



The Automobile and Its Threats to Our Planetary Welfare

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Vehicles powered by petroleum pose grave threats to justice, peace, and the integrity of creation.¹

Before I present the evidence to support this stark and unsettling thesis, I confess that I certainly am part of the problem. Together, my wife and I have owned ten cars over the past twenty-five years and driven over 300,000 miles. We are part of the ninety-two percent of U.S. households that own a car that travels an average of 12,000 miles a year.² In fact, we have owned two cars for much of our married life and do so now. Like most Americans we use these vehicles primarily to get to work and to shop for household goods, but we also drive many miles every year to attend our sons' sports events. In fact, we have added two more drivers to the road recently by teaching both of our sons to drive.

Cars help us be the relational creatures we are. They help us maintain social relationships with family and friends, both far and near. They also help us appreciate (to some extent) God's beautiful world, often whizzing by at high speeds. I relish the solitude and scenic beauty that accompanies me on many of my trips in

¹Some of the content in this article is excerpted with permission from "The Power to Change: U.S. Energy Policy and Global Warming," a revised social policy document I have been commissioned to write for the Presbyterian Church (USA).

²David Sandalow, *Freedom from Oil: How the Next President Can End the United States' Oil Addiction* (New York: McGraw Hill, 2008) 19.

The use of oil is expensive—not only economically, but also costly to justice, peace, and the integrity of creation. Christians need to be familiar with the data and respond to the threats.

Iowa, Minnesota, and Wisconsin. I also cherish the great experiences our family has enjoyed as we have traveled across the country on various vacations. In a recent national poll, thirty-nine percent of Americans said they “love” their car.³ While my wife and I may not be willing to go that far, the reality is we can’t imagine our lives without a car.

The problem is that over ninety-six percent of the vehicles in the United States run on petroleum products.⁴ President Bush admitted during his 2006 State of the Union speech that “America is addicted to oil.”⁵ Petroleum is the largest primary source of energy in the United States, providing nearly forty percent of the nation’s energy.⁶ We use one-quarter of the world’s petroleum supply and import more than sixty percent of the oil we consume.⁷ Energy expert Daniel Yergin says, “We are so dependent on oil, and oil is so embedded in our daily doings, that we hardly stop to comprehend its pervasive significance.”⁸ And yet we must. If present trends continue, recent studies indicate that the 800 million vehicles on the world’s roads today will grow to two billion vehicles by the year 2030.⁹ This growth in vehicle ownership will produce a rapid increase in petroleum demand. The drilling, refining, distribution, and combustion of petroleum products (along with other fossil fuels) poses several grave threats to our planetary welfare.

THREATS TO JUSTICE

Each human being breathes about 3,000 gallons of air per day.¹⁰ The American Lung Association estimates that over 150 million people in the United States live in areas where poor air quality puts their health at risk.¹¹ Vehicle emissions are the leading cause of this air pollution.¹² The 240 million cars, trucks, and buses on U.S. roads today emit a noxious cloud of pollutants consisting of large and fine particulate matter, volatile organic compounds, ozone, nitrogen oxide, and carbon monoxide.¹³ These

³Ibid., 150.

⁴ABC News/Time Magazine/Washington Post Poll: Traffic (January 2005), online at <http://abcnews.go.com/images/Politics/973a2Traffic.pdf> (accessed 8 December 2007). Cited in Sandalow, *Freedom from Oil*, 14.

⁵George W. Bush, “State of the Union Address by the President,” 31 January 2006, online at <http://www.whitehouse.gov/stateoftheunion/2006/> (accessed 23 July 2007).

⁶Energy Information Administration, *Annual Energy Review*, “U.S. Primary Energy Consumption by Source and Sector, 2006, online at http://www.eia.doe.gov/emeu/aer/peccs_diagram.html (accessed 5 December 2007).

⁷Jay Inslee and Bracken Hicks, *Apollo’s Fire: Igniting America’s Clean-Energy Economy* (Washington, DC: Island Press, 2008) 14.

⁸Daniel Yergin, *The Prize: The Epic Quest for Oil, Money, and Power* (New York: Simon & Schuster, 1991) 13–14.

⁹Joyce Dargay, Dermot Gately, and Martin Sommer, “Vehicle Ownership and Income Growth, Worldwide: 1960–2030,” *Energy Journal* 28/4 (2007), online at http://www.econ.nyu.edu/dept/courses/gately/Vehicle%20Ownership%20and%20Income%20Growth_abstract.htm (accessed 10 December 2007).

