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## FACT

### THE POLITICAL SCENE

#### PUMP DREAMS

by JOHN CASSIDY

Is energy independence an impossible goal?

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In the predawn hours of October 6, 1973, on Yom Kippur, Egyptian and Syrian forces launched a surprise attack on Israeli positions in the Gaza Strip and the Golan Heights. Two weeks later, after the Pentagon had started airlifting matériel to Israel, to counter Soviet shipments to Egypt and Syria, King Faisal, of Saudi Arabia, cut off his country's oil exports to the United States. Other members of the Organization of the Petroleum Exporting Countries, which had been founded in Baghdad thirteen years earlier, followed Faisal's lead. Almost overnight, the price of crude oil doubled. Gasoline prices rose sharply, shortages developed, and a new phrase entered the American lexicon: "gas lines." On November 7th, President Nixon, already under pressure from Watergate, addressed an anxious country, saying, "Let us set as our national goal, in the spirit of Apollo, with the determination of the Manhattan Project, that by the end of this decade we will have developed the potential to meet our own energy needs without depending on any foreign energy source."

More than thirty years later, Nixon, Leonid Brezhnev, Anwar Sadat, Hafez al-Assad, and Golda Meir are all dead—and so is King Faisal, who was assassinated by his nephew in 1975—but energy independence has returned as a major issue. The price of crude recently touched fifty dollars a barrel, drivers in many parts of the country are paying more than two dollars a gallon for gasoline, and both Presidential candidates have been sounding uncannily like Nixon. "I want an America that relies on its own ingenuity and innovation—not on the Saudi royal family," Senator John Kerry said in his speech at the Democratic Convention, in July. "And our energy plan for a stronger America will invest in new technologies and alternative fuels and the cars of the future—so that no young American in uniform will ever be held hostage to our dependence on oil from the Middle East." President Bush has countered by pushing his own energy agenda, which includes a controversial proposal to begin drilling for oil in the Arctic National Wildlife Refuge, an idea that Congress has so far rejected. "We will make our country less dependent on foreign sources of energy," Bush told the Republican Convention.

Although the Democratic and Republican energy plans differ widely, their underlying rationale is the same. In 2003, the United States consumed some twenty million barrels of oil a day, of which slightly more than half was imported from abroad, much of it from the Persian Gulf. By 2020,

according to the Department of Energy, domestic oil producers will be meeting less than a third of United States needs, and the Gulf countries will be supplying up to two-thirds of the world's oil. "This imbalance, if allowed to continue, will inevitably undermine our economy, our standard of living, and our national security," the Bush Administration's National Energy Policy Development Group warned in a May, 2001, report. "But it is not beyond our power to correct. America leads the world in scientific achievement, technical skill, and entrepreneurial drive. Within our country are abundant natural resources, unrivaled technology, and unlimited human creativity. With forward-looking leadership and sensible policies, we can meet our future energy demands and promote energy conservation, and do so in environmentally responsible ways that set a standard for the world."

When energy independence is presented in this way, it is hard to object—who would advocate energy dependence?—but optimism and an appeal to American patriotism don't add up to a coherent policy. Moving beyond rhetoric and actually trying to make America less reliant on foreign oil involves confronting powerful commercial interests, solving difficult technological problems, and convincing the American public that cheap fuel is not a birthright.

The two hundred and ninety million people who live in the United States make up just five per cent of the world's population, but they consume a quarter of the world's oil supply. For much of the twentieth century, the United States was the world's largest oil producer, and its profligacy wasn't a pressing problem. Today, however, we are only the third-largest producer, behind Saudi Arabia and Russia. In terms of proven reserves—oil deposits that are known to exist and are believed to be accessible at reasonable cost—we have slipped to tenth place in the international rankings, as reservoirs in Texas, Louisiana, and Oklahoma have started to dry up.

According to the oil company BP's "Statistical Review of World Energy," a recognized authority on these matters, at the end of 2003 the United States possessed thirty-one billion barrels of proven reserves, more than China and less than Nigeria. These figures have a straightforward implication: if the United States were forced to rely on its own resources, it would run out of oil in four years and three months. This calculation takes into account the Strategic Petroleum Reserve, which President Ford created in 1975, and which is stored at a number of sites in Texas and Louisiana. At full capacity, the reserve contains about seven hundred million barrels of oil—enough to keep the economy going for a few months during an emergency, such as the outbreak of a war that would cut the supply lines to the Middle East, but not nearly enough to keep gasoline prices low for a more extended period, which is what some politicians have suggested. "The purpose of the Strategic Petroleum Reserve, from its inception, was never to bring down the price of oil," Larry Goldstein, the president of the Petroleum Industry Research Foundation, told me. "It was to minimize the economic dislocation during supply disruptions, unforeseen shocks to the market."

