Energy Security for America

Papers presented at the AJC Energy Security Symposium

Washington, D.C.
May 5, 2003

THE AMERICAN JEWISH COMMITTEE

CONTENTS

Foreword

AJC Energy Policy

The American Jewish Committee is a long-time advocate of the need to reduce our nation's dependence on foreign energy sources. AJC's involvement in the issue is inextricably tied to our concerns as Americans and as Jews. As expressed in two recently adopted AJC statements on the subject (see pages 61-68 in this publication), a sharp reduction of energy dependence is essential to our national security, the economic and social well-being of our country, the continuance of a broad U.S. role in world affairs, and the safety and survival of the State of Israel.

Our ever-growing dependence on foreign oil is of particular concern. The September 11 terrorist attacks against the United States, our ongoing war on terror, and war in Iraq underscore the extent to which our national security and position as the leader of the Free World are jeopardized by America's energy dependence on unstable or hostile foreign nations. Specifically, our increasing reliance on foreign energy sources makes the country susceptible to pressure from oil-producing nations, vulnerable to terrorist attack, and impaired in its ability to remain an independent player on the world stage. The recent blackout affecting a significant portion of the United States further substantiated our deep reliance upon energy to function even on a basic level as an economy and society.

AJC believes, as do most experts in the field, that unless the U.S. diminishes its reliance on foreign sources of oil, our vulnerability to OPEC member nations and rogue states (overlapping categories that include the nations with the largest share of the world's proven oil reserves) will only increase. Over the years, U.S. dependence on foreign fossil fuels has led to coalitions with nations that are fomenters of terrorism and/or that lack democratic values and operate with few environmental constraints—in complete contravention of core AJC values and concerns.

In addition, as Jews, we have a duty to conserve and care for the earth. Jewish Scriptures and tradition teach that this is a responsibility both to our Creator and to future generations. Thus, we are enjoined to behold creation as "very good" (Gen. 1:31), to "till and tend the garden" (Gen. 2:15), and to set limits on the private use of creation's bounties because "the Earth is the Lord's and all that is in it" (Ps. 24:1). This consciousness translates into an obligation to use the resources of the earth wisely and to preserve the environment for future generations.

AJC Advocacy Efforts

In furtherance of our efforts to reduce the nation's dependence on foreign sources of energy, AJC has advocated a comprehensive energy program that calls for a variety of measures to encourage conservation and efficiency. These include the adoption of increased corporate average fuel economy (CAFE) standards (which could eventually reduce energy usage by two million barrels—or approximately 20 percent of our imports—of oil per day), as well as provisions allowing for exploration and development of some domestic energy sources, so long as research bears out the presence of sufficient recoverable oil and such measures are accompanied by sound environmental safeguards.

AJC actively engages in advocacy efforts to encourage Congressional enactment of comprehensive energy legislation that would significantly reduce our reliance on foreign sources of energy. In addition, through op-ed articles, radio commentaries, and sponsorship of seminars to educate community groups and the American public, AJC strives to increase public awareness of the need to face our energy crisis and its foreign policy and national security implications.

As part of this effort, AJC's National office and Washington, D.C., Chapter recently held a joint symposium on energy security in which participants heard from various experts in the field, including representatives from the Department of Energy, the National Academy of Science, and other private institutions. The aim of the symposium was to bring together experts in the field to discuss what, in fact, must be done in order to achieve real energy independence. This publication contains many of their presentations and recommendations.

For further discussion of AJC's views on the crucial and present nature of the energy policy debate, please refer to the AJC policy statements included in this publication.

Henry Dubinsky, Chair
National Energy Committee
American Jewish Committee

Introduction to the Energy Security Symposium

Should energy—its sources, production, distribution, and consumption—be a major concern of the American Jewish Committee? If so, how should the issue be framed? These were the principal questions that the Washington Chapter of AJC discussed at an early meeting of its Energy Task Force in late 2002. By the close of the meeting, we agreed not only that energy *should* be a major concern, but that energy *security*—the assured flow of energy resources to meet the needs of the American economy—should be the specific issue at hand.

Why energy security? Since the early 1970s, from the time of the first Arab oil embargo, American politicians have developed a rhetoric of energy independence—the notion that America's energy needs could somehow be satisfied within our borders. By and large, the rhetoric has been empty—a political soup that smelled delicious to the public but was devoid of substance. While some progress has been made toward reducing our reliance on OPEC oil sources and on conserving energy, our nation is now and will remain into the foreseeable future dependent upon the importation of foreign oil. Without it, our economy would grind to a halt.

In part, this is bad news. It suggests that American foreign policy will not be able to ignore to some extent the never-ending thirst for oil. But the news is not all bad. In an age of globalization, when every industry from high technology to wine has become global in production and distribution, why should the oil industry be different? Why should not the advantages of globalization be applied to the exploration, recovery, refining, and distribution of petroleum products? Among those advantages are economies of scale, distribution of facilities, and potential environmental protection.

Moreover, recognizing the fact of global interdependence for oil and accepting it steers us away from bad policy choices—such as trying prematurely to develop an uneconomical and environmentally damaging shale oil industry in Utah and Wyoming, merely because it would be domestic. And it focuses us on sounder choices, such as developing oil resources in less hostile parts of the world, improving emission standards for vehicles, and steadily developing and improving automobile technologies, such as hybrid power sources. While we cannot become energy independent, we can most certainly improve our energy security dramatically and lessen our dependence on Arab and Persian oil to a great degree.

Based on these understandings, we constructed our Energy Security Symposium, held on May 5, 2003, just prior to AJC's Annual Meeting in Washington, D.C. Our first and last speakers illustrated how long-term the energy issue has been and how it has entwined and tormented both major political parties and many administrations. Stuart Eizenstat, President Jimmy Carter's White House chief of staff and a Democrat, opened, and David Garman, President George W. Bush's assistant secretary of energy for energy efficiency and renewable energy, closed the symposium, with both stressing the need for new technologies.

The majority of our speakers—from government, industry and academia—addressed the supply and the demand sides of the equation. While differing in their approaches, all were optimistic that in one way or another we could make great strides in improving U.S. energy security. In fact, their presentations, in total, represent a kind of "road map" for how we should proceed over the next half century. From the current development of hybrid cars and the push for more conservation and efficiency to the use of exotic technologies such as hydrogen later in this century, we can make good progress.

Getting there will not be easy. Balancing the need for economic growth with protection of the environment as we move toward energy security will trigger harsh political wars. The ANWR (Arctic National Wildlife Refuge) and vehicle emission standards battles are just two examples. The current dispute over placing wind farms off Cape Cod to generate electricity—pitting environmentalists against each other—is an example of how confusing and divisive these issues can be. But we can and must find solutions, and AJC can play an important role. More basically, Jewish values derived from our tasks of stewardship of the earth and providing a better future for our descendants provide a fertile basis for developing policy.

Finally, I would like to thank the members of the Washington Chapter who put great effort into creating the Energy Security Symposium; all are professionals who have worked in the energy policy field: Stuart Sloame, who directed the effort, Robert Horn, Linda Silverman, Gerry Charnoff, Maurice Axelrad, Ben Schlesinger, and Len Levine. Our chapter has a remarkable range of government policy talent, and this symposium took maximum advantage of that.

Leslie David Simon
President, Washington Chapter AJC
June 2003

Keynote Address

Ambassador Stuart Eizenstat

It is very timely that we are here to discuss energy issues. Within the last ten years, the United States has fought two wars with Iraq, and going back twenty years a third war was waged between Iraq and Iran. We have committed a total of 750,000 U.S. troops and suffered a loss of over 400 American soldiers in these two wars. We are continuing to have a great deal of difficulty in Iraq, an area upon which we continue to be highly dependent for oil imports.

At present, we import more than 51 percent of our oil, and that number is projected to increase to 64 percent by 2020. Oil played a central role in the first Gulf War, with Iraq's invasion of not only Kuwait, but its potential threat to Saudi Arabia. It has been a factor, although not the central factor—in fact, it would be incorrect to say oil was the central factor—in the second Gulf War.

Each year we import 16 percent of our oil from Saudi Arabia and an additional 9 percent from other Persian Gulf states. This is a consistently volatile region, and our dependence on oil from the Middle East is fraught with insecurity and danger. As we were so horribly reminded on September 11, terrorist threats both at home and abroad have links, whether direct or indirect, with the oil-producing states in the Gulf region. Our reliance on states that are unstable or even hostile to the United States presents a very real national security dilemma that has to be addressed immediately.

Some states such as Iran, and until very recently Iraq, are actively hostile. Others, such as Saudi Arabia, have been historically friendly, but are autocratic, rest on power bases without broad public support, and have their own internal fundamentalist threats. While we have national security interests in the stability of these regimes, we have to remain aware of the possibility that they could fall into unfriendly hands. Given my experience with Iran during the Carter administration, I can say with certainty that one would never have forecast the Iranian revolution which toppled the Shah of Iran, given the military support he appeared to have at the time.

Potential threats in this region, therefore, have had major impacts on our economy. In 1972, the price of crude oil was about $3 a barrel. At the end of 1974, it had quadrupled to $12. This was the result of an embargo by Arab oil-producing states in response to Western support of Israel in the Yom Kippur War. That war started with an attack on Israel by Syria and Egypt on October 5, 1973. The United States and many countries in the Western world showed strong support for Israel and, as a result, an embargo occurred which curtailed production by five million barrels per day. We made up about a million barrels from other sources, but the net loss of four million barrels per day extended through March 1974, and represented 7 percent of Free World production.

