

72. David Winning, "China CNOOC Deal for Four Nigeria Oil Blocks Hits Snags," *Dow Jones International News*, November 2, 2006.

73. The largest of these loans was a twenty-year loan for \$300 million with a 3 percent interest rate extended to Turkmenistan's State Bank of Foreign Economic Activity for work on a fertilizer plant and construction of a glass factory. See "Zhongguo zhengfu jingmao biaotuan fangwen Tukumansitan qude youanman chenggong" [The Visit of the Chinese Government's Economic and Trade Delegation to Turkmenistan Achieves Complete Success], Economic and Commercial Counselor's Office of the Embassy of the People's Republic of China in Turkmenistan, August 29, 2006 (<http://tm.mofcom.gov.cn/aarticle/jmxw/200608/20060803009073.html>).

74. E-mail correspondence from oil industry analyst, January 15, 2009.

75. Paul Sampson, "Turkmenistan: Looking East," *Energy Compass*, December 5, 2008; and "Turkmenistan Reserves: Big, but Nasty," *World Gas Intelligence*, November 26, 2008.

76. Gary Gentile, "Former Unocal CEO Says Higher Bid Would Have Led to Acquisition by CNOOC," *Associated Press Worldstream*, October 13, 2005.

77. For the comments of Chinese oil executives and officials on the opportunities provided by the financial crisis and lower oil prices, see Kong Ji, "Zhongshihua: 'san banfu' yingdui weiji" [Sinopec: 'Three Weapons' to Deal with the Crisis], *Zhongguo qiye bao* [China Enterprise News], January 16, 2009 ([www.ceccen.com/index.php?page=news\\_view&cid=262](http://www.ceccen.com/index.php?page=news_view&cid=262)); Zhang Guobao, "Dangqian de nengyuan xingshi: 'wei' zhongzhi 'ji'" ['Opportunities' amid 'Risks' in the Current Energy Situation], *Renmin ribao* [People's Daily], December 29, 2008 (<http://scitech.people.com.cn/GB/8591346.html>); and "Jinring wei ji he youjia baodie gei Woguo youqi haiwai bingou chuangzao liangji" [The Financial Crisis and the Slump in Oil Prices Creates a Good Opportunity for International Acquisitions by China's Oil Firms], *Xinhua*, November 5, 2008 ([http://news.xinhuanet.com/energy/2008-11/05/content\\_110309781.htm](http://news.xinhuanet.com/energy/2008-11/05/content_110309781.htm)).

PART



## Understanding Energy Interdependence

CHAPTER FIVE

## Making Sense of “Energy Independence”

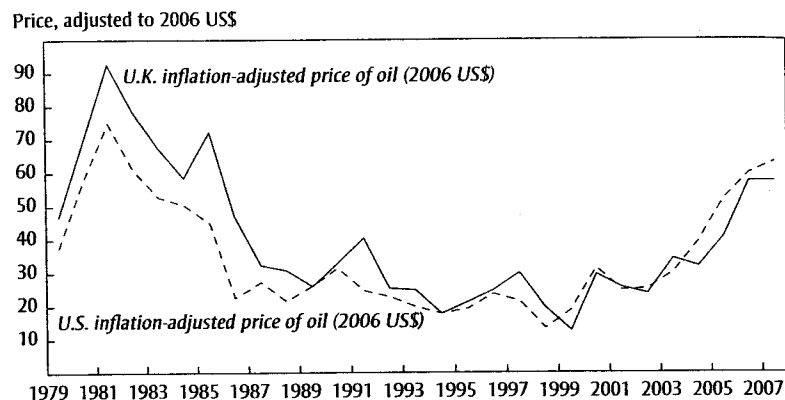
PIETRO S. NIVOLA with ERIN E. R. CARTER

Some of us are old enough to remember Richard M. Nixon proclaiming that “our national goal” should be “to meet our own energy needs without depending on any foreign sources.”<sup>1</sup> All of us, old and young, ought to be startled that, thirty-five years later, it remains hard to find a leading U.S. politician who does not champion more or less the same strange notion. Regrettably, that has included two of the nation’s most sensible political leaders, President Barack Obama and Senator John McCain. Both of their campaigns repeatedly lamented the nation’s “dependency” on foreign oil.

