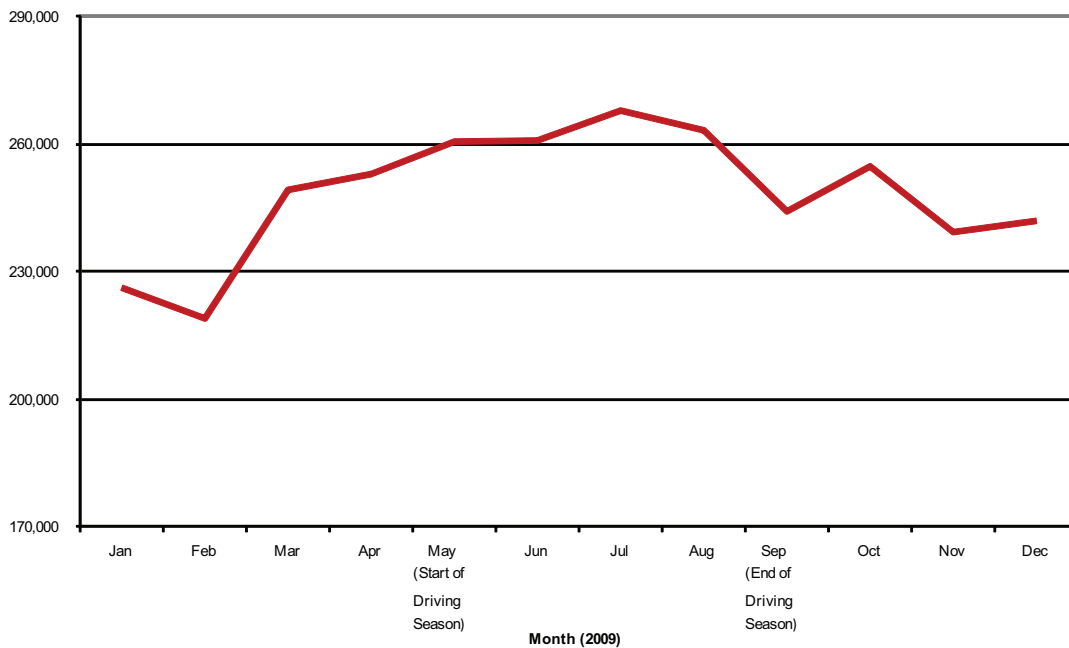
47 U.S. Energy Information Administration. Demand. http://www.eia.doe.gov/pub/oil_gas/petroleum/analysis_publications/oil_market_basics/demand_text.htm#Global%20Oil%20Consumption (accessed May 21, 2010).

48 U.S. Energy Information Administration. "Use of energy in the United States Explained: Energy Use for Transportation," January 26, 2010. http://tonto.eia.doe.gov/energyexplained/index.cfm?page=us_energy_transportation#tab1 (accessed May 21, 2010).

49 Center for Transportation Analysis. *Transportation Energy Data Book, Chapter 1: Petroleum*, 2009. http://cta.ornl.gov/data/tedb28/Edition28_Chapter01.pdf (accessed May 21, 2010).

50 U.S. Energy Information Administration, *Figure 2.1a Energy Consumption by Sector Overview*, 2008. http://www.eia.doe.gov/emeu/aer/pdf/pages/sec2_4.pdf (accessed May 21, 2010).

United States Vehicle Miles Traveled



Source: U.S. Department of Transportation

real dollar of real Gross Domestic Product has dropped by about 50 percent.⁵¹ The transportation sector's efficiency level, however, has largely stagnated.

The fact is that we have an automobile dependent transit system in which cars and light trucks account for 60 percent of energy use in the sector, and more efficient trains and buses only account for three percent.⁵² There are 249 million cars, trucks, and buses on our roads, amounting to more than three vehicles for every four people, or nearly 2.5 cars per household.⁵³

While American use of public transportation grew by four percent in 2008, saving over four billion gallons of gasoline (roughly the equivalent of taking all of Florida's cars off the road), if we doubled current levels of use, we could decrease our oil consumption by an amount nearly equivalent to our annual import from Saudi Arabia.⁵⁴ Small changes in how we travel to work and play can make large differences in our oil dependence.