¹⁰Terry Tamminen, *Lives Per Gallon: The True Cost of Our Oil Addiction* (Washington, DC: Island Press, 2006) 9.

¹¹Ibid., 13.

¹²Sandalow, *Freedom from Oil*, 30.

¹³Ibid., 18.

pollutants are a leading cause of asthma, lung cancer and other respiratory diseases, cardiopulmonary disease, low-birth-weight babies, and increased infant mortality.¹⁴ Each year, diesel exhaust alone is responsible for over 125,000 cancer cases in the United States, and nearly 100,000 Americans die annually from causes attributable to smog.¹⁵ These health impacts are concentrated in cities all over the country, but they have a particularly harsh and unjust effect on vulnerable populations such as asthmatics, the elderly, the very young, and those who live near busy highways, refineries, and polluting industries. People who are poor and racial minorities bear a disproportionate and unjust share of this burden.

“poor households with incomes below \$15,000 a year typically spend more than ten percent of their incomes on gasoline”

The rising cost of petroleum fuels has impacted all Americans. The average price of gasoline has more than doubled since 2002, rising now to well over \$3 a gallon and sometimes more. As with the impact of pollution on health, however, the rising cost of gasoline has a disproportionate effect on people who are poor. Poor households with incomes below \$15,000 a year typically spend more than ten percent of their incomes on gasoline.¹⁶ This amount has increased significantly in recent years.

The needs of the poor also get short-changed because the United States spends more and more money each year to purchase oil. U.S. oil production peaked in the 1970s, and since then imports have been rising steadily to meet demand. In 2006, imports of energy-related petroleum products cost over \$290 billion and represented more than thirty percent of the nation’s international trade deficit.¹⁷ These are dollars the United States could be spending to reduce serious and unjust deficits in health care coverage, inner-city education, and poverty alleviation. Instead, the rapidly increasing demand for oil in China and India is pushing the U.S. cost of imported oil even higher.

There are other significant costs related to U.S. oil supplies. Various studies estimate that it costs the nation between \$55 billion and nearly \$100 billion each year to militarily secure its oil supplies around the world.¹⁸ These estimates do not include more than \$500 billion spent since 2003 for the war in Iraq, which has the world’s third largest proven reserves of oil.¹⁹ A recent report by the Congressional

¹⁴Tamminen, *Lives Per Gallon*, 13–14.

¹⁵*Ibid.*, 22.

¹⁶Sandalow, *Freedom from Oil*, 19.

¹⁷U.S. Census Bureau, *U.S. International Trade in Goods and Services—2006*, Exhibit 17, “Imports of Energy-Related Petroleum Products, Including Crude Oil,” online at http://www.census.gov/foreign-trade/Press-Release/current_press_release/exh17.pdf (accessed 23 July 2007).

¹⁸Evan Harrje, *The Real Price of Gasoline* (Washington, DC: International Center for Technology Assessment, 2000). Cited in Tamminen, *Lives Per Gallon*, 59.

¹⁹Energy Information Administration, *World Proved Reserves of Oil and Natural Gas, Most Recent Estimates*, January 9, 2007, online at <http://www.eia.doe.gov/emeu/international/reserves.html> (accessed 23 July 2007).

Budget Office estimates that the wars in Iraq and Afghanistan could cost \$2.4 trillion over the next decade.²⁰ Obviously these funds could be spent to address a host of injustices both at home and abroad.

THREATS TO PEACE

The link between oil, war, and geopolitics is not new. At the turn of the twentieth century Great Britain decided to convert its Royal Navy from a coal-burning fleet to an oil-burning fleet. This led Winston Churchill to help form the Anglo-Persian Oil Company, which invested heavily in what today is Iran.²¹ During the 1930s, Japanese disagreements with the United States led to an oil boycott. This led Japan to invade oil-rich Indonesia, which ignited the war in the Pacific.²² During World War II the United States was the world's leading oil producer, supplying over eighty-five percent of the oil the Allied forces consumed during the war.²³ By 1943, however, it became clear that the United States was rapidly depleting its domestic supplies. In 1944, the State Department issued the *Foreign Petroleum Policy of the United States*, which sought "a broad policy of conservation of Western Hemisphere petroleum reserves" and "substantial and orderly expansion of production in Eastern Hemisphere sources of supply, principally the Middle East."²⁴

