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Energy Policy: Conceptual Framework and Continuing Issues

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Summary

In the spring of 2006, crude oil prices were exceeding $70/barrel (bbl) in response to tight markets and uncertainty over the security of world oil supply. On August 8, 2005, the 109th Congress — during its first session — enacted the Energy Policy Act of 2005 (EPACT, P.L. 109-58). However, a number of developments have placed additional pressure on world markets. Successive hurricanes, Katrina and Rita, in late August and late September 2005, brought about the shutdown of more than 5 million barrels per day of refining capacity in Texas and Louisiana and initially shut down the 25% of U.S. crude oil production and 20% of U.S. natural gas production that comes from the Outer Continental Shelf in the Gulf of Mexico. In May 2006, 300,000 barrels per day of U.S. production capacity had not been restored. World and domestic demand for oil has remained strong, taking up most of the world's spare production capacity. The phaseout of the gasoline additive methyl tertiary butyl ether (MTBE) and a renewable fuels mandate in EPACT have placed additional pressure on gasoline price and deliverability in the United States.

In the face of these developments since the passage of EPACT, and because the prospect that this episode of elevated prices is likely to be a long one, congressional interest in energy policy remains high. When the United States experiences a period marked by sharp increases in the price for energy and concern about the adequacy of essential supplies, there is widespread concern that the nation has no energy policy. The nation has, in fact, adopted several distinct policy approaches over the years, and many of the debates have been about determining the appropriate extent of the federal government's role in energy.

There were episodes from 1973-2003, when oil prices spiked, but these were generally for comparatively brief periods; overall, the period was one of general price and supply stability. It isn't so much that energy policy failed to be adequately responsive to past crises; rather, during lengthy periods of stability and declining prices for conventional fuels, it has proven difficult to sustain certain policy courses that might help shield the nation from occasional episodes of instability. Because prices are now expected by some analysts to remain high, the prospect for certain longer-range energy policies may now be more favorable. Traditionally, the energy debate has been most vigorous over the balance to be struck between increasing supply and encouraging conservation. However, when markets are unstable, debate turns on another axis as well, that of short-term versus long-term policies.

Energy policy issues of continuing interest include opening up the Arctic National Wildlife Refuge (ANWR) for leasing; Corporate Average Fuel Economy Standards (CAFE) for passenger vehicles; improving U.S. energy infrastructure, including pipelines and refineries; seeking effective means to promote energy conservation using currently available technologies; and developing new technologies and alternative fuels.

This report has been prepared to provide background context, and it will not be updated during the balance of the session.

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Introduction

In the spring of 2006, crude oil prices were exceeding $70/barrel (bbl) in response to tight markets and uncertainty over the security of world oil supply. On August 8, 2005, the 109th Congress — during its first session — enacted the Energy Policy Act of 2005 (EPACT, P.L. 109-58). However, a number of developments have placed additional pressure on world markets. Successive hurricanes, Katrina and Rita, in late August and late September 2005, brought about the shutdown of more than 5 million barrels per day of refining capacity in Texas and Louisiana and initially shut down the 25% of U.S. crude oil production and 20% of U.S. natural gas production that comes from the Outer Continental Shelf in the Gulf of Mexico. In May 2006, 300,000 barrels per day of U.S. production capacity had not been restored. World and domestic demand for oil has remained strong, taking up most of the world's spare production capacity. The phaseout of the gasoline additive methyl tertiary butyl ether (MTBE) and a renewable fuels mandate in EPACT have placed additional pressure on gasoline price and deliverability in the United States.

The passage of EPACT had its roots in an unexpected jump in oil prices that began in the late spring of 1999, following a production cut by the Organization of Petroleum Exporting Countries (OPEC). In early 2003, oil prices were reaching into the mid-$30s. Prices rose even higher during 2004 — exceeding $50 per barrel for a brief period — owing to growing world demand both in the United States and the Far East, inadequate refining capacity, and Hurricane Ivan, which reduced U.S. production from the Gulf of Mexico for several months. Crude oil and petroleum product prices escalated further during 2005. These increases were initially attributable to growing international demand for oil that, domestically, put a strain on U.S. and world refining capacity. Then, in August and September, hurricanes Katrina and Rita caused further supply disruption.