The Lessons of Iran

As we are all now transfixed by Iraq, Al-Qaeda, and Islamic fundamentalism, it is worth remembering that the first Islamic radical revolution occurred when I was in the White House in late 1978 and early 1979. During this period, the Ayatollah Ruhollah Khomeini returned to Tehran from exile in Paris, and the Shah abdicated. At that time, oil production from Iran dropped precipitously and prices skyrocketed. The Iranian revolution resulted in the loss of 2-2.5 million barrels of oil per day between November 1978 and June 1979. After the embassy occupation in November 1979, President Jimmy Carter halted all oil imports from Iran. Consequently, during the one-year period from the beginning of 1979 until the beginning of 1980, oil prices rose 120 percent. That increase was a knockout blow to the U.S. economy, aggravating inflationary pressures and increasing unemployment.

From 1978 to 1981, crude oil prices rose two and a half times, from $14 a barrel to $35 a barrel. Another, smaller supply interruption occurred during the Iran-Iraq War from 1980-88. During that war, Iraq's crude oil production fell dramatically, as did the crude oil production in Iran. However, the impact in Iran was milder, but still worrisome.

Iran presents a great policy dilemma for us today. It has enormous resources of oil and natural gas and is a hydra-headed country. On the one hand, it has a reformist president, supported by the majority of its people, and yet Muhammad Khatami clearly does not have control of the security and defense apparatus in Iran, as well as other major sectors of the Iranian government. The Iranian government is the chief supporter of terrorist organizations such as Hizballah, who seek to destroy the Middle East peace process and are on a crash course to develop medium-range missiles with potential chemical or nuclear warheads that will be able to reach Israel in a few years. At present, while we do not import any oil from Iran, oil is a fungible product, and their oil production is estimated to amount to some 3.9 million barrels per day.

Our dependence on oil from the Middle East profoundly influences our economy and our foreign policy. As I have suggested, it has had a hand in two wars. We now appear to be thinning out or perhaps even eliminating our troops in Saudi Arabia, and this has both pluses and minuses. However one looks at the geopolitics of this gradual military withdrawal, it is clear that we will remain dependent on Saudi and Gulf oil for a very long time.

Non-Middle Eastern Sources of Oil

One of the interesting developments since the time I was in the White House is the development of a tremendous amount of non-Persian Gulf oil. Nigeria, for example, which boasts Africa's largest population, supplies the United States with 900,000 barrels of oil per day. But it also has a wealth of religious and regional animosities, and it is hardly stable. The Caspian Sea region is generally considered to represent one of the largest untapped oil resources in the world. Azerbaijan and Georgia are also areas of enormous corruption and great instability. Georgia itself is a country with about five million people that teeters on implosion, and Azerbaijan has an autocratic government.

While the Caspian Sea is an important element in reducing and diversifying our dependence on the Middle East and the Persian Gulf, it is by no means a be-all and end-all solution. The Caspian Sea is 700 miles long, contains six separate hydrocarbon basins, and most of the oil and gas reserves in the Caspian region have not yet been developed. To give some sense of its potential impact, in 2001 oil industry officials reported sizable oil deposits in an area known as East Kazakhstan, which is located off the Kazakhstan coast in the Caspian Sea. Initial estimates indicate that the East Kazakhstan field alone could contain as much as 50 billion barrels and at least 20 billion barrels of crude oil. By comparison, the United States has known reserves of 21 billion barrels.

Getting the Caspian oil to international markets, however, will require overcoming enormous obstacles, since it must travel by pipeline through one of the most politically volatile areas of the world. For example, the Baku-Ceyhan line, which will go from Baku in Azerbaijan to Ceyhan in Turkey, is a 1,700-kilometer pipeline that has to traverse very difficult environmental and other obstacles. Because the Caspian Sea is landlocked, oil and natural gas has to be transported by pipeline to a terminal on the open sea, where it will be pumped into tankers and shipped to customers. Long distances over often inhospitable mountain and desert terrain, prone to earthquakes and vulnerable to attack, will make pipeline construction and operation challenging.

As important as the Caspian is, the reserves there are closer to what they were in the North Sea and are in no sense similar to what they are in the Persian Gulf. So while diversification is important, and the development of oil and gas in Russia, China, the North Sea, and the Caspian are very important to reduce our dependence on Middle Eastern oil, they are not, in at least the short term, an immediate solution.

The largest number of reserves is still found in the Middle East. The Persian Gulf holds nearly 674 billion barrels of crude oil reserves, which make up between 56 percent and 66 percent of the world's proven reserves. Saudi Arabia alone has reserves of over 260 billion barrels, Iraq 112-115 billion barrels, and Kuwait around 50 billion.

Russia is believed, by contrast, to have about 25 billion barrels of reserves, and the Caspian between 25 and 50 billion.

Oil from an Economic Perspective

We also need to look at oil from an economic standpoint, in particular, with regard to balance of payments. Oil is the United States' biggest natural resource import and one of the largest contributors to our massive trade deficit, a deficit that in 2002 hit over $400 billion. We imported around $103 billion worth of petroleum products in 2002, slightly up from the previous year. Again, our increasing reliance on foreign oil not only has foreign policy impacts, but has economic impacts as well, and is one of the primary causes of the growing trade deficit since the 1990s.

In terms of solutions, there is one other issue about oil which is not directly Persian Gulf-related but more general: To the extent that we want to reduce the threat of greenhouse gases, a reduction in oil consumption is essential. Transportation is responsible for one-third of the release of greenhouse gases into the earth's atmosphere. Although the U.S. accounts for 3 percent of the world's population, we are responsible for over 20 percent of greenhouse gases worldwide.

Solutions and the Notion of Energy Independence

Let us begin to talk about some solutions. First, I think it is really misleading to talk about energy independence. We are not going to become energy independent any time in the near future. We are going to be importing very large amounts of oil and natural gas for a very long time.

At the same time, I think it is also a false trade-off to talk about having either energy production or energy conservation. The fact is that sometimes I think we are not really serious about energy at all. We talk a good game, but when it really comes down to brass tacks, the interest groups on all sides checkmate each other, and any tough decisions end up with a blank. Quite frankly, I think that the administration's energy bill, whatever its good intentions, is going to end up with very little additional production, almost no additional conservation, and very little incentive for the production of alternative energies.

It is time that we make some tough decisions if we are serious about reducing our dependence on foreign oil: Number one, on the conservation side, is CAFE standards. In 1977, when we were trying to implement the 1975 Energy Policy and Conservation Act, I remember very well a meeting with the CEOs of the big three automakers in the Cabinet room in the White House. Congress had passed the 1975 act mandating so-called CAFE standards—fuel efficiency standards for new passenger cars—but did not mandate the actual amount, leaving it to the administration to fill in. We were considering an increase from 18 miles per gallon in 1977 rising to 27.5 miles per gallon in 1985. I remember Tom Murphy speaking for General Motors, saying, "Mr. President, we do not have the technology to do that. It will be financially ruinous, and we simply can't produce cars with a fleet-wide average of 27.5 miles per gallon by 1985."

Well, they did so, because they were mandated to do so. Quite frankly, it not only did not hurt the industry; it helped it. The mandates made the American sector of the industry more competitive with Japanese and German cars, particularly, Japanese cars that already had a head start. Today the fleet-wide average is below what it was in 1985, and there has been no increase in CAFE standards now for over fifteen years.

Indeed, the effort made in the Senate by Senator John Kerry and others to increase CAFE standards over time to 40 miles per gallon was soundly defeated by two-thirds of the Senate. By raising CAFE standards, we would reduce our vulnerability to Middle Eastern and other oil. A rise in CAFE standards to 40 miles per gallon would save 125 billion gallons of gasoline by 2012, representing about 1.9 million barrels of oil per day, or more than the total amount of oil we import from Saudi Arabia. And yet, this measure never got out of the House, never even was seriously considered, and was defeated by a two-to-one margin on the Senate floor.

In terms of infrastructure, the Administration's bill had some important innovations: Getting more transmission lines built more quickly and getting oil and gas pipelines built more quickly are important, but these steps run into tremendous licensing problems. It is very difficult to overcome state burdens; it is important that we have the kind of national impetus that we tried to do through a fast-track process in 1980 with the Energy Mobilization Board, but that ended up also going nowhere.

If we are serious about energy, we have to be serious about providing the kind of infrastructure that the American Jewish Committee in its February 2002 energy statement suggested.

Third is diversification of energy in terms of alternative resources. Now there are very good reasons to criticize our 1980 synthetic fuels program. It was overly ambitious and the loan guarantees that it would have provided would have very costly, particularly when oil prices collapsed in the 1980s—but that is precisely the problem. We go through peaks and valleys, as we have seen just in the last couple of months, with oil going up to $27 or $28 a barrel because of Iraq, then going down; it is very hard to get production incentives and conservation when we have that kind of volatility.

Now again, there were many flaws to the synthetic fuels program that we proposed and that was passed by the Congress, but if we had had a sustainable alternative fuels program then, we would be much further along in gasification of coal and in many other technologies that we could have tried on a pilot basis, and the technology would have perhaps been ready to go on line now.

