Energy Dependence and the Role of Government

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Introduction

Politicians, policy analysts, business leaders, and pundits are voicing new urgency for energy independence. Concerns stem from high and volatile oil prices, political instability in oil-producing regions, some countries' use of petroleum for political goals, and increased carbon dioxide emissions from fossil fuels.

In past history and today, energy independence is invoked for a variety of concerns—security, nationalism, economic interests, and environmentalism. Some claim the national security of the country is at stake with the vast imports of foreign oil – much of it from unstable parts of the world. Fears about Middle Eastern oil states' ties to terrorists also factor in to the security concern. Others argue that the increased volatility in the market, with global demand for fossil fuels spiraling and the resulting spike in oil prices means that the U.S. should focus on further developing its domestic resources. Some present the environmental arguments for energy independence – they argue for independence from fossil fuels with their carbon dioxide emissions that cause global warming. Their solutions include drastic restrictions on fossil fuels and government funding to develop alternative energy sources – wind, solar, and biofuels.

Energy dependence is a multi-faceted concept. It takes on its meaning depending on the particular interests of the person or organization using the term and the particular circumstances of its use. In past debates as in true currently, there is a dichotomy of viewpoints and policy responses: one focuses on the demand side – mandated reductions in energy use, the other on the supply side – the private exploration and development of new sources of fossil fuels or increased government investment in alternative energy sources.

No matter whether decreasing the demand and/or increasing the supply of energy is the focus, energy independence is a chimera. Rather, energy security should be the focus, and by that is meant a concerted effort to expand sources of energy – conventional and new – not by government intervention and taxpayer subsidies, but by the market responding to prices and perceived scarcity in the future.

On that point, in an editorial for the Ashbrook Center, Mackubin T. Owens noted that the concept of energy independence doesn't make sense in this era of energy interdependence and globalization. Energy security, he says, which means focusing on increasing energy production, makes more sense:

> While energy independence is a pipe dream, energy security is achievable. Unlike the former, the goal of which is to become self sufficient in the production of energy, the latter focuses on increasing the *supply* of energy by exploiting all of the sources available to us.
>
> For instance, current policy discourages the production of domestic oil and natural gas. Energy security suggests that we should expand access to non-park federal lands in the West, Alaska, and under the waters off our coasts. These areas hold an estimated 635 trillion cubic feet of recoverable natural gas—enough to meet the needs of the 60 million American homes fueled by natural gas for over a century—

> and an estimated 112 billion barrels of recoverable oil—enough to produce gasoline for 60 million cars and fuel oil for 25 million homes for 60 years. [1]

Energy security may or may not be achievable. If it is focused on unleashing market forces for greater energy diversity, letting price signals operate, removing restrictions on energy production, and restraining the government from picking winners and losers, it would have the best chance of success.

Much of the so-called energy independence programs attempted in the U.S. over the past quarter of a century plus did not follow these guidelines. The consequences of many political actions in support of the chimera of energy independence, in fact, actually increased the price of energy, lowered domestic production, and increased imports.

Unfortunately, many espousing current proposals to "do something" about energy haven't learned from those past mistakes. As the Heritage Foundation's Ben Lieberman and Nicolas Loris wrote recently:

> Those who don't know energy policy history are condemned to repeat it. There are many energy bills currently pending before Congress, and they fall into two general categories: (1) those that seek to increase domestic energy supplies, and (2) those that seek scapegoats and diversions instead. Policymakers should recognize the failures of past energy policies that led to some of the most dismal and frustrating years for American consumers and instead focus on ways to increase the supply of energy domestically.[2]

The energy dependence/energy security debate is principally about oil and how to reduce U.S. dependence on foreign oil or, from the environmentalists' viewpoint, how to reduce consumption of oil.

Thus, in this paper, oil will be a primary focus. In this paper I will focus on these major areas:

- Role of government in energy policy
- World and U.S. energy trends— supply and demand
- Energy interdependence as a result of globalization.
- Lessons and recommendations

Role of Government -- U.S. Presidents' Views of Energy Independence

If energy independence is a myth, why does it have such dominance in the political sphere?

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[1] Mackubin T. Owens, Energy Security vs. Energy Independence, Ashbrook Center, November 2007 http://www.ashbrook.org/publicat/oped/owens/07/energy.html

[2] Ben Lieberman and Nicolas Loris, "Energy Policy: Let's Not Repeat the Mistakes of the '70s," The Heritage Foundation, July 28, 2008 http://www.heritage.org/Research/EnergyandEnvironment/wm2004.cfm

Energy dependence and its opposite energy independence are not new concepts in the U.S. political world, but have formed major themes of Presidential Administrations since the early 1970s. In various periods during the past 35 years, government policies have varied from those emphasizing the demand side to those focusing on the supply side. Almost every presidential administration has supported ever more government mandates to reduce dependence on foreign oil and massive government subsidy programs to finance selected alternative energy sources.

Richard Nixon (1969-74)

In the United States, presidents from Richard M. Nixon on have called for the U.S. to halt its dependence on foreign oil. Just a few weeks after Arab OPEC members declared an embargo of oil exports to countries that supported Israel in the Yom Kippur War, President Nixon in a November 7, 1973 speech declared that he was launching "Project Independence 1980." He asserted that the very independence of the U.S. was at risk unless the country could become self-sufficient in energy and not depend on any external sources by the end of the 1970s.

The Arab oil embargo caused widespread shortages, stiff price hikes in oil and gas, and service disruptions. Nixon named an "energy czar" to manage the energy crisis – William E. Simon (after a brief rule by Colorado Governor John Love). The government instituted price controls and allocation schemes to manage the distribution of oil and gas. The results were severe shortages in some areas of the country, lengthy waits in gas lines in others.

As Cato's Jerry Taylor has chronicled, Congress then in 1973 decided to take action by enacting legislation which basically eliminated price controls at gasoline stations but put caps on domestic oil production profits.

These draconian restrictions had severe effects that prominent economists contend actually *increased* domestic prices by increasing demand and restricting supply, helped increase world crude oil prices, and increased dependence on oil imports. Because of the wholesale price controls, oil companies had little incentive to invest in research and development for new supplies.[3]

In Nixon's second State of the Union address in January 1974, he continued to focus on "Project Independence" and noted that his speech marked the first time such an address had energy as its "one priority"[4]

At a news conference in February 1974, Nixon, by that time deeply implicated in the Watergate investigations, nevertheless focused on his energy program and the possible lifting of the Arab oil embargo in the near future:

The embargo was indeed lifted in March 1974. With the White House implicated in the Watergate scandal and talks of impeachment escalating, Nixon resigned in August 1974.

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[3] Jerry Taylor, "Republicans vs. Oil," National Review Online, November 08, 2005 http://www.nationalreview.com/comment/taylor200511081818.asp

[4] Richard M. Nixon, State of the Union Address , January 30, 1974, http://millercenter.org/scripps/archive/speeches/detail/3887

As WTRG Economics noted, the U.S. price controls on domestically produced oil had perverse consequences:

> The obvious result of the price controls was that U.S. consumers of crude oil paid about 50 percent more for imports than domestic production and U.S producers received less than world market price. In effect, the domestic petroleum industry was subsidizing the U.S. consumer. . . .
>
> In the absence of price controls U.S. exploration and production would certainly have been significantly greater. Higher petroleum prices faced by consumers would have resulted in lower rates of consumption: automobiles would have had higher miles per gallon sooner, homes and commercial buildings would have been better insulated and improvements in industrial energy efficiency would have been greater than they were during this period. As a consequence, the United States would have been less dependent on imports in 1979-1980 and the price increase in response to Iranian and Iraqi supply interruptions would have been significantly less.[5]

Gerald Ford (1974-77)

However, many of the controls remained in place under President Gerald Ford, who took office on August 9, 1974. Just two months later in an October 8, 1974 speech to Congress, Ford outlined his plans to attack current economic problems –recession and inflation – and to increase the domestic energy supply.[6]

During his tenure, Ford's energy policies were mixed in terms of allowing market forces to work. Although he continually fought with Congress over his attempt to decontrol domestic oil prices and allocation schemes, Ford attempted to impose a stiff oil import fee without going through Congress. While in office, the Energy Policy Conservation Act of 1975 was passed over many of his objections.

Despite Ford's efforts to decontrol domestic oil prices, the government became even more involved in energy planning, including creation of the Strategic Petroleum Reserve, greater government funding for research into alternative fuels and energy conservation programs, and mandatory mileage standards for motor vehicles – Corporate Average Fuel Economy standards or CAFE.

The recession, which began in November 1973 ended in March 1975.

Jimmy Carter (1977-81)

President Jimmy Carter, two weeks after he took office in 1977, continued the focus on energy independence, but shifted it to a national energy policy that would stress reducing demand through conservation and thriftiness.

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[5] WTRG Economics, Oil Price History and Analysis http://www.wtrg.com/prices.htm

[6]President Gerald Ford, Address to Congress, October 8, 1974
http://millercenter.org/scripps/archive/speeches/detail/3283

A few months later in his administration, President Carter tried to transform energy independence into a crusade – as he termed it – the "moral equivalent of war."[7]

Carter dramatically increased the role of government in energy policy principally by creating the Department of Energy. With Congress, he also formed the Synthetic Fuels Corporation, which cost about $20 million but had virtually no success.[8]

Meanwhile, geopolitical events were taking place, with broad consequences for U.S. energy policy. The Shah of Iran fled his country as ruler January 16, 1979 and soon after, Ayatollah Khomeini came out of exile in France to rule. It was a period of strong anti-American sentiment because of the country's previous support of the Shah. That sentiment led Islamic fundamentalists to storm the U.S. embassy in Tehran in November 1979 and hold 52 U.S. citizens hostage.[9]

In 1979 the U.S. economic situation was grave indeed: inflation was over 13 percent, unemployment hit 11 percent, and the prime rate reached an unprecedented 21.5 percent.

Iranian oil production dropped, and prices increased. Then in September 1980 Iraq invaded Iran, – the beginning of a war that would last for eight years. The double whammy of the Iranian Revolution and the Iraq-Iran war caused a severe decline in Iranian as well as Iraqi oil production, and resultant world price increases. Oil prices more than doubled from 1978-1982.[10]

Congress enacted in April 1980 a windfall profits tax on the domestic crude oil industry. Titled the Crude Oil Windfall Profit Tax Act, it instituted temporary excise taxes on oil companies. According to the Congressional Research Service in a report on its economic effects, the tax reduced domestic oil production from 1.2 percent to 8 percent, increased dependence on imported oil, was an administrative nightmare, had high compliance costs, and generated little or no revenues. Despite these negative effects, it wasn't repealed until 1988, spurred on by depressed prices in the U.S. oil industry.[11]"

Ronald Reagan (1981-89)

The nomination of Ronald Reagan as president changed the rhetoric – and the policies –

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[7] President Jimmy Carter, Address to the Nation on Energy, April 18, 1977 http://millercenter.org/scripps/archive/speeches/detail/3398

[8] The Government Role in Civilian Technology: Building a New Alliance, National Academy of Sciences, National Academy of Engineering, Institute of Medicine (SEM), 1992, pp. 58-9 *http://books.nap.edu/openbook.php?record_id=1998&page=59*

[9] BBC News, "BBC on this day," January 16, 1979 http://news.bbc.co.uk/onthisday/hi/dates/stories/january/16/newsid_2530000/2530475.stm

[10] WTRG Economics, Oil Price History and Analysis, http://www.wtrg.com/prices.htm

[11] CRS Report for Congress, "The Crude Oil Windfall Profit Tax of the 1980s: Implications for Current Energy Policy," March 9, 2006 http://republicanwhip.house.gov/UploadedFiles/windfall.pdf

relating to energy. His focus was on increasing the supply of energy rather than restricting demand. In his nomination speech he spoke about a new direction in energy policy – producing more energy for economic prosperity.[12]

One of Reagan's first actions as President – on January 28, 1981 -- was to repeal price controls on oil, which President Carter had begun to phase out.[13]

During the recession of 1981, U.S. productivity dropped. In a slower economy, the demand for fuel fell. This, combined with the ending of the Iranian oil embargo and the elimination of price controls, meant a significant decrease in oil prices, after a peak when prices were decontrolled, as shown on the chart below[14]:

Reagan also approved legislation to eliminate the U.S. Synthetic Fuels Corp.

George H.W. Bush (1989-1993)

In President George H.W. Bush's 1991 State of the Union Address, he announced that the country was embarking on "a comprehensive national energy strategy that calls for energy conservation and efficiency, increased development and greater use of alternative fuels."[15]

His policies were an almost random compilation of programs to again reduce "our dependence on foreign oil."

President Bush issued a directive that put off-limits to drilling most offshore areas that were presumably rich in oil and gas.[16] That moratorium essentially meant that about 85 percent of the Outer Continental Shelf [17]owned by the federal government was not open to new oil and gas leases. Generally those areas are from three to six miles from shore and extending 200 miles.