The Bush Administration, which has proposed expanded tax breaks for drilling and exploration, apparently believes that there is plenty of oil yet to be discovered beneath the North American continent, a view not shared by the oil industry, which has cut back sharply on domestic drilling. Not so long ago, the deep waters of the Gulf of Mexico were considered a fertile exploration

area. Lately, after much costly and frustrating drilling, it has proved something of a disappointment. Lee Raymond, the chairman and chief executive of ExxonMobil, was recently moved to comment that the company would have done better financially if it had given up after sinking a single well there.

The Arctic National Wildlife Refuge, on Alaska's North Slope, is the new hope. The Prudhoe Bay oil field, one of the world's biggest reservoirs, is just sixty miles west of the refuge. Surveys carried out by the U.S. Geological Survey suggest that anwr may contain about ten billion barrels of recoverable oil. If this estimate turns out to be reliable, and if exploration starts next year, in 2025 anwr could be generating about a million barrels of oil a day. This is a lot of fuel, but it dwindles next to our energy requirements. By 2025, according to the Department of Energy, Americans will be consuming almost thirty million barrels a day. With luck, an anwr oil field operating at full capacity could satisfy perhaps three or four per cent of that total, meaning that most of the oil we use would still have to be imported.

Senator Kerry's ambitious energy plan, which doesn't include drilling in the Arctic preserve, comes in two parts. The less publicized piece involves promoting natural gas and coal, two hydrocarbons that already meet about half of America's energy needs, mostly in the form of fuel for power stations. Kerry says that he will build a gas pipeline from Alaska, where there are large deposits of natural gas, and invest ten billion dollars in modernizing antiquated coal plants.

These ideas have merit—global stocks of natural gas and coal are huge—but they don't represent a panacea. As natural gas has come to be used more widely in the United States, we have started to import large quantities of it from foreign producers. America possesses just three per cent of the world's known reserves; Iran, Russia, and Qatar together possess more than fifty per cent. There can be no guarantee that a future government in Tehran, Moscow, or Doha won't seek to exercise its market power in the same way that opec did in the nineteen-seventies.

Coal is less subject to political uncertainty, and Nazi Germany demonstrated that it can fairly easily be converted to gasoline. It is still abundant in the United States and in many other countries that are short of oil, such as China and India and some European countries. Modern coal-fired power plants don't emit nearly as much nitrogen oxide and sulfur dioxide, the two main sources of acid rain, as older plants do. However, burning coal inevitably generates carbon dioxide, the gas primarily responsible for global warming, which even the Bush Administration has now admitted is a genuine phenomenon. It is feasible to sequester the carbon dioxide, but scientists are divided about whether it will prove possible to store it someplace where it won't get released into the atmosphere. Since 1996, Statoil, a Norwegian company, has been injecting about a million metric tons of carbon dioxide a year into an aquifer under the North Sea. "People like myself have a lot of confidence that this will work," Bob Williams, a physicist at the Princeton Environmental Institute, told me. "But we can't say it with certainty until we do a lot more experiments. Nobody is going to be convinced by one demonstration project in the North Sea. You don't want CO<sub>2</sub> to come up into your basement from an underground storage area."

Many environmentalists see any attempt to prolong our dependence on hydrocarbons as dubious.

The Apollo Alliance, an influential umbrella organization of Greens and trade unionists, is calling for the development of power derived from the sun, the oceans, and crops, which it says will enable the country to achieve energy independence within a generation. Senator Kerry has adopted some of the Apollo Alliance's rhetoric, calling energy independence "the great project of our generation." The second half of his plan, the conservation and alternative-energy part, includes a pledge to make sure that twenty per cent of America's electricity comes from renewable energy sources by 2020. Since about ten per cent of the power supply already comes from alternative-energy plants—hydroelectric plants, mainly—this doesn't sound like an overambitious target, and it hardly amounts to energy independence.