This continuing period of volatility in fuel supplies and prices has been the fourth significant episode since 1973 to jog American awareness of the extent to which the U.S. economy and lifestyle depend on inexpensive and plentiful energy. However, this surge in price represents a departure from historic trends because the rise in the price for oil fuels and energy products has occurred over five years and has been sustained. Some analysts have coined the term "demand destruction" to describe price-induced reductions in consumption, but overall demand for oil has proven

resilient. World demand for oil has grown from roughly 78 million barrels daily in 2001 to roughly 83 million barrels daily during the first three quarters of 2005.[1]

An additional departure from past patterns is that, historically, increases in crude price owing to supply or international issues have driven product prices as the higher cost for crude feedstock is passed on. However, crude supply and stocks in 2005 — prior to the hurricanes — were adequate. Commitments by OPEC during the course of the year to maintain or boost production appeared to have little but short-term effects on crude prices. Tightness in refined products prior to the hurricanes and the accompanying rise of product prices was a function of insufficient refining capacity in the United States to meet demand for a range of summer gasoline formulations. The pressures on product prices appeared to work backwards to support higher prices for crude. The hurricanes exacerbated these dynamics, further tightening product supply owing to problems with pipeline distribution as well as refining capacity, and introducing at the same time an uncertainty about crude supply that had not been as strong a worry prior to the storms.

In 2006, a number of factors — new and old — are contributing to an especially brittle climate for energy supply and price. Whenever the United States has experienced a period marked by sharp increases in the price for energy and concern about the adequacy of essential supplies, there is widespread concern that the nation has no energy policy. However, not only does the nation have an energy policy, it has adopted several distinct policy approaches over the years.

This report discusses those major policy approaches, provides a conceptual framework for categorizing energy policy proposals, and briefly describes energy issues that remain current in the debate after the enactment of EPACT. Most policymakers acknowledged that EPACT would provide negligible price relief in the short term, but they contended that it would encourage domestic production of oil and gas and further conservation and alternative fuel initiatives. At issue for Congress during the balance of the 109th Congress is whether there should be an additional policy response in the face of continued pressure on oil price and supply.

Energy Policy Since the 1973-74 Arab Embargo

In the thirty years since the Arab oil embargo, the United States has pursued a number of different energy policy courses. In the course of several episodes during this period when oil price and supply became unstable, the U.S. moved from a set of policies more reliant on the federal government, to policies more dependent upon markets. This history is briefly summarized in the section to follow.

The Period of Oil Price Controls

In the aftermath of the Arab oil embargo in 1973, many looked to government to solve the problem, for both the short- and long-term. By 1975, refiner acquisition

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[1] U.S. Department of Energy, Energy Information Administration, *International Petroleum Annual*: [http://www.eia.doe.gov/emeu/ipsr/demand.html]

costs for imported crude oil had roughly tripled, rising from an average cost of $4/barrel (bbl) in 1973 to $12.50/barrel in 1974. However, refiner acquisition costs for domestic crude did not even double — rising from $4/bbl to $7/bbl — owing to a system of federal price controls that kept the price of domestic production below the market price. This discouraged domestic production and encouraged imports. However, controls may have helped insulate consumers from some of the price increase, which was the intended effect.

Automobile fuel economy standards were enacted during the late 1970's to reduce gasoline consumption in the transportation sector. At the same time, hopes were invested in government-funded research and development of conservation technologies and alternative fuels.

A second supply interruption was triggered in1979 by the fall of the Shah of Iran and a greatly reduced flow of Iranian oil to world markets for several months. A phased deregulation of oil prices, enacted in 1975 in the Energy Policy and Conservation Act (EPCA, P.L. 94-163), was designed to enable prices to become more responsive to market conditions. But, the pace of the deregulation was conceived to be gradual. At the time of the Iranian revolution, gasoline prices in the United States were still subject to some control. The result was long lines at U.S. gas pumps.

The Early Effects of a Market-Oriented Energy Policy

Letting the market set prices, supporters of deregulation had argued in the 1975 debate, would encourage the development of additional domestic supplies of oil as well as the development of alternative energy sources. Shortly after assuming office in 1981, President Reagan accelerated the EPCA schedule for price decontrol. Energy policy, in general, became more market-oriented, and the government role was lessened.

Sustained high crude oil prices contributed to a reduction in U.S. petroleum consumption from 18.8 to 15.2 million barrels per day (mbd) from 1978 to 1982; there was more substitution of other fuels for oil, more efficient consumption of oil, and price-induced conservation. Higher prices resulted in new oil production from non-OPEC nations, allowing the United States and other consuming nations to diversify their sources of supply. Faced with a loss of market share and revenue, OPEC increased its own production in the mid-1980s, thereby lowering the price for crude oil. In the course of the year from 1985 to 1986, world oil prices plunged. In the United States, refiner acquisition cost for imported oil fell from $27/barrel to $14/barrel.

Prices remained depressed until a fresh round of spikes in oil prices occurred in 1990-91 following Iraq's invasion of Kuwait in early August 1990. That resulted in a cut-off of 4.3 million barrels per day (mbd) from world markets. The price of oil, which had averaged $16/bbl at the end of July 1990, exceeded $28 by late August and reached $36/bbl in September 1990.