A second issue in terms of alternative energy is nuclear power. I had on my desk ready to send to the president for final check-off the Nuclear Licensing Act, which would have streamlined what then took seven to eight years to get the necessary permits for nuclear plants down to the Japanese average of about three years. It was ready to send to Capitol Hill and then Three Mile Island happened, and any effort to try to speed up the licensing of nuclear plants fell apart. And we have not had a new nuclear power plant ordered in this country since 1974.

You cannot have it both ways: I am a very strong advocate of reducing emissions for global warming, but you cannot have a solution by which you want to reduce global warming and also want to eliminate nuclear power. It cannot be done. Nuclear power needs to be a more important part of our energy picture, as it is in other countries. Nuclear power is relatively safe. I think the industry made some serious mistakes in not allowing a sort of cookie cutter-type process, whereby there was a systemization of nuclear plants. The utilities tried to do too much of their own thing. But nuclear power has to be an important component.

Next is research and development. I certainly applaud President Bush for his hydrogen initiative, but we need to give real money and real incentives for fuel cell development and for the purchase of hybrid cars. I went to a car dealership in Rockville, Maryland, about a year and a half ago to get a new car, and I was asked by the salesman whether I was interested in looking at a hybrid car, the Prius. I took a test drive. In town the Prius gets 52 miles a gallon and over 40 miles a gallon on the road. It is one of those perverse situations where you actually get better mileage in town than on the road, because when you put your foot on the brake it activates the fuel cell, and that does not happen as often when you are on the road. Encouraging the purchase of cars like that can make a difference. In the state of Maryland, you pay no sales tax on a Prius.

The development of solar, wind, nuclear, hydrogen, and fuel cells—all need to be encouraged, because we are not certain which ones will be the most viable. We need to have a very robust research and development program, which we do not have now.

Let me conclude by reiterating that our dependence on oil from abroad has both foreign policy, international economic, environmental, and domestic economic impacts. No one is more affected by these impacts than those of us who are concerned about the Middle East and Israel's security. It is incumbent on the American Jewish Committee to continue to be a very forceful voice in pushing for a genuine energy policy in which we do not simply look at false trade-offs between production and conservation. We need both.

QUESTIONS AND ANSWERS

1. Do you think that tax incentives should be given to persuade prospective car buyers to purchase hybrid cars? Additionally, should similar incentives be offered to car producers who generate energy-efficient technology to produce these hybrid vehicles?

The president has actually suggested this; I think that people should be given incentives to purchase hybrid cars, and companies to produce them. They are beginning to produce them; the marketplace is beginning to demand them. But if states could be encouraged, as Maryland has done, not to charge sales tax, then it is possible to increase demand. Again, one of the problems is that we go through price cycles, and people become influenced to do something when they see gasoline going up to $2 a gallon; then when it goes back to $1.50, the impetus declines. We have to have some stable incentives involved so that people, even when gas is at $1.50, will be encouraged to do so.

2. How much of U.S. oil comes from the Middle East?

Twenty-five percent comes from the Persian Gulf, if you include Saudi Arabia and the other states.

3. What is the relationship between government-mandated energy policy and actual price at the pump?

If you look at the history of energy policy since the early 1970s, Richard Nixon declared his Energy Independence Initiative after the Yom Kippur War, when you first had a spike in oil prices. During the Carter administration, we had two energy policies, one in 1977, which the president called the "moral equivalent of war"; and then a second cycle after the Iranian revolution again spiked oil prices. We did a lot of things wrong on energy, and one of the worst things I ever recommended to the president was in the midst of the Iranian crisis suggesting that we maintain price controls on gasoline at the pump. It was an absolute disaster. If we had deregulated immediately, prices would have gone up, but then they would have found a clearinghouse level and we would not have had gas lines.

Whatever one thinks of the details of his program, President Bush made a genuine effort with Dick Cheney on energy, and he has continued to try to push it. It is very hard to build any domestic support for that at a point when oil prices again come down to levels that they are likely to drop to now, about $22 or $23 a barrel. That is currently the OPEC price level.

OPEC, having learned their lesson in the 1970s, has been very good at not allowing long-term spikes in oil prices, because they know that would increase incentives for conservation and for the development of alternative energy and would end up hurting the purchases of their product.

There is no easy solution; it takes political leadership; it takes a president, and I hope this president will continue to push, to indicate that it is urgent, but it is very hard to sustain public support in the absence of the perception of a crisis. This is a slow crisis; it's not one that people perceive. So it really requires the essence of political leadership, because the mutual interests are so conflicting with conservationists and environmentalists on one side and production forces on the other. There is not a big political payoff for getting one's neck out front. We realized that in our 1977 program, when it took two years to try to deregulate natural gas, which was one of the very good things we did, and then in 1979-80 when we deregulated crude oil.

4. What is the role of the president and the Congress in promoting energy solutions?

I do not think there is any simple solution. If the president of the United States makes it an important issue and raises its visibility, then it will become something one can build on. Only the president can do that; no individual member of Congress has the influence to do it. It is very much the bully pulpit of the president.

People have to be told very basic facts. The basic facts are that we are going to be dangerously dependent on foreign oil unless we take tough steps and move forward on conservation, on nuclear energy, on pipelines, and so forth; only the president can do that. How does one do it? Maybe we should have a White House conference on energy, one that would take six months to a year to plan, be a major focal point, with panels and experts, and participation by the president. We have not ever had a White House conference on energy, so far as I know. Maybe it is time to pull a lot of these strands together and focus on what are some of the most promising technologies, both in nuclear energy and other alternative fuels, and on conservation.

The problem is that it is so highly politicized; it seems that you are either for conservation or for production, and the notion of being for both seems to be lost. Additionally, when you do something like CAFE standards, you run into a buzz saw with the automobile industry. They are very powerful; they are obviously large employers, and it is extremely difficult to buck that. It is hard to conceive that we are serious about energy if we do not do something about nuclear power on the one hand and CAFE standards on the other, and both are totally at the dead center of these conflicting constituencies. There is only one person who can try to synthesize these factions, and that is the president.

Energy Supply

John C. Felmy
Chief Economist and Director,
American Petroleum Institute

We need a balanced energy policy—not just CAFE standards versus drilling in the ANWR. We need conservation. We need energy efficiency. We need renewable energy, but renewable energy is but a small source of the total energy supply in the United States and in the world, and until the costs decline, it is going to continue to be small.

To meet our needs going forward—our growing economy and growing population—we are going to need more conventional energy or else we are going to face some dire consequences. We are going to need more oil, coal, natural gas, and, yes, a lot more nuclear energy.

Energy Sources and Usage

What have we been doing over the past few years? Looking at this price chart (Figure A), you see that the top line is the price of regular grade gasoline in cents per gallon, and the bottom line is the price of crude oil in cents per gallon. One of the things I spend my life doing is explaining to several hundred reporters a year that there are 42 gallons in a barrel of crude oil. If you want to know how much the price changes per gallon, you have to divide the barrel price by 42. That can sometimes be an epiphany. We have seen the crude oil prices change from $11 to $37-$38 a barrel. We are on a roller-coaster, and we need to develop an energy policy to get us off this treadmill.

Figure A

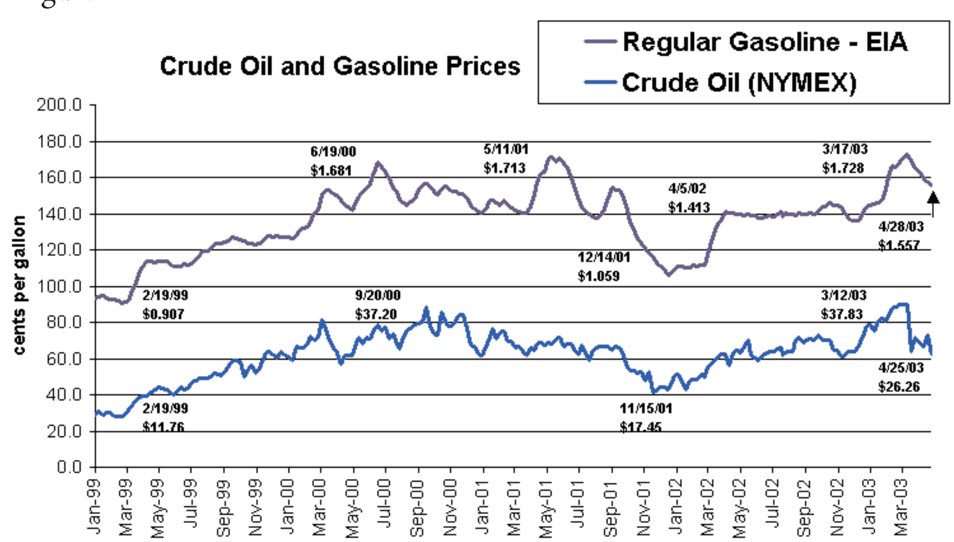
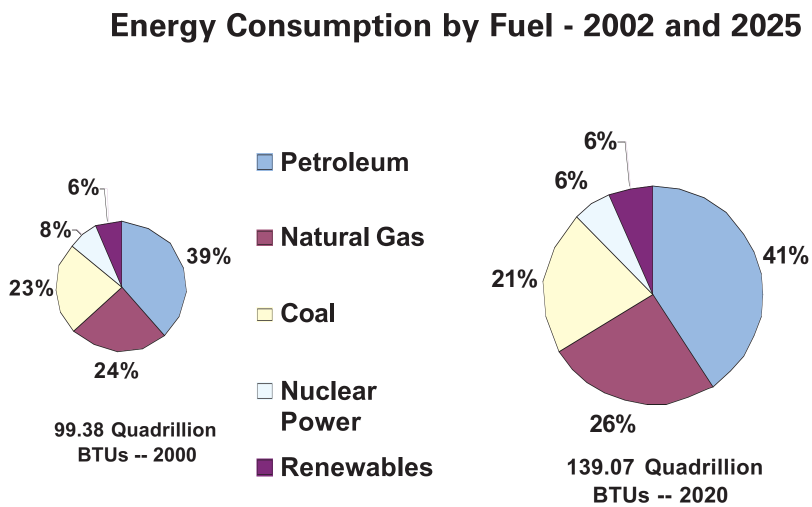