From that point on, every U.S. president has emphasized the strategic importance of Middle Eastern oil. A State Department report issued during the Truman administration described Saudi Arabia's oil resources as a "stupendous source of strategic power, and one of the greatest material prizes in human history."²⁵ During the Cold War, the Eisenhower administration promised to use U.S. combat forces to defend countries in the Middle East from Soviet aggression and provided military assistance to friendly regimes. The Nixon administration supplied advanced weaponry worth billions of dollars to Saudi Arabia and Iran in the early 1970s,²⁶ but when the Shah of Iran fell, President Jimmy Carter decided to abandon the use of surrogates to protect America's access to oil from the Persian Gulf. He told Congress that the U.S. would use "any means necessary, including military force," to secure oil from this area.²⁷ In 1983, the Reagan Administration established the U.S. Central Command (Centcom) to project military power into this region.²⁸ In 1990, President George H. W. Bush deployed Centcom troops in Saudi Arabia and util-

²⁰Tom Raum, "National Debt Grows \$1 Million a Minute," *The Guardian Unlimited*, online at <http://www.guardian.co.uk/uslatest/story/0,-7123172,00.html> (accessed 3 December 2007).

²¹Tamminen, *Lives Per Gallon*, 83.

²²*Ibid.*, 82.

²³Michael T. Klare, *Blood and Oil: The Dangers and Consequences of America's Growing Petroleum Dependency* (New York: Metropolitan Books, 2004) 10.

²⁴*Ibid.*, 30.

²⁵*Ibid.*, 32.

²⁶*Ibid.*, 43.

²⁷*Ibid.*, 4.

²⁸*Ibid.*, 2.

ized Centcom and other military forces to repel Iraqi troops from the oil fields of Kuwait. This brief history makes clear that Operation Iraqi Freedom, which was launched in March 2003, is only the latest in a series of U.S. military engagements in the Persian Gulf.²⁹ Given the fact that the U.S. continues to import about twenty-five percent of its oil from the Middle East, it will likely not be the last.

U.S. dependence on oil from the Middle East is ironic, self-defeating, counterproductive, and dangerous economically. It is ironic because the U.S. military is the nation's largest consumer of oil. In 2006, the defense establishment spent \$13.6 billion to consume 340,000 barrels of oil per day, representing 1.5 percent of total U.S. energy consumption.³⁰ The average U.S. soldier in Iraq and Afghanistan daily utilizes sixteen gallons of oil either directly or indirectly through the use of Humvees, tanks, trucks, helicopters, and air strikes.³¹ It is a bitter irony that some wars in the future may be fought in part to secure the oil to fight them.

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U.S. dependence on Persian Gulf oil is self-defeating because some of the money the U.S. expends to import oil from this region has wound up in the pockets of those committed to sponsoring terrorism around the world. Fifteen of the nineteen terrorists who hijacked planes and crashed them into the World Trade Center and the Pentagon were citizens of Saudi Arabia. Osama bin Laden is a Saudi, and oil money has helped finance Al-Qaeda. In 2005, the U.S. spent nearly \$40 billion to import oil from the Persian Gulf, while at the same time we financed a war on terror.³² To some extent, every gallon of gas we purchase helps fund terrorists.³³

U.S. dependence on foreign oil is counterproductive because it often requires us to do business with nations that do not support democracy. In a recent book, U.S. Congressman Jay Inslee cites Tom Friedman's First Law of Petropolitics: “The price of oil and the pace of freedom always move in opposite directions.”³⁴ Inslee claims, “It is not a coincidence that of the ten nations with the largest proven oil reserves..., only one (Canada) is a true democracy.”³⁵ Among the top ten suppliers of oil to the United States are nations like Nigeria and Angola, which are experiencing

²⁹Ibid., 5.

³⁰Dave Montgomery, “U.S. Military Embraces Green Trend,” *The Commercial Appeal* (Memphis), accessed online December 5, 2007 via the Greenwire news service at <http://www.eenews.net/Greenwire/print/.2007/12/05/9>.

³¹Michael T. Klare, “The Pentagon V. Peak Oil: How Wars of the Future May Be Fought Just to Run the Machines That Fight Them,” *TomDispatch.com*, online at <http://www.tomdispatch.com/post/174810/> (accessed 6 December 2007).

³²Inslee and Hicks, *Apollo's Fire*, 14.

³³S. David Freeman, *Winning Our Energy Independence: An Energy Insider Shows How* (Layton, UT: Gibbs Smith, 2007) 3.

³⁴Inslee and Hicks, *Apollo's Fire*, 15.