Responding to the Iraqi threat, Western and Middle Eastern nations found common ground that would have been unimaginable a decade earlier. By the late

1980s, recognition had grown of the interdependence of oil-producing and oil-consuming nations; the OPEC nations had come to recognize that long-term demand for their oil was jeopardized by any prolonged period of high oil prices. Most did not wish to repeat the cycle of the early- to mid-1980s and boosted their production to make up for some of the lost supply. Consuming nations also coordinated the release of strategic stocks of crude and products. Prices began to fall in mid-October 1990 when the United Nations approved the use of force against Iraq. Prices fell more sharply after the United States and a consortium of nations began conducting air strikes on Iraq in mid-January 1991.

Other Responses to the Disruptions of the 1970s and 1980s

During all of these episodes, importance was placed on conservation, more efficient use of energy, and development of alternative energy sources. The oil shocks of the mid- and late-1970s spurred considerable spending on alternative fuels — including solar, geothermal, wind, clean coal, synthetic fuels, alcohol-based fuels — and technologies to improve the efficiency of energy use. Regulations were developed to improve the efficiency of home appliances and to incorporate more energy-efficient designs in buildings. In the early 1980s, states and utilities promoted energy efficiency as one form of "demand-side management" to reduce the need for construction of new power plants. Many industries re-engineered their processes to save energy. Conservation and efficiency were championed by some as a lower-cost and more environmentally appealing way to achieve greater energy security than policies to boost supply. However, largely because of the generally lower prices over time for fossil fuels — as is noted below — these energy programs showed mixed results.

The Challenge Faced by Policymakers

As suggested earlier, each episode of short supply and higher prices spurs concern that the nation lacks an energy policy and has ignored past lessons. However, it is apparent from a review of the years since the time of the Arab oil embargo and first oil price shock in 1973 until 2004 that it is more accurate to see this 30-year period as one of general price and supply stability that was periodically broken by short episodes of supply disruption and price volatility. It wasn't so much that energy policy failed to be responsive to earlier crises; rather, during lengthy periods of stability and declining prices for conventional fuels, it proved difficult to sustain certain policy courses that might help shield the nation from future episodes of instability.

An energy policy that would most effectively shield the nation and the economy from the worst effects of supply shortages would be a policy that might well deny the nation the full benefits of cheap and plentiful energy when markets are stable. The periods of relative calm and stability result in a markedly uncertain environment for investment in alternative fuels, energy efficiency technologies, and boosting the production of conventional fuels in regions where production costs are significantly higher than in the Middle East. State and local regulations and codes further cloud the climate for investment. Local opposition to new on- and off-shore production projects, power plants, electric transmission lines, refineries, and pipelines is often

most effective during periods of price and supply stability, but sometimes eases only after shortages have actually occurred.

However, a prolonged climate for higher prices — stemming from tightness in the supply of products and continuing instability in Middle East regions where oil reserves are concentrated — may introduce new changes in the character and particulars of U.S. energy policy. This possibility is a benchmark to keep in mind when thinking about energy policy conceptually and as subsequent debate on energy policy continues in Congress.

An Energy Policy Schematic

Constructing a balanced energy policy that will not undermine other competing and equally legitimate policy goals is a complex problem. How to boost energy supply without exacting an unacceptable toll on the environment? How, then, to reduce gasoline consumption, a commodity central to the nation's economy and lifestyle, when raising its price to achieve a meaningful reduction in demand could be economically disruptive and politically unappealing? Should federal policy encourage the use of more expensive alternative fuels and technologies that heighten efficiency, when OPEC has generally demonstrated a capability to adjust the price of oil to keep it far cheaper than its substitutes?

Debate over energy policy has produced an enormous range of proposals, many of which have been adopted at one point or another over the years. In general, it is helpful to recognize the broad categories into which most proposals fall: Most energy policies are designed to affect either the supply of or the demand for energy products, and they are, at the same time, designed to have an effect either in the near term or the longer term.

Traditionally, the energy debate has been the most vigorous over the balance to be struck between increasing supply and encouraging conservation. However, energy policy turns on the additional axis of short- and long-term policies. In the midst of high prices during the spring of 2001, policymakers were pressed to come up with immediate policy responses that would afford consumers price relief. However, at that time President Bush was advising Congress and Americans that the Administration's soon to be released energy policy plan would focus on long-term remedies for the nation's energy problems and that there would be no immediate relief for consumers paying higher prices for gasoline, electricity, and other fuels. The President and his supporters suggested that by setting out an action-oriented and actionable comprehensive policy, markets and consumers should feel some short-term reassurance. This did not quell all the demands for more immediate action to reduce energy prices. Nor were they completely quelled during the protracted debate over omnibus energy legislation from 2003 until the enactment of EPACT in the summer of 2005.