Figure B



Where do we get our energy right now? According to the pie chart (Figure B), you see that we get approximately 63 percent of our energy from oil and gas and, when you add in 23 percent from coal, about 86 percent in total from fossil fuels. Renewable energy is a very small share, and I will break down how small a share it is, if you look at the darlings of renewable energy: solar, wind, and geothermal energy.

This graph (Figure C) shows how much our energy supply has changed over the years, and how much our demand has increased from 2000 projecting forward to 2025. We continue to import more and more energy into the United States. Most of it is oil; we import around 55 percent to 60 percent of our oil, 15 percent of our natural gas, and some electricity.

Figure C

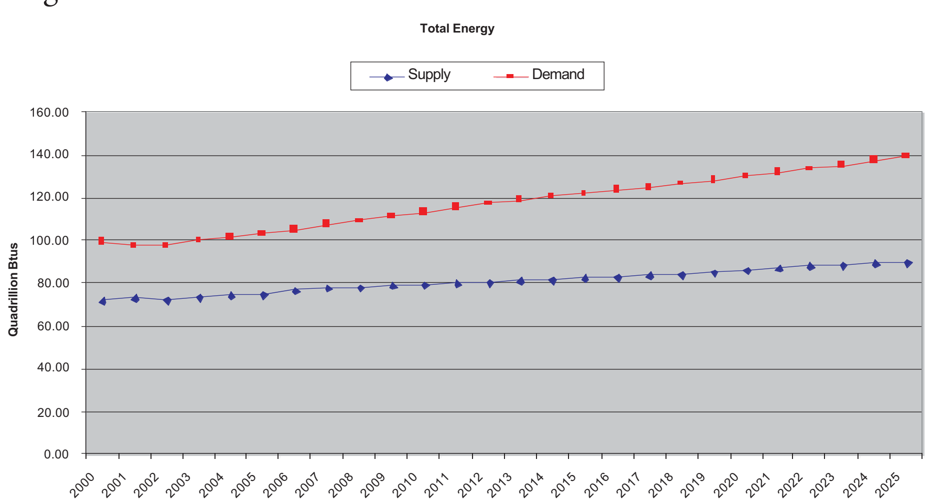
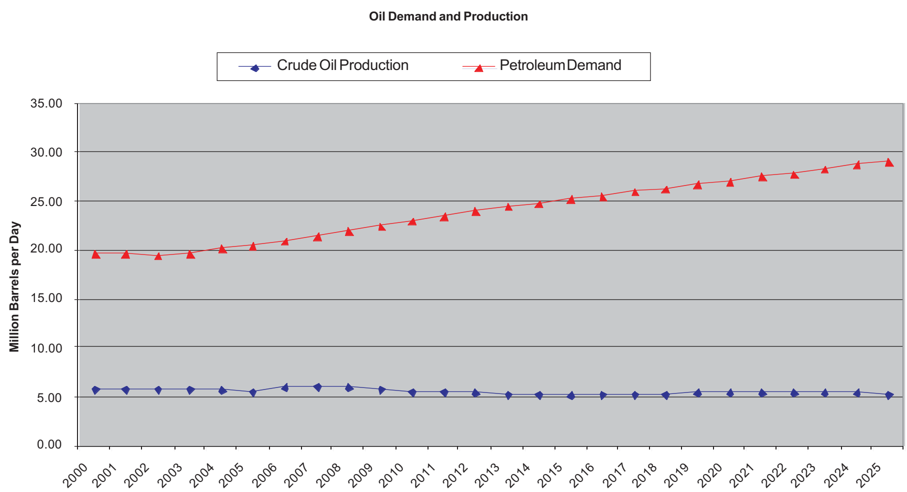


Figure D



Looking at Figure D, showing oil demand and production, you can see that going forward, the forecast is that by 2025 we are going to import almost 68 percent of our oil from abroad, and that is going to present some major challenges. Unless we do something to produce more oil in this country, you can see that the supply curve, which is the lower part of the chart, will continue to decline in relation to demand.

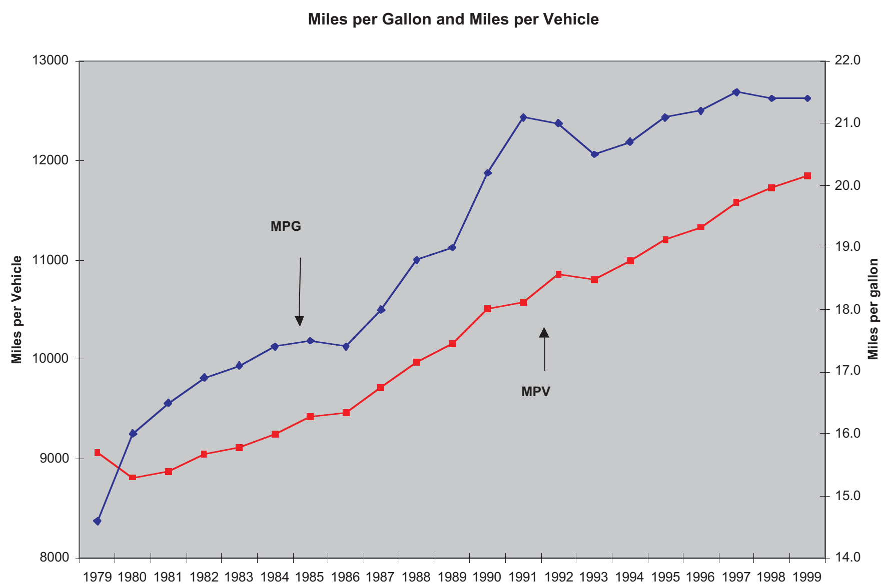
If we look forward, the EIA (Energy Information Administration) forecast for 2025, according to the Department of Energy, is that we are going to double our GDP. (Figure E.) To meet that need, even with improved energy efficiency, conservation, and an increase in renewables of around 65 percent, we are still going to need 47 percent more petroleum. We are going to need 54 percent more natural gas and 34 percent more coal. We are going to need a lot more conventional energy. The reality of the situation is that we are going to need a lot more, and that implies that we are going to have petroleum imports increase by 200 percent—a dramatic number.

Figure E

EIA Forecast to 2025

- **Real Gross Domestic Product is projected to increase by 105 percent**
- **Total energy consumption is forecasted to increase by 43 percent**
- **Petroleum demand is projected to increase by 47 percent**
- **Natural gas demand is projected to increase by 54 percent**
- **Coal demand is projected to increase by 34 percent**
- **Electricity demand is projected to increase by 54 percent**
- **Renewable energy supply is projected to increase by 65 percent**
- **Nuclear energy is projected to increase by 5 percent**
- **Energy efficiency (output per unit of energy) is projected to improve by 43 percent**

Figure F



The reality of the energy situation is that we are going to need a lot more conventional energy.

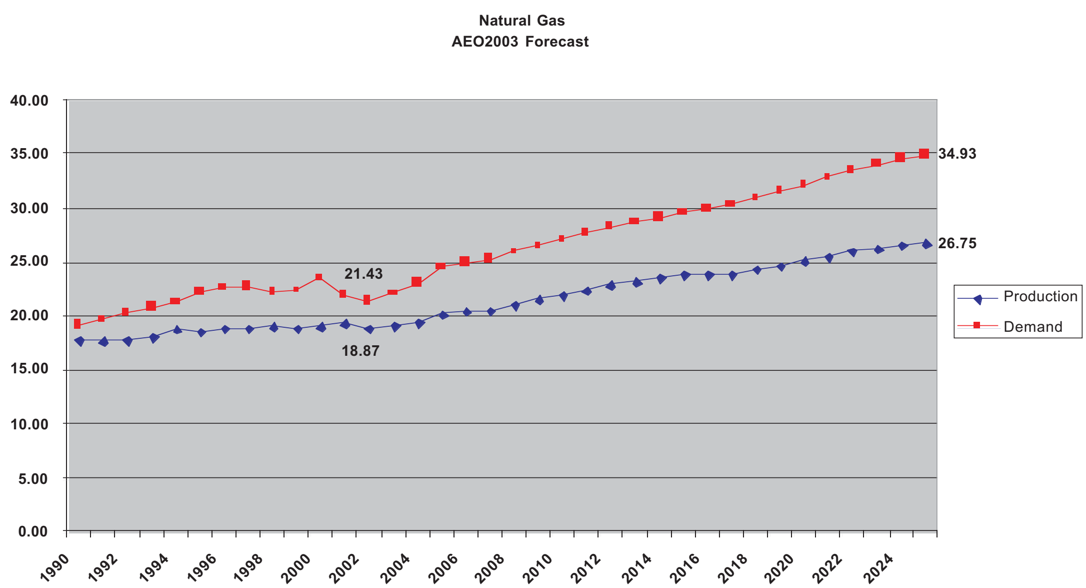
CAFE Standards

I will turn to CAFE standards as a question. Let me make clear that the American Petroleum Institute [with whom he is affiliated] does not have a position on CAFE. We do not manufacture cars, so API does not have a position. What I want to point out as an economist is that CAFE is strongly disturbing to me. I would repeal it, not just increase it. Why? Because it costs jobs and lives. The National Academy of Sciences estimated that it cost somewhere around 2,600 lives because of the way CAFE standards were imposed. It almost destroyed Detroit. That is why the Japanese have such a large market share of vehicle sales in this country.