³⁵Ibid.

civil unrest because their oil wealth has not been very broadly spread in society. In addition, the leaders of two other major U.S. suppliers, Vladimir Putin in Russia and Hugo Chavez in Venezuela, are taking steps to shore up their personal power in ways many believe will undermine democracy in these nations.

Finally, the short-term curtailment of oil shipments and long-term declines in oil production could be economically ruinous. More than half the world's oil passes through a few potential "choke points," including the Suez Canal, the Bosphorus, and the Straits of Hormuz and Malacca.³⁶ A significant disruption of oil shipments through any of these points could wreak havoc on the U.S. and global economy. Nine out of the last ten recessions in the United States were preceded by oil price shocks related to supply disruptions.³⁷ Rising oil prices are also increasing concerns about whether the world is approaching peak oil production. U.S. oil production peaked in the 1970s and many predict that global oil production will peak within the next two or three decades, if it has not done so already. Once conventional oil production peaks, it is expected to decline by as much as three percent per year.³⁸ Thus, fifteen years after the peak there could be forty-five percent less oil available on the market. This relatively rapid change has the potential to spur inflation, plunge economies into recession, and ignite conflict around the world.

THREATS TO THE INTEGRITY OF CREATION

In addition to social, economic, and political problems associated with our nation's heavy reliance on oil, there are also serious environmental problems. The impact on air pollution has already been noted. The impact on water pollution is also important. Every year tankers shipping oil to foreign markets spill large amounts of oil in the oceans, which fouls beaches, threatens fresh water supplies, and causes significant harm to wildlife. Globally, there have been at least eight spills of over one million gallons in the past fifteen years. The largest spill in U.S. waters occurred in 1989 when the Exxon Valdez ran aground in Alaska's Prince William Sound. This spill of almost eleven million gallons caused extensive environmental damage and cost the company over \$2 billion to clean up.³⁹ Sadly, the U.S. Minerals

³⁶National Petroleum Council, *Facing the Hard Truths about Energy*, July 2007, pre-publication draft, Executive Summary, p. 8, online at <http://www.npc.org/> (accessed 20 July 2007).

³⁷Statement of Hillard Huntington, Executive Director, Energy Modeling Forum, Stanford University, testifying at a hearing, "The Hidden Cost of Oil," before the Committee on Foreign Relations of the U.S. Senate, March 30, 2006, p. 4, online at <http://www.senate.gov/~foreign/testimony/2006/HuntingtonTestimony060330.pdf> (accessed 13 May 2008). Recent price increases have not yet triggered a full recession because energy efficiency has made energy costs a smaller percentage of the nation's gross domestic product.

³⁸Howard Geller, *Energy Revolution: Policies for a Sustainable Future* (Washington, DC: Island Press, 2003) 13. While there is a significant amount of oil locked up in unconventional sources like tar sands in Canada and Venezuela, many analysts think concerns about greenhouse gas emissions will preclude substantial exploitation of these resources.

³⁹Sandalow, *Freedom from Oil*, 32. Only oil tankers with double hulls are now allowed to enter Prince William Sound. Terry Tamminen claims Exxon refurbished the *Exxon Valdez*, changed its name to the *SeaRiver Mediterranean*, and then petitioned the federal government for permission to allow this single-hull tanker to continue moving oil out of Valdez, Alaska. See Tamminen, *Lives Per Gallon*, 33.

Management Service projects a ninety-four percent likelihood that a spill of similar proportions will occur along the west coast of the U.S. by 2020.⁴⁰

The storage of gasoline and diesel fuel on land also poses dangers to water quality. In 1992, the U.S. Environmental Protection Agency reported that approximately twenty-five percent of underground storage tanks at gas stations around the nation were leaking. This precipitated a vigorous clean-up campaign, but numerous communities around the nation have had their groundwater supplies polluted. More recently, the American Petroleum Institute has reported that at least thirty-five percent of their member's distribution centers have leaks in above- and below-ground tanks that threaten water supplies.⁴¹

The most significant environmental dangers posed by U.S. (and global) oil consumption, however, are related to global warming and climate change. Oil is the largest source of U.S. greenhouse gases, producing forty-four percent of the nation's total emissions.⁴² Approximately sixty-seven percent of these emissions are attributable to the vehicle transportation sector of the U.S. economy.⁴³

“the IPCC projects current concentrations of greenhouse gases could more than quadruple by the year 2100”

Recent reports by the United Nations Intergovernmental Panel on Climate Change (IPCC) have emphasized that global warming is real, that it is caused by human activity, and that it will very likely produce climate change in the twenty-first century that will be unprecedented in human history. The United Nations established the IPCC in 1988 to review and assess the most recent scientific, technical, and socioeconomic information relevant to climate change. The IPCC has issued reports every five years and issued its Fourth Assessment Report in four installments during 2007. Over 1,200 authors contributed to the report, and their work was reviewed by more than 2,500 scientific experts.⁴⁴ Since each report for policy makers is approved line by line in plenary sessions, the IPCC's findings are arguably the least controversial and most accepted assessments of climate change in the scientific community.