Yet, even getting to twenty per cent represents a big challenge. Power generated from waves, windmills, and solar panels is weak, intermittent, and expensive—at least twice the cost of electricity produced from coal or gas. When it is cold or dark, solar panels don't produce energy; when it is calm, wind turbines don't turn. To insure continuity of supply, renewable power plants have to budget for large amounts of overcapacity, a problem that isn't going to disappear. And, although alternative energy is getting cheaper as technology improves, the same is true of energy generated from hydrocarbons. "He"—Kerry—"is asking for an awful lot without telling us how he's going to get there and at what cost," Robert Ebel, a veteran oil-industry executive who once worked for the C.I.A. and now heads the energy program at the Center for Strategic and International Studies, in Washington, said. "Where is the twenty per cent going to come from?"

There is another, more basic problem with Kerry's proposals. Switching to renewable energy wouldn't reduce oil imports much, because most power stations don't run on oil, which is largely used for road and air transport. Developing a transport fuel that can compete with oil is an enormous challenge. For this reason, among others, many analysts regard the candidates' endorsement of energy independence as a political diversion. "It makes absolutely no sense to talk about energy independence," Ebel told me. "We cannot produce our way to energy independence, and we cannot use efficiency or conservation to achieve energy independence. It's just not going to happen, at least in my lifetime."

If the skeptics are right, what can be done? Some experts, such as Edward L. Morse, who worked in the State Department on energy issues during the Carter and Reagan Administrations, believe that new discoveries in Russia, Central Asia, and West Africa will eventually allow the United States to diversify its sources of petroleum. "The most recent giant field that was discovered was Kashagan, in Kazakhstan," Morse told me. "That field probably has more oil in place than the total remaining known reserves of the United States. The exploitable resources in the former Soviet Union are probably on the same order of magnitude as those in Saudi Arabia and Iraq."

Unfortunately, nobody knows for sure how much crude is buried in the Caspian region and Siberia, or how much it will cost to extract those reserves and transport them to world markets. Taking the planet as a whole, the rate at which oil is being discovered has slowed down since the nineteen-sixties, and some geologists believe that global production is about to start falling. Colin Campbell, a British geologist who used to work for major oil companies, has popularized this argument. "Understanding depletion is simple," Campbell says on the Web site of the

organization he founded, the Association for the Study of Peak Oil & Gas. “Think of an Irish pub. The glass starts full and ends empty. There are only so many more drinks to closing time. It’s the same with oil.”

The geological debate is difficult for an outsider to judge. All we know for sure is that proven reserves are concentrated in the Persian Gulf: Saudi Arabia (262.7 billion barrels), Iran (130.7 billion), Iraq (115 billion), the United Arab Emirates (97.8 billion), and Kuwait (96.5 billion). The only country in the Western Hemisphere that has reserves of comparable magnitude is Venezuela (78 billion barrels), which is also a member of opec and boasts a populist, left-leaning President, Hugo Chávez, who frequently rails against United States imperialism. opec oil, for all its geopolitical drawbacks, is cheap, easy to transport, and relatively clean if used efficiently.

One of the key strategic issues facing the United States is how to insure continued access to opec oil when other countries are also importing more fuel. During the past ten years, global demand for oil has risen by almost a fifth, with the greatest increases coming from India and China, which recently passed Japan to become the world’s second-largest consumer of crude oil.

The decision to invade Iraq represented one way to deal with the oil-dependency dilemma: direct American intervention. President Bush, a former Texas wildcatter, and Vice-President Cheney, the former chief executive of Halliburton, the world’s biggest oil-services company, both have an acute understanding of energy issues. In 1999, when Cheney was still at Halliburton, he gave a speech at London’s Institute of Petroleum in which he pointed out that by 2010 the world would probably need another fifty million barrels of oil a day. “So where is the oil going to come from?” Cheney asked. “While many regions of the world offer great oil opportunities, the Middle East, with two-thirds of the world’s oil and the lowest cost, is still where the prize ultimately lies.”

As Vice-President, Cheney was put in charge of the National Energy Policy Development Group, which, in its May, 2001, report, pointed out that the Persian Gulf region would “remain vital to U. S. interests.” The Bush Administration hadn’t publicly raised the possibility of invading Iraq, but in August, 2002, seven months before the war started, Cheney warned that Saddam would be able to seize control of the world’s economic lifeline if he acquired weapons of mass destruction: “Armed with an arsenal of these weapons of terror, and seated atop ten per cent of the world’s oil reserves, Saddam Hussein could then be expected to seek domination of the entire Middle East, take control of a great portion of the world’s energy supplies, directly threaten America’s friends throughout the region, and subject the United States or any other nation to nuclear blackmail.”