It is useful to clarify the differences between short-term and long-term policy initiatives. For example, a drawdown of oil from the Strategic Petroleum Reserve (SPR) affects crude oil supply in the near term. However, enactment of tax

incentives for investment in new oil drilling technologies might add to domestic crude supply further in the future. Proponents of drilling in the Arctic National Wildlife Refuge (ANWR) argue it might add anywhere from 300,000 b/d (barrels per day) to 1.4 mbd to U.S. domestic supply, but this, too, is a longer-term policy initiative.

Turning to the consumption side of the ledger, boosting the federal gasoline tax by $1.50/gallon might be expected to reduce gasoline consumption in the near term, but increasing the corporate average fuel economy (CAFE) standards on new motor vehicles would not take full effect until older vehicles were largely replaced, a process that could take more than a decade.

The table below suggests a way in which many energy policies may be visualized along these lines:

Table 1. A Schematic of Energy Policies

	Affecting Supply	Affecting Demand
Short- to Mid-term	Strategic Petroleum Reserve (SPR)	High energy prices due to unfettered market forces or taxation
	Allowing high prices to allocate and price scarce energy	Policies promoting conservation and more energy-efficient choices
Mid- to Long-term	Tax incentives to promote production	Corporate Average Fuel Economy Standards (CAFE)
	Open new areas to leasing and exploration	Tax incentives to encourage less, or more-efficient consumption
	Research and development	Efficiency standards
	Market pricing of energy	Efficiency labeling
		Research and development in efficiency technologies

The axis of long-term/short-term, supply/demand does not capture all policy options. For example, one of the major issues in energy policy is the price for fuels. Energy policy generally is designed to affect price indirectly — by having price follow, or reflect, current demand or supply for energy. There are a few exceptions. Tax policy may address energy price directly to the extent that excise taxes on fuel products can be raised or lowered (recognizing that these tax boosts or cuts may not be reflected penny-for-penny in the "pump" price for fuels).

Short-term policies to affect supply, such as potential use of strategic reserves, have been sometimes very controversial because, in the absence of a very clear-cut and widely acknowledged physical shortage, such initiatives are perceived to be

thinly disguised efforts to grant price relief.[2] Some suggest at times that high prices — left uninterfered with — are the best policy of all, encouraging markets to provide more supply in due course, and that federal policy should address only those most adversely affected by sharply higher prices. The Low Income Home Energy Assistance Program (LIHEAP) is one such effort to provide direct assistance to families whose quality of life is especially burdened by high energy prices. LIHEAP is a short-term policy for addressing the impact of high prices for energy.

Supply and demand may also be affected by external events, including political and diplomatic dynamics between or among the producing nations. Weather, seasonal or otherwise, will affect supply and demand; policy cannot affect the weather, only its consequences. Lastly, Congress always has the option to require study and analysis of a problem before settling on a policy course. Requirements for such studies are regularly included in appropriations bills and other legislation.

The Current Context: What's Different?

In every energy debate, one question is a constant: How extensive a federal role is appropriate in energy policy? However often that question recurs, the context in which it is raised changes. The context in 2006 has become distinctly different than in previous episodes.

- U.S. energy policy was primarily market-based for roughly 20 years, but policy makers have been weighing whether problems in some sectors and with some fuels are attributable to distribution or regulatory inefficiencies interfering with markets, or whether government intervention may be necessary to protect consumers and the economy from problems to which markets cannot flexibly respond. Some critics of U.S. energy policy argue that these inefficiencies and distortions are themselves the consequence of government intervention — for example, Clean Air Act requirements that have required the manufacture of several different regional formulations of gasoline.

- Strong economic growth during the mid- and late 1990s at a time of declining real energy prices resulted in growth in consumption even though efficiency of energy use is dramatically better than during the 1970s and 1980s. Growth in petroleum consumption in the United States as domestic production declines has meant a commensurate increase in oil imports. During the second half of 2004, growth in demand as well from the Far East pressured spare oil production

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[2] The Energy Policy and Conservation Act (P.L. 94-163, EPCA) authorizes drawdown of the Strategic Petroleum Reserve upon a finding by the President that there is a "severe energy supply interruption," or in the event of a circumstance that "constitutes, or is likely to become, a domestic or international energy supply shortage of significant scope or duration" and where "action taken ... would assist directly and significantly in preventing or reducing the adverse impact of such shortage."

capacity. In the midst of market uncertainties, increased OPEC production — unlike in the past — appeared unable to exert its historical effect of moderating crude oil prices.