Between 2000 and 2008, the price of crude oil by the barrel more than doubled. This same time period saw the average price per gallon of gasoline increase by 70 percent.⁵⁵ Just two summers ago, as we headed into the summer driving season, prices were climbing to record highs. The drain and impacts of \$4 per gallon of gas in 2008 serves as a clear call for a new direction this summer.

Looking ahead, we need to assess opportunities to curtail oil use across the transportation sector. Saving upwards of 7 million barrels of oil per day, as the EPA has outlined, is a feasible down payment on ending oil dependence in the transportation sector and would benefit our economy, our national security and climate.

51 Energy Information Administration. *Table 1.5: Energy Consumption, Expenditures, and Emissions Indicators, 1949-2008*. <http://www.eia.doe.gov/emeu/aer/txt/ptb0105.html> (accessed July 27, 2009).

52 U.S. Energy Information Administration. "Use of energy in the United States Explained: Energy Use for Transportation."

53 Ibid.

54 Rob McCulloch, Philip Faustmann and Jessica Darmawan, *Getting on Track: Record Transit Ridership Increases Energy Independence*, Environment America Research and Policy Center.

55 Center for Transportation Analysis. *Transportation Energy Data Book, Chapter 10: Transportation and the Economy*, 2009. http://cta.ornl.gov/data/tedb28/Edition28_Chapter10.pdf (accessed May 21, 2010).

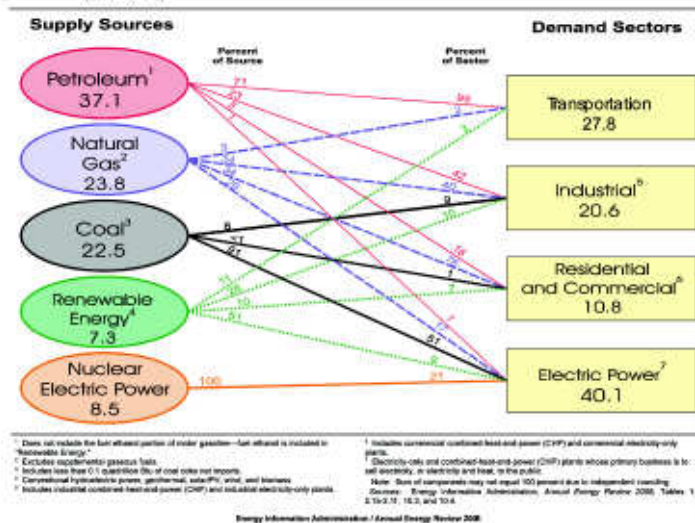
New Trends in Fuel Economy: Autos and Trucks

The Energy Independence and Security Act (EISA) of 2007 marked the first tentative steps toward increasing fuel efficiency in two decades. Signed by President Bush, it mandated automakers to boost the fleet-wide fuel economy to 35 mpg by 2020. In April 2010, President Obama accelerated this timeframe to 2016, with his May 19, 2009 executive order to develop fuel economy standards even stricter than EISA.⁵⁶ Until these recent steps, we had failed to improve the fuel economy of cars and light trucks by any meaningful amount since the inception of fuel economy standards set the bar for cars and light trucks in 1975. The lack of action on this critical front is of particular concern considering the growing number of cars on American roads,⁵⁷ increased demand for energy, and the fact that our net imports of petroleum have only increased since 1985.⁵⁸