If the world takes a business-as-usual approach and continues a fossil fuel-intensive energy path during the twenty-first century, the IPCC projects current

⁴⁰Tamminen, *Lives Per Gallon*, 33.

⁴¹*Ibid.*, 39–40.

⁴²Energy Information Administration, “U.S. Carbon Dioxide Emissions from Energy Sources: 2006 Flash Estimate,” May 2007, online at <http://www.eia.doe.gov/oiaf/1605/flash/pdf/flash.pdf> (accessed 7 December 2007).

⁴³Energy Information Administration, “Petroleum Navigator: Product Supplied, 2006,” updated November 27, 2007, online at http://tonto.eia.doe.gov/dnav/pet/pet_cons_psup_dc_nus_mbb1_a.htm (accessed 7 December 2007). Cited in Freeman, *Winning Our Energy Independence*, 19. Approximately nine percent of oil in the U.S. is used in the aviation industry, five percent in home heating, and the rest in industrial manufacturing.

⁴⁴Intergovernmental Panel of Climate Change, “Fact Sheet for ‘Climate Change 2007,’” online at <http://www.ipcc.ch/press/factsheet.htm> (accessed 24 July 2007).

concentrations of greenhouse gases could more than quadruple by the year 2100. Under this scenario, the IPCC projects the global-average surface temperature will increase 4.0° Celsius (7.2° Fahrenheit) by the end of the twenty-first century. Put into perspective, the global-average surface temperature only increased 0.6°C (1.1°F) during the twentieth century.⁴⁵

This rapid rate of global warming will raise sea levels, endangering millions living in low-lying areas, despoil freshwater resources, widen the range of infectious diseases like malaria, reduce agricultural production, and increase the risk of extinction for twenty-five to thirty percent of all surveyed species.⁴⁶ A recent report released by the U.S. Climate Change Science Program claims, “We are very likely to experience a faster rate of climate change in the next 100 years than has been seen over the past 10,000 years.”⁴⁷

Those of us living in the United States have a unique moral responsibility to change our energy consumption practices in the face of global climate change. According to the World Resources Institute, our nation is responsible for nearly thirty percent of the carbon dioxide emissions produced by the combustion of fossil fuels from 1850 to 2002, and we still lead the world, accounting for approximately twenty-three percent of all greenhouse gas emissions today.⁴⁸ The United States is also the sixth largest per capita polluter. Only Qatar, the United Arab Emirates, Kuwait, Australia, and Bahrain emit more greenhouse gases per person.⁴⁹ Each person in the United States produces 24.5 tons of greenhouse gas emissions per year, compared to only 3.9 tons per person in China.⁵⁰ There is no question that as a nation, and as individuals, the United States must accept its moral responsibility to deal with the negative consequences associated with fossil fuel consumption and global warming.

Greenhouse gases from petroleum consumption are the largest source of U.S. emissions. Any responsible attempt by the U.S. to address global warming must

⁴⁵Intergovernmental Panel on Climate Change, *Fourth Assessment Report: The Physical Science Basis* (Geneva: IPCC Secretariat, February 2007) 11–14, online at <http://www.ipcc.ch/SPM2feb07.pdf> (accessed 7 July 2007). This mean projection is for the fossil fuel-intensive A1F1 scenario, the worst of the six developed by the IPCC. Under this scenario, greenhouse gas concentrations are projected to increase from approximately 379 ppm of carbon dioxide (CO₂) in 2005 to 1550 ppm carbon dioxide equivalent (CO₂e) by 2100. Even under the IPCC's best case scenario (B1), greenhouse gas concentrations increase to 600 ppm CO₂e by 2100, which they estimate will lead to a warming of 3.2°F by the end of this century—almost three times the rate of warming over the past one hundred years.