- There is recognition of the interdependence of producing and consuming nations; however, the political balance among the OPEC nations is delicate and can influence oil production decisions and whether OPEC is able to exert market control at all.

- There is growing recognition that the recent shortages and price spikes in some regions of the country have been compounded by insufficiencies in the nation's energy infrastructure — refining capacity, gas and oil pipelines, transmission lines, and electric generating facilities. Some have questioned the advisability of locating so much of the nation's refining capacity in the Louisiana, Alabama, and Texas.

- Problems with gasoline supply and home heating oil stocks since 2000 imply some need to develop additional refining capacity and transport systems that will add both capacity and flexibility to distribution. However, national and local environmental regulation and requirements, and local community sentiment, affect the speed and ease of siting and building such facilities. Because high prices tend to eventually depress demand, the industry is sometimes wary of making investment in capacity that would achieve profit targets only during short-lived periods of unusually high prices. Uncertainty about the course of the economy may also contribute to questions about the profitability of these investments. Concerns about greenhouse gas emissions add an additional measure of uncertainty. Policymakers have debated additional measures for "refinery revitalization" and streamlining the process for approval of refinery siting and construction

Major Unresolved Energy Issues

The shift to a more market-oriented energy policy, additional lessons some have taken from experiences during the 1980s and 1990s, geopolitical developments, and developments such as those outlined above, are likely to play a part in any consideration of energy issues still pending and of interest to many policymakers in a post-EPACT climate. Some of these issues are broadly reviewed below. Tax policy plays a role in many of these areas. (See CRS Issue Brief IB10054, *Energy Tax Policy*, by Salvatore Lazzari).

Petroleum and Natural Gas

The roots of the rise in crude oil prices has its origins in March 1999, when cuts by OPEC in world crude production in March 1999 sent domestic refiner acquisition costs for crude oil on a sharp ascent from less than $11/bbl (barrel) in February 1999

to $24.50/bbl by December of the same year. Responding, in part, to intense lobbying by the United States, the OPEC oil ministers boosted crude production and settled upon $22-$28 per barrel as a desirable "price band." But the price band grew increasingly out-of-touch and irrelevant as prices renewed their increase, and surged during 2004. Prices for crude breached $70/bbl in May 2006.

Growth in demand, internationally and domestically, partly accounts for price increases. Demand for petroleum products in the United States averaged 20.7 mbd during each of 2004 and 2005, but was averaging 20.4 mbd during the first third of 2006.[3] Increases in demand, as well as declining domestic production, have been offset by increased crude and product imports, which are averaging 12 mbd — hovering around roughly 10 mbd of crude and 2 mbd of refined product.

In January 2006, the Energy Information Administration (EIA) predicted that gasoline prices would probably rise during the first half of the year. Contributing reasons were rising prices for crude, some resumption in demand, and a tilt toward the manufacture of distillates that was slowing additions to gasoline stocks. Additionally, five fuel specification changes during 2005 were predicted to put additional pressure on the gasoline supply system.[4] An ultra-low sulfur diesel program that began in June 2006 required that 80% of on-highway diesel have no more than 15 ppm (parts per million) sulfur content. The elimination of MTBE (methyl tertiary butyl ether) has placed pressure on ethanol supply and prices and has incurred some loss to product yield in the manufacture of RFG (reformulated gasoline).[5]

The ability of the OPEC cartel to exert influence upon oil prices at critical times underscores that — with respect to petroleum — the problem is less that the world supply of oil is tight than that so much of it is concentrated in other parts of the globe, principally the Middle East. U.S. dependence upon imported oil is now about 60% of total consumption. Absent some elusive technical "fix," there are limited prospects for significantly reducing that figure without incurring economic hardship and lifestyle compromises. However, relatively modest increases in worldwide production or reductions in demand by consuming nations can substantially reduce the magnitude of oil price spikes.

Clean Air Standards and Gasoline Supply and Distribution. Attention has focused on the Clean Air Act standards that regulate the oxygen content, volatility, benzene and the sulfur content of gasoline. Refineries face state and local

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[3] U.S. Department of Energy. Energy Information Administration. Monthly Energy Review. April 2006: Table 3.1b *Petroleum Overview: Disposition and Stocks* [http://www.eia.doe.gov/emeu/mer/pdf/pages/sec3_3.pdf], and Weekly Petroleum Status Report, Table 1. *U.S. Petroleum Balance Sheet: 4 Weeks Ending 05/02/2006* [http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/weekly_petroleum_status_report/current/pdf/table01.pdf].