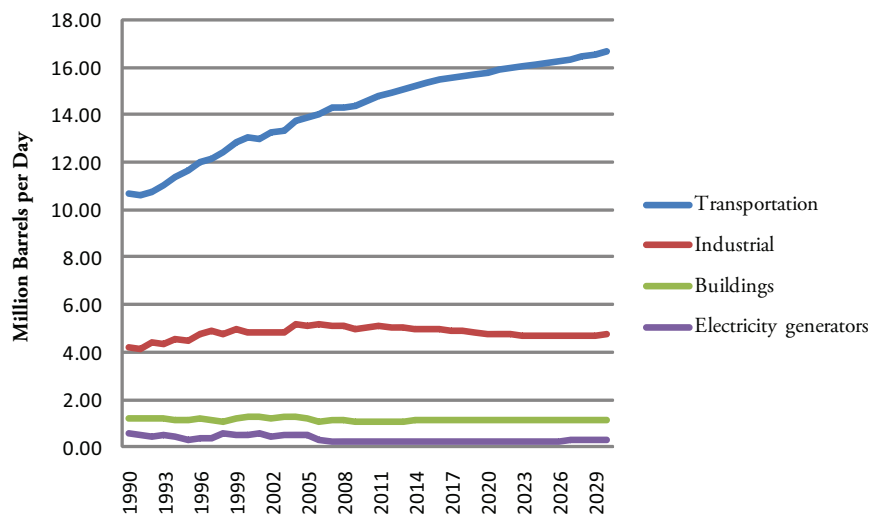
Inaction on fuel economy standards resulted in an increasingly truck-oriented fleet as well as a more powerful vehicle fleet, as manufacturers translated technological advances into increased horsepower rather than fuel economy. As a result, fleet fuel economy reached a peak in 1987 and declined steadily until 2004.⁵⁹ Even today, the average light-duty vehicle achieves only 21.1 miles per gallon on the road.⁶⁰

Today, American petroleum consumption is nearly three-times that of the second most consuming country, China.⁶¹ The Chinese are not being quite so complacent. According to one account, “China already gets the equivalent of 35.8 miles a gallon this year based on the American measurement system of corporate averages and will be required to get 42.2 miles a gallon in 2015.”⁶²

Figure 2.0 Primary Energy Consumption by Source and Sector, 2008 (Quadrillion Btu)



Liquid Fuels Consumption By Sector



Source: U.S. Energy Information Administration

56 Peter Baker. “Obama Mandates Rules to Raise Fuel Standards,” The New York Times, May, 21 2010. <http://www.nytimes.com/2010/05/22/business/energy-environment/22fuel.html?hp> (accessed May 21, 2010).
 57 Research and Innovative Technology Administration. Table 1-11: Number of U.S. Aircraft, Vehicles, Vessels, and Other Conveyances. http://www.bts.gov/publications/national_transportation_statistics/html/table_01_11.html.
 58 U.S. Energy Information Administration. “How dependent are we on foreign oil?”
 59 U.S. Environmental Protection Agency, Light-Duty Automotive Technology, Carbon Dioxide Emissions, and Fuel Economy Trends: 1975 – 2009, November 2009. <http://www.epa.gov/oms/cert/mpg/fetrends/420r09014.pdf> (accessed May 21, 2010).
 60 Ibid.
 61 U.S. Energy Information Administration. “Oil: Crude and Petroleum Products Explained, Use of Oil.”
 62 Keith Bradsher. “China Is Said to Plan Strict Gas Mileage Rules,” The New York Times, May 27, 2009. <http://www.nytimes.com/2009/05/28/business/energy-environment/28fuel.html>. (accessed May 21, 2010).

While we have finally woken up to the need for greater effort, we still lag most other countries in terms of fuel economy standards.

The new U.S. standards will reduce greenhouse gas emissions by 960 million metric tons, equivalent to shutting 249 coal plants or taking more than 183 million cars off the road for one year.⁶³ Over the lives of the vehicles sold from 2012-2016 we will save nearly 2 billion barrels of oil - more oil than we imported from Saudi Arabia, Venezuela, Libya and Nigeria combined in 2008. According to EPA and the Department of Transportation, new vehicle standards will also create benefits for consumers, the environment and automakers, totaling \$240 billion.