He also pushed for the 1990 Clean Air Act Amendments, which have had far-reaching effects on motor fuels by requiring that certain types of reformulated blends had to be offered in different parts of the country. Not only did those requirements raise prices, but also led to some unintended environmental consequences, principally the requirement for oxygenated fuel that led to broad use of methyl tertiary butyl ether (MTBE), which was suspected of contaminating water supplies.

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[12] Ronald Reagan, Nomination Acceptance Speech, Republican National Convention, Detroit, Michigan, July 17, 1980 http://www.4president.org/speeches/reagan1980convention.htm

[13] CRS Report for Congress, "The Crude Oil Windfall Profit Tax of the 1980s: Implications for Current Energy Policy," March 9, 2006 http://republicanwhip.house.gov/UploadedFiles/windfall.pdf

[14] *Investor's Business Daily*, "Carter's Oil Crisis," June 1, 2007 http://www.ibdeditorials.com/IBDArticles.aspx?id=265590277656184

[15]President George H.W. Bush, State of the Union Address, January 29, 1991 http://www.infoplease.com/ipa/A0900156.html

[16]Ben Lieberman, Correcting Mistakes of the 1990s Should Top the Energy Agenda for 2006, March 20, 2006 http://www.heritage.org/Research/EnergyandEnvironment/bg1921.cfm

[17] Department of the Interior, MMS http://www.gomr.mms.gov/homepg/whoismms/whatsocs.html

Perhaps Bush's most far-reaching action, however, was signing the United Nations Framework Convention on Climate Change in May 1992, which was ratified by the Senate. The Convention's objective was to stabilize greenhouse gas emissions that "would prevent dangerous anthropogenic interference with the climate system."[18]

The "Rio Treaty" set the stage for a host of new domestic laws and regulations restricting fossil fuels, as well as the Kyoto Protocol, which the U.S. signed but did not ratify, that sets mandatory emission limits.

Bill Clinton (1993-2001)

Many of the policies proposed under President Bill Clinton focused on restricting demand for as well as the supply of energy from fossil fuels and providing funding for alternative fuels and energy efficiency.

During Clinton's tenure, his Administration early on proposed a so-called "Broad Based Energy Tax," or BTU tax, to be assessed on energy derived from fossil fuels, nuclear, and hydropower. While the tax proposal got little support, other proposals for a "cap and trade" approach, that is, a form of energy rationing torestrict emissions to, say, 1990 levels or below, and the issuing of tradable emission permits did gain traction.

His Administration negotiated and signed the Kyoto Protocol in December 1997, which would require the U.S. to reduce its greenhouse gas emissions to 7 percent below 1990 levels by 2008-2012.

Although his Administration signed the agreement, President Clinton did not submit it to Congress for ratification, as earlier that year the Senate had unanimously passed a resolution[19] indicating that it would be opposed to any Kyoto treaty if it did not include developing countries in its purview for timetables and reductions because that would cause serious harm to the U.S. economy.

Through executive orders, Clinton significantly restricted the use of natural resources by creating national monuments under the Antiquities Act of 1906. One of the largest was the establishment of Utah's Grand Staircase Escalante National Monument, which encompassed 1.7 million acres. According to the *New York Times,* that 1996 order blocked the "development of the largest known coal reserves in the nation: an underground bank of nearly seven billion tons of coal worth up to a trillion dollars."[20] The coal in that area is much in demand for power plants, since it is low in sulfur and ash.

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[18] CEI, "Global Warming and Energy"http://cei.org/pdf/2317.pdf

[19] Byrd-Hagel Resolution (SRes 98), July 25, 1997, vote 95-0.

[20] *The New York Times*, Sept. 17, 1996 http://query.nytimes.com/gst/fullpage.html?res=9F07E0DC103AF934A2575AC0A960958260&sec=&spon=&page wanted=1

As Clinton headed into his second term, his 1998 State of the Union address left no doubt that even though the Kyoto Protocol wasn't ratified, his Administration was committed to carrying out its goals. [21]

George W. Bush (2001 – present)

President George W. Bush, early on in his tenure as president, focused on a National Energy Policy,[22] which mainly focused on subsidizing alternative energy sources through tax incentives and mandates, although his policies did attempt to open up new areas for oil and gas drilling.

His energy plan included federal funding of the use of hydrogen in fuel cell vehicles, for electricity, and other uses, tax incentives for wind and solar power and for purchasing hybrid vehicles, and extensions of the ethanol tax credit.

Bush did, however, include proposals to open up to oil and gas drilling a small part of the Arctic National Wildlife Refuge, to modernize the electricity grid, and to streamline paperwork and processes for nuclear energy plants.

The Energy Policy Act of 2005 included many of his proposals for government funding of alternative energy sources and vehicles.[23] Throughout his tenure, his Administration has supported massive subsidies for alternative fuels and mandates for use of those fuels, while at the same time supporting expansion of drilling for petroleum and natural gas.

For energy policy, perhaps the defining moment in Bush's presidency was his January 31, 2006 State of the Union Address, where he opined that "America is addicted to oil."[24] And, continuing the tradition of almost every president since 1973, he declared that his proposals would almost set the U.S. free from Middle Eastern oil imports.

President Bush touted the 2007 Energy Independence and Security Act of 2007, as "expanding the production of renewable fuels, reducing our dependence on oil, and confronting global climate change." Signed on December 19, 2007, the legislation put in place huge mandatory requirements for the use of biofuels. The Act set a mandatory Renewable Fuel Standard, requiring a shift to biofuels of 36 billion gallons in 2022 – a five-fold increase over current levels. It also distributed taxpayer largess to alternative fuels and vehicles.

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[21]President Bill Clinton, State of the Union Address, January 27, 1998
http://clinton4.nara.gov/textonly/WH/SOTU98/address.html

[22]White House press release, The President's Energy Legislative Agenda, June 2001
http://www.whitehouse.gov/news/releases/2001/06/energyinit.html

[23] White House, Fact Sheet, August 8, 2005 http://www.whitehouse.gov/news/releases/2005/08/20050808-4.html

[24] President George W. Bush, State of the Union Address, January 31, 2006
http://www.whitehouse.gov/news/releases/2006/01/20060131-10.html

In addition, it set a national fuel economy standard for automobiles – CAFE standard -- of 35 miles per gallon by 2020. According to CEI, the Environmental Protection Agency has shown that only two 2008 models comply with this mandate, out of the over 1,000 models on the market. CEI has long argued that higher CAFE standards cause manufacturers to downsize their new vehicles, which causes them to be less crashworthy in accidents, according to scientific data.[25]

World and U.S. Energy Trends

The Emergence of Oil Cartels

Talk of energy independence invariably focuses on rising U.S. petroleum imports and the political instability and/or anti-American sentiment of many of the major petroleum-exporting countries. Other geopolitical concerns stem from national ownership of major oil and natural gas production and pipelines and the political exploitation of those resources.

Significant in the development of private oil and gas companies in the U.S. in that resource and mineral rights (except on state and federal lands and federal offshore territory, i.e., the outer continental shelf) are privately owned by landowners, who make individual decisions whether to lease their rights to oil and gas companies for royalty payments. This private ownership of resources also gave rise to the vibrant early development of the oil and gas industry in the country, as both large and small entrepreneurs could enter the market. The competition led to technological innovations in research, drilling, storage, and transportation tools and equipment.

While today there are no production restrictions on oil and gas companies, in the earlier days, the Texas Railroad Commission acted as a cartel to control prices by limiting Texas' oil and gas production. Founded in 1891, the Commission originally had jurisdiction over railroads, wharves, terminals, and express services. However, in 1917 until the 1970s, it regulated oil pipelines and oil and gas production. With a huge drop in oil prices in the 1930s, and with Texas as the country's largest oil-producing state, the Commission began to restrict the volume of oil that could be produced. Up into the 1950s, it controlled an estimated 40 percent of U.S. crude oil production and about 50 percent of proven reserves.[26] The Commission is considered to be the model for the Organization of the Petroleum Exporting Countries (OPEC).

Four Middle Eastern countries – Saudi Arabia, Iran, Iraq, and Kuwait -- plus Venezuela, formed OPEC in 1960. By 1971 OPEC had 11 members, with the addition of Algeria, Libya, Qatar, Indonesia, Nigeria, and the United Arab Emirates. At that time, the Texas Railroad Commission found that the U.S. oil fields no longer had spare capacity, so setting production limits no longer made sense. During that period, OPEC member countries rich in oil established their own cartel, which became one that controlled much of the world's oil production.[27]

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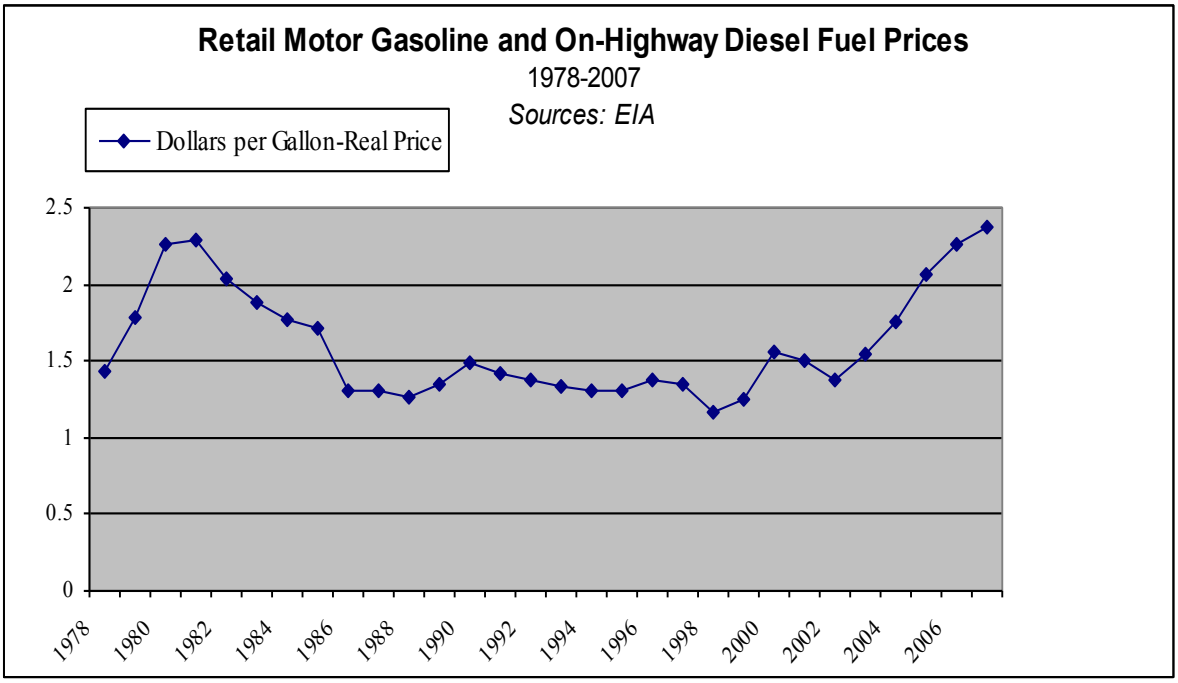
[25] CEI, press release, December 19, 2007 http://cei.org/gencon/003,06322.cfm

[26]The Citizen Compendium, Texas Railroad Commission
http://en.citizendium.org/wiki/Texas_Railroad_Commission

[27] WTRG Economics, Oil Price History and Analysis http://www.wtrg.com/prices.htm

With the rapid rise in demand for oil, countries that normally could depend on non-OPEC supplies have become more dependent on oil imports from OPEC countries. As the Energy Information Administration (EIA) has noted,[28] widespread economic growth over the past five years has fueled increased global demand, while tepid supply growth in non-OPEC countries has put more pressure on OPEC countries to try to fill the gap. However, their own production growth has been modest. Hence the sharp price increases over the past five years, which have been further exacerbated by fears of supply disruptions in politically or geographically vulnerable areas, for example, the risk of supply disruptions in major oil-producing countries, such as Iran, Iraq, Nigeria, Russia, or Venezuela, or the risk of hurricanes in the Gulf of Mexico, which could threaten the oil platforms there.



With the volatile and high oil prices as well as economic slowdowns in much of the world recently, demand for oil has tempered somewhat, particularly in the United States over the summer 2008, when prices at the gas tank hit over $4.00 a gallon. Slower demand has been lowering the pressure on world oil supplies; meanwhile, OPEC countries, particularly Saudi Arabia, have increased production, further easing the tight market. In just one month, oil prices fell from a high of $145 per barrel in mid-July 2008 to less than $113 per barrel by mid-August.[29] With economic slowdowns in the U.S., the European Union, and other countries, and consumers cutting back on gasoline consumption, oil demand has softened recently, which led to further price drops.