[4] U.S. Department of Energy. Energy Information Administration. *Short-Term Energy Outlook*. January 10, 2006.

[5] U.S. Department of Energy. Energy Information Administration. *This Week In Petroleum: The Year of the Fuel Spec*. January 5, 2006.

standards on how to achieve compliance with federal requirements. The expiration in early May 2006 of the oxygenate requirement for reformulated gasoline and the use of methyl tertiary butyl ether (MTBE) spurred demand for ethanol, leading to higher prices and tighter supply for ethanol.

One consequence of regional variations is that gasoline supply loses some of its fungibility; one region experiencing a shortage may no longer be able to secure additional supply from a nearby locality with a different blend of gasoline. Distribution becomes more complicated because different blends sharing the same pipeline must be carefully batched to avoid contamination. In the wake of the 2005 hurricanes, and again in the spring of 2006, some standards were temporarily relaxed in an effort to improve gasoline production and ease distribution problems. Additionally, foreign refineries that supply the U.S. gasoline market do not make the regional formulations.

Some have urged a rationalization of Clean Air Act standards that would permit a "harmonization" of U.S. gasoline standards. This would introduce flexibility into the gasoline manufacture and distribution system that might bring prices down. Opponents of harmonization argue that it might compromise air quality, and lead to further compromise of clean air objectives in the future. Harmonization might also raise prices for fuel in regions that did not require the more exacting formulations.

Drilling in ANWR and on Other Federal Lands. The greater the nation's ability to produce its own fuels, the less vulnerable it is to unanticipated international developments that can reduce or threaten supply. But the policy options on the supply side, such as opening up the Arctic National Wildlife Refuge (ANWR) for exploration, are mostly long-term. Alaskan oil production, which once touched 2 mbd, has now fallen below 900,000 mbd and, without new production, will continue to decline.[6] This could lead to low production, raising transport tariffs on the Trans-Alaska Pipeline, with further adverse impacts on North Slope production.

Proponents of exploring ANWR point to advances in exploration and drilling technology and methods that have significantly reduced the extent of surface disturbance. While opponents concede this may be so, they argue that these advances are limited to exploration and extraction, and that considerable risk to the environment remains during the production and transportation phases. Opponents also suggest that the risks are not worth bearing, especially if the resources in ANWR turn out to be at the lower range of estimates, providing only an additional 300,000 b/d of supply. Some respond to this argument by noting that the nation has experienced periods of tight supply when even an additional few hundred thousand barrels of crude oil per day would have significantly reduced gasoline and heating oil prices. For some opponents, any weighing of risks and benefits are pointless because, citing the area's pristine character, they argue that its ecology and habitat should not be disturbed under any circumstances.

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[6] There are other prospects for oil development in northern Alaska, including two fields scheduled for development just outside the National Petroleum Reserve — Alaska (NPR-A).

There was some expectation that proponents of ANWR exploration would be successful in gaining congressional authorization during the first session of the 109th Congress. Provisions doing so were added to the Senate version of the budget reconciliation measure (S. 1932) after being dropped from the House legislation (H.R. 4241) in committee. (For additional information and background, see CRS Report RL31278, *Arctic National Wildlife Refuge: Background and Issues*, by M. Lynne Corn, and CRS Issue Brief IB10134, *Gasoline Prices: New Legislation and Proposals*, by Carl E. Behrens and Carol Glover.)

The broader issue raised by ANWR — that of access to public lands for energy exploration and development — is a significant component of the national energy debate. There is considerable disagreement about the potential resources on federal lands — particularly the amount of oil and gas that may be "locked up" by land-use restrictions and other regulatory factors. The Bush Administration's energy policy report recommended an examination of "land status and lease stipulation impediments" and that policymakers "consider modifications where appropriate." A report by the Department of Interior, on the other hand, indicates this may not be the problem some have alleged.[7] (For additional information and background, see CRS Report RS20902, *National Monument Issues*, by Carol Hardy Vincent.)

Natural Gas Supply. For the past decade in the United States, natural gas consumption was encouraged, particularly for gas-fired combined-cycle power plants that could provide incremental electric supply to the nation's power grid at highly competitive prices and with few environmental constraints. Plentiful supplies, and relatively low prices for several years, discouraged additions to natural gas reserves during the 1990s.[8] With surges in demand for electricity and a colder winter in 2000-2001, residential and other consumers of natural gas suddenly faced sharply higher prices as competition grew for gas supplies. At the wellhead, gas prices rose from $2.16 per thousand cubic feet (mcf) in 1999 to $4.00 per mcf in 2001. But they reached the $8.00 level for a few months during this period and prices continued to rise during 2003 and 2004.[9]