⁴⁶Intergovernmental Panel on Climate Change, *Fourth Assessment Report: Climate Change Impacts, Adaptation, and Vulnerability* (Geneva: IPCC Secretariat, April 2007) 8, online at <http://www.ipcc.ch/SPM6avr07.pdf> (accessed 7 July 2007).

⁴⁷U.S. Climate Change Science Program, *The Effects of Climate Change on Agriculture, Land Resources, Water Resources, and Biodiversity* (September 2007 public review draft) 7, online at <http://www.climatechange.gov/Library/sap/sap4-3/public-review-draft/sap4-3prd-all.pdf> (accessed 12 September, 2007).

⁴⁸Kevin A. Baumert, Timothy Herzog, and Jonathan Pershing, *Navigating the Numbers: Greenhouse Gas Data and International Climate Policy* (New York: WorldWatch Institute, 2005) 31–33, online at http://www.wri.org/climate/pubs_description.cfm?pid=4093#pdf_files (accessed 29 September 2007).

⁴⁹Ibid.

⁵⁰Ibid., 21–24. This refers to per capita emissions of carbon dioxide equivalent in 2000. The world average was 5.6 tons; the average for developed nations was 14.1 tons; the average for developing nations was 3.3 tons.

grapple with this reality. There have been two main approaches proposed thus far: first, to build more fuel-efficient vehicles, and second, to develop alternative fuels to power our vehicles. The remainder of this article briefly reviews issues related to both approaches.

VEHICLE FUEL EFFICIENCY

The disruptions in oil supply and resulting price shocks during the 1970s triggered a national commitment to energy conservation and efficiency in the United States. Acting in concert, the Democrat-controlled Congress drafted the nation's first Corporate Automotive Fuel Economy (CAFE) standards that Republican President Richard Nixon signed into law in 1975. These standards required automakers to double the average fuel economy of cars from 13.6 miles per gallon (mpg) in model year 1974 to 27.5 mpg in model year 1985. Similar fuel economy standards were adopted for light trucks. As a result, U.S. oil imports dropped from 46.5 percent in 1977 to 27 percent in 1985.⁵¹

Unfortunately this trend did not continue. The 27.5 mpg standard for cars remained the same after 1985, and the standard for light trucks only increased from 20 mpg in 1989 to 21.6 mpg in 2006.⁵² As a result, U.S. fuel economy standards now lag well behind virtually all other industrial countries. In Japan, new vehicles must achieve approximately 46 mpg, in the European Union the figure is 37 mpg, and even China's standard of 29 mpg exceeds the current U.S. standard.⁵³

One of the reasons automobile manufacturers and their unions have vigorously opposed increases in the CAFE standards is because light trucks (which includes most minivans and SUVs) now make up about fifty percent of the new vehicle fleet, compared to only ten percent in 1975. It is much harder to achieve significant fuel economy increases in these large, heavy vehicles that U.S. drivers have come to favor. Federal tax policy has played a role in this shift to large, heavy vehicles. In 2003, President Bush signed into law a tax bill that included a tax credit of up to \$100,000 for those who purchased vehicles that weighed more than 6,000 pounds. Depending on a person's tax bracket, this loophole could reduce the purchase of a General Motors Hummer by tens of thousands of dollars. The meager tax credits offered to purchasers of gasoline-electric hybrid vehicles or cars powered by alternative fuels paled in comparison.⁵⁴

On December 19, 2007, President George W. Bush signed into law the Energy Independence and Security Act, which included the first major increase in CAFE standards in over twenty years.⁵⁵ In contrast to the initial CAFE legislation that re-

⁵¹Inslee and Hicks, *Apollo's Fire*, 58.

⁵²Sandalow, *Freedom from Oil*, 111.

⁵³*Ibid.*, 112.

⁵⁴Tamminen, *Lives Per Gallon*, 66.

⁵⁵Associated Press, "Bush Signs Auto Fuel Economy Bill," *The New York Times*, December 19, 2007, online at <http://www.nytimes.com/aponline/us/AP-Congress-Energy.html> (accessed 19 December 2007).

sulted in a one hundred percent increase in fuel economy, the new legislation mandates only a forty percent increase over thirteen years. Automakers will have to increase the combined average fuel economy of cars and light trucks from 24.5 mpg today to 35 mpg in 2020. Under this law U.S. oil imports should be reduced by 1.2 million barrels per day and level off at approximately ten million barrels per day in 2030, instead of continuing to grow beyond twelve million barrels per day.⁵⁶