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[28] U.S. Department of Energy, Energy Information Administration, "Fundamental Factors and Oil Prices: Recent Experience and Lessons for the Coming Decade," Jeddah Energy Meeting, June 22, 2008.

[29] EIA, This Week in Petroleum, August 20, 2008
http://tonto.eia.doe.gov/oog/info/twip/twip.asp?featureclicked=5&

The price decline led to OPEC's decision on September 9, 2008 to agree to slightly cut oil output, even though members Iran and Venezuela wanted more substantial cuts to boost prices. [30]

Geopolitical Issues – Oil and Gas

Energy dependence in the U.S. focuses almost exclusively on petroleum, principally because crude oil imports from politically unstable and/or unfriendly countries have increased dramatically. The main use of petroleum-based fuel in the U.S. is for the transportation sector – cars, trucks, buses, and airplanes. The transportation sector uses more than two-thirds – 68 percent -- of the liquid fuels consumed in the U.S., and motor vehicles represent the majority of that.

Thus, the energy security debate in the U.S. is all about oil. In the European Union, the energy dependency issues revolve around both oil and natural gas, since most EU countries depend on imported gas.

A major difference between the U.S. and most other major oil and gas producing countries is that those other countries directly own and operate national oil and gas companies, in whole or in part. Increasingly, some of those countries are using their control of major oil and gas resources – and pipelines – for political ends. In some of these resource-rich countries, a new type of nationalism is emerging – resource nationalism.

Venezuelan President Hugo Chávez, although his country is a major exporter to the U.S., has, at various times, threatened to cut off exports to the U.S. and confiscated U.S. companies' oil assets in Venezuela. At the same time, through oil, he is building a leftist group of Latin American countries that are increasingly anti-American. He also has consolidated his control of the state-owned oil company, Petroleos de Venezuela S.A. (PdVSA).

The U.S. currently imports more than 10 percent of its oil from Venezuela,[31] making it the U.S.'s fourth largest oil importer. While Chávez's threats may be more for show than for real, he is interested in diversifying his country's oil exports particularly to China and India.

Energy security is high on the agendas of most European countries. Russia, the largest natural gas producer in the world and with the largest gas reserves, is also flexing its energy muscles. Its giant state-controlled gas company, Gazprom, has been alternately intimidating and reaching out to its former Soviet satellite countries to keep control of the gas pipelines to Europe.

The recent Russia-Georgia conflict caused consternation in Europe, not only about this outbreak of aggression, but also about the fact that European countries are dependent on Russia for much of their natural gas as well as some of their oil – and on the Russian-controlled pipelines. The European Union imported from Russia 42 percent of its total natural gas imports

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[30] *The Economist*, "Running out of gas," September 11, 2008
http://www.economist.com/finance/displaystory.cfm?story_id=12209376

[31] EIA, Imports by Country of Origin. June 2008
http://tonto.eia.doe.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbbl_m.htm

in 2005[32]. Germany, for example, depends on Russia for about 40 percent of its imports of natural gas.[33] Because of their gas dependence, Europe's political leaders have given a very tepid response to Russia's aggression.

Because a competing pipeline from other oil producers runs near Georgia to Europe, the "war" also caused a disruption in oil exports from Azerbaijan through Georgia into Turkey.

Concerns among Europeans about the possibility of future Russian incursions into other countries where there are large populations of ethnic Russians have arisen. Some also see such aggression as attempts to keep pipeline competition at bay, such as the Nabucco gas pipeline project, backed by EU and U.S. interests to bypass Russia and supply gas to Europe.

While Russia is not part of OPEC, it did attend the September OPEC meeting and said it is seeking more cooperation with OPEC. That, combined with anti-American OPEC countries, Venezuela and Iran, doesn't bode well for global interests to be considered. Neither does the fact that Russia has expressed interest in forming an OPEC-type gas cartel for greater control.[34]

On a different front, oil-rich Nigeria – the 12th largest oil-producing country in the world, has had its oil production disrupted numerous times by Nigerian militants attacking oil facilities and forcing a loss of production. The latest occurred in mid-September 2008.

U.S. Primary Energy Sources and Trends

Oil

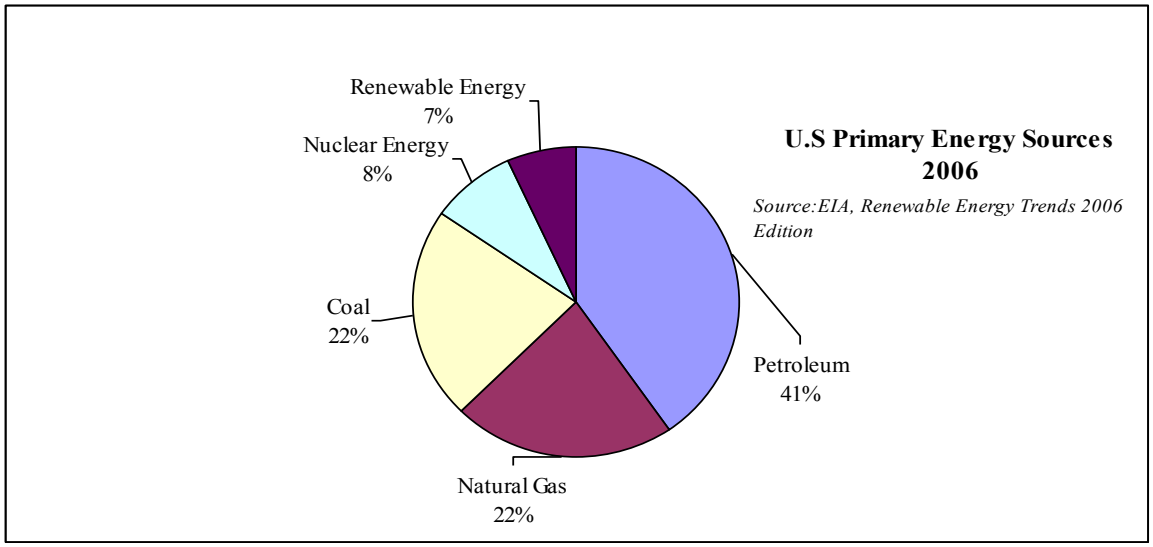
The primary energy sources in the world today are petroleum, natural gas, coal, nuclear power, and hydroelectric power. In terms of overall energy production, the U.S. ranks number one. It is also the top energy consuming country and the top net importer of energy.[35]

[32] Eurostat, News Release, October 25, 2007
http://epp.eurostat.ec.europa.eu/pls/portal/docs/PAGE/PGP_PRD_CAT_PREREL/PGE_CAT_PREREL_YEAR_2007/PGE_CAT_PREREL_YEAR_2007_MONTH_10/6-25102007-EN-BP.PDF

[33] *Financial Times*, "Reliance on Russia set to persist," September 5, 2008, p. 3.

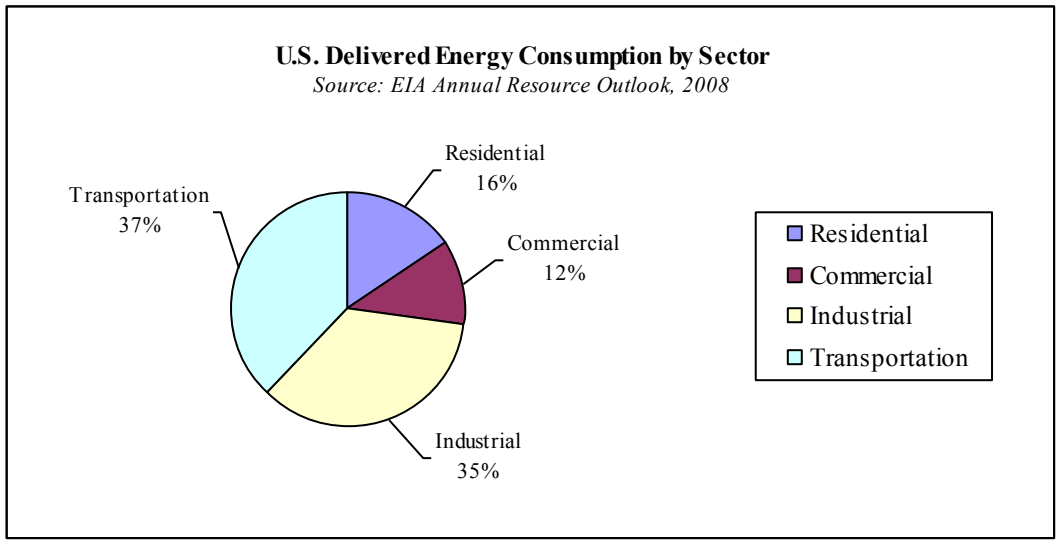
[34] Ariel Cohen, Gas OPEC: A Stealthy Cartel Emerges, April 12, 2007 The Heritage Foundation
http://www.heritage.org/Research/EnergyandEnvironment/wm1423.cfm

[35] EIA,, U.S. Energy Profile, Country Analysis Brief
http://tonto.eia.doe.gov/country/country_energy_data.cfm?fips=US



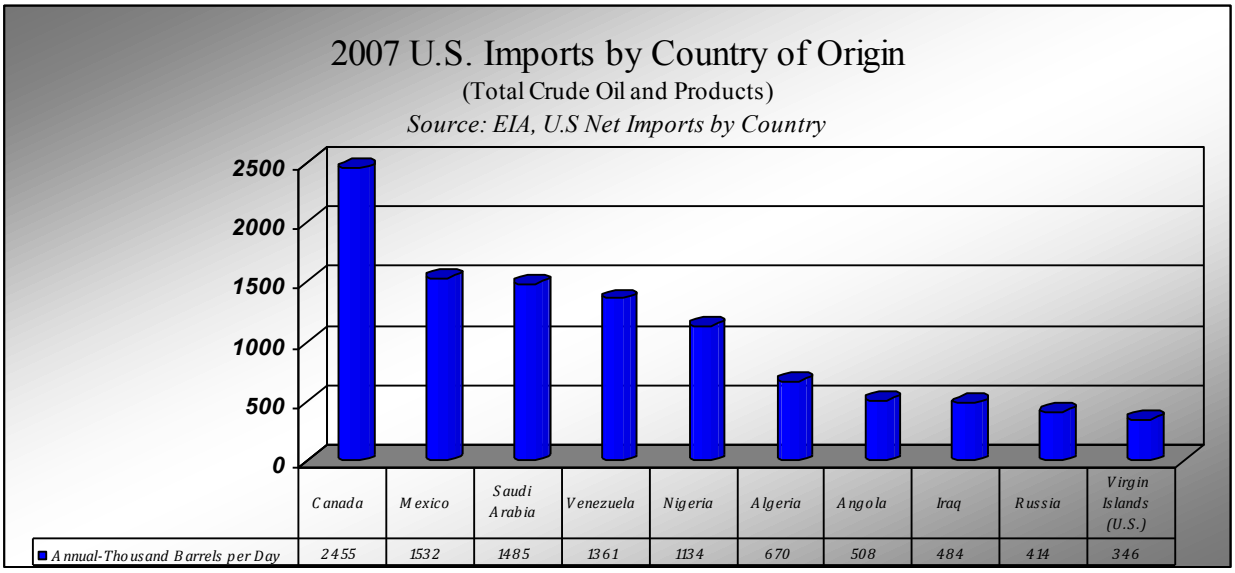
The U.S. ranks third in the world in total oil production, and second in natural gas and coal production. However, U.S. oil production from aging oil fields has been on a downward trend since 1980. Natural gas production in the U.S. dipped in the late 1980s, rose in the late 1990s, and has remained somewhat below those levels since. Coal production by contrast has grown since 1980.

As noted, U.S. energy consumption is the highest in the world. With decreased oil production and growing demand, the U.S. has increasingly relied on imported oil to serve its energy needs – 13.7 million barrels of oil per day in 2006.[36]



[36] EIA, Saudi Arabia Energy Profile http://tonto.eia.doe.gov/country/country_energy_data.cfm?fips=SA

Because of its value as a fuel for vehicles, homes, and businesses and its industrial use, oil has been the main focus of discussions and debate about U.S. energy dependency. In recent months, oil imports amounting to over 26 percent have been imported from its close neighboring countries Canada and Mexico. However, with a slowdown in Mexico's oil exports to the U.S. in 2008, the U.S. now imports between 13 and 14 percent of its oil from Saudi Arabia, which now ranks second among oil exporters to the U.S.[37]



The top oil producers in the world are often divided into those countries in the Organization of the Petroleum Exporting Countries (OPEC) and non-OPEC countries. OPEC countries include Algeria, Angola, Ecuador, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela.[38]

In the Energy Information Administration's (EIA) listing of the top 15 world oil producers,[39] seven were non-OPEC countries -- Russia, the United States, China, Mexico, Canada, Norway, and Brazil.