But these hardly prepared markets for Hurricanes Katrina and Rita, which sidelined 1.5 mbd of crude oil production and 10 billion cubic feet per day. By early January, nearly 27% of Gulf oil production and nearly 19% of gas production remained shut in, with expectations that 19% of oil production and 6% of natural gas production will still be offline by March 2006. The Minerals Management Service (MMS) has estimated that as much as 5% percent of oil and gas production may not be restored.[10] It should be noted that there is no "catchup"for production lost because of the hurricanes — more than 110 million barrels of oil and more than 580 bcf of natural gas by the beginning of January 2006. Natural gas price futures briefly

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[7] Scientific Inventory of Onshore Federal Lands' Oil and Gas Resources and Reserves and the Extent and Nature of Restrictions or Impediments to the Development. January 2003. See [http://momentum.doi.gov/epca/ExecSum.pdf].

[8] See [http://www.eia.doe.gov/emeu/aer/txt/ptb0410.html].

[9] EIA, *Monthly Energy Review*, Table 9.11.

[10] il Daily, "Gulf Output Inches Back," Jan. 10, 2006, p. 7.

exceeded $15/mcf (thousand cubic feet) in mid-December. Warmer than typical weather in January 2006 caused prices to decline to well under $10/mcf early that month. Prices had fallen to roughly $6.60/mcf in early May 2006. Sharp fluctuations in supply, demand, and price for natural gas can occur suddenly between seasons.

A major potential source of additional gas is tanker-borne imports in the form of liquefied natural gas (LNG). Expansion and refurbishment of facilities to accommodate LNG imports continues. Additionally, there are a number of proposals for new facilities that have received certification from the Federal Energy Regulatory Commission (FERC); these facilities would receive LNG produced abroad for consumption in the United States. The Alaska North Slope holds large proven reserves of natural gas. Shortly before adjournment, the 108th Congress approved an $18 billion loan guarantee for the construction of this pipeline (P.L. 108-357), and a proposal to build the project was made at the end of 2004 by the major holders of North Slope gas reserves.

Electricity Regulation and Supply

A reliable electric system depends on adequate transmission capacity. The blackout of 2003 in the Northeast, Midwest, and Canada highlighted the need for infrastructure improvements and standard operating rules. The regulatory regime has shifted in the electricity industry to encourage competition in the generation sector, but investment in transmission infrastructure has not kept up with increases in bulk power transfers and electricity demand. Additionally, transmission lines are congested in several regions of the United States. Difficulty in siting the lines and regulatory uncertainty have dampened interest in investing in the transmission system. The Energy Policy Act of 2005 includes a provision that will allow transmission companies, under certain conditions, to petition in U.S. District Court to acquire rights-of-way through the exercise of the right of eminent domain. The Federal Energy Regulatory Commission (FERC) has approved three Regional Transmission Organizations (RTOs) and is in the process of evaluating others.[11]

Some have argued that transmission and wholesale power markets cannot be competitive without additional market transparency, or access to market information. The Energy Policy Act of 2005 allows FERC to promulgate rules that will facilitate the dissemination of information about the availability and prices of wholesale electric energy in transmission service. Proposals have been made to require FERC to issue rules establishing an electronic information system to provide information about the availability and price of wholesale electric energy and transmission services to FERC, state commissions, buyers and sellers of wholesale electric energy, users of transmission services, and the public. However, concerns have been raised that such a system would take away too much authority from the states.

Concern over electricity supply has also led to some reassessment of the relative roles that natural gas, coal, renewables, and nuclear energy may have in future electricity generation. In its energy policy report, the Bush Administration indicated

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[11] For details, see [http://www.ferc.gov/industries/electric/indus-act/rto.asp].

its objectives to remove barriers to the use of coal in electric power generation, with a renewed emphasis on cleaner-burning coal technologies.

Supporters of renewable energy have urged the establishment of a national "renewable portfolio standard," which would require that a certain percentage of electricity generation come from non-hydro renewable energy sources. Nuclear energy supporters have long proposed that new nuclear generating capacity receive incentives for helping to reduce air emissions.

(For additional information, see CRS Report RL32728, *Electric Utility Regulatory Reform: Issues for the 109th Congress*, by Amy Abel.)

Conservation and Energy Efficiency

As has been noted, the energy policy debate has turned partly on perceptions of the balance between supply-oriented and conservation-oriented policies that make up an appropriate energy policy to address the current matrix of energy problems. For example, environmental groups often ask why ANWR should be opened to leasing if a comparable amount of oil could be saved by raising motor vehicle fuel economy.