*“the Environmental Protection Agency denied a request
by California and sixteen other states to set standards
for carbon dioxide emissions from automobiles”*

On the same day President Bush signed the bill increasing CAFE standards, the European Commission informed automakers that they would have to reduce carbon dioxide emissions by twenty-five percent from the current average of 160 grams per kilometer to 120 grams per kilometer by 2012.⁵⁷ This would likely require a nearly twenty-five percent increase in fuel economy from the current average in the European Union of 37 miles per gallon. Also on the same day, the Environmental Protection Agency ignored a recent Supreme Court ruling and denied a request by California and sixteen other states to set standards for carbon dioxide emissions from automobiles. These standards would have required automakers to reduce greenhouse gas emissions by thirty percent in new cars and light trucks by 2016 and would have been phased in beginning in 2009.⁵⁸

These developments indicate that much more can be done to increase vehicle fuel economy and reduce related greenhouse gas emissions. Nevertheless, the recent move by the United States to increase CAFE standards is morally laudable. The key will be mustering the political will to strive for even higher standards.

BIOFUELS

Another way to lessen U.S. dependency on imported oil and to reduce the carbon footprint of the transportation sector is through the development of biofuels. In fact, the same federal legislation that raises CAFE standards also increases the nation's Renewable Fuels Standard from nine billion gallons of renewable fuels in 2008 to thirty-six billion gallons in 2022.

Corn-based ethanol is currently the largest source of biofuel in the nation.

⁵⁶American Council for an Energy-Efficient Economy, “Fuel Economy Standards in the 2007 Energy Bill,” December 5, 2007 update, online at <http://aceee.org/transportation/fueleconomyupdate.pdf> (accessed 7 December 2007).

⁵⁷James Kanter, “Europe Proposes Binding Limits on Auto Emissions,” *The New York Times*, December 20, 2007, online at <http://www.nytimes.com/2007/12/20/business/20emissions.html?ref=business> (accessed 20 December 2007).

⁵⁸John M. Broder and Felicity Barringer, “E.P.A. Says 17 States Can't Set Emission Rules,” *The New York Times*, December 20, 2007, online at http://www.nytimes.com/2007/12/20/washington/20epa.html?_r=1&hp&oref=slogin (accessed 20 December 2007).

The industry has grown rapidly in response to government incentives and market forces. It has been a boon to many farmers because corn prices have risen almost fifty percent in recent years.⁵⁹ It has also benefited rural communities because just one ethanol facility that produces forty million gallons per year can inject \$140 million into the local economy.⁶⁰ Today, approximately twenty percent of the U.S. corn harvest is utilized for ethanol production, and that percentage is rising.⁶¹ The Government Accountability Office projects that 30 percent of the nation's corn crop may be devoted to ethanol production by 2012.⁶²

“the increased use of corn for transportation fuel is driving up the cost of grain for livestock producers as well as the cost of food in grocery stores”

There are many problems with corn-based ethanol production, however. Almost all corn in the nation is planted, fertilized, cultivated, and harvested with machinery powered by fossil fuels. The fermentation and transportation of corn-based ethanol is also fossil-fuel intensive. As a result, burning corn-based ethanol in gasoline tanks only lowers greenhouse gas emissions by thirteen percent.⁶³ There are also other environmental problems. The production of ethanol is water-intensive and thus puts significant stress on local groundwater resources; it can also produce significant air and surface water pollution. Finally, there is good reason to fear that soil erosion will increase as rising prices encourage farmers to plant corn in some of the thirty-five million acres currently set aside for soil and wildlife conservation.⁶⁴

Economically, the increased use of corn for transportation fuel is driving up the cost of grain for livestock producers as well as the cost of food in grocery stores. Globally, grain prices have reached their highest levels in a decade. As a result, the United States is purchasing only about half the grain it bought to distribute as food aid in 2000.⁶⁵ The United Nations Food and Agriculture Organization warns that rising food prices and reduced food supplies are increasing the likelihood for social

⁵⁹Editorial, “The High Costs of Ethanol,” *The New York Times*, September 19, 2007, online at <http://www.nytimes.com/2007/09/19/opinion/19wed1.html> (accessed 25 September 2007).

⁶⁰Worldwatch Institute and Center for American Progress, *American Energy: The Renewable Path to Energy Security* (Washington, DC: WorldWatch Institute, September 2006) 22.