Among OPEC members, Saudi Arabia is the world's top oil producer and holds about one-fifth of the world's proven oil reserves. The country also is the largest net oil exporter.[40]

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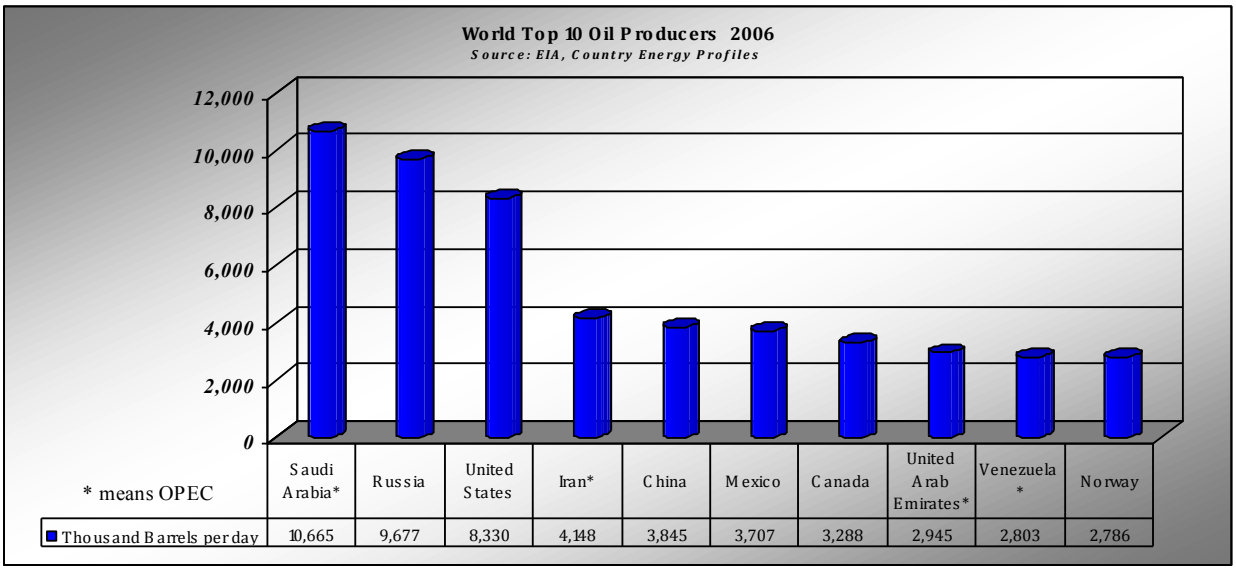
[37] EIA, U.S. Net Imports by Country, http://tonto.eia.doe.gov/dnav/pet/pet_move_neti_a_EP00_IMN_mbblpd_m.htm

[38] *Ibid.*

[39] EIA, Country Energy Profiles http://tonto.eia.doe.gov/country/index.cfm

[40] *Ibid*.

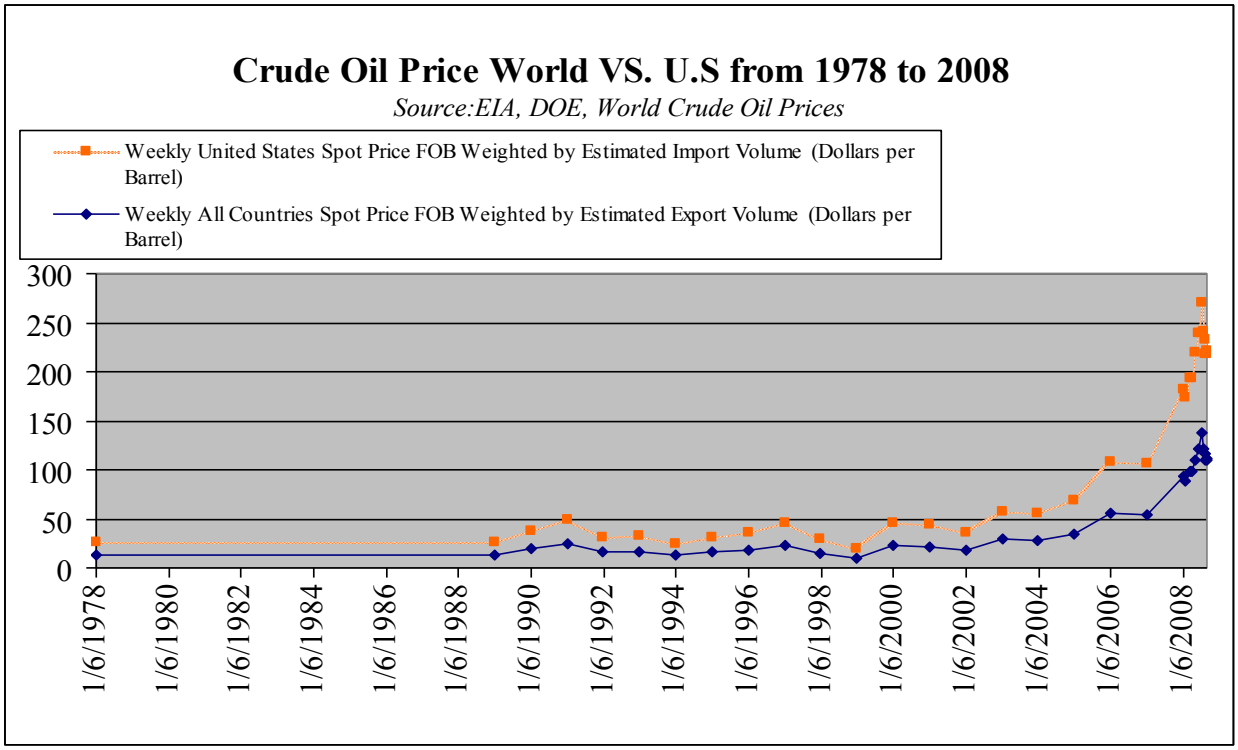


As noted earlier, the U.S. is the top oil-consuming nation, and historically, the developed world has been the largest oil consumer. However, with the very rapid economic growth of countries such as India and China, which has had double-digit growth rates over recent years, their energy needs have increased dramatically. Besides the energy needed to fuel their industrial expansion, with populations well over one billion each, that economic growth is also fueling the emergence of a vast middle-class in those countries, with the needs and wants seen in the developed world.

In terms of total energy consumption, China now ranks second behind the U.S., followed by Russia and then Japan.[41] World petroleum consumption also shows China second to the U.S., with Japan ranking third.[42]

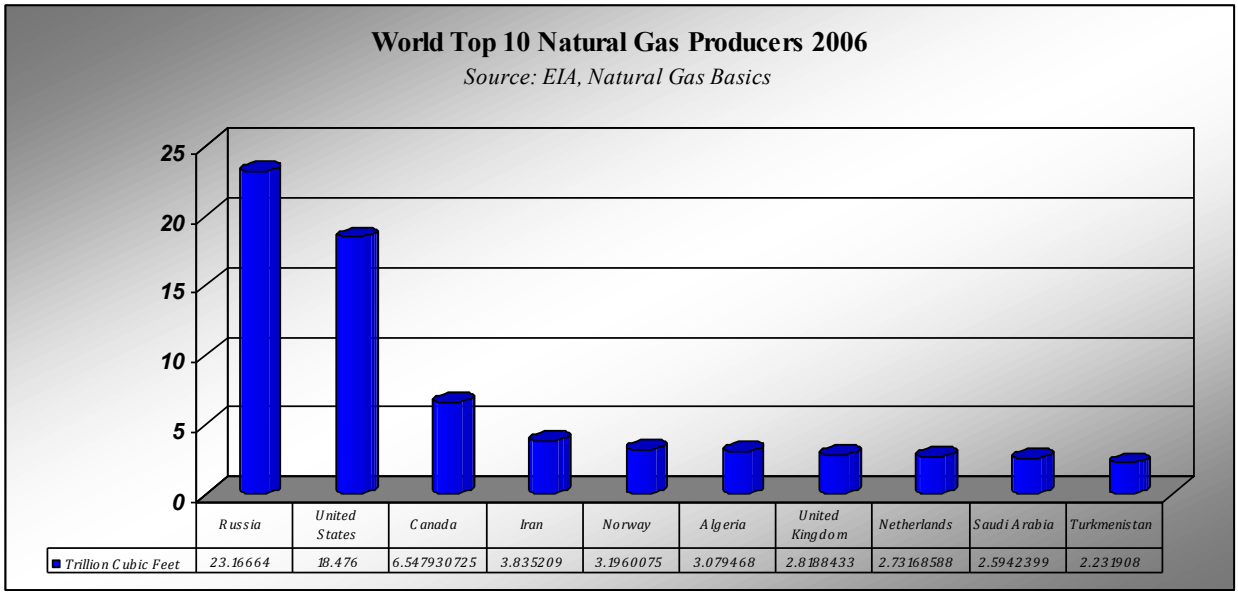
[41]EIA, World Primary Energy Consumption by Region, 1996-2005 http://www.eia.doe.gov/emeu/aer/pdf/pages/sec11_7.pdf

[42]EIA, World Petroleum Consumption, 1960-2006 http://www.eia.doe.gov/emeu/aer/pdf/pages/sec11_21.pdf



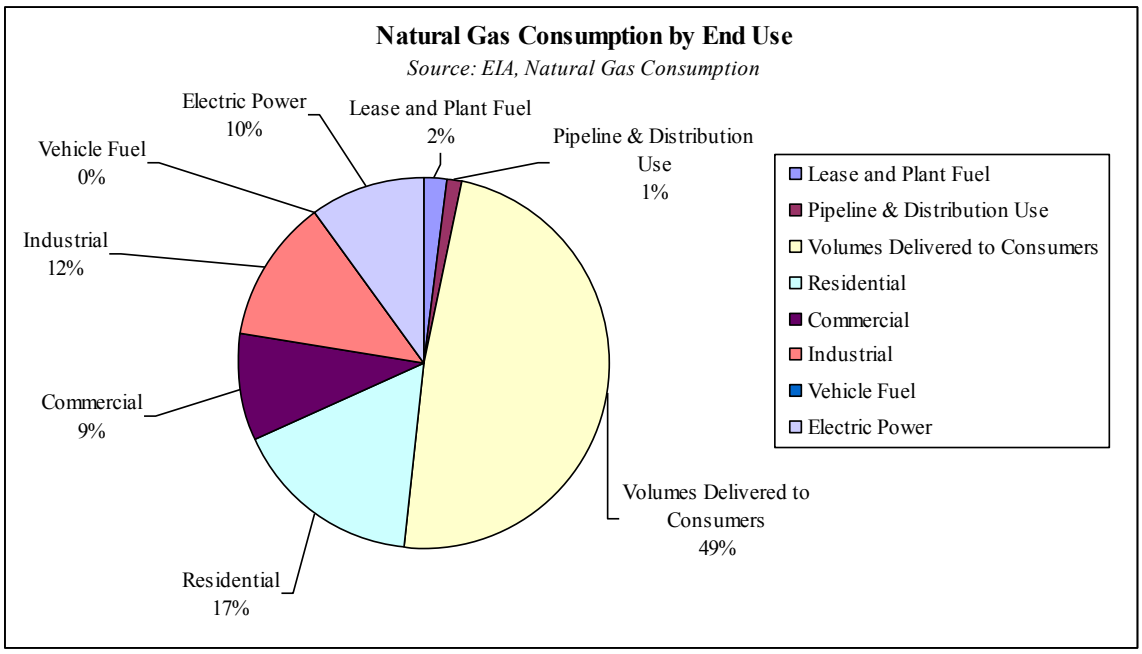
Natural Gas

World production of natural gas amounted to 104.70 trillion cubic feet in 2007. Russia ranks number one in natural gas production, with 23.064 trillion cubic feet, followed by the U.S., with 19.278 trillion, and then Canada, with 6.604 trillion cubic feet.[43]



[43]EIA, Natural Gas Basics http://www.eia.doe.gov/basics/quickgas.html

In the EIA's International Energy Outlook 2008,[44] it is projected that because of its lower production of carbon dioxide in combustion, natural gas is expected to replace oil when possible.



The largest commercial users of natural gas are the industrial sector and the electric power sector. These uses are projected to increase significantly over the next 20-plus years.

Natural gas, although a fossil fuel, is considered a "cleaner" energy source than oil or coal, especially by environmental groups, because of its significantly lower production of greenhouse gas emissions. It also burns much cleaner and produces far less pollution.

Natural gas and oil are often found together in the same fields – on land or off-shore. Once wells are drilled and production begins, natural gas is stored in underground storage facilities, such as salt beds and abandoned oil and gas wells. Then pipelines move it to the end-users.