But the most important thing about CAFE is that it does not work. On Figure F there are two lines, the lower line represents miles driven per vehicle and the top line, miles per gallon. Over the 20-year period between 1980 and 2000, miles per gallon increased by about 37.5 percent. Over the same period, miles driven increased by about the same. If you look at gallons per vehicle—just for passenger cars, not SUVs—miles per vehicle changed from 551 gallons in 1980 to 547 in 2000. Thus every improvement in efficiency was offset by people driving more. The dirty little secret about CAFE is that it causes sprawl, because it makes it cheaper for people to drive. That is an economist's interpretation of CAFE standards.

An engineer would say that we improved the fuel efficiency, so we use less. But that is not the way the world works. If you make it cheaper to drive, people will drive more. Therefore, as a concept to reduce fuel usage, CAFE will not get you there.

Figure G

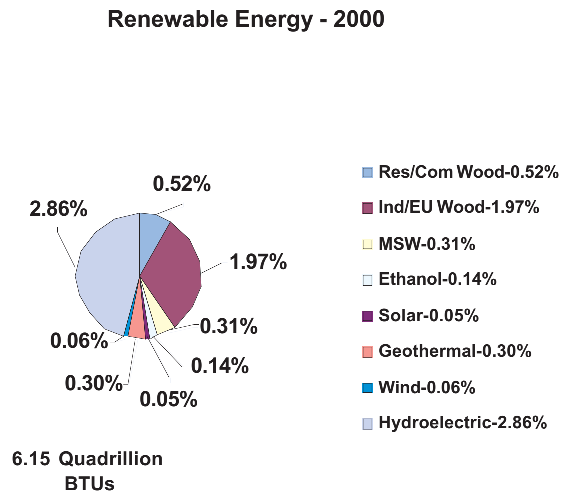


Natural Gas and Renewable Sources

Let us turn to Figure G, the chart for natural gas. Natural gas is a fuel preferred by our government. It is clean burning. It is used in most power plant construction; by now 95 percent of all power plants are natural gas-fired. Unfortunately, we face so many restrictions on producing natural gas in the United States that our production of natural gas has been flat for about eight years. Yet going forward, the forecast is that demand will increase substantially to meet a continued growth in natural gas supplies. That is going to be an enormous challenge for us, unless we adopt policies that help us move forward in that direction.

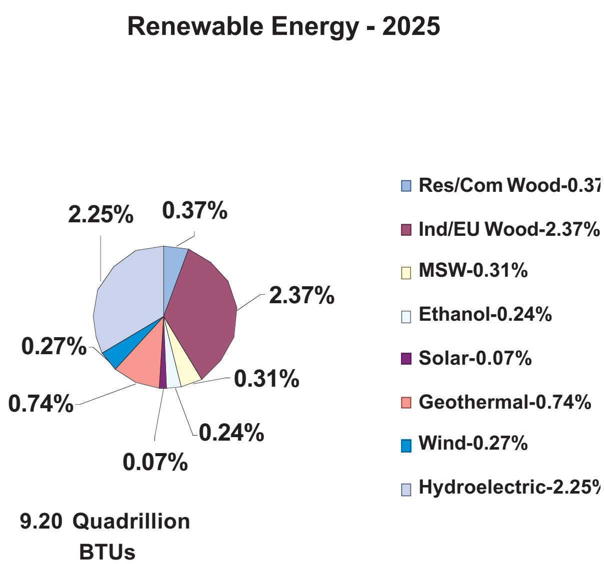
Why won't renewable sources of energy do the trick? If you take the renewable share of the first pie chart (Figure B), which showed 6 percent of energy consumption coming from renewable energy, and you look at what the renewable energy category is composed of (Figure H), the biggest component is hydroelectric, followed by wood, primarily used in the pulp and paper industry. If you remove those two sources, which none of the advocates of renewable energy support, and take out municipal solid waste, which is the MSW item on the pie chart (Figure H), you narrow down the category to only solar, wind, and geothermal—the darlings of renewable energy.

Figure H



These categories are important, but they comprise only 0.41 percent of our energy supplies. Even if you increase them by 1000 percent, you would only get to 4 percent. The reality is that they are important, but they are tiny. According to the Department of Energy, if you increase them dramatically, you only get to a level of 1 percent of supplies (Figure I). We need a balanced energy policy, but we have got to be realistic about what each individual energy source can deliver.

Figure I



World Energy Consumption

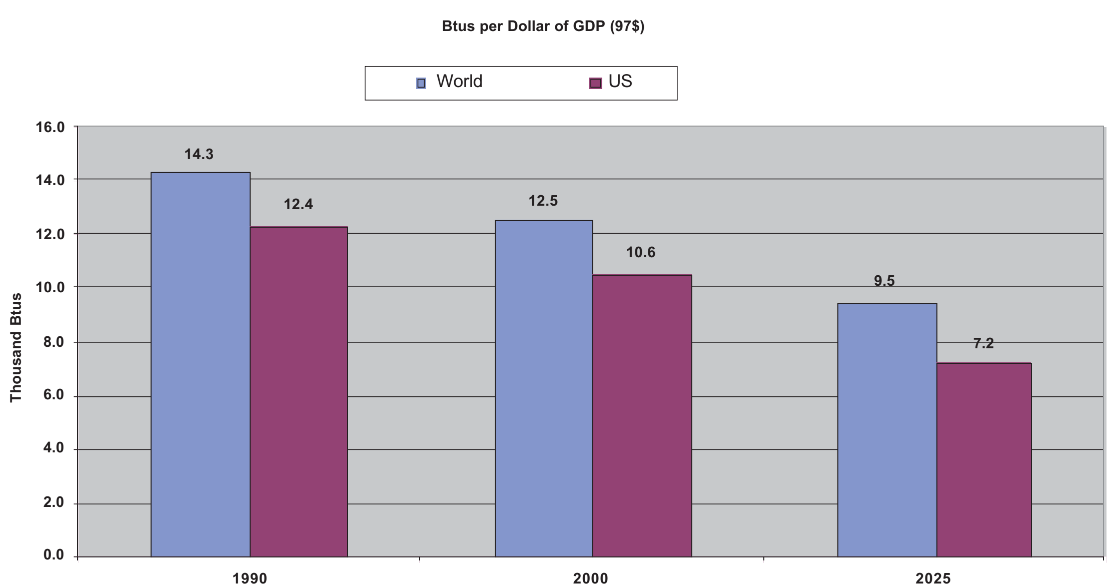
For the world, the situation is basically the same. The world demand for petroleum is going to continue to grow, because we continue to have more cars in the world, particularly, in developing countries like China and India, and world efficiency continues to grow (Figure J). The bar chart (Figure K) shows thousand BTUs per dollar of GDP produced.

Figure J

World Energy Consumption – Quadrillion Btus - EIA

Fuel	2000	2025	Percent Change
Petroleum Share	**155.9** 39.1%	**240.7** 37.6%	**54.4**
Natural Gas Share	**91.4** 22.9%	**181.8** 28.4%	**98.9**
Coal Share	**93.6** 23.5%	**139.0** 21.7%	**48.5**
Nuclear Share	**25.5** 6.4%	**28.6** 4.5%	**12.2**
Other Share	**32.8** 8.2%	**50.0** 7.8%	**52.4**
Total	**398.9**	**640.1**	**60.5**

Figure K



The United States continues to be more efficient than the rest of the world in this respect, and continues to improve faster than the rest of the world. We are going to see continued improvements in energy efficiency, but that will be offset to a degree because the wealthier the world gets, and the wealthier the United States gets, the more petroleum and the more energy each will use. Why? Because people want a car, want bigger houses. Thus the per capita use of energy will continue to grow and will offset the energy efficiency, and so again, we are going to need more conventional energy to be able to meet it.

This is world oil consumption. (Figure L) We are facing a dramatic increase in oil consumption from the year 2000 when we consumed 77 million barrels a day to the projection for 2025 of almost 120 million barrels a day in terms of demand.

Figure M shows where the oil comes; the major exporters are Saudi Arabia, of course, in the lead, followed by Russia, with Norway and Venezuela also important suppliers. With a concentration of reserves in the Middle East and in OPEC—roughly 80 percent of world reserves are in OPEC—they are going to continue to be an important supplier.