Cheney has since been criticized for exaggerating the threat that Saddam represented, but the geostrategic thinking that underpinned the energy portions of his speech was not new. It dated back to January 23, 1980, when President Jimmy Carter declared, in his State of the Union address, “Let our position be absolutely clear: An attempt by any outside force to gain control of the Persian Gulf region will be regarded as an assault on the vital interests of the United States of America, and such an assault will be repelled by any means necessary, including military force.”

Prior to the Carter Doctrine, the United States had exercised its influence in the Middle East through friendly governments in Saudi Arabia and Iran: the so-called “twin pillars” of American

policy. But in January, 1979, a popular revolt toppled the Shah, and the new regime in Tehran tilted toward Moscow. Then, in December, 1979, the Soviet Union invaded Afghanistan. Following Carter's speech, the Pentagon embarked on a lengthy military buildup in the Gulf, beginning with the creation of a Rapid Deployment Joint Task Force, which could be dispatched to the Middle East on short notice. In 1983, President Reagan went a step further, establishing a U.S. Central Command, based in Tampa, and charging it with defending U.S. interests in East Africa, the Middle East, and Central Asia.

When Communism collapsed, the U.S. military didn't withdraw from the Persian Gulf. After the Gulf War of 1991, it stationed its forces in Saudi Arabia, the Muslim holy land, and built up its presence in Qatar and Turkey. Saddam, after surviving one American-led invasion, eventually fell victim to Washington's willingness to project its power militarily, a point that Michael T. Klare, a professor at Hampshire College, in Amherst, Massachusetts, stresses in his new book, "Blood and Oil." "From the vantage of officers and enlisted personnel in the U.S. Central Command, the invasion of Iraq is only the latest in a series of military engagements in the Gulf proceeding from the Carter Doctrine," Klare writes. "This history helps to explain why the very first military objective of Operation Iraqi Freedom was to secure control over the oil fields and refineries of southern Iraq."

The policy of direct intervention hasn't worked as planned. In April, 2003, just weeks after the invasion of Iraq, Vice-President Cheney predicted that by the end of the year Iraq would be able to raise its oil output as much as fifty per cent over prewar levels. Before the war, the Iraqi National Oil Company was pumping about two and a half million barrels a day. Now, with the help of money, personnel, and equipment provided by the American government, it is pumping about 1.8 million barrels a day—at least, on those days when insurgent attacks on pipelines and storage facilities don't force a cut in production. Early hopes of a surge in foreign investment that would enable Iraq to double or triple production in the next few years have turned out to be fanciful. Western oil companies are understandably reluctant to invest in a country that seems to be slipping toward civil war. "Iraq has great potential, but it also has great problems," Robert Ebel said. "I would give them perhaps four, or four and a half, million barrels of production a day by the end of the decade—certainly not the six million barrels the Iraqis are talking about."

To energy traders, what is happening outside Iraq's borders is at least as important as what is happening inside the country. The Bush Administration's decision to take military action has destabilized the rest of the Middle East, especially Saudi Arabia, and this has severely rattled the oil market. "People who trade oil futures in New York and London read ten articles saying that the Saudi regime is going to collapse, then they bid up the price of oil," Robert Mabro, the chairman of the Oxford Institute of Energy Studies and an internationally renowned expert on oil, told me last week. "The fears may be exaggerated, but they are having a big effect on the oil price."

Contrary to popular belief, the opec cartel, led by Saudi Arabia, no longer controls the price of oil, and hasn't done so since 1986, when the price collapsed. The price is determined by the forces of supply and demand, operating through the futures markets in New York and London, where oil is

traded like any other commodity. During the past couple of years, opec's eleven members have raised their daily production by almost three million barrels to meet rising demand, and they don't have much spare capacity left. Futures traders believe that another interruption in supply could lead to a crisis in the market. This has led them to bid up the current price by about fifteen dollars a barrel since the start of the year, an increase that is sometimes referred to in the markets as a security premium. "The recent terrorist attacks in Saudi Arabia and the continuing attacks on oil infrastructure in Iraq are largely responsible for the extant security premium in crude-oil prices," John Kilduff, an energy analyst at the brokerage firm Fimat USA, said in recent testimony before the Senate Committee on Energy and Natural Resources. "Historically, Saudi Arabia has been the stalwart in terms of being able to fill production gaps when they have occurred. The mere idea that the kingdom may be the source of a supply disruption has caused available crude to become even more valuable in the face of such an uncertainty."