One purpose of a presidential campaign is to win the White House, but another is to educate the public and prepare it for the policy challenges ahead. The 2008 election was uplifting in many respects, but alas, its treatment of the energy issue was not among them. For all the persistent political fascination with “energy independence,” the reasoning behind it is flawed. Policymakers from the top down ought to recognize that reality and start leveling with the voters about it.

The aim of this chapter is to encourage a long-overdue change in the terms of what has otherwise become a repetitious and largely sterile debate.

**FIGURE 5-1. Crude Oil Prices in the United States and United Kingdom**



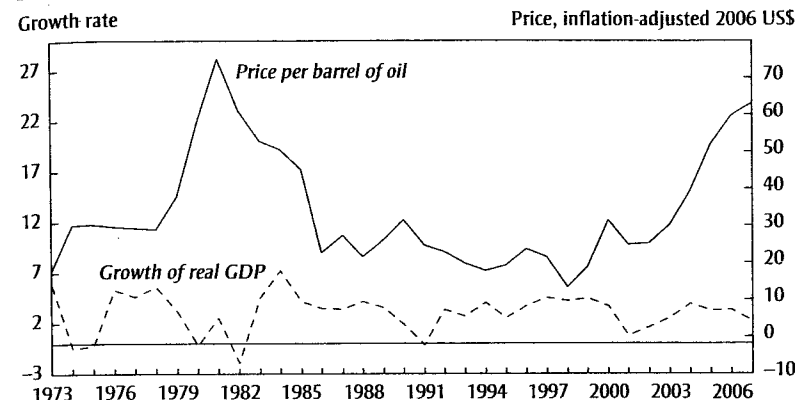
Sources: U.S. price of oil from Department of Energy, table 9.1, Crude Oil Price Summary ([http://tonto.eia.doe.gov/merquery/mer\\_data.asp?table=T09.01](http://tonto.eia.doe.gov/merquery/mer_data.asp?table=T09.01)); U.K. price of crude oil from Energy Information Administration, table 11.7, "Crude Oil Prices by Selected Types, 1970-2009" (<http://www.eia.doe.gov/emeu/aer/bxt/ptb1107.html>).

### Reality Check

What's wrong with the premise that energy autarky is a path to national prosperity and security? To begin with, the assumption seems to be that the less oil that the United States buys from abroad, the more insulated the U.S. economy will be from the vagaries of the international oil market. By that logic, presumably, if the country imported little or no oil, it would not experience the price fluctuations that it must endure by being too dependent on imports.

A simple way to shatter that myth is to compare the pattern of prices of crude oil in the United States, which has to buy a lot of foreign oil, with the pattern in, say, the United Kingdom, a nation that has been self-sufficient in oil since 1980. Figure 5-1 displays the comparison. The ups and downs of prices in the two countries follow much the same paths. So, for example, when global oil prices (adjusted for inflation) rose sharply, from \$25 per barrel in 2000 to more than \$66 per barrel in 2007, British consumers were no better insulated from the increase than Americans were. Both faced approximately the same conditions. Petroleum is priced in a world market and no country, even a net exporter, can stop the world and get off.

**FIGURE 5-2. Price of Oil and Changes in U.S. Real GDP**



Sources: Price of oil from Department of Energy, table 9.1, Crude Oil Price Summary ([http://tonto.eia.doe.gov/merquery/mer\\_data.asp?table=T09.01](http://tonto.eia.doe.gov/merquery/mer_data.asp?table=T09.01)); GDP data from Bureau of Economic Analysis ([www.bea.gov/national/xls/gdpchg.xls](http://www.bea.gov/national/xls/gdpchg.xls)).

That's the first point to make about the quixotic quest for energy independence. Here is a second: although the U.S. economy today has to import about 60 percent of the oil that it consumes, it is actually *less*, not more, sensitive to rising international oil prices now than it was in Nixon's day, when imported oil amounted to only a third of U.S. consumption.