Liquified natural gas (LNG), because of its significantly smaller volume and its ability to be stored and transported more readily without the use of pipelines, is gaining increasing interest from producers. It is produced by chilling natural gas to very low temperatures until it becomes a liquid. In that form it can be stored more easily and can be transported around the world by tankers. Trucks can also ship LNG for storage in chilled tanks for transmission to users. [45] In 2007, U.S. imports of LNG totaled 584 billion cubic feet.[46]

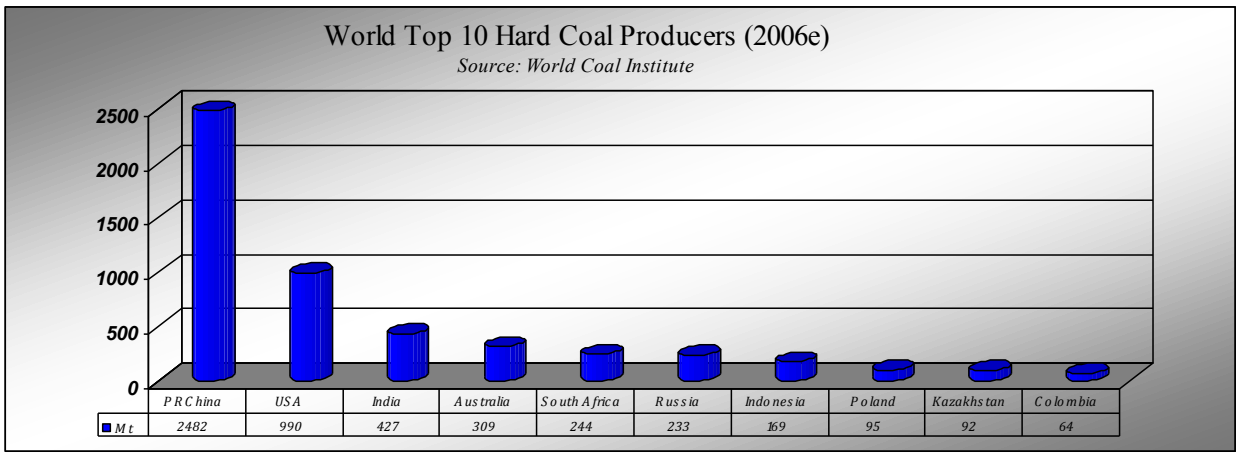
[44]EIA, International Energy Outlook 2008, Highlights http://www.eia.doe.gov/oiaf/ieo/highlights.html

[45]EIA, http://www.eia.doe.gov/kids/energyfacts/sources/non-renewable/naturalgas.html

[46]EIA, Natural Gas Basic Statistics http://www.eia.doe.gov/basics/quickgas.html

Coal

The following chart shows the ten largest hard coal-producing countries in the world, as of 2006[47]:



Globally, coal is one of the main sources of energy and supplies 25 percent of energy needs. Coal is also used to generate 40 percent of the world's electricity.[48]

World coal consumption is expected to increase at an annual rate of 2 percent, according to the U.S. Department of Energy's EIA. Part of the reason is that many countries are coal-rich, and, as the prices of oil and gas increase, relatively inexpensive coal will be used more, especially in developing countries such as China and India.

Worldwide too coal is used to produce almost 70 percent of steel, and the demand for steel for buildings and infrastructure, vehicles, and appliances is increasing, especially in rapidly developing countries such as China, which saw an 18.5 percent increase in steel production between 2005 and 2006.[49]

The U.S. is estimated to hold about 27 percent of the coal reserves in the world, the largest percentage of any other country.[50] Besides having the largest share of reserves, the U.S. is also the second largest producer of coal.

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[47] World Coal Institute, Coal Facts 2007 http://www.worldcoal.org/pages/content/index.asp?PageID=188

[48] *Op cit.,* World Coal Institute.

[49] World Coal Institute, Coal and Steel Facts http://www.worldcoal.org/pages/content/index.asp?PageID=189

[50] Clifford Krauss, "An Export in Solid Supply," *The New York Times,* March 19, 2008 http://www.nytimes.com/2008/03/19/business/19coal.html?pagewanted=1&_r=1&adxnnlx=1220378642-PgHdnwYukQtQFSQ5aPDd9g

In the U.S., coal is perhaps the most disregarded energy source by those seeking energy security. In many developed countries, the fact that its combustion creates carbon dioxide emissions has been used as a reason to explore alternatives to coal. In addition, coal mining has increasingly come under attack because of coal mining's perceived effects on the environment. Mining itself also is looked upon as antiquated and unsafe, even with the high technology methods and machinery used today to extract coal.

The World Coal Institute has a cogent synopsis[51] of why coal can play an important role in energy security:

- Coal reserves are very large and will be available for the foreseeable future

  without raising geopolitical or safety issues.

- Coal is readily available from a wide variety of sources in a well-supplied worldwide market.

- Coal can be easily stored at power stations and stocks can be drawn on in emergencies.

- Coal-based power is not dependent on the weather and can be used as a backup for wind and hydropower.

- Coal does not need high pressure pipelines or dedicated supply routes.

- Coal supply routes do not need to be protected at enormous expense.

In a European Commission energy document[52] published five years ago, researchers projected that under all their scenarios, world coal consumption would significantly increase over the next several decades and would double from 2003 levels by 2030. The reason, according to the EC report, is that "in the long run, coal remains the only abundant and cheap fossil source, provided that environmental considerations do not dominate the scenario framework."

Countries such as India and China with massive energy needs also have large coal reserves and are in the forefront of investigating underground coal gasification on a commercial scale. This technology involves drilling bore holes into the coal seam, then igniting the coal, and adding a combustion agent, such as oxygen. The burning of the coal produces gases, which are forced to the surface and then captured to provide energy.[53]

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[51] World Coal Institute, *The Coal Resource*, pp. 16-17
http://www.worldcoal.org/assets_cm/files/PDF/globalcoalmarket.pdf

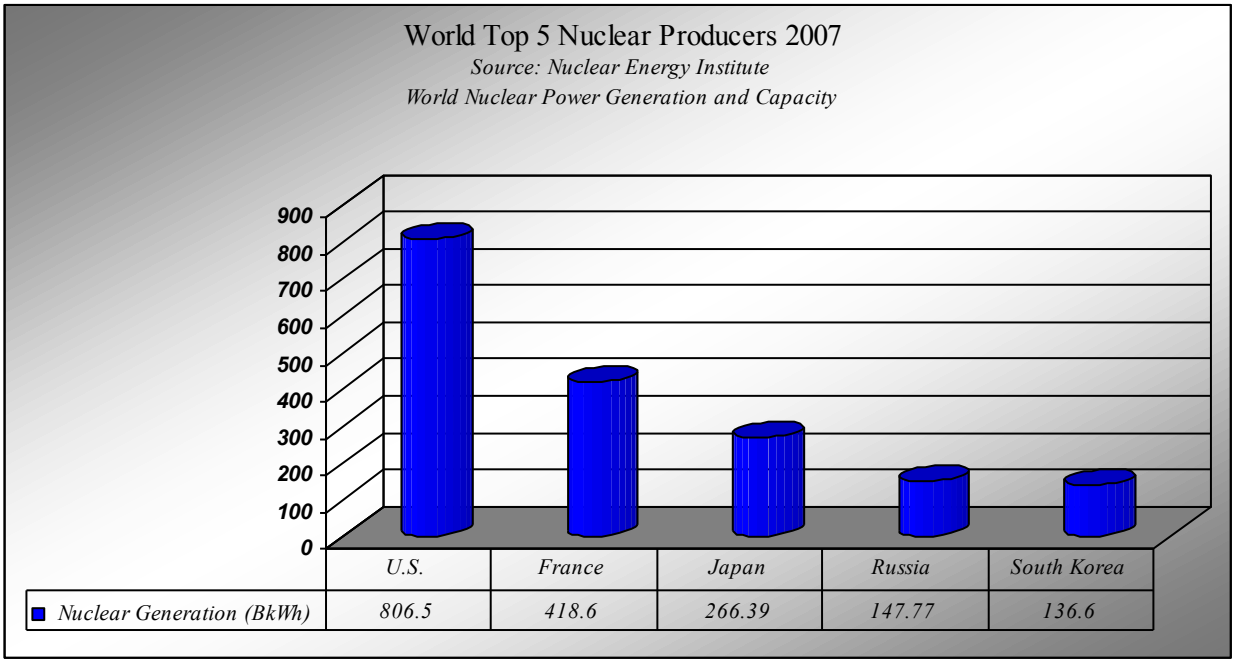
[52] European Commission, *World energy, technology and climate policy outlook 2030,* 2003
http://ec.europa.eu/research/energy/pdf/weto_final_report.pdf

[53] David Winning, "Cleaning up coal's Act," *The Wall Street Journal*, Energy Report, September 15, 2008.

While there are questions about the risks of large-scale projects, such as possible underground water contamination and subsidence, some experts say that those risks are avoidable with proper assaying and planning.

Nuclear Energy

Worldwide, about 16 percent of electricity is generated by nuclear power. Thirty countries in the world operate about 435 commercial nuclear power reactors. It is usually a surprise to many people that the U.S. is the largest generator of nuclear power in the world, although nuclear power accounts for only about one-fifth of U.S. power generation. In the U.S. its 104 nuclear power plants are dispersed and operate in 31 states.[54]



Other countries have gained prominence because of their strong reliance on nuclear energy. France, for example, uses nuclear energy for about 77 percent of its electricity generation.[55] Its total nuclear generation in 2005 was 428.95 billion kilowatt hours, whereas the U.S. generated 781.00 billion kilowatt hours using nuclear energy. Other countries that produce significant energy through nuclear power are Japan, South Korea, Germany, and Russia. [56]

With concern about greenhouse gas emissions from fossil fuels as well as the rise in petroleum prices, countries such as China and India are planning to expand their nuclear

[54] EIA, Table 9.1 Nuclear Generating Units, 1955-2007 http://www.eia.doe.gov/emeu/aer/pdf/pages/sec9_3.pdf, and States with Commercial Nuclear Industries http://www.eia.doe.gov/cneaf/nuclear/page/at_a_glance/reactors/states.html

[55]Nuclear Energy Institute, World Statistics http://www.nei.org./resourcesandstats/nuclear_statistics/worldstatistics/

[56]EIA, International Energy Annual 2005, World Net Nuclear Electric Power Generation, Table 2.7. http://www.eia.doe.gov/fuelnuclear.html

facilities. These concerns, combined with energy security, are causing some countries, such as Germany, to reconsider their phase-out of nuclear plants.

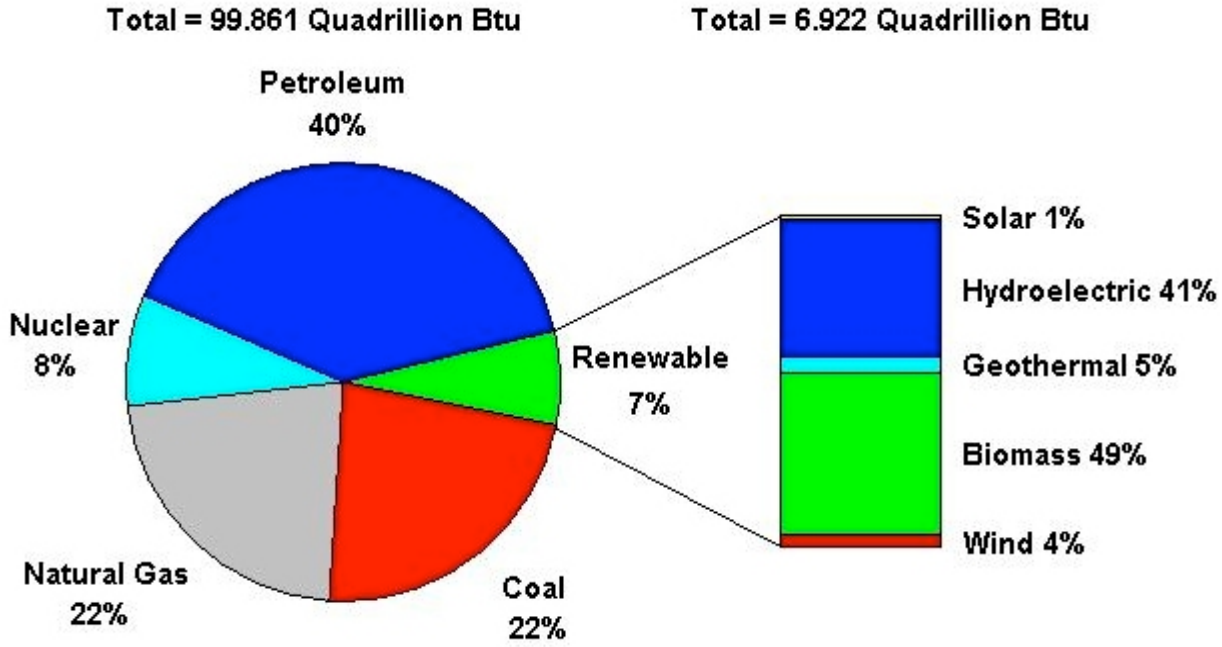
While nuclear power would seem like one of the solutions to reduce greenhouse gas emissions and to move toward greater energy security, environmental groups have campaigned relentlessly against existing facilities and any plans for new nuclear power reactors. They question the safety of nuclear power plants and the disposal of nuclear waste. Other opponents are against nuclear power per se, as they fear the proliferation of nuclear weapons.