By invading Iraq, the Bush Administration has unwittingly helped to create what its National Energy Policy was designed to avoid: rising oil prices that threaten to derail the economic recovery. When the price of fuel goes up, it acts like a tax on the economy, reducing consumers' purchasing power and raising firms' costs. After the oil-price shocks of both 1973 and 1979, the economy went into a recession. So far this year, the economy has continued to grow, but the rate of expansion has fallen, a development that Alan Greenspan, the chairman of the Federal Reserve, has largely blamed on rising oil prices.

In light of what is happening in the oil market and in the Middle East, many analysts believe it is time to reassess the Carter Doctrine and its Bush-Cheney variant. "I think we are pretty much at the end of the line," Jeffrey Sachs, the director of Columbia University's Earth Institute, who also serves as a special adviser to Kofi Annan, the United Nations Secretary-General, told me. "Saudi Arabia is pretty rapidly destabilizing. Iraq I don't think we are ever going to get under control this way. And our relationship with Iran is poor and deteriorating. The idea that we are going to be the dominant military power of the Persian Gulf is an extremely unrealistic way to manage our affairs. I don't have an automatic solution. I just think that this one—where we keep building up the military commitment because it keeps failing—is a loser." A less provocative United States policy stance would involve reducing the American military presence in the Gulf while retaining a veto over what happens there. (American disengagement, which Senator Kerry sometimes seems to advocate, is neither realistic nor desirable.) "The only sensible policy in the Middle East for a superpower is one of benign protection," Robert Mabro said. "Don't misbehave, boys! If you start misbehaving, we might intervene.' But we aren't going to be there all the time."

From an economic vantage point, a strategy based on Realpolitik makes sense. To meet the rising demand for oil in the coming decades, the Gulf states need to spend tens of billions of dollars on expanding their capacity, an enormous capital investment that is unlikely to materialize in a hostile environment. Some opec members already favor keeping the supply tight so that prices will stay high. As in the past, the West will have to rely on the Saudi government to be the voice of moderation. "If you are sitting on a very large reserve base, as Saudi Arabia is, you don't want somebody coming along and saying, 'We are really going to make a push to develop an

alternative to the internal-combustion engine,” Robert Ebel said. “You have a division of opinion within opec, but Saudi Arabia is big enough to call the shots.”

For decades, energy policy has been subject to a simple political divide: Republicans tend to favor increasing supply; Democrats tend to favor reducing demand. If this split ever made sense, it doesn't any longer—something that Senator Kerry, to his credit, has grasped, despite his lack of candor about Middle East oil. “There is no single thing out there that is going to solve the problem,” Larry Goldstein said. “You have to focus on the supply side as well as the demand side.” Amy Myers Jaffe, a senior fellow at Rice University's James A. Baker III Institute for Public Policy, who heads a joint task force on the future of energy with the Council on Foreign Relations, concurs. “A coherent policy has to be a combination of everything,” she said.

Considering Americans' voracious demand for fuel, the first step is conservation. The measures that Bush and Kerry have proposed, such as providing tax breaks to people who buy gas-electricity hybrids and cars powered by hydrogen fuel cells, are halfhearted. (American carmakers have just started to market these vehicles, in very limited numbers.) A quicker and less costly way to conserve fuel would be to tighten up the Corporate Average Fuel Efficiency standards, which President Ford introduced. The fuel-efficiency requirements—27.5 miles per gallon for cars; 21 miles per gallon for light trucks—have hardly been raised since 1986. Moreover, many S.U.V.s are officially classed as light trucks, which means they are subject to less stringent requirements. If this loophole was closed, at least according to some estimates, demand for gasoline would drop by a million barrels a day—two-thirds of what we import from Saudi Arabia. Yet neither candidate has been willing to face down the auto industry and come out in favor of making the change.