If you have a hard time believing that, consider figure 5-2, which shows the relationship between movements in oil prices and U.S. rates of economic growth. Following the first energy crisis—the price shock that followed the Arab oil embargo in 1973—the United States fell into recession. When prices skyrocketed with the Iranian revolution in 1979–80, U.S. growth plunged sharply again. The same effect occurred, albeit less markedly, after oil prices ticked up around the time of the Gulf war in 1990. After that, however, an intriguing thing happened: sharp new spikes, like the great run-up starting in 1998, evidently took much less of a toll on the economy. In fact, growth in the four years from 2003 through 2006 was relatively solid despite soaring oil prices. The economic decline that began afterward had less to do with those prices than with the subprime mortgage debacle and the ensuing meltdown in financial markets.

The U.S. economy's sensitivity to energy shocks has diminished because a nation's so-called energy intensity, not the share of fuel supplied by for-

eign sources, determines its relative capacity to minimize damage from surging energy prices. To produce a dollar of GDP, the United States requires about 40 percent less energy than it did some twenty-five years ago. With energy inputs now playing a proportionately smaller part in generating overall output, the economy absorbs higher fuel prices more easily.

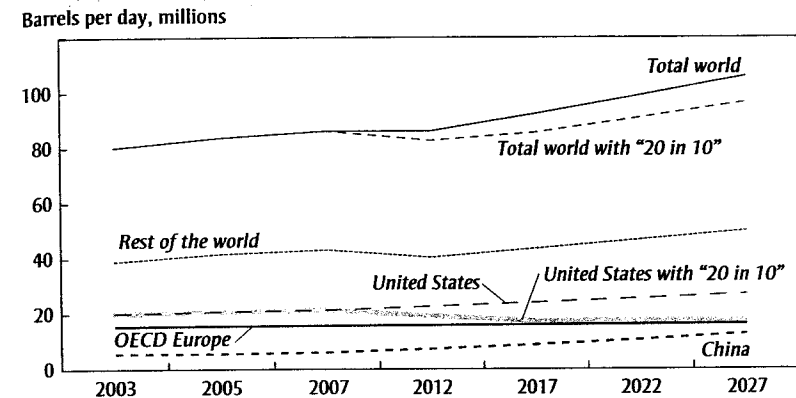
The inflationary (and then contractive) impacts of energy-price hikes, in short, seem to have subsided over time. In any event, sound monetary management and a further reduction in energy intensity are more promising approaches to ensuring economic stability than a struggle to curb dependence on imports.

### “Energy Security”

Proponents of energy independence, however, advance additional rationales. One is that by substituting domestically produced fuels for oil from overseas, the United States could help improve the global supply, thereby dampening the world price. That proposition rests on the fact that the United States consumes about a quarter of the world’s oil, so, *ceteris paribus*, any appreciable U.S. reduction would transform the international marketplace.

The trouble with that thesis is that only in utopia can *ceteris be paribus*. In the real world, other big consumers keep emerging, and they will erase much of the slack that the United States could conceivably cut. Think about China. The gap between Chinese and U.S. GDP is projected to narrow dramatically by 2027. China, which consumes 7.6 million barrels of oil each day, could be on track to add another 3.5 million barrels a day to worldwide demand by 2017. Such an increase alone would offset more than three-quarters of the 4 million barrels a day that the administration of President George W. Bush had proposed to displace by a combination of conservation and use of alternative fuels. With China, India, and other huge new customers coming on line, schemes like Bush’s Twenty in Ten Plan might shift the projected global demand for oil to a lower trend line, but it would still climb at an impressive rate. In sum, even if the United States kicked its “addiction to oil”—lowering consumption by 20 percent, as the Bush program had envisioned, and then holding it flat at approximately Europe’s expected level—*worldwide* demand would nonetheless resume rising robustly once the global economy recovers from its current downturn.<sup>2</sup>