Some of these concerns may stifle the development of nuclear power in the U.S. and several other Western countries. However, the EIA projects that the issues of greenhouse gas emissions, energy security, and rising fossil fuel prices have and will continue to support new nuclear power development.[57]

Renewable Energy

Many of the proposals for energy independence give a large role to renewable energy in the future. That would mainly be accomplished through mandates for an increase in renewables to displace fossil fuels through tax incentives, subsidies, loans, and grants, as well as government mandates, both federal and state.

The chart below[58] shows the role of renewable energy consumption in the nation's energy supply as of 2006:



[57]EIA, http://www.eia.doe.gov/oiaf/ieo/highlights.html

[58] EIA, Renewable Energy Trends 2006 Edition
http://www.eia.doe.gov/cneaf/solar.renewables/page/trends/rentrends.html

As can be seen, renewable energy, which includes solar, hydroelectric, geothermal, biomass, and wind energy, makes up seven percent of the total consumption of energy in the U.S. Hydroelectric power and biomass (biofuels, waste, wood, and wood-derived fuels) comprise the bulk of renewables consumption and together account for 90 percent. Wind power represented just four percent, and solar, one percent, of renewables consumption.

Hydropower

Total renewable energy consumption in the U.S. in 2006 amounted to 6.922 Quadrillion BTUs, with conventional hydroelectric power providing 2.869 Quadrillion BTUs or over 40 percent of the total.

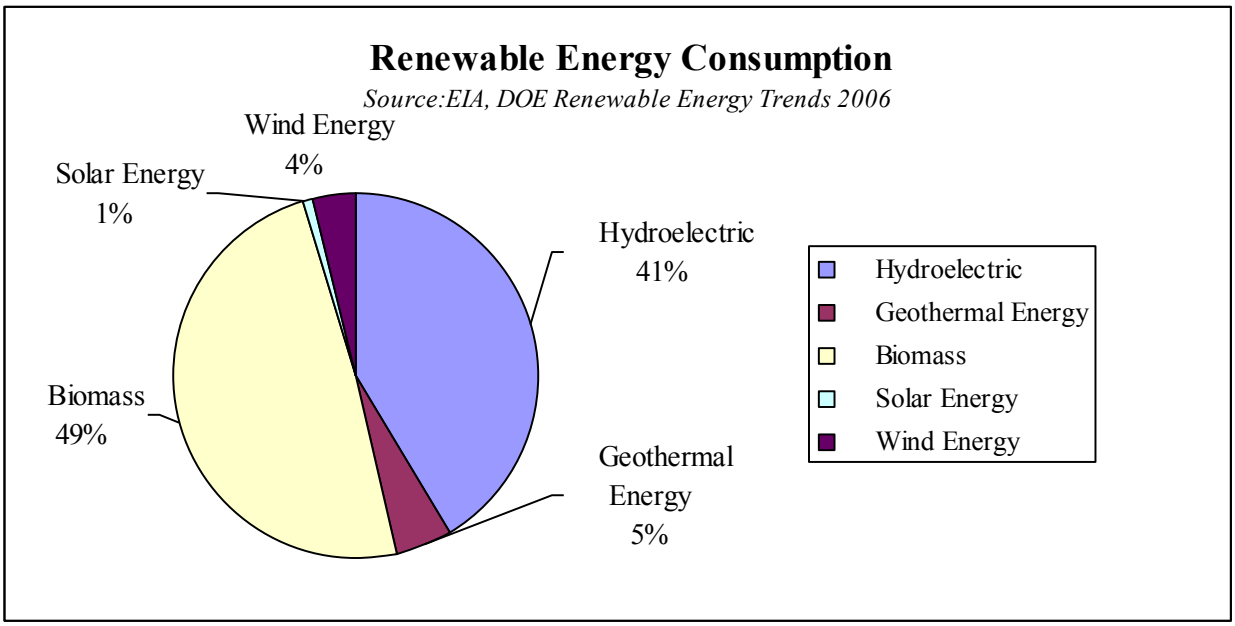
In terms of renewable energy, hydropower by far is the most important source for electricity generation. While hydroelectric power is an important energy source, there are difficulties in future expansion. Many of the suitable waterways have already been developed, and the massive construction needed and the huge costs are likely prohibitive in the near future. In addition, environmentalists have campaigned against large-scale hydroelectric plants and have charged that the habitats of certain plants, fish, and animals have been destroyed or disrupted by the damming of rivers and streams.[59]

Supporters of hydropower, however, point to the fact that operating a hydroelectric plant is not dependent on fossil fuels' price volatility, so its pricing can be more stable and independent. Also, unlike oil, hydropower is a domestic source that produces no fossil fuel emissions in its energy production. In addition, hydroelectric power plants generally have a long life – 50 to 100 years – compared to fossil-fuel plants, and, because they are so automated, require few employees.

Biomass

Hydropower and biomass provide 90 percent of the energy derived from renewables, as shown in the chart following. Biomass, one of the oldest sources of energy, includes wood and wood residues, municipal and other wastes, and biofuels, principally ethanol derived from corn.

[59] EIA, Hydroelectric http://www.eia.doe.gov/cneaf/solar.renewables/page/hydroelec/hydroelec.html



Biomass in the form of wood residues is primarily used in industrial processes and for generating electricity. Liquid biofuels – ethanol -- from a variety of sources, but principally from corn, is increasingly being produced, because of government subsidies and mandates.

Biomass is a lower density fuel than fossil fuels, that is, its mass to produce the same amount of energy is much greater. That means that it is more expensive to produce, handle, and transport biomass fuels. In addition, biomass is not a concentrated but a dispersed resource, which means that the facilities used to generate energy using biomass are generally dispersed as well and are smaller with fewer economies of scale.

One of the most politically popular subsets of biomass is ethanol. With the volatility of oil prices in world markets, policy makers are increasingly looking to alternative energy sources in attempts to secure the unrealistic goal of "energy independence" in a world of globalized energy markets. Ethanol has been the U.S. government's alternative fuel of choice. But ethanol is not the "magic bullet" that its proponents claim.

Today, producers of ethanol and other biofuels benefit from complex and highly remunerative "incentive" programs that include biofuel use mandates, subsidies, tax credits, grants, loans, and import restrictions. These programs benefit politically influential agribusinesses to the detriment of American consumers and should be ended.

The unintended economic consequences of U.S. ethanol policy are far-reaching. With new government subsidies and mandates for ethanol, corn producers have increasingly turned to ethanol production, leading to the price of corn skyrocketing. Since corn goes into so many foods—from livestock feed to cereals—high prices for corn translate into higher costs for manufacturing a wide array of foods. Those costs are passed on to consumers in the form of higher prices, with the poor suffering the most, since they pay a larger proportion of their incomes on food.

Many farmers have switched more acreage to corn production for ethanol, rather than other food crops. Land prices in farming areas have also skyrocketed, which increases the costs of other crops produced on that land.

On the world markets, the high food prices have caused major problems in developing countries, where many people live at a subsistence level and depend on staple foods, such as corn and rice, which may be in scarce supply or less affordable.

The ethanol bubble may not be about to burst yet—government support is likely to keep it going for a while. But there are already some strong signals of discontent among other interest groups affected by the high costs of corn.

Many biofuel proponents point to the "next generation" of fuels that will be manufactured from cellulosic biomass and other crop residues, from fast-growing grasses such as switchgrass, and from forestry wastes. Yet there are no manufacturing plants capable of producing cellulosic ethanol in other than demonstration quantities, and prominent agriculturists have demurred from endorsing this approach by noting some of the negative ecological effects. Vaclav Smil of the University of Manitoba has noted:

> The [biofuels] prospect does not change radically by using crop residues to produce cellulosic ethanol: Only a part of these residues could be removed from fields in order to maintain key ecosystemic services of recycling organic matter and nitrogen, retaining moisture and preventing soil erosion.[60]

Some advances are being made with the use of bioengineered enzymes that would break down the cellulose more rapidly. However, those are still in the laboratory.

In addition to the environmental consequences of switching from corn to crop residues or switchgrass for ethanol production, switchgrass could not economically compete with corn, according to the Iowa State study:

> A key and possibly counterintuitive insight is that there is no ethanol price that makes it worthwhile to grow switchgrass because any ethanol price that allows ethanol plants to pay more for switchgrass also allows them to pay more for corn. So long as farms are responding to net returns in a rational manner and so long as ethanol plants are paying their breakeven price for raw material, farmers will plant corn as an energy crop. Switchgrass in the Corn Belt will make economic sense only if it receives an additional subsidy that is not provided for corn-based ethanol.[61]

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[60] Vaclav Smil, Energy at the Crossroads, background notes for a presentation at the Global Science Forum Conference on Scientific Challenges for Energy Research, Paris, May 17-18, 2006, p. 11. http://www.oecd.org/dataoecd/52/25/36760950.pdf

[61] Center for Agricultural and Rural Development (CARD), Iowa State University, "Emerging Biofuels: Outlook of Effects on U.S. Grain, Oilseed, and Livestock Markets," May 2007, pp. 40-41 http://www.card.iastate.edu/publications/DBS/PDFFiles/07sr101.pdf

Wind Energy

In comparison to biomass and hydropower, other renewable energy sources in the U.S. provide but a small share of total energy production – only 7 percent.

Currently wind energy throughout the U.S. produces 0.4 percent of the nation's total electricity production, or an amount that can serve more than 2.4 million households. In terms of total energy production, wind energy plays a very small – but growing – role; it represents only 0.28 percent of total energy production. According to the EIA, a significant reason for the increase in wind energy is the production tax credit, which is one of the largest subsidies that any type of energy receives.

> The estimated value of production tax credits to wind producers in FY 2007 was $666 million. The benefit was distributed over an estimated 27.7 million megawatthours, making wind power the largest beneficiary of production tax credits among all renewable technologies.[62]

In terms of subsidies and support, wind power receives a whopping $23.37 per megawatt hour, compared to natural gas and petroleum liquids, which receive $0.25 per megawatt hour.[63]

One of the energy independence plans that has garnered attention is that of oilman T. Boone Pickens, founder and chairman, BP Capital Management. Called the "Pickens Plan,"[64] it focuses on massive wind farms for electricity generation. This wind power, according to Pickens, would displace clean natural gas used for electricity. That natural gas would then be freed up to be used for transportation fuel and drastically reduce U.S. dependence on oil.

However, critics have pointed to significant downsides to the plan.[65] For example, areas where wind is consistent enough to power wind farms are not necessarily near areas where the electricity needs are greatest. Thus, large-scale and long-distance transmission lines would need to be built, with the significant "line losses" of energy that occur over long distances. Long-distance grids would increase those line losses, which are estimated to amount to about 10 percent of all electricity generated.

Despite the fact that Pickens is making substantial investments in wind farms in Texas, those turbines will need the infrastructure to carry the power to businesses and consumers, which would undoubtedly require massive government funding.

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[62] EIA, How much does the Federal Government spend on energy-specific subsidies and support? http://tonto.eia.doe.gov/energy_in_brief/energy_subsidies.cfm?featureclicked=2&

[63] EIA, Federal Financial Interventions and Subsidies in Energy Markets 2007, SR/CNEAF/2008-1 (Washington, D.C., 2008).

[64] PickensPlan website http://www.pickensplan.com/theplan/

[65] Institute for Energy Research, "Pitfalls in the Pickens Plan," http://www.instituteforenergyresearch.org/2008/07/10/pitfalls-in-the-pickens-plan/

Also, winds are not steady but are intermittent, and there is very little wind during peak demand summer months. Thus, during periods where power isn't being generated, there would have to be alternative backup sources, i.e., gas- or coal-fired plants. Gas-fired plants are the most efficient back-up for wind power, as gas can be turned on and off immediately, not so with wind power or indeed coal-fired plants. Thus, the potential savings in gas so it can be used in transportation may not be realistic.

In addition, the Pickens Plan doesn't discuss the cost of refitting both vehicles for natural gas rather than gasoline and the fuel pumps at gas stations.