Impacts of EPA Program on GHG Emissions and Fuel Savings

Calendar Year	Annual GHG Reduction (CO ₂ EQ MMT)	Fuel Savings (Million Barrels Per Day of Gasoline Equivalent)	Annual Fuel Savings (Billion Gallons of Gasoline Equivalent)
2020	156.3	0.8	12.6
2030	307.4	1.6	24.7
2040	401.5	2.1	32.6
2050	505.9	2.7	41.5

Source: U.S. Energy Information Administration

More efficient vehicles can have significant consumer benefits. Trading in a 14 mile per gallon (mpg) SUV for a 28 mpg vehicle can save a consumer more than \$1,700 a year if gas prices reach levels seen in the summer of 2008.⁶⁴ In addition, the new standards could be an economic boon nationally. According to the Union of Concerned Scientists, mandating improved efficiency will create 20,000 auto industry jobs and 200,000 related jobs nationwide by 2020, helping to create a strong, thriving auto industry.⁶⁵

There will be significant strategic benefits as well. While the Energy Information Administration (EIA) projects savings of 800,000 barrels of oil per day by 2020, outside analysis predicts oil savings from these new rules alone could be as high as 1.2 million barrels of oil per day in 2020 and rise to nearly 3 million barrels per day by 2030, virtually all of which will cut into the total we import.

Furthermore, these standards will shift the path for new vehicles and create the opportunity for more aggressive standards for vehicles in 2017 and beyond. These next standards should stress the limits of the internal combustion engine and bring in hybrids, plug-in hybrids, electric and fuel cell vehicles.

The Energy Information Administration projects U.S. dependence on foreign oil imports will drop from 58 percent in 2007 to 40 percent in 2030. Contributing to this decline is a flat-lining of demand and increased off-shore drilling.⁶⁶ Moreover, the EIA predicts that an increase in diesel fuel-consuming light-duty vehicles on our roads – in compliance with new government issued fuel economy standards and biofuel consumption regulations – will also contribute to decreased dependence.⁶⁷ Absent such measures, decreased demand for foreign oil seems unlikely. Furthermore, considering the BP oil spill in the Gulf, and the pulling of plans to expand off-shore drilling, we face a greater need to reduce our dependence on imports.

63 U.S. Environmental Protection Agency. "Greenhouse Gas Equivalencies Calculator," March 23, 2010. <http://www.epa.gov/rdee/energy-resources/calculator.html> (accessed May 21, 2010).

64 Sierra Club. "Green Transportation: Clean Car Savings Calculator." <http://www.sierraclub.org/transportation/clunkers/calculator.aspx> (accessed May 21, 2010).

65 Union of Concerned Scientists. National Clean Vehicle Program: Model Year 2012-2016 Standards. April 1, 2010. http://www.ucsusa.org/assets/documents/clean_vehicles/National-Clean-Car-Standards-Fact-Sheet.pdf

66 U.S. Energy Information Administration. "How dependent are we on foreign oil?"

67 U.S. Energy Information Administration. "Oil: Crude and Petroleum Products Explained, Use of Oil."

Nevertheless, a recent analysis of government efforts suggests that existing measures will be insufficient to meet U.S. Government goals on greenhouse gas reductions. The Obama Administration's goal of reducing GHG emissions by 14 percent from 2005 levels by 2020 is likely unachievable given existing policy options applied to the transportation sector.⁶⁸ Looking across the transportation sector more oil savings can and must be achieved.

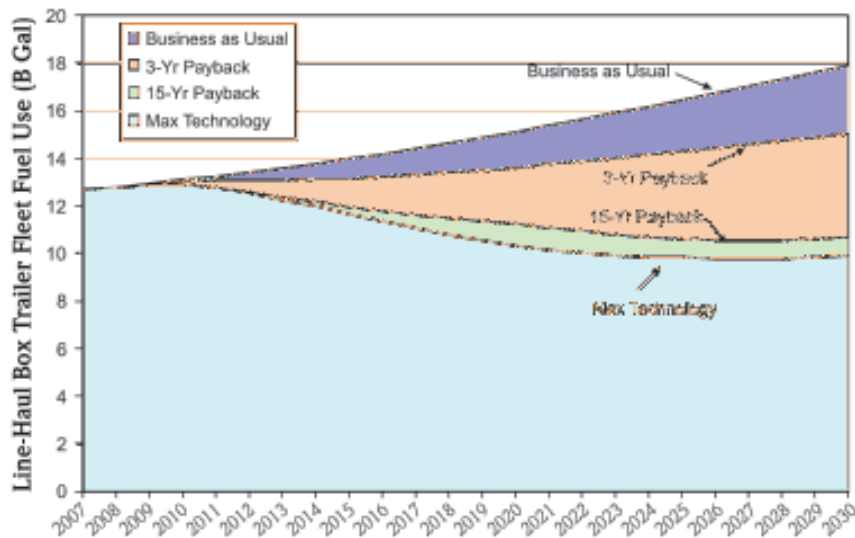
By moving from light-duty vehicles to plug-in electric vehicles the United States can reduce GHG emissions from the transportation sector significantly even taking into consideration the entire fuel cycle, from extraction to well-to-wheels. In