FIGURE 5-3. Global Forecast of Oil Consumption<sup>a</sup>



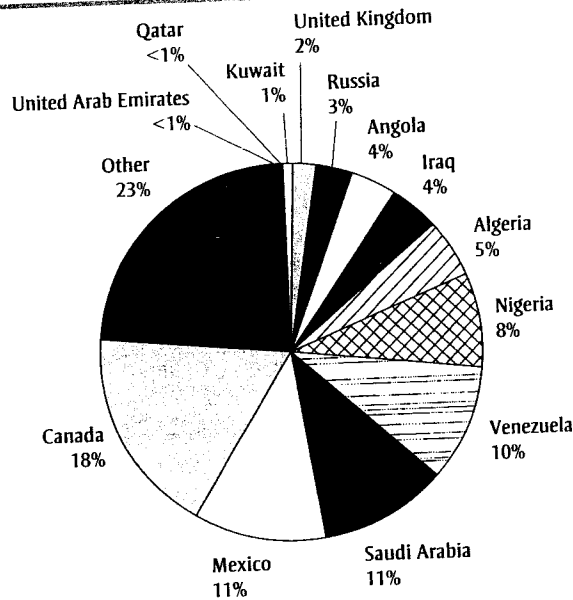
Sources: Energy Information Administration, [www.eia.doe.gov/oiaf/ieo/pdf/ieoreftab\\_4.pdf](http://www.eia.doe.gov/oiaf/ieo/pdf/ieoreftab_4.pdf); [www.eia.doe.gov/emeu/pub/3atab.pdf](http://www.eia.doe.gov/emeu/pub/3atab.pdf); [www.eia.doe.gov/emeu/international/RecentPetroleumConsumptionBarrelsperDay.xls](http://www.eia.doe.gov/emeu/international/RecentPetroleumConsumptionBarrelsperDay.xls).

a. Using the EIA’s estimation of the average growth rate for the period 2003–30 for each country or area, we interpolated values for 2012, 2017, 2022, and 2027. We know of no published estimate for the U.S. rate of growth after 2017 under the “20 in 10” regime. Therefore, we assumed conservatively that the growth rate would correspond to the OECD’s estimate for Europe in the period 2017–27.

Figure 5-3 tells the tale. If anything, this figure paints a best-case scenario. Not only does it assume, heroically, that all of the reduction proposed by a plan such as Bush’s would actually transpire—and that subsequently the United States would become almost as energy thrifty as Europe—it also projects conservative growth of demand in China. It presupposes that although China’s GDP will close in on U.S. GDP by around 2027, Chinese oil consumption will still be less than 60 percent of the U.S. level—a debatable forecast.

When confronted with this disagreeable reality, the proponents of energy independence repair to yet another argument: granted, whatever energy measures the nation takes will eventually be dwarfed by global demand, but at least, as then-senator Hillary Clinton explained as she prepared to enter the presidential primaries, it would become somewhat less “dependent on regimes that are going to undermine our security.”<sup>3</sup> Presumably, the likes of Iran, Venezuela, and Sudan would exert less leverage in international affairs if their oil revenues declined. The United States could help cut these derelicts down to size by lessening the U.S. footprint in the market for their oil.

**FIGURE 5-4. Total U.S. Imports of Crude Oil and Products by Country of Origin, 2007**



Source: Energy Information Administration, "U.S. Imports by Country of Origin, Total Crude Oil and Products, 1960-2007" ([http://tonto.eia.doe.gov/dnav/pet/pet\\_move\\_impcus\\_a2\\_nus\\_ep00\\_im0\\_mbb1\\_a.htm](http://tonto.eia.doe.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbb1_a.htm)).

Would that matters were so simple. The offending oil regimes will enrich themselves whether the United States does business with them or not. Iran, for example, has not sold a single barrel of oil to the United States since the hostage crisis in 1979, yet the mullahs continue to rake in money from the oil that they sell to Europe, Japan, China, and other major clients.<sup>4</sup> The result? Tehran remains defiant, disagreeable, and emboldened. So much for the United States reaping any geostrategic advantage by abstaining from Iranian oil.

Likewise, as figure 5-4 indicates, the United States purchases no oil from the rogue regime in Sudan. However, the Chinese, among others, buy plenty.<sup>5</sup> So long as the Sudanese can peddle their petroleum to *somebody*, U.S. policymakers will remain just as powerless to slow the flow of revenue to that country—and just as wobbly in mobilizing the international community over the atrocities in Darfur—as they would be if the United States were one of Khartoum's direct customers.