These are our U.S. suppliers (Figure N). A little-known fact is that Canada is the largest supplier of oil to the United States. Mexico is also very important as is Venezuela, so we get a huge share of our oil imports from the Western Hemisphere. That was the good news. Unfortunately, when Venezuela shut down, that was the bad news, but they have since returned to production and we have continued to diversify our sources of supply over the past several years.

Figure L

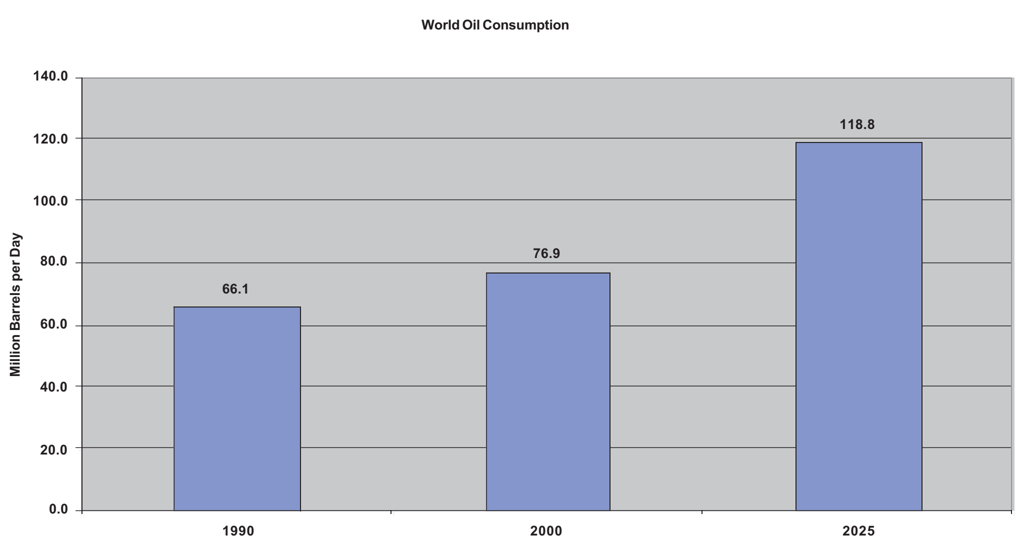


Figure M

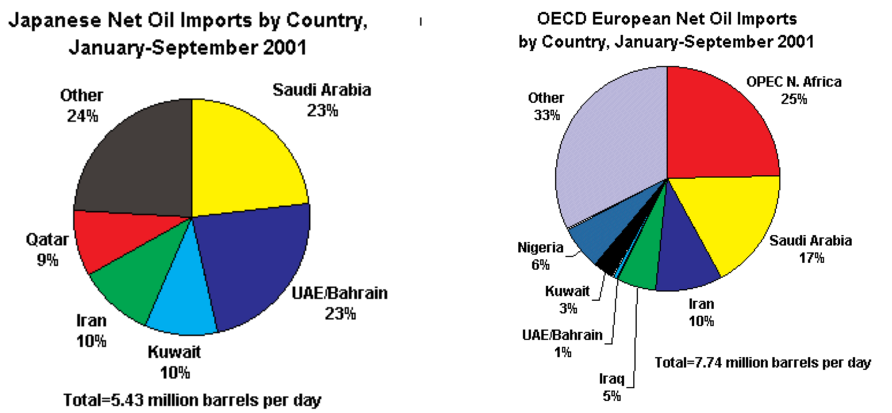
Top World Oil Net Exporters, 2002*		
	Country	**Net Exports (million barrels per day)**
1)	Saudi Arabia	6.76
2)	Russia	5.03
3)	Norway	3.14
4)	Venezuela	2.26
5)	Iran	2.30
6)	United Arab Emirates	1.95
7)	Nigeria	1.85
8)	Kuwait	1.73
9)	Mexico	1.69
10)	Iraq	1.58
11)	Algeria	1.27
12)	Libya	1.16

Figure N

Major Sources of U.S. Net Petroleum Imports, 2002* (all volumes in million barrels per day)			
	Net Total Oil Imports	**Net Crude Oil Imports**	**Net Petroleum Product Imports**
Canada	1.83	1.42	0.41
Saudi Arabia	1.55	1.52	0.03
Venezuela	1.37	1.20	0.17
Mexico	1.28	1.49	-0.21
Nigeria	0.60	0.57	0.03
United Kingdom	0.47	0.41	0.06
Iraq	0.44	0.44	0.00
Norway	0.38	0.34	0.04
Angola	0.33	0.32	0.01
Net Imports	10.38	9.04	1.34

Figure O

Dependence is not strictly a US issue



Japan and Europe also have major import issues, with the concentration of their oil coming from the Middle East (Figure O). Looking forward (Figure P) to where the demand growth is going to be for oil, we see it coming fundamentally from Asian economies, from the developing economies, and it will be used largely for transport, because the vehicles that are going to be manufactured and sold in the world largely will be powered by petroleum.

Where are the supplies going to come from? OPEC is going to continue to play an ever-important role at a source of supply for world petroleum. Non-OPEC countries are also going to play an important role, including the Caspian Sea region and parts of West Africa. We are going to continue to need to diversify our oil supply sources going forward.

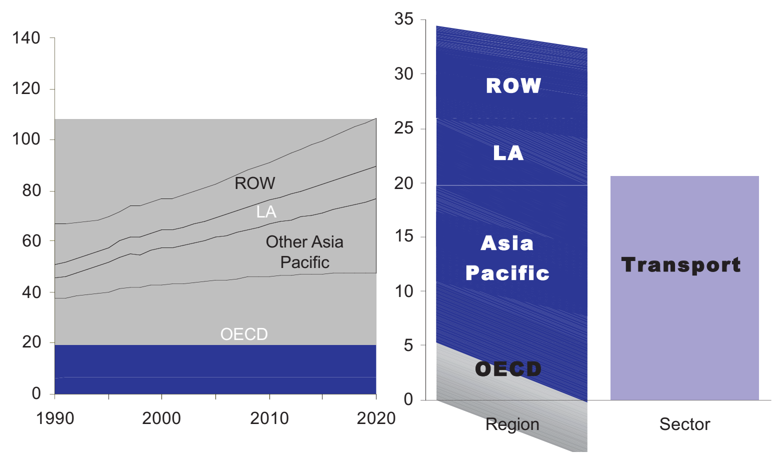
Summary

To sum this up quickly, I would reiterate the important points of an energy policy we need: It has to be balanced. It has to promote energy efficiency, renewable energy, and conservation. We believe in energy programs like Energy Star, LIPHEAP, and Weatherization.

What we need to develop is new sources. We need to streamline regulations to be able to develop infrastructure, pipelines, refineries, transmission lines, and so on. We need to reform economic sanctions. They simply don't work. And we need to reform the tax code so that it conforms with reality

Figure P

Forecast demand growth



Right now, depreciation schedules are so out of whack with economic reality that they penalize owners of infrastructure like refineries, pipelines, etc. This is a serious problem. And we really do need to educate Americans on the use of energy, because most Americans simply do not know the facts on what they are doing when they turn on that light switch: Where does that energy come from? Where does the natural gas that they use to cook with come from? Where does the petroleum come from?

Discussed earlier was the need to develop measures for global climate change. Let me make clear that global climate change is a serious issue, but it is also clear that the science of climate change is not certain. If you take average temperature change over the last 150 years, and you take average sun spot activity over the last 150 years, and you put them on the same chart this is what you see: Basically, solar activity has increased dramatically over the last century. The correlation between those two lines is 98 percent, and that has nothing to do with carbon; it is just simply solar activity.

As we go forward, we do need to develop climate change programs, which are important, but the precautionary principle does not work here. Solutions like Kyoto or other mandatory approaches simply do not work, because if climate change is occurring because of something other than carbon—for instance, if the North Atlantic current shuts down because of solar activity—Europe will freeze and then you are going to need a lot more energy. Thus some policies like Kyoto, which would destroy the energy industry, would be the wrong thing to do.

Energy Supply

Robert Hanfling
Energy Consultant, Charles River Asssociates

This country has had an energy policy for many, many years: It was for cheap, available energy. That is what the country was built upon, what the American dream grew upon. Whether it was a conscious or an unconscious policy—I think it was conscious—it was for cheap, available energy. To a great extent, that is still where we are today.

I have often been asked how we can get the public involved. Public involvement comes in two ways: When I was in government, I was often asked why, if we could put a man on the moon, couldn't we solve the energy problem? First of all, the space program was done off-line. It didn't affect everybody every day or every month. They did not get bills in the mail from their electricity company or go out and observe the price of gasoline while we were putting a man on the moon. Energy is very different, in that the public is informed and involved on a continuing basis, but most of that basis relates to the price of gasoline.

Over the past 30 years not much progress has been made. In the past, when gasoline prices went up a couple cents a gallon, we had congressional hearings. The public went berserk. For those of you who live in Washington, there is one gas station at Connecticut and Van Ness where gasoline is anywhere from 12¢ to 18¢ a gallon cheaper than even a quarter mile below or a half a mile above. There are no lines. If somebody asks how we get the public involved, how we get them to buy hybrid cars—raise the price of gasoline.