particular, emissions would be drastically reduced by removing the need to convert crude oil to gasoline. Moreover, the Plug-in Hybrid Electric Vehicles (PHEV) itself is more energy efficient, storing kinetic energy for future use. Electricity used to power our electric vehicles in the short-term will likely be generated from coal and natural gas – of which the United States has expansive reserves. But by moving the majority of our emissions from millions of cars to several energy-generating locations the opportunity for sequestering GHG emissions underground becomes increasingly possible, leaving room for further reductions. Furthermore, the opportunity to expand to non- and low-GHG emitting fuels for electricity generation becomes feasible in the long-term, making it possible to reduce emissions to an even greater degree.⁶⁹

Freight Trucks

Given that medium and heavy duty trucks are the second largest consumers of oil in the transportation sector,⁷⁰ setting standards for these vehicles is essential. Both the EPA and DOT are looking at setting⁷¹ greenhouse emissions and mileage standards for trucks for the first time. Savings of nearly 700,000 barrels of oil per day can be achieved with new standards on future models and also by taking actions to improve the efficiency of trucks already on the road. According to one study, aggressive action to push technology and efficiency on the long-haul tractor trailer fleet alone could save eight billion gallons of diesel fuel annually by 2030. However, if we consider a path that includes shifting freight to rail and bringing in natural gas as domestic fuel for heavy duty trucks, greater savings are possible.

Potential Fuel Savings in the U.S. Long Haul Box Trailer Fleet



Source: "Reducing Heavy-Duty Long Haul Combination Truck Fuel Consumption and CO2 Emissions," <http://www.theicct.org/documents/0000/0986/ICCT-NESCAUM-ESFinal>.

68 W. Ross Morrow, et al., "Analysis of Policies to Reduce Oil Consumption and Greenhouse-Gas Emissions from the U.S. Transportation Sector," Harvard Kennedy School, Belfer Center for Science and International Affairs, February 2010, p. 2.

69 Michael Kitntner-Meyer, Kevin Schneider and Robert Pratt. Impact Assessment of Plug-In Hybrid Vehicles on Electric Utilities and Regional U.S. Power Grids, Part 1: Technical Analysis, Pacific Northwest National Laboratory, May 24, 2007. <http://www.ferc.gov/about/com-mem/wellinghoff/5-24-07-technical-analy-wellinghoff.pdf> (accessed May 21, 2010).

70 Energy Information Administration. *Annual Energy Outlook 2010, Table A7 Transportation Sector Key Indicators and Delivered Energy Consumption*. <http://www.eia.doe.gov/oiaf/aeo/pdf/appa.pdf> (accessed May 21, 2010).

71 Northeast States Center for a Clean Air Future, International Council on Clean Transportation, Southwest Research Institute and TIAX, LLC. *Reducing Heavy-Duty Long Haul Combination Truck Fuel Consumption and CO2 Emissions*, October 2009. <http://www.theicct.org/documents/0000/0986/ICCT-NESCAUM-ESFinal.pdf> (accessed May 21, 2010).

Raising Prices at the Pump

Left out of the government analysis is a very effective tool to reduce such emissions and consumption – raising the price of gasoline at the pump. The high gas prices in 2008 did have an impact both on what vehicles consumers were buying and how much they drove. Vehicle miles travelled actually went down with higher pump prices and transit ridership went up to record highs.⁷² Some have noted that “fuel prices above \$8/gallon may be needed to significantly reduce U.S. GHG emissions and oil imports.”⁷³ However, raising fuel taxes that high that quickly would be both politically impossible and likely have significant disruptive effects on the U.S. economy.⁷⁴ There are enormous political challenges to such an approach, but they should be considered as part of a serious national strategy.