Energy expert Glenn Schleede has closely analyzed the wind industry, the significant subsidies it receives, and its inefficient delivery of energy. In a May 13, 2008 memo, Schleede noted that the costs of the expanded transmission capacity would not be paid for by wind-farm owners, but by electric customers in their monthly bills:

> Most of Texas' "wind farms" are located distant from the areas where electricity is needed. Texas political leaders and regulators have mandated that additional transmission capacity will be built and that the cost be borne by electric customers in their monthly bills, not by the "wind farm" owners who are profiting so handsomely. This requirement amounts to another huge subsidy for "wind farm" owners. Adding transmission capacity to serve distant "wind farms" is very costly. First, the estimated cost of building the transmission capacity ranges from $3.78 billion to $6.38 billion. Second, significant amounts of electricity is lost as it moves over transmission lines, especially over long distances so not all the electricity that the "wind farm" produces ever reaches electric customers. Third, wind farms use transmission capacity inefficiently, resulting in high unit cost for the electricity that is eventually received. [66]

Large-scale wind farms also have negative environmental effects. Besides the noise of wind turbines and possible micro-climate effects, they can also harm bird populations. Turbines on one early large wind farm in California, the Altamont Pass Wind Resource Area, have killed large numbers of birds, according to the environmental group, Center for Biological Diversity:

> Wind turbines at Altamont Pass kill an estimated 880 to 1,300 birds of prey each year, including up to 116 golden eagles, 300 red-tailed hawks, 380 burrowing owls, and additional hundreds of other raptors including kestrels, falcons, vultures, and other owl species. The APWRA is an ecological sink for golden eagles and other raptor species and may be having significant impacts on populations of birds that are rare and reproduce infrequently.[67]

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[66] Glenn Schleede, "Pickens' profits show why PTC should note be extended," National Wind Watch, posted May 13, 2008 http://64.233.169.104/search?q=cache:HZGflatAduQJ:www.wind-watch.org/alerts/2008/05/13/pickens-profits-show-why-ptc-should-not-be-extended/+%22wind+power%22+schleede+%22may+13%22&hl=en&ct=clnk&cd=2&gl=us&client=firefox-a

[67] Center for Biological Diversity, "Fact Sheet on Altamont Pass Bird Kills," http://www.biologicaldiversity.org/campaigns/protecting_birds_of_prey_at_altamont_pass/pdfs/factsheet.pdf

In terms of wind power's role in energy independence, in the U.S. it may have some limited role to play. However, wind power – because of its reliance on natural gas for backup electricity – may increase some countries' energy *dependence*. For example, some countries in the European Union that are heavily committed to wind power may actually increase their dependence on Russian gas imports for back-up energy to wind.

Solar

Solar energy – the light and heat from the sun -- can be used to produce thermal heat and electricity. Solar thermal panels absorb the sun's heat either to warm buildings or to heat water for home water systems. The production of electricity through using sunlight is a different technology altogether. With the use of photovoltaic (PVs) cells, sunlight is converted into electric energy – for something as small as powering a wristwatch to producing electricity on a large-scale. For electricity plants, cells are formed into modules and then further connected to form an array. Another way to produce electricity from the sun uses mirrors or other solar collectors to direct sunlight to a fluid, which when heated produces steam, which powers a turbine to produce electricity in a generator.

Solar energy production has some issues in common with wind power. Solar also produces energy intermittently rather than continuously – strongest at mid-day, less so in the mornings and early evenings. On cloudy or rainy days, it doesn't produce at all. Some areas, such as deserts, which have a lot of sunshine, also have blowing sand, which can scratch the surfaces of solar panels or cells.

Systems to store the energy or tie into the electricity grid add significantly to the cost of solar installations.

Solar, however, has been made quite attractive because of its Investment Tax Credit (ITC), due to expire at the end of 2008, unless it is renewed. For residential customers, the ITC provides a 30 percent credit toward the cost of solar expenditures, with a cap of $2,000. Commercial installations, on the other hand, receive a credit of 30 percent of the cost of the installation – but with no cap.

According to EIA, solar energy receives subsidies and support amounting to $24.34 per megawatt hour, again compared to natural gas and petroleum liquids support of $0.25 per megawatt hour.[68]

"Clean" Vehicles

Since the transportation sector in the U.S. uses a large percentage of the oil produced domestically and imported – 37 percent of energy consumption. According to the EIA, transportation is the only end-use sector that has not increasingly relied on electricity as an

[68] EIA, Federal Financial Interventions and Subsidies in Energy Markets 2007, SR/CNEAF/2008-1 (Washington, D.C., 2008).

energy source.[69] That, plus the fact that the transportation sector produces significant CO2 emissions, has focused attention on developing new types of motor vehicles that aren't dependent on the internal combustion engine. But experts note that it's likely that by 2020, most motor vehicles will still be mainly using fossil fuels.

Currently, cars that use alternative energy sources instead of or to supplement gasoline include those using compressed natural gas (CNGs), mixtures of gasoline and ethanol or other mixtures (flex fuel vehicles), batteries (plug-in electric vehicles), fuel and batteries (hybrid electric vehicles), fuel cells (powered by hydrogen), and others.

Some of these alternative vehicles are not in production yet, some are relatively short-range, others still need the infrastructure to make them feasible alternatives.

The plug-in hybrid has some advantages over the plug-in electric currently, since it can shift to its fuel tank if the battery is discharged. All electric cars still have not overcome the issue of range with the batteries in- or near-production. While electric cars are designed to be plugged in at home or in garages for recharging, the lack of infrastructure – charging sites – at remote locations and in parking lots currently limits their widespread development.

Infrastructure problems also exist for cars using fuels such as natural gas, E85 (an ethanol mix), and especially hydrogen. That is, there are limited numbers of gas stations providing these fuels, and in some areas of the country, the availability is very rare.

Energy Interdependence

As noted in the introduction, energy independence is a chimera. Rather, the world energy markets are global. Even if the U.S. produced all of its own oil, the prices of that oil will respond to world market conditions. That is, if there are disruptions of the oil supply in, say, Russia, that would put price pressures on our domestic prices. As Cato's Jerry Taylor and Peter Van Doren noted, the United Kingdom in 1979 depended on the North Sea for virtually all of its oil consumption. However, when the Shah of Iran fell that year, not only did prices soar for those relying on Iranian crude oil, but also in so-called energy independent nations like the U.K.[70]

Taylor and Van Doren also noted that energy independence has its downside. Removing the U.S. from the international energy markets would make the U.S. more vulnerable to disruptions in supply. If the production facilities are concentrated rather than dispersed, they are more vulnerable to terrorist attacks. Also, if the U.S. were not a part of the world oil trading system, in the event of a disruption in the domestic supply, the U.S. would not be able to quickly import needed supplies from the international market.

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[69]EIA, Emissions of Greenhouse Gases Report, November 28, 2007
http://www.eia.doe.gov/oiaf/1605/ggrpt/carbon.html#transportation

[70] Jerry Taylor and Peter Van Doren, "Pumping the Bizarre," National Review, May 4, 2005
http://www.nationalreview.com/comment/taylor_200505040803.asp

One also should look at other countries in the world and their "energy dependence." Eurostat, the Statistical Office of the European Communities, did just that for European Union countries in 2006. It found that the EU27 had an energy dependence rate of 54 percent, that is, the net energy imports divided by gross consumption averaged 54 percent for those 27 countries. In Cyprus, Malta, Luxembourg, and Ireland, that rate was over 90 percent. Denmark, which is a net energy exporter, had a negative rate, and "the least dependent on energy imports were Poland (20%), the United Kingdom (20%), the Czech Republic (28%) and Romania (29%)."[71]

If one looks East, Japan is a stark example of a developed country with minimal energy resources that is *99 percent* dependent on foreign oil and gas.[72]

Views of Energy Independence

National Security

Energy independence in relation to national security has been a primary focus of the U.S. government, Congressional leaders, and influential policy groups. One such group, the Council on Foreign Relations, created a task force to review the implications of oil dependency on the foreign policy goals of the U.S. Their report[73] lays out the issues and provides recommendations for the U.S. to more closely integrate energy goals with national security goals. What is different about their report and some of the more hawkish promoters of energy independence is that the Task Force recognizes that energy independence is a myth that many politicians and others are demagoging:

> The voices that espouse "energy independence" are doing the nation a disservice by focusing on a goal that is unachievable over the foreseeable future and that encourages the adoption of inefficient and counterproductive policies.[74]

While the report's review of the issues is exemplary, their main recommendation is based on the premise that the government needs to take steps to reduce demand for petroleum, particularly as a transportation fuel. Less oil should be used over time and the government must step in to gradually reduce the use of oil through taxes, cap and trade systems, and more stringent fuel economy standards.

The Council does recognize that some attention should be given to increasing the supply of oil domestically, but dismisses that as not being "essential." More important would be federal government incentives and investment in greater energy efficiency and alternative fuels, for, the report states, "Government spending is appropriate in this context because the market alone does

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[71] Eurostat, Energy consumption and production, EU27 energy dependence rate at 54% in 2006, 10 July, 2008, http://epp.eurostat.ec.europa.eu/pls/portal/docs/PAGE/PGP_PRD_CAT_PREREL/PGE_CAT_PREREL_YEAR_2008/PGE_CAT_PREREL_YEAR_2008_MONTH_07/8-10072008-EN-AP.PDF

[72] Kent Calder, "Sino-Japanese Energy Relations: Prospects for Deepening Strategic Competition," presented at the Conference on Japan's Contemporary Challenges, Yale University, New Haven, Connecticut, March 9-10, 2007.

[73] Council on Foreign Relations, "National Security Consequences of U.S. Oil Dependency," Report of an Independent Task Force, 2006.

[74] *Op cit.,* p. 4.

not make as much effort as is warranted by national security and environmental considerations."[75]

The report, however, does give recognition to the need for the market to operate. One of the recommendations in the report recognizes that foreign governments' domestic subsidies and price controls on oil and gas distort the world markets and urges the U.S. government to encourage them to eliminate those distorting mechanisms. Also, domestically, the report recommends getting rid of the tariff the U.S. imposes on imported ethanol.

Yet the Task Force does promote greater government involvement in energy issues and recommends that an energy security directorate be created within the National Security Staff.

The Democrats' Energy Bill

Just a week ago, the House of Representatives voted for an energy bill that was touted as a compromise. Essentially, it is a bill to provide Democrats with cover in their election campaigns to show their constituents that they're "doing something" about the high cost of energy. However, the bill does little to expand exploration, hits oil producers with new taxes that will discourage investment, and provides new subsidies for alternative energy favored by environmental groups. According to a CEI press release[76] on the House vote, the bill will –

In reality, it would open some Outer Continental Shelf areas that are at least 50 miles from the coast, but permanently withdraw all areas within 50 miles, including waters surrounding Alaska that are currently not under moratorium. The U. S. Geological Survey thinks nearly all the economically recoverable oil is within 50 miles of shore, including Alaskan waters. In other words, open all the areas that have little or no oil, and close all the areas that probably do have lots of oil. The bill would also cause investment in domestic oil production and refining to decrease by raising taxes on oil companies and use the additional tax revenue to pay off special interests like Boone Pickens and other producers of uncompetitive energy.

- Permanently ban access to about 97 percent of the undersea oil lying within 50 miles of the California coast.
- Continue the ban on energy production in the Eastern Gulf of Mexico.
- Impose a brand-new ban on oil and gas leases in Alaska's coastal waters out to 50 miles.
- Impose a brand-new ban on oil and gas leases in Alaska's coastal waters out to 50 miles.
- Not allow states that approve new leases beyond 50 miles to share royalties with the federal government, thus stripping any financial incentive for states to stand up to environmental pressure groups, who will continue to agitate against any new oil and gas operations offshore.

[75] *Op cit*., p. 8.

[76] Competitive Enterprise Institute, press release, September 16, 2008 http://cei.org/node/21126

Recommendations[*]

Remove government impediments to domestic oil and gas exploration and production. If the Arctic National Wildlife Refuge (ANWR) has as much oil as the U.S. Geological Survey's mean estimate,[77] this would increase America's proven domestic oil reserves by approximately 50 percent. Within a few years, an additional million barrels a day could be flowing to West Coast refineries. Critics say that it would be 10 years or so before ANWR would be producing. However, for more than 10 years, drilling in ANWR has been restricted.

ANWR is not the only potential oil reserve that could be opened up. While the western Gulf of Mexico is now America's largest producing oil and natural gas field (which first started up in the late 1940s and early 1950s),` the eastern Gulf of Mexico and entire Atlantic and Pacific Outer Continental Shelf (OCS) areas are closed to production. OCS reserves are potentially enormous. The U.S. Department of Interior estimates that oil and gas resources in undiscovered fields on the OCS total 86 billion barrels of oil and 420 trillion cubic feet of gas.[78] This oil and gas, according to Interior, can be conventionally produced using current or technologically feasible new production methods – without an assessment of the costs.