The Energy Policy and Conservation Act (P.L. 94-163) established new car corporate average fuel economy (CAFE) standards, beginning with model year 1978. Currently, the standards are 27.5 miles per gallon (mpg) for cars and 20.7 mpg for light-duty trucks, including sport utility vehicles (SUVs). Proposals to raise the CAFE standards have been controversial. Beginning with enactment of the FY1996 Department of Transportation Appropriations Act, Congress forbade the expenditure of appropriated funds to make any change in the current CAFE requirements.

However, a study by the National Academy of Sciences (NAS), requested by the 106th Congress, to recommend "appropriate" CAFE standards, was released at the end of July 2001.[12] While the report did not recommend a specific level for CAFE, it did conclude that "significant" reductions in fuel consumption could be achieved within 15 years utilizing existing technologies. Were increases in new car fuel economy achieved by reducing vehicle weight or disproportionately encouraging the sale of small vehicles, the study allowed that additional fatalities could result. However, some members of the NAS panel dissented, suggesting that the analysis of the relationship between fuel economy and vehicle safety is extremely complex.

The Energy Policy Act of 2005 (P.L. 109-58) (1) authorizes $3.5 million annually during FY2006-FY2010 for the National Highway Traffic Safety Administration (NHTSA) to carry out fuel economy rulemakings, (2) requires a study to explore the feasibility and effects of a significant reduction in fuel consumption by 2014, and (3) requires NHTSA to adjust its test procedure for measuring fuel economy to take into account differences in vehicles and driving habits since the test was designed. Some of these factors include higher speed limits, faster acceleration, differences in the ratio between city and highway driving, and the use of air conditioning. On January 10, 2006, NHTSA issued a proposed rulemaking that

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[12] See [http://www.nap.edu/books/0309076013/html/].

would establish tests to establish the effect of these factors on in-use fuel economy. The in-use fuel economy stickers posted to the windows of new cars would reflect the results of these tests beginning in FY2008. This work would not affect the CAFE calculation for purposes of determining manufacturers' compliance with the CAFE standard, but it would affect the adjustment factor applied against the CAFE rating to estimate the in-use fuel economy.

On May 7, 2003, the National Highway Traffic Safety Administration (NHTSA) issued a final rule to boost the CAFE of light-duty trucks by 1.5 mpg by 2007 to 22.2 mpg. On August 23, 2005, NHTSA released a notice of proposed rulemaking for light-duty trucks beginning with model year (MY2008). The agency proposes a restructuring of the CAFE program for SUVs that would establish higher standards based on vehicle size. The agency proposes two different tracks that manufacturers can follow for model years 2008-2010 — meeting an "Unreformed" or "Reformed" CAFE standard. In MY2011, all manufacturers will be required to meet the reformed standard. The unreformed light-duty truck standards for MY2008-2010 would be a fleetwide average of 22.5, 23.1, and 23.5 mpg for model years 2008, 2009, and 2010, respectively. Manufacturers opting for the reformed standard would be required to meet a range of standards depending on vehicle size — ranging from 20.4 to 26.8 mpg for MY2008, 20.8 to 27.8 for MY2009, and 21.3 to 28.4 in MY2010. The reformed CAFE standards would apply to all manufacturers in MY2011. Legislation was introduced in the spring of 2006 to extend authority to NHTSA to restructure the CAFE program for passenger cars.[13]

There is little question that the price hikes during past episodes of tight energy supply spurred many improvements in energy efficiency. Some argue, however, that the easiest and lowest-cost efficiency gains have been achieved, and that expectations should be lowered about the additional efficiency gains that can be captured in the present price framework for energy. When the Reagan Administration redirected energy policy to a more market-oriented framework, it was argued that R&D needed to be carefully focused on areas that were promising, but unlikely to be explored by the private sector.

In its energy policy plan, the Bush Administration recommended a review of the funding and performance of energy efficiency research and development for the purpose of determining appropriate funding for performance-based research in public-private partnerships.

The Uncertain Future

As apparent as it seems to many that the nation should do "something" about energy, the preceding pages have outlined the layers of complexity that augur against easy agreement to many of the policy options that have been proposed and debated since the mid-1970s. A review of the history shows that every episode of instability

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[13] For a discussion on the CAFE debate during the second session of the 109th Congress, see CRS Report RL33413, *Automobile and Light Truck Fuel Economy*, by Brent D. Yacobucci and Robert Bamberger.

has had its own set of unique contributing factors — and that these may be geopolitical, based in energy infrastructure or unanticipated natural disasters, or triggered by extremes of heat or cold beyond anyone's control. Making policy decisions that will anticipate unpredictable future developments, or settling on policies to mitigate the consequences when these events are before us, will remain a challenge for policymakers as the energy debate continues.