Beyond these major consumers of oil, standards for all oil-dependent vehicles from ships, to trains and airplanes are needed to ensure that our transportation sector heads in the direction of using less oil.

Getting to Oil Free Vehicles

The largest potential reductions to greenhouse gas emissions in the transportation sector will likely come from a large-scale movement away from gasoline dependent vehicles to either plug-in electric or fuel cell vehicles powered by hydrogen.

Manufacturers are pushing to bring the first battery electric vehicles to market. By the end of 2010, several auto-makers will be selling a variety of electric drive cars ranging from the all electric Nissan Leaf to the plug-in hybrid Chevrolet Volt. The industry and the Department of Energy are focusing on making the launch of electric vehicles successful. This will require additional work to improve the electric power grid and other projects.

While the infrastructure to support large-scale deployment of such vehicles is not yet in place, the trend lines are positive. The continuation of a systematic policy of promoting innovation in this area will prove a productive avenue for both reducing GHG emissions and reliance on foreign oil.

President Obama has stated a goal of having on the road the first one million vehicles capable of running off the grid on the road by 2015. Investments under the American Recovery and Reinvestment Act are helping to achieve this goal.⁷⁵ Aggressive electrification of the fleet can significantly reduce oil consumption by more than 4 million barrels per day. One vision of the future would displace as much as 75 percent of the miles we drive in gasoline vehicles with electric miles.⁷⁶ The U.S. EPA also offers a look at how quickly electric vehicles and plug-in hybrids will come to market.⁷⁷ More aggressive and rapid penetration of electric vehicles will deliver greater oil savings quickly.

In the short-run, however, incentive programs need to be carefully structured. As the EPA and DOT set emissions and fuel economy standards for 2017 and beyond, they must be mindful that growing numbers of hybrid vehicles and electric cars have the perverse effect of actually slowing improvements to the conventional fuel economy since deployment of additional hybrids can allow automobile producers to improve the overall fuel economy of their fleets without improving the efficiency of their gasoline-powered vehicles.⁷⁸ In order to achieve stated goals, the United States will need both better fuel efficiency for conventional vehicles and a widespread deployment of advanced technology alternative vehicles.

72 Rob McCulloch, Philip Faustmann and Jessica Darmawan, *Getting on Track: Record Transit Ridership Increases Energy Independence*,” Environment America Research and Policy Center.

73 Morrow, et al, p.2

74 Jim Tankersley. “Senators consider gasoline tax as part of climate bill,” *Los Angeles Times*, April 14, 2010. <http://articles.latimes.com/2010/apr/14/nation/la-na-gas-tax14-2010apr14> (accessed May 24, 2010).

75 U.S. Department of Energy, “President Obama Announces \$2.4 Billion in Funding to Support Next Generation Electric Vehicles,” March 19, 2009. <http://www.energy.gov/news/7066.htm> (accessed May 21, 2010).

76 Electrification Coalition. *Electrification Roadmap*,” November 2009. <http://www.electrificationcoalition.org/electrification-roadmap.php> (accessed May 21, 2010).

77 U.S. Environmental Protection Agency. “Plug-in Hybrid electric Vehicles,” October 26, 2009. <http://www.epa.gov/OMS/climate/420f07048.htm> (accessed May 25, 2010).

78 Morrow, et al, p.2

While the current standards can be expected to reduce GHG emissions by 20 to 30 percent, moving to hybrid electric and all electric vehicles would cut such emissions by 50 percent. This number increases as we transition to renewable power generation. Moving to hydrogen powered fuel cell vehicles could reduce such emissions by 60 - 90 percent, depending on how the hydrogen is produced.

But while the climate change benefits are obvious, so are the technological challenges. Electric vehicles offer a near term solution. Fuel cell systems, which remain costly and require a new fueling infrastructure, can be a part of a new transportation future as progress is made on this front.⁷⁹

Because these technologies remain relatively young, the development curves are quite steep. There is, however, good reason to assume that industry, as it continues to be supported by rigorous, bipartisan federal efforts, will achieve the necessary improvements to make such electric vehicles – including hydrogen fuel cells – competitive in terms of cost and durability.