With high gas and fuel prices, even wealthy, anti-growth counties such as Santa Barbara are rethinking restrictions off their coast. In late August 2008, the Santa Barbara County Board of Supervisors voted to allow offshore drilling.[79] While that action was mainly symbolic – the state, not the county, has jurisdiction – it does illustrate that public opinion may be changing in relation to offshore drilling.

Environmental concerns that have restricted OCS drilling are unwarranted. The last significant offshore oil spill in the continental U.S. was in 1969. Hurricanes Katrina and Rita in 2005 destroyed many oil rigs and platforms in the Gulf, but did not cause any significant oil spills. To overcome opposition to OCS production in coastal States such as California, Congress should share the royalties 50-50 with the states, just as it does with royalties from production on federal lands. As the Competitive Enterprise Institute's Myron Ebell and others wrote to Congress:

> For too long the federal government has tied the hands of state governments that wish to permit oil and natural gas leasing in their adjacent offshore zones. Congress should remove the moratoria on offshore gas production and share the federal

[*] Much of the Recommendations section was previously published in a monograph by the author: Frances B. Smith, "Ethanol Subsidies: A Case Study in the Law of Unintended Consequences," Competitive Enterprise Institute, Issue Analysis, June 2007. http://cei.org/pdf/5976.pdf

[77] U.S. Geological Survey, Arctic National Wildlife Refuge, 1002 Area, Petroleum Assessment, 1998, Including Economic Analysis. http://pubs.usgs.gov/fs/fs-0028-01/fs-0028-01.pdf

[78] U.S. Department of Interior, Minerals Management Service, Outer Continental Shelf Oil and Gas Assessment 2006 http://www.mms.gov/revaldiv/RedNatAssessment.htm

[79] Los Angeles Times, August 27, 2008 http://www.latimes.com/news/science/environment/la-me-oilvote27-2008aug27,0,3994433.story

> royalties with the States that decide to allow offshore production, just as they share the royalties from production on federal lands with the States.[80]

Heritage Foundation's Ben Lieberman reiterated this message in a recent paper, [81] in which he wrote that Congress should let the moratorium on offshore drilling expire on September 30, 2008. President Bush has already rescinded executive orders for a moratorium. Congress, however, has to authorize the Interior Department to open up the OCS to leasing through appropriating funds for Interior. It should do so.

In addition, other pressures work against more timely production of oil from leases on federal lands and waters. Some experts have noted that of the 10-year estimate of the time to production from ANWR, at least five of those years is the result of litigation. Thus, streamlining the process and limiting litigation is important.

Eliminate subsidies for fuels – traditional and alternative. The Energy Information Administration estimates aggregate energy subsidies in the U.S. at between $5 billion and $10 billion per year, approximately $2 billion of which is devoted to research and development programs that benefit particular energy industries. According to the International Energy Agency, removing price subsidies in China, India, Indonesia, Iran, Russia, Kazakhstan, South Africa, and Venezuela would reduce global energy usage by an estimated 3.5 percent and reduce global CO2 emissions by 4.6 percent.[82]

The U.S. Congressional Budget Office and other analysts note that federal R&D money rarely produces commercially viable technologies (for example, the Project for the Next Generation of Vehicles, which expended billions but failed to produce an affordable high-mileage car). Economists Linda Cohen and Roger Noll note, "An effective, coherent national commercial R&D program has never been put in place."[83] If the investments are worth making because of their potential to develop market-viable innovations, the private sector is fully capable of making those investments on its own. In addition, government R&D funding allocation is inevitably subject to political influence. As a result, notes one Department of Energy official, "Government R&D dollars will tend to flow to marginal ideas."[84]

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[80] Joint Letter in Support of OCS Bill, June 28, 2008 http://cei.org/gencon/032%2C05412.cfm

[81] Ben Lieberman, "Congressional Moratorium on Offshore Drilling in the Outer Continental Shelf Should Be Allowed to Expire," The Heritage Foundation, August 8, 2008 http://www.heritage.org/Research/EnergyandEnvironment/wm2016.cfm

[82] International Energy Agency, World Energy Outlook: Looking at Energy Subsidies, Paris, 1999, pp. 9-10.

[83] Linda Cohen and Roger Noll, *The Technology Pork Barrel* (Washington, DC: The Brookings Institution, 1991), p. 378.

[84] U.S. Department of Energy, Energy Research Advisory Board member Eric Reichl, cited in Taylor and Van Doren, "Soft Energy Versus Hard Facts," p. 147.

Streamline the red tape that holds back the development of nuclear energy. As noted earlier, nuclear energy is a viable energy source that produces virtually no greenhouse gas emissions. It is domestically produced, has relatively stable prices, and has the potential to provide a much greater share of energy production, particularly for electricity generation, in place of coal or gas.

However, nuclear power's very high initial capital costs, together with environmental pressures, has held back its development. Also, nuclear power is highly regulated and permits for new reactors have been stalled for decades. Licensing regulations are cumbersome and costly. According to the Congressional Research Service, no new nuclear reactors have been ordered since 1978.[85] With recent higher gas prices, emission restrictions on fossil-fuel-fired electricity plants, and even greater restrictions on coal, interest in nuclear power has been growing, and utilities around the country have said they are planning to apply for nuclear reactor licenses.

Besides environmentalists' concerns about nuclear power, other factors that cause nuclear power to be disparaged include the disposal of spent nuclear fuel and whose responsibility it is, the government's or nuclear producers. Jack Spencer and Nicolas Loris have pointed out[86] that spent nuclear fuel can be reprocessed and resultant unused fuel can be used again, as is done in a similar way in France and other countries. The waste remaining would be less and could be stored in secure underground locations.

Lift the protectionist tariff on ethanol imports and repeal the ethanol mandate. Were corn-based ethanol a good value for consumers, it would be competitive on the world market. Yet the U.S. imposes a $0.54-per-gallon tariff on ethanol imports. The tariff raises the cost of imported ethanol from such countries as Brazil, which is the world's largest exporter of ethanol from sugar cane. With that high tariff, imports cannot easily compete with subsidized U.S. ethanol.

The Energy Policy Act of 2005 included a broad array of mandates and incentives for alternative fuel vehicles. Chief among these is a Renewable Fuel Standard that began at 4 billion gallons in 2006 and increases to 7.5 billion gallons in 2012. This mandate has artificially inflated demand for corn, leading to higher prices for food and farmland. The 2007 Act increases the mandate to 15 billion gallons from corn and 21 billion gallons from advanced biofuels (non-corn) by 2022.

Ethanol also receives substantial excise tax credits. The mid-1990s saw expanded mandates and continued subsidies for ethanol, to its current level of a $0.51 pr gallon excise tax credit. (This will be reduced to $0.45 as a result of the new farm bill.) With a combination of the excise tax credit and $0.12 to $0.30 per gallon of agricultural subsidies, ethanol producers reaped from a low of $0.63 to $0.81 per gallon, courtesy of U.S. taxpayers. These should be repealed.

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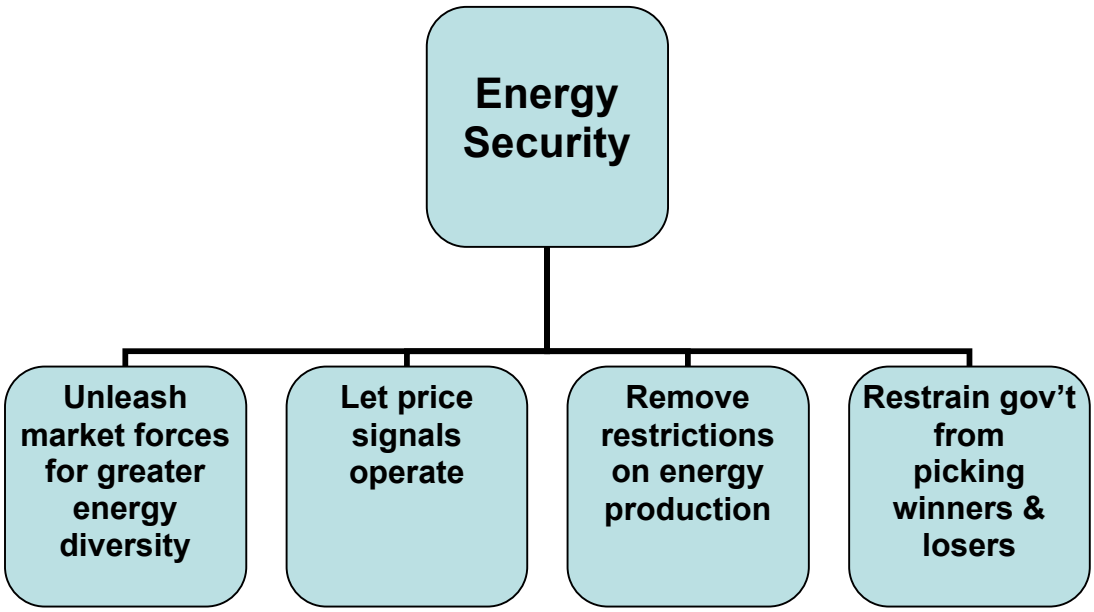
[85] CRS Report for Congress, "Nuclear Power: Outlook for New U.S. Reactors," Updated March 9, 2007 http://www.fas.org/sgp/crs/misc/RL33442.pdf

[86] Spencer and Loris, "Dispelling Myths About Nuclear Energy," The Heritage Foundation, December 3, 2007 http://www.heritage.org/Research/EnergyandEnvironment/bg2087.cfm

Conclusion

The most sensible approach to energy security is energy diversity – explore the energy sources we currently have while we search for those that may be 10 to 20 years or more in the future. As has been shown, the U.S. is energy-rich, with oil, natural gas, coal, hydropower, nuclear and alternative energy sources. As noted in the introduction to this paper, the best path to energy security is greater diversification in energy sources and in petroleum imports. This means removing restrictions and mandates that impede diversification among existing energy sources as well as possible new ones. It also means that the market should be the testing ground for new approaches and new energy alternatives. Trial and error in a free market works better at finding feasible solutions than does the government in picking winners and losers.



With stiff price hikes, consumers of energy conserve; witness the significant drop-off in U.S. gas consumption when gasoline hit $4.00 per gallon. If the prices of some of the primary energy sources continue to rise on world markets, there is a greater incentive to find and develop new fields, to focus on alternatives that previously were cost-prohibitive, to invest in technology to improve energy efficiency, and to explore new options.

However, as recent history has shown, government intervention through unnecessary restrictions and prohibitions, funding and incentives that pick "winners and losers" before they have been tried and tested can inhibit the search for expanded conventional energy sources as well as alternatives. The market is better able to find those new alternatives through private investment and trial and error.

The "silver bullet" that can provide the U.S. with energy independence is in all likelihood not going to be found. Instead, the U.S. should focus on removing impediments to private investment and exploration, eliminating restrictions on less expensive supplies of alternative energy, such as ethanol tariffs, and doing away with government funding and incentive schemes for alternatives that may not work and may have unintended consequences.

CEI's Myron Ebell has pointed out that producing more oil and gas domestically makes sense in terms of reducing our trade deficit and creating jobs. However, to try to be "energy independent" would mean replacing lower cost imported oil with higher cost alternatives. Ebell notes,

> That would put our economy at a competitive disadvantage versus countries that continued to rely on cheaper oil imports. Politicians of both parties can talk all they want about the need to stop buying Mideast[ern oil]. But the fact is that Saudi Arabia is the lowest-cost producer and will still be selling oil when every other producer has been put out of business. If we really did stop importing oil, the producers that would go out of business would be our two largest suppliers—Canada and Mexico.[87]

In terms of current oil dependency and future "replacements" for oil, it is useful to look back and see how energy sources have evolved. Throughout history, one energy source has displaced another, generally because it was a more efficient source and it had a greater energy density, that is, the amount of energy contained in a certain volume or mass was greater than the earlier source or could be produced or extracted more efficiently or by using less energy.

Vaclav Smil's insights about the transition to other energy sources are instructive. As Smil noted:

> But it would be misleading to think that the coming energy transition is only a matter of magnitude, calling for an order of magnitude larger displacement of dominant resources than during the last major energy transition. That transition also introduced fuels with superior energy densities: even low-quality bituminous coal contains 50% more energy than air-dry wood, best hard coals are twice as energy-dense as wood, and liquid fuels refined from crude oil have nearly three times higher energy density. Moreover, these fuels could be produced with power densities of three orders of magnitude higher than wood, charcoal or straw.[88]

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[87]Myron Ebell, "Convention Hijinks," September 9, 2008 http://www.globalwarming.org/node/2586

[88] Vaclav Smil, "Energy at the Crossroads" Background notes for a presentation at the Global Science Forum Conference on Scientific Challenges for Energy Research, Paris, May 17-18, 2006.
http://www.oecd.org/dataoecd/52/25/36760950.pdf