⁶¹Joel K. Boure, Jr., “Green Dreams,” *National Geographic Magazine*, October 2007, online at <http://magma.nationalgeographic.com/ngm/2007-10/biofuels/biofuels.html> (accessed 27 September 2007).

⁶²Tom Doggett, “Ethanol to take 30 pct of U.S. corn crop in 2012: GAO,” *Reuters*, June 11, 2007, online at <http://www.reuters.com/article/scienceNews/idUSN114921520070611?feedType=RSS%20> (accessed 17 September 2007).

⁶³“The High Costs of Ethanol,” *The New York Times*, September 19, 2007.

⁶⁴Joel K. Boure, Jr., “Green Dreams,” *National Geographic Magazine*, October, 2007.

⁶⁵Celia W. Dugger, “As Prices Soar, U.S. Food Aid Buys Less,” *The New York Times*, September 29, 2007, online at http://www.nytimes.com/2007/09/29/world/29food.html?_r=1&ref=world&oref=slogin (accessed 29 September 2007).

unrest in developing countries.⁶⁶ In 2006, the rapidly increasing price of tortilla flour led to riots in some parts of Mexico.⁶⁷ Recently, the United Nations Special Rapporteur on the Right to Food called for a five-year moratorium on the production of first-generation liquid biofuels made from food crops such as corn, wheat, palm oil, and rapeseed.⁶⁸

Clearly there are serious problems associated with the way biofuels are currently being produced in the United States. Even if the entire corn crop were devoted to ethanol production, it would only produce twelve percent of the gasoline we consume. Devotion of the entire soy bean crop to biodiesel production would only replace six percent of the nation's diesel consumption.⁶⁹ Key to biofuel production in the future will be new feedstocks and conversion technologies. While important technological challenges still need to be overcome, the potential of cellulosic ethanol is promising because it produces ethanol from portions of plants not used for food and also from fast-growing trees and perennials like switch grass. Studies indicate that one third of the nation's current petroleum demand could be satisfied if cellulosic ethanol becomes commercially viable.⁷⁰

There is no question that legislative action has been necessary to mandate the production of more fuel-efficient vehicles and alternative fuels. Appeals to U.S. drivers over the past twenty years to voluntarily reduce their fuel consumption through the purchase of more fuel-efficient vehicles have failed. Similarly, the power of the petroleum lobby has constrained investment in alternative fuels research and development. The United States desperately needs political leadership on energy policy, but there is still plenty of room for personal responsibility.

Each of us can be better stewards of the energy we consume. Energy conservation taps the moral virtue of frugality and seeks to make wise use of God's precious energy resources through behavioral changes in lifestyle practices. Energy efficiency utilizes available technology to use less energy to produce goods and services. Taken together, energy conservation and energy efficiency are vital hallmarks of good stewardship and a sustainable energy future.

There is much we can do with currently available automotive technology. For example, trading in a large SUV that gets twelve miles per gallon in combined city and highway for a sedan that gets twenty-four combined miles per gallon doubles fuel economy and cuts greenhouse gas emissions in half. Alternatively, replacing the SUV with a gasoline-electric hybrid that gets 36 miles per gallon triples gas

⁶⁶"The High Costs of Ethanol," *The New York Times*, September 19, 2007.

⁶⁷Ford Runge and Benjamin Senauer, "How Biofuels Could Starve the Poor," *Foreign Affairs* (May/June 2007), online at <http://www.foreignaffairs.org/20070501faessay86305/c-ford-runge-benjamin-senauer/how-biofuels-could-starve-the-poor.html> (accessed 7 December 2007).

⁶⁸United Nations General Assembly, "Report of the Special Rapporteur on the Right to Food," August 22, 2007, p. 14, online at <http://daccessdds.un.org/doc/UNDOC/GEN/N07/487/05/PDF/N0748705.pdf?OpenElement> (accessed 3 November 2007).

⁶⁹Boure, "Green Dreams."

⁷⁰Worldwatch Institute, *American Energy*, 23.

mileage and cuts greenhouse gas emissions by two-thirds. These gains can be further increased if we drive fewer miles each year by walking, car-pooling, and using mass transit.

Together with people all around the world, Christians at the outset of the twenty-first century must respond to the threats to planetary welfare posed by vehicles fueled by petroleum. We must find new ways of living in harmony with Earth's energy resources and in solidarity with all of God's creatures. This moral obligation involves our commitment to the poor and marginalized among the present generation, but it includes especially our responsibilities to future generations. Actions taken or not taken today will impact the welfare of the planet for centuries to come. ⊕

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