Biofuels

Just as our cars and trucks are becoming cleaner, so should the fuels we put in them. Besides electrifying our vehicle fleet, another alternative energy source is biofuels. If coupled with strong sourcing safeguards and full lifecycle accounting, sustainable biofuels can help displace oil and cut greenhouse gas emissions.

In February 2010, the EPA issued final rules for the Renewable Fuel Standard – a mandate to increase our use of biofuels from 9 billion gallons in 2008 to 36 billion gallons in 2022.⁸⁰ Besides setting aggressive targets for biofuel use, Congress also included a strong definition of qualifying renewable biomass and directions to measure the entire lifecycle of greenhouse gas emissions, including both direct and indirect emissions.

The vast majority of currently produced biofuel is ethanol derived from corn. While corn ethanol can contribute to reductions in oil use, it does not achieve major reductions in emissions and can increase them in some cases.⁸¹ It may drive up grocery prices, as well, by creating extra demand for a widely-used food product. Instead, biofuels derived from cellulosic feedstocks can eliminate competition with food products and reduce emissions substantially more than corn ethanol.

To significantly reduce emissions and displace oil use, we must develop next generation cellulosic biofuels. The Renewable Fuel Standard currently mandates that we use 16 billion gallons of cellulosic biofuels in 2022. However, current production is far short of that, and in recognition, EPA lowered the 2010 cellulosic requirement to just 6.5 million gallons. It is clear that significant investment is needed to meet the goals of the Renewable Fuel Standard and to jump-start the cellulosic biofuels industry.⁸²

Investing in Transportation Choices: The Role of Transit and Rail

Compared to other Western nations, the United States is severely lacking transit and travel options that are not oil dependent. Passenger rail options that do exist do so at a level inferior to those of our counterparts. Traveling the 200 miles between New York and Boston takes an additional 50 percent of the time compared to traveling the same distance between London and Paris.⁸³ While the differing landscapes of both continents certainly contribute to this, we have let our passenger rail system decay over the decades with an almost single-minded focus on highways and roads. Our rail systems for both passengers and freight need an overhaul.

79 U.S. Department of Energy. Hydrogen and Fuel Cell Activities, Progress and Plans, Report to Congress," January 2009, p. 20. http://www.hydrogen.energy.gov/pdfs/epact_report_sec811.pdf (accessed May 21, 2010).

80 U.S. Environmental Protection Agency, "EPA Lifecycle Analysis of Greenhouse Gas Emissions from Renewable Fuels," February 2010. <http://www.epa.gov/otag/renewablefuels/420f10006.htm> (accessed May 21, 2010).

81 California Air Resources Board, "Carbon Intensity Lookup Table for Gasoline and Fuels that Substitute for Gasoline." Dec, 14, 2009. http://www.arb.ca.gov/fuels/lcfs/121409lcfs_lutables.pdf (Accessed May 24, 2010).

82 U.S. Environmental Protection Agency, "Regulation of Fuels and Fuel Additives: Changes to Renewable Fuel Standard Program; Final Rule", *Federal Register* 75, no. 2010-03851 (March 2010). <http://www.regulations.gov/search/Regs/home.html#documentDetail?R=0900006480ac93f2> (accessed May 21, 2010).

83 Amtrak. *Northeast Corridor Boston and Virginia Beach*. <http://www.amtrak.com/timetable/july09/W04.pdf> (accessed July 28, 2009).

As with developing advanced technology vehicle infrastructure, discovering the best way to proceed is dependent on an assessment of the numerous options for mass transit and high speed rail. Simply building mass transit to service scattered suburbs is likely to have a minimal impact on fuel usage and GHG emissions. In contrast, a coherent approach to combine mass transit construction with careful land-use and zoning strategies could make a significant impact.⁸⁴ Extensive research in community design has shown that the higher densities, access to local shopping, and ease of walking, biking and transit in traditional communities reduce driving and energy consumption.⁸⁵ For instance, residents of sprawling suburban communities like San Ramon in the San Francisco Bay area had, in 2006, three to seven times as many vehicles and drive four to nine times as much as those living in convenient older North Beach in San Francisco and in Manhattan.⁸⁶