Figure 5-4 does show that a nontrivial share of the oil that the United States imports—10 percent—comes from Venezuela. The coffers of Hugo Chávez are being filled, to an extent, by U.S. petrodollars. But suppose that the practice ended tomorrow morning. Venezuela would promptly sell its oil somewhere else, and Chávez would continue to be, well, Chávez.

At the end of the day, the bilateral shopping decisions of the United States matter less than is widely assumed in the vast global energy market. All the main suppliers have plenty of other greedy buyers waiting in line. Yes, there could be trouble if one or more of the foreign sources abruptly interrupted its flow of supplies not just to us but the rest of the world. The price of oil would zoom again. It is impossible to rule out a crisis of that sort. A devastating terrorist attack on Saudi Arabian oil fields, for example, could precipitate it; so could a willful decision by a country with an oddball ruler, bent on wrecking everyone's economy including his own. It is worth noting, though, that even the likes of Ahmadinejad and Chávez show no signs of pursuing a course so masochistic. The fortunes of their regimes depend on pumping oil, not hoarding it. Whatever the case, this much is clear: the effects of a disruption would be felt in the United States, like everywhere else, regardless of whether we are part of a particular supplier's clientele or not.

In sum, it is far from clear how much security is likely to be achieved by becoming more self-sufficient. Now, let us consider the other side of the ledger: what we stand to lose.

### The Cost of Cobbling at Home

None of the skepticism expressed so far would be fatal if the search for independence had a minimal economic downside. Unfortunately, the added cost of relying increasingly on homemade fuels is large.

First, a few fundamentals. Seldom acknowledged amid the rhetoric in political circles is that, in point of fact, the United States of America produces the bulk of the "energy" that it needs. True, imports of oil have increased (mostly because Americans choose to drive far more—and use much less efficient motor vehicles—than do consumers in other industrial countries), but imported oil is just one part of the picture. Nearly all of what propels the nation's electric generators—coal, gas, nuclear power, hydropower, and nonhydro renewables—is made in the U.S.A. In stark contrast to western Europe, for example, the United States produces about

85 percent of its primary heating fuel, natural gas, domestically (almost all the rest comes from Canada). Furnaces in Europe had to shut down when the flow of Russian gas through Ukraine was interrupted last winter. Nothing comparable threatens U.S. households.

When we are told that “we must reduce our dependence on foreign sources of *energy*,” what does that mean? Is 70 percent self-sufficient too little? Is 80 percent the magic number, or 90 percent, or 100 percent? More likely, the intended point of the statement is that the United States purchases too much foreign *oil*. But even that proposition gets tossed about carelessly. Glance again at figure 5-4, which delineates the various sources of the oil that the country imports. The portfolio is very diversified. Nearly 90 percent of total usage is met by U.S. wells and those of suppliers outside the Middle East. Both of our NAFTA trading partners supply us with more oil than Chávez’s Venezuela does, and they supply more than Saudi Arabia does as well.

The unstable Middle East—that is, Saudi Arabia and other Persian Gulf countries—meets less than 11 percent of U.S. needs.<sup>6</sup> Whether that share is thought of as large or, all things considered, comparatively small (Japan, by contrast, imports nearly 90 percent of its oil from the region), importing some Middle Eastern oil makes eminent economic sense. Saudi Arabia and other Gulf countries hold a comparative advantage: they are the world’s lowest-cost producers. Not to purchase at least a portion of U.S. crude oil inventory from them—and instead contort ourselves to displace their oil with homegrown fuels—would be a little like me deciding to cobble my own shoes instead of “importing” them from a shoe store.

It is wasteful to insist on fabricating in-house commodities that the United States is better off acquiring through international trade. To cease trading for oil, including with various Middle Eastern sources, would be inefficient, diverting scarce resources into fundamentally non-competitive enterprises and leaving fewer for other industries—industries that could put those resources to more productive use. In the end, living standards are lowered, not secured, by a monomaniacal pursuit of energy independence.