Getting serious about conservation would be a lot more practical than talking about the “hydrogen economy.” In January, 2002, the Bush Administration launched its FreedomCAR Initiative, which was intended to produce an affordable hydrogen-powered automobile within ten or fifteen years. Not to be outdone, Senator Kerry has called for the establishment of a taxpayer-funded Hydrogen Institute, which, his campaign says, would “unite scientists and researchers to create a New Energy Economy by 2020.” These grandiose plans are unlikely to be realized. In his new book, “The Hype About Hydrogen,” Joseph Romm, a former Assistant Secretary of Energy in the Clinton Administration, points out that as far back as 1923 the British scientist John Haldane described an energy economy based on liquefied hydrogen stored in underground tanks. Since Haldane's day, a great deal of scientific effort has been expended on hydrogen fuel cells, but hydrogen-powered cars are still underpowered, unreliable, and costly. Hydrogen itself is also expensive, because it rarely exists in pure form. The cheapest way to obtain it is to burn coal or natural gas, which produces hydrogen and carbon dioxide.

For this reason, if no other, many experts say that increasing the supply of fossil fuels is essential. “It can't be our policy that we will never drill for energy in the United States, that we will never have any new import terminals for liquid natural gas, or that we don't mine coalfields,” Jaffe said. Many people seem to be confused about where the power to light their homes comes from, she went on. “You have movements of canoeists that want to shut down

every hydroelectric plant in the country. You have people who believe we shouldn't renew the leases for nuclear plants. Nobody wants a liquid-natural-gas terminal near their home. They don't want any drilling for natural gas or oil. The public is really not up to speed on energy issues."

Many Americans also appear to believe that they are entitled to cheap fuel, regardless of how much they consume. When gasoline hits two dollars a gallon, they look for somebody to blame—this despite the fact that gasoline is still cheaper than it was in the nineteen-seventies, after adjusting for inflation, and that it costs a lot less than it does abroad. In the United Kingdom, for example, a gallon of gasoline costs more than five dollars.

No prominent politician will say it publicly, but from an energy perspective an extended period of higher fuel prices might well be just what the country needs. Many of the problems we now face can be traced to the nineteen-nineties, when oil prices collapsed. Between 1976 and 1985, when gasoline prices were high, drivers switched to smaller, less wasteful cars, and oil consumption fell by ten per cent. Once oil prices slipped back, Americans returned to their beloved gas-guzzlers. Between 1985 and 2000, the demand for oil rose by almost twenty-five per cent.

Higher energy prices would have many beneficial effects. Besides encouraging gasoline conservation, they would help the renewable-energy sector, which can't compete at today's prices, and they also would make it economical to start exploiting nonconventional supplies of oil, such as oil shale in the Rockies, tar sands in Alberta, Canada, and heavy oil in Venezuela's Orinoco Belt. "Under any reasonable economic scenario, in twenty-five or thirty years we will be using more alternative fuels," Jeffrey Sachs said. "We will be gasifying coal and we will be liquefying tar sands, and doing a lot of things that mean opec's bargaining power will be reduced."

The most straightforward way to keep energy prices up, and the one that most developed countries adopt, is to tax hydrocarbons—a policy proposal long regarded as political suicide in the United States. The federal tax on gasoline hasn't gone up since 1993, when President Clinton raised it a paltry four cents a gallon. Americans prefer lower prices at the pump even if they have to pay hundreds of billions of dollars in taxes to support a U.S. military presence in the Middle East. Amy Myers Jaffe has calculated that the cost to taxpayers of oil-related military activities is equivalent to about ten cents per gallon of gasoline. "We are being taxed on energy in this country," she said. "It's just hidden."

Given the public's ignorance about energy issues, and the entrenched interests that dominate the industry, many analysts are skeptical about the prospects for change. Jaffe believes that it will take a repeat of what happened in the seventies to force meaningful reforms. Joseph Romm said, "If people cared about oil imports they would buy different cars. In response to 9/11, people started putting flags on their S.U.V.s and buying Hummers. That tells you something."

Before any progress can be made, the political debate will have to move beyond the myth of energy independence. "Sooner or later, we are going to have a lot of hybrid cars, electric cars, and, perhaps, at some time in the future, we are going to have a hydrogen economy," Robert Mabro told me. "But, until we get there, to talk about energy independence is foolish. The two candidates, with due respect, are lying to the people, or they don't know what they are talking

about.”✦