At the height or depth of the problem, in the Ford Administration, we went to Congress to raise the federal excise tax on gasoline by a huge 3¢ a gallon. It lost in the House by about 200 votes. We still want that price. If you were building a swimming pool, and the contractor said you have to fill that swimming pool with a liquid other than tap water, what would be the cheapest liquid you could buy to fill that swimming pool? It probably is gasoline—not Coca Cola, not orange juice, not milk, not bottled water, but gasoline. So from an economic point of view, is the marginal cost really built into our price of gasoline? Probably not. So if you want to get the public involved, raise the price of gasoline and people will adjust.

How Change Comes About

What does it take to make things change? I had a meeting with the [representatives of the] major airlines. If you were flying during the mid-seventies, you would go to LaGuardia and get out on the runway and the pilot would say, "We are number 54 for takeoff." It would take about an hour and twenty minutes, and you would see all those 727s out on the runway in line burning fuel. We met with the heads of the airlines and a government official, a kid from Brooklyn, and asked them if there was a better way to deal with the delay. Why burn all this jet fuel? Why not just keep the plane at the gate? Their response was: "Don't be ridiculous; you don't know what you are talking about. Who are you to tell us what to do?" Then JP-6, the jet fuel for airplanes, doubled in price. Today you don't leave the gate until the crew knows they can take off and they can land. Price is a tremendous economic stimulus and a tremendous way to focus people's attention on trying to solve the problems. But there is an emotional issue. People do not want to drive prices up.

I want to assure you—and this is not to make you complacent—the energy problem is going to be solved. That's the good news. The bad news is that it is going to be solved either by action or by inaction. It was solved in California vis-à-vis electricity because they had brownouts and blackouts. It was solved when Governor Jerry Brown exercised all of his holdbacks on gasoline in the late seventies or 1980. We had gas lines around the country, the National Guard was called out in eight states, and there were shootings on gas lines. I had to go out, not so much to calm them down, but to talk to the National Guard about that.

Like Stuart, I've made moves I regretted related to the energy issue. I testified in front of Scoop [Henry] Jackson at one particular hearing and talked about pernicious regulations. Let me tell you what that meant. It was done in good faith, in the government's good interest, supported by the public. We thought we knew who the enemy was. It was not OPEC; it was not the Middle East; it was the oil companies. I said we were going to pass rules and regulations whereby we would go back to a test year and find out how much gasoline was delivered to each gas station around the country. That would be all the gasoline that these pirates, these gasoline companies, could deliver to these gas stations.

What happened? In the cities there were gas lines; you could barely get gasoline. We tried alternate days, odd numbers, even numbers, all kinds of things. At gas stations fifteen to twenty miles outside the city, in Warrenton, Virginia, for example, when the gasoline trucks came to refill their tanks with more gasoline, they could not—because they were full. People were afraid to drive twenty miles outside of town, and the gasoline companies asked, "Why can't we move that gasoline into the city?"—and the government said no. So be very careful what you ask for when it comes to regulation, because sometimes it just does not work.

There are different opinions, for example, with regard to CAFE standards. There are different views as to whether, when you make things more efficient, you get an unintended consequence that people adjust by driving more.

Possible Solutions

I want to talk about possible solutions. We've talked about California, brownouts and blackouts, gas shortages, gas lines and recessions. Stuart talked about double-digit inflation, double-digit unemployment, and the many reasons why he and I were unemployed after 1980. The socio-political adjustments come, and then there is something that we do not like to talk about or to do—and that is war. I do not mean only the United States going into the Middle East. Energy is the basic engine that drives economies all over the world. If we want to get people out of poverty around the world, it is going to take energy, and those countries that do not have energy might go to war, a la Japan in 1940, over oil and other related issues.

This is not a problem within the United States. It is not a problem just for Israel or just for the Middle East. It is a worldwide problem, not just for energy. I used to come to meetings with a three-legged stool or a tripod and ask, "Which leg is more important?" "That's easy," everybody said, "every leg has to be equal and in balance." What if I call one leg supply, one leg demand, and one leg economics and employment? We used to go to meetings where people would say that the problem was all about supply, that we could produce our way out of this problem. No, we cannot.

Bill Simon, the former secretary of the treasury and the head of FEA [Federal Energy Administration] when I was there, was having a hearing with Senator Walter Mondale, and he testified, "Deregulate oil prices; this country will be awash in oil; we won't know where to store it." Mondale rejoined by saying, "You deregulate prices, and gas will go up to $6, $8, $9 a barrel. This country cannot survive on that." They were both wrong.

From the supply side, there is the view: Let's just keep drilling, using digging incentives, and we will produce our way out of this. No, we will not. In 1975, in the State of the Union Address, President Jerry Ford said, "Reduce oil imports by one million barrels a day by the end of '75, two million barrels a day by the end of '77, and the economic vulnerability of imports by '85, develop technology and resources such that the United States can help the rest of the world work themselves out of the energy problem." We came out with Project Independence Blueprint. It was brilliant, but I almost got fired over it, because I kept saying that all of the analysis was very accurate, but totally invalid. The numbers were good, but it just did not work. The PIB came out, two and a half inches thick, with a plan for zero imports by 1980. It just missed.

The Importance of Energy Independence

Energy independence is not the right vision. Energy interdependence, both domestically and internationally, is very important. Many criticisms can be made of the president; I will mention two. Isolating ourselves—putting aside the recent war—from many international organizations and international treaties is the wrong approach, particularly with regard to energy. We are laughed at around the world when it comes to energy. When we helped to create the International Energy Agency, we were paying perhaps 50¢, 60¢, 70¢ a gallon, and Europe was at $5 a gallon and there was a tax. They do not take us seriously when we want their help on these kinds of problems. That was in 1995.

In 1977, I was in the White House working on the National Energy Plan, helping to form the Department of Energy. Our program called for reducing oil imports by six million barrels a day by 1985, and we had a brilliant five-part program. Some of the points worked; some of them did not work.

I went back to a program that I had run for President Ford, the Fuel Conversion Program. After World War II, most electricity was generated by coal, which produced a lot of pollution. I remember growing up in Brooklyn, with the incinerators and the coal plants, so that whenever you wanted to drive a car, you had to put the windshield wipers on to get the soot off. Ring around the collar started in Brooklyn; it was sooty and dirty. The government encouraged conversion from coal to oil. It is cleaner and better. ConEd converted from coal to oil, as did a lot of other utilities around the country.

The energy crisis—I will come back to the term "crisis" in a minute—came and we had a Fuel Conversion Program that I was the regulator for under President Ford. My job was to go around to the utilities who had just converted from coal to oil and gas and say, "Sorry, we made a mistake; here is a law I have in my pocket that you've got to convert back to coal." It did not quite work. We have to focus on the problem.

I have often talked about—and still do—the energy crisis. In Japanese the word crisis is formed by two separate symbols. When these symbols are separated, one means opportunity and the other one means danger. When you put these two Japanese symbols together, they form the word crisis. At the time we used to say that a crisis was something that Walter Cronkite or Tom Brokaw was talking about on Monday and by Friday the crisis has to be solved. You cannot go more than a week. Okay? This is not an energy crisis; this is an energy long-term problem with a lot of different parts to it.

To return to that three-legged stool, there are other parties who say, "No, forget about supply; it is ruining the world. We can get out of this problem just by reducing demand and increasing efficiency. That is all that we need—this leg of the stool." They are right that we need more conservation, more energy efficiency. I don't know how many of you buy these high-efficiency light bulbs; they are more expensive initially, but over time save electricity. They have been on the market for years. The stores cannot sell them. The producers have put incentives on them, but people do not buy them, because they do not want that up-front cost.

We have to be careful of the economics, and we have to be careful of the environment. Global warming, is it true or not? I do not know. I've got stacks of data on both sides, but what I do know is risk benefit. If we are wrong, we are in big trouble. Aren't there things that we should do that we can do anyway and make them economically sound?

What can we do here? One very important thing is education. Can we get this perspective on MTV? It is not going to be as influential on PBS. There has been a lot of educational stuff on PBS and in the schools. Another problem with education: the Columbia School of Journalism they did a survey of how business, scientists, and government officials are viewed by the American public. They are all viewed very, very low. Show me a television program that is not on PBS that shows people working at their jobs, for the public good, except for maybe *West Wing*. Generally scientists, business people, and engineers are shown in a very negative light on TV.

I am a very strong proponent of nuclear power. The bill Stuart was talking about was one that I wrote for the president. The Bush administration has incentives in the center part of its bill to try to get six new nuclear plants built. But on TV nuclear power is always the end of the world; look at any of the James Bond pictures, it is always evil and bad. So, one thing to do is education.

Two is an evaluation of risk benefit, not just for the individual, but for the society. We need a partnership, a domestic partnership, between the federal government, state governments, and local governments; we need zoning. Stuart talked about trying to build a transmission line or a pipeline; we have public planning and land-use plans for everything except energy. We have never done that in this country.

Last, some consistency on the part of government is needed. A new administration comes in and whatever the other administration did was no good. This has to be a bipartisan move.

In many respects, energy and environment are probably the most divisive domestic issue since the civil rights movement. I had to contend with bumper stickers in Texas that said, "Let the bastards freeze in the dark,"—and they were talking about New England and California.