Pause to ponder the U.S. ethanol industry. Some 3.9 billion gallons of ethanol were produced from corn in 2005. That is a drop in the bucket; it amounts to less than 3 percent of total gasoline sales. Many prominent politicians want to jack that quantity way up, but what those enthusiasts don’t advertise is the cost.<sup>7</sup>

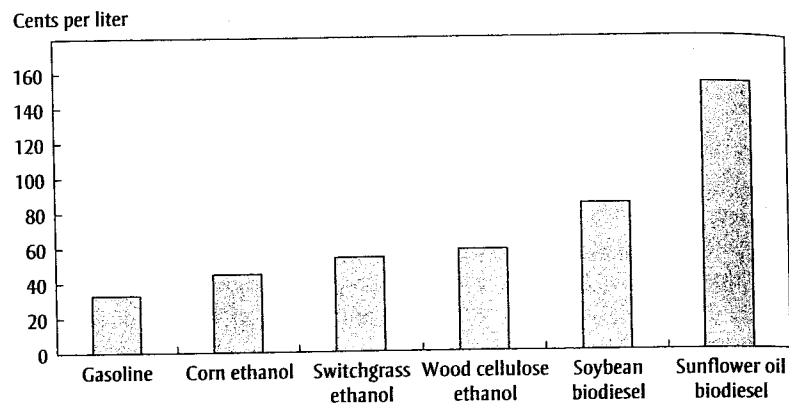
Ethanol’s energy content is appreciably less than that of ordinary gasoline: you need 1.5 gallons of ethanol to drive the same distance you could on a gallon of gasoline. And, if you allow for the substantial subsidy in effect since 2004, ethanol’s expense clearly exceeds that of conventional gasoline. In the spring of 2006, for instance, the wholesale price of gasoline was about \$2.20 a gallon. The price of ethanol, counting the subsidy, was more like \$3.16 a gallon.<sup>8</sup> In some states, the figure was much more.

Some of that price premium might be worth footing if production of corn-based ethanol yielded a significant net reduction of greenhouse gases. Sadly, that is not the case. The lower emissions of carbon dioxide obtained by substituting corn for oil as the feedstock for motor fuel are largely offset by additional emissions of other pollutants, such as nitrous oxide, a potent greenhouse gas. (Nitrous oxide is a byproduct of the nitrogen fertilizer used to grow the corn.) Further, when ethanol refineries are coal-fired (witness the brand-new big plant in Richardson, North Dakota), their effect is to increase, not reduce, carbon emissions.<sup>9</sup>

Because relying on corn-based ethanol promises, at best, only a minor mitigation of greenhouse gas pollution, biofuel advocates are exploring alternatives to corn—fuel derived from cellulose, for instance, or from soybeans, or switchgrass, or even an odd mixture of prairie vegetation. A team of ecologists at the University of Minnesota claims that an eclectic assortment of prairie grasses could offer a bigger environmental payoff; the root structure of this biofuel source, these experts say, acts like an efficient carbon sink.

We don’t know enough about the economics of every imaginable substitute for corn, but we do have indications about some. The cost of producing ethanol from cellulose, for example, currently surpasses that of producing traditional ethanol, to say nothing of ordinary gasoline (see figure 5-5). Spending so much for options like fuel from cellulose or soybeans—and consequently crowding out extensive acreage used for food production—can be justified only if the resources thereby diverted are really being allocated to their most-valued use. It strains credulity to claim that they are. Think of it this way: doggedly devoting vast swaths of food-producing farmland to supply motor fuels in effect presupposes that society values filling the tanks of SUVs with the derivatives of grains, beans, or other agricultural commodities more than ensuring affordable grocery bills for hundreds of millions of human beings.<sup>10</sup>

Finally, the pursuit of such perverse priorities also has wide-ranging political implications: it inspires a host of other lobbies to assert that they,

**FIGURE 5-5. Cost of Production for Transportation Fuels, 2005**

Source: David Pimentel and Tad W. Patzek, "Ethanol Production Using Corn, Switchgrass, and Wood; Biodiesel Production Using Soybean and Sunflower," *Natural Resources Research* 14, no. 1 (March 2005).

like the ethanol coalition, have a legitimate part to play in the great energy-independence game.

### The Energy Pork Barrel

To succeed without outsized subsidies, government policies to encourage homemade energy would have to be buttressed by a prolonged period of steep market prices for fossil fuels and also by a long suspension of politics as usual. Don't bet the ranch that either of those conditions will prevail.