Investing in transportation choices and making communities easier to navigate through walking and biking and transit creates significant benefits. According to Representative Earl Blumenauer, “In Portland, Oregon, the investments we’ve made in sidewalks, streetcars, light rail and bike lanes have directly benefited families. The citizens of Portland drive 20 percent less than residents of other major metropolitan areas. This means less pollution and savings of \$2,500 per year for the average family; it can put that money toward health care, housing or savings.”⁸⁷

Investing in America’s railroad system has the potential to reduce oil use from the transportation of both people and freight. According to a recent analysis by the EPA, electrifying portions of our freight rail system and switching freight from heavy-duty trucks to rail can reduce emissions and oil consumption.⁸⁸

Shifting freight to rail and creating an efficient inter-modal system for our goods is a priority. Also promising is the development of more extensive high-speed rail links serving high-population corridors, which have the potential to reduce car traffic and almost wholly eliminate the need for some plane travel.⁸⁹ Building a high-speed rail network that connects city centers would provide a convenient alternative for moving people between cities and provide quick access to public transit within the destination city, which would have the added benefit of reducing congestion and delays at many American airports and reducing energy intensive air travel for short trips. The National Rail Plan is a step in the right direction. There are a large number of potential corridors under consideration for rail, and the completion of these links are likely to have a significant effect on greenhouse emissions and oil demand while also easing road congestion and creating jobs in the United States.⁹⁰

84 National Academies. “Incorporating Climate Change Considerations into Transportation Planning,” November 27, 2009. <http://trb.metapress.com/content/c4q12300t252g213/> (accessed May 21, 2010).

85 Transportation Research Board. “Incorporating Climate Change.”

86 John Holtzclaw. *Making Truth Convenient: Ending Our Oil Addiction, Building Sustainable Communities*, Sierra Club, July 12, 2006. <http://www.sierraclub.org/sprawl/articles/campusprogress2006.pdf> (accessed May 21, 2010).

87 Earl Blumenauer. “Transit bills fight climate change,” *Politico*, February 8, 2010. http://www.politico.com/news/stories/0210/32656_Page2.html (accessed May 21, 2010).

88 U.S. Environmental Protection Agency, *EPA Analysis of the Transportation Sector: Greenhouse Gas and Oil Reduction Scenarios*

89 Lester R. Brown. “Earth Policy Institute: Restructuring the U.S. Transport System – the Potential of High-Speed Rail,” *Sustainablog*, February 3, 2009. <http://blog.sustainablog.org/earth-policy-institute-restructuring-the-us-transport-system-the-potential-of-high-speed-rail/> (accessed May 21, 2010).

90 U.S. Department of Transportation. “High-Speed Rail Corridor Descriptions.” <http://www.fra.dot.gov/Pages/203.shtml> (accessed May 21, 2010).

Conclusions

This report has demonstrated the threat posed by American dependence on oil to power the transportation sector. Every day that we fail to act, is a day that we continue to place America's security, economy and climate in jeopardy. The need for action is urgent.

It is in our power to plan now for a new transportation future – one that befits our nation in the 21st century. Building on bipartisan initiatives put in place over the past decade, the United States has begun to take important steps toward reducing our dependence on foreign oil. Higher fuel economy standards for vehicles will play an important role in charting this new future. The new standards that will impact new vehicles between 2012 and 2016 must be viewed as a first step in the right direction. Setting the bar for 2017 and beyond must begin now and must be done with the long term oil free goal in mind. But genuine success will require a comprehensive approach bringing together government initiatives at the federal, state, and local level with the innovativeness and creativity of private enterprise. We must ensure that our transportation policies and spending are tied to reducing oil dependence not perpetuating it. We have made some progress, but more is required. Even the most aggressive implementation of current goals will only make a small dent in the problem we face. Incrementalism has its place, but so does visionary leadership.

The national security, economic and climate consequences of our reliance on oil pose an enormous risk to our nation. We can use the summer driving season as a time to reflect on transportation in the United States, and envision the solutions that we can invest in to shape an oil free future. We need to imagine a better future – one in which we spend less time in our cars and less money on gas, and do more to protect our country, our national interests and the environment. The biggest challenge for the United States is addressing a failure of imagination.



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