Recall the original "National Energy Policy" that President Bush advanced early in his presidency. The ink on it was barely dry when market prices shifted unexpectedly. Natural gas, which had run to \$10 per 1,000 cubic feet in early 2001, was closer to \$3 by that summer, and, for a while, it was headed lower. Crude oil prices plunged from about \$30 a barrel in early September 2001 to around \$17 a barrel by mid-November. Prices softened everywhere, including in California, where spot prices of electricity had soared during the state's power crisis in the first part of 2001. Suddenly it looked as if Bush's plan, replete as it was with incentives to goose energy production, had run into the headwind of market forces. The plan's financial practicality, as well as its urgency, quickly

faded. Presently, it looks as though a similar train of events—the collapse of oil prices that began in the latter part of 2008—will strand new proposals like those that more recently captivated Congress. Whenever energy prices tumble, as they have repeatedly, the government's latest best-laid plans are bound to follow yesterday's into the boondoggle bin.

The caprice of the marketplace frustrates energy planning. So does the fact that legislative efforts to promote energy self-reliance are perforce politicized.<sup>11</sup> During the troubled 1970s, the Carter administration mounted the most concerted and sustained campaign to enact a national energy plan. Scrambling to create the coalitions needed to pass a bundle of bills, Congress heard from almost all comers seeking a piece of the action. The queue of claimants included energy producers of nearly every shape and description but also other supposed stakeholders.<sup>12</sup> Truckers, for instance, lobbied for extra incentives to pay for windscreens on cabs and trailers. The intercity busline industry sought to get its axles greased with tax benefits, on the grounds that using buses conserves oil. Barge operators on waterways lobbied to secure their own tax preferences, arguing that they, like the buses, were energy savers. Even opponents of school integration got into the act: they labored to graft anti-busing amendments onto bills on the theory that those measures, too, would spare fuel. In the end, to be sure, not every sort of supplicant got its appetite satisfied. The prospect of federal subsidies and dispensations, however, had clearly invited a feeding frenzy by interest groups—and many would keep circling Washington for decades.

Thus, a quarter-century later, the pursuit of energy independence (or, for that matter, energy "security") remains vulnerable to similar political manipulation. Legislation before Congress in recent years has illustrated the extensive logrolling involved. H.R. 3221 was stuffed with loans, loan guarantees, grants, procurement mandates, or tax advantages for small businesses, green-building retrofitters, railroads, bicyclists, and electric vehicle manufacturers, as well as ethanol plants and planters, biodiesel producers, renewable energy manufacturers, developers of hydrogen technology, and nuclear power.<sup>13</sup>

Figure 5-5 provides estimates of the costs of at least some of these alternative energy sources. They are uneconomic in comparison with conventional sources. At a time when the government is running up colossal deficits, devoting large sums of money to prop up costly homespun alternatives for fossil fuels requires, at a minimum, a more compelling justification than just the mantra of "energy independence."

## Bottom Line

Neither the economic nor the security interests of the United States are likely to be well served by any national energy strategy that force-feeds, in effect, a “Buy American” approach when international trade can meet a sizable share of U.S. energy requirements at lower cost. Time and again, events have vindicated this conclusion.

Does that mean that there is no reason whatsoever to rework the nation’s energy policies? A serious effort to lower the country’s level of carbon emissions—not just from the combustion of petroleum products but, also important, coal—is worthwhile, especially if it could encourage other big polluters (China, for example) to participate in a global assault on greenhouse gases. That is because climate change—unlike “foreign oil”—indisputably is a problem, one beckoning for every major economy to take action.<sup>14</sup>

The actions required to combat climate change, however, are rather different from the policy biases that have long dominated Congress’s energy agenda. Throwing more tax dollars at ethanol production or pinning hopes on flawed conservation programs, such as U.S. corporate average fuel economy (CAFE) regulations for motor vehicles, are not steps in the right direction.<sup>15</sup> Instead, a serious energy initiative to slow global warming would include a genuine inducement to curb the burning of all fuels that warm the Earth’s atmosphere.

To elaborate in depth on how a proper inducement could be designed and implemented would exceed the scope of these pages. Suffice it say that *real* change would begin by adopting a carbon tax—and tying this fundamental reform to a comprehensive overhaul of the nation’s anachronistic system of taxation, which perversely penalizes earning, saving, and investment instead of discouraging profligate consumption of energy resources, especially the sorts that are endangering the planet.

## Notes

1. Richard M. Nixon, launching Project Independence in November 1973, quoted in John L. Moore, *Continuing Energy Crisis in America* (Washington: CQ Press, 1975), p. 2.

2. President Bush used the “addiction to oil” phrase in his January 2006 State of the Union address.

3. Remarks, 2006 *Take Back America Conference*, June 14, 2006.

4. Japan, for example, imported 684,300 barrels daily from Iran in 2006. See OPEC, “Annual Statistical Bulletin 2006” ([www.opec.org/library/Annual%20Statistical%20Bulletin/pdf/ASB2006.pdf](http://www.opec.org/library/Annual%20Statistical%20Bulletin/pdf/ASB2006.pdf)).

5. See, for instance, Peter S. Goodman, “China Invests Heavily in Sudan’s Oil Industry,” *Washington Post*, December 23, 2004, p. A1.

6. The mix from this region includes oil from Bahrain, Iraq, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates.

7. In June 2007, the Senate passed an energy bill mandating the production of 36 billion gallons of ethanol per year by 2022. How that target can be reached remains a mystery. Even if *all* U.S. corn production were turned into ethanol, it would yield about 28 billion gallons, still well short of the mandated 36 billion. Let’s suppose, for the sake of argument, that “only” half of all corn production were dedicated to ethanol, thereby providing 14 billion gallons. Further let’s suppose that the remaining 22 billion gallons were supplied by somehow cranking up production of other sources of ethanol (alcohol derived from cornstalks, wood chips, or grass). To produce 22 billion gallons of it each year, some 25 million acres of cropland would have to be set aside. What might so large a corn-based and cellulosic conversion ensure? Thirty-six billion gallons of ethanol a year would (because of ethanol’s lower heat content) displace a mere 1.54 million barrels of oil per day, or 7.4 percent of the 21 million barrels of oil per day the United States *currently* consumes. Of course, by 2022, U.S. consumption is expected to reach nearly 25 million barrels per day, so the dent would be even less impressive. See Robert Bryce, “The Great Corn Con,” *Slate*, June 26, 2007. On projected U.S. consumption (for 2020), see Energy Information Administration ([www.eia.doe.gov/oiaf/ieo/pdf/ieoreftab\\_4.pdf](http://www.eia.doe.gov/oiaf/ieo/pdf/ieoreftab_4.pdf)).

8. Michael B. McElroy, “The Ethanol Illusion,” *Harvard Magazine*, November–December, 2006.

9. There are, of course, other environmental complications of ethanol production. Not too long ago, during a debate at the University of Iowa, for example, it was noted that “when you put a gallon of Iowa ethanol” into your car, you are “also effectively putting several pounds of Iowa topsoil into the Mississippi River.” Further, “while growing corn for ethanol production in Iowa can be done without irrigation, doing so in the dryer Plains states cannot. Using modern methods, it takes about 2,000 gallons of water to grow a bushel of corn.” Unsustainable depletion of water tables was a problem in the Plains states even before the ethanol campaign took hold. See Michael O’Hanlon, “Beyond Corn-Based Ethanol,” *Washington Times*, October 26, 2007.

10. The recent government-engineered surge in ethanol production devours 20 percent of the U.S. corn crop—and raises the price of everything from cereals to feed for chickens, pigs, and dairy and beef cattle. Marianne Lavelle and Bret Schulte, “Is Ethanol the Answer?” *U.S. News and World Report*, February 12, 2007, p. 34.

11. We are not alone in observing this propensity. Vijay Vaitheeswaran, for example, writes: “Modern history is littered with failed government schemes to reduce dependence on fossil fuels, such as the effort to develop synthetic petroleum after the 1970s oil shocks or the false dawn of wind and solar energy in the 1980s. Massive government programs are simply not the answer. Of course, there is a legitimate government role in investing in and encouraging long-term energy research of the sort that private firms cannot provide. But when bureaucrats start picking pet technologies,