I think that AJC can continue to play a useful role, and each of us as individuals has to get involved.

The Security of Energy

Phil Sharp
Senior Research Fellow with the Environment and Natural Resources Program,
Kennedy School of Government

We are not without an energy policy in this country. We have dozens of energy policies. Some might argue that we are without a coherent energy policy and have always been, and perhaps always will be.

The one place where there is a genuine crisis in policymaking is in the electricity sector. We do not have a settled group of rules at the federal level, and in some cases at the state level, as to how to proceed at this point, nor a settled view on how to operate these markets. A unified platform as to how to operate these markets is where central attention needs to be focused in policymaking in this country, but not to the exclusion of other things.

What I am going to focus on is the topic of the symposium—the security of energy. Since 9/11 we have had new and intensified public attention to this issue. Much of that attention has been on the vulnerable infrastructure in the United States, whether nuclear power plants, dams, or the electric grid system; whether the danger is from cyberthreats to that system or particularly vulnerable transformers in various locations around the country. There are a number of developments relative to these threats through the national academies and within the U.S. government, but I will focus on one of the traditional questions, one raised by the previous speakers—the issue of oil, and to what degree it represents a security threat to the United States.

World Oil Markets

I am going to focus primarily on oil markets. Let me reiterate the significant role that the world oil markets play and will play in almost every projected future. Looking at the conventional projections as to where that is going, we expect to see, both worldwide and in the United States, a growth in consumption. One of the most significant things that will happen to affect the security and foreign policy arrangements concerns where that growth occurs. That growth is going to occur enormously in Asia and, in particular, in China. China is becoming a major importer of oil, which may well have relevance for the Middle East and to the United States in how the U.S. approaches world oil markets over the next twenty years, because China is bound to become more interested in where oil is coming from and consequently become more involved in the politics of the Middle East. One can only speculate as to the various ways China might become more engaged in Middle Eastern politics.

Secondly, how the United States and China manage to engage with the world oil market over the next twenty years could become very significant with respect to our relationship to one another, because potentially we will be the largest importers and, therefore, in competition to supply our economies. I don't want to overstate that, but just want to raise it as something that we need to get on the horizon in our thinking about this.

Our imports of oil, which have been a longstanding measure of how we are doing in energy policy, have not been, I think, exactly the measure. It is one measure, perhaps not the most significant one. Our imports are expected to grow. They are about 55 percent of our supply today, and will be 64 percent of our supply by the year 2020, unless things change. And the American love affair with the SUV does not seem to have come to an end. Some of us thought congestion would cause the automobile to become a less desirable approach to transportation, but then, of course, the skill and imagination of our manufacturers was such that they now have created a vehicle in which you can do everything you want. While you sit in the congestion, you can call home, hear the problems of your children, and say I don't want to come home. I'm better off being in congestion. Whatever your concern, the SUV provides a way out, as there is a new quality of life inside the vehicle and, unfortunately, that has been at a cost to fuel economy.

Very significantly, in terms of future supply, not only will we being using more oil, but the Middle East will remain a significant world supplier of oil. Today it is the source of about 32 percent of the oil; it is thought to become in 2020 the source of as much as 35 percent. The point is that the Middle East is not going to be irrelevant to us any time in the near future.

And finally, a point that is going to become increasingly important in international and domestic politics is that oil is now and will be the most significant contributor to carbon dioxide in the atmosphere, if these projections are anywhere near right. It will beat coal worldwide, and become the most significant one. Clearly, both internationally and at home, we will begin to take action on this front, to try to put in some kind of carbon constraints, without having a very clear picture of what impact that will have on these markets.

What We Fear: The Four D's

Let me suggest to you—from the rhetoric we hear on Capitol Hill, in the media, and in our own conversations—what we interpret as the actual threat. What is it that we worry about when we talk about the oil markets? Certainly, there are many positive things, including the fact that oil fuels the economy. Fuels are economically relatively cheap, except at certain times, for short periods of time. Let me suggest to you four things we worry about, using an alliterative device as a mnemonic, and then give you my point of view as to whether they are serious, or, more importantly, whether you can address this problem with energy policy, which is what usually happens in the public debates. The assumption is that we can solve these threats if we just have a different energy policy. Sometimes that is true and sometimes not.

The first fear is of disruption in supply, which has an economic impact, which means prices are higher, that somehow the oil will not reach the market, and we won't get the supply. Stuart Eizenstat mentioned a few events that historically have driven our concern about disruption.

For a long time, we debated whether OPEC was a threat in this regard, at least the Arab contingent of it, either by its ability to embargo us again as they did in 1973, or by their being able to drive the price so high as to do the same as disruption and milk us for all we are worth.

By and large, I think this is a low-probability threat to the United States. The fact is that they have learned their economic interest is such that it just doesn't seem to be something that can unite them in terms of either keeping prices extremely high or of creating any kind of disruption. It works against their self-interest. I think that we misunderstand: It is not that our foreign policy does not have to be attentive to what OPEC is doing and engage in conversation with them, but we should not be trying to design our energy policy, at any cost, around the idea of breaking up OPEC. This used to be the rhetoric that so many on Capitol Hill were obsessed with.

In terms of threat, more realistically and higher on the probability list than OPEC is our vulnerability to military and political failures in various places around the world. Ironically, if you had predicted back in the '80s the situation we have been in this year, you would have predicted a serious energy crisis and a serious response to our economy, the European economies, and the Japanese economies—which, in fact, we have not seen. We have seen some costs to our economies as a result of this instability, but we have had, in fact, three major supply areas of the world in political turmoil: Obviously, Iraq presented a threat that it could have spread, but did not, fortunately. Secondly, there was Nigeria, which has become an increasingly important supplier and has had political unrest, which came at the same time, of course, as more serious turmoil was going on in Venezuela, where the production was cut back and is slowly coming back into play.

The point here is that, while we have to be attentive to these things, in fact, this threat, at least from our experience since 1979, has not panned out as a severe threat to us. I am not saying it cannot in the future, but it just is not the kind of threat that many of us used to wring our hands about and say we have got to have an energy policy, because of this threat. The market, so far, has been able to accommodate it.

The third area, a subset of this military-political instability realm, which represents more risk to us economically and, therefore, security-wise, is Saudi Arabia, because, as you saw on the list, it is number one in terms of oil exports. The size of those exports, if they were to go out the way Iraq's did for a time recently, would probably have serious consequences that could not easily be made up. Equally significant, Saudi Arabia represents what we call surge capacity, or surplus capacity, or swing capacity—that is, they have the infrastructure in place so that they can step up the production, pump the wells more, and in very short order, in a few days, put more oil onto the market in terms of supply. As things got tight in Iraq, they did this, which helped keep the market afloat.

One might overstate this. You hear a lot of hand-wringing in Washington: "We've got to have a policy because Saudi Arabia is an unstable political regime that could collapse." Some who disagree with that could say, "Yes, but whoever comes to power must have resources, they've got to have money, and the only place to get it is out of the oil wells, and they've got to produce."

The greater risk is that they could face serious internal or terrorist activities that might put some of their facilities out of commission for months at a time, and we would see that in the marketplace. This remains the one tough nut for us in the world oil market, but I do not want to overstate it, because if you have increments of increased production in all the other producing areas around the world, you might be able to offset it enough that it does not become as serious a problem as some project. But it remains, and will remain, a focus of U.S. concerns.

Now, besides disruption, another concern often articulated—and I am going to use a mild term because it starts with a D—is distortion, that is, because of the strategic concern we have about the oil markets, we have to distort other values in our foreign policy. We have to accommodate regimes that we would rather not and clearly do not want to accommodate. We have to accommodate regimes that are obviously hostile to Israel. We have to accommodate regimes that are hostile to modernization. We have to accommodate regimes that are hostile to democracy, to values that we overwhelmingly would like to see a part of American foreign policy, because of the notion that we have to accommodate something that is so important economically.

I'll come back to this later when we talk about whether we can change the oil policy enough in this country that we don't have to do that, but I don't think we can transform the oil policy very fast to overcome this. However, there are two very significant things we need to keep in mind: One is that, through energy policy, we can reduce the risk that we would have to accommodate quickly; in other words, the more the market is not tight and vulnerable to what happens in Saudi Arabia or elsewhere, the more margin we have to play with.

The second part is what is on our minds and what we value, and I think we have to have a clearer, stronger discussion of this in the United States. That is, most of the time when we do not accommodate, or when we think we have to accommodate, the reality is that the risk is only that we are going to see a price increase in oil, and that is a risk that we should be willing to take for higher values.

We just did so in Iraq. Anybody who cared only about oil would have said this was not a smart move in the short term, because it had the high risk that we could end up with production out, prices way up, who knows what. That is only one sliver of the argument that went on. It did not happen that way, of course; we did not face that risk. I think one aspect of policy here is not energy policy; it is a matter of being clear with ourselves that we should be willing to pay a price and take risks with world oil. We don't have to accommodate and go along with everything because it represents a threat to oil supply.

The third potential threat I call diversion. Diversion involves knowing where those revenues that are pouring in go. Obviously, some of these regimes finance themselves, but we are also increasingly concerned that they divert some of these resources to terrorist activities, whether in the United States, Israel, or in other places. This is serious, it is real, and it has to be on the foreign policy agenda of the United States in a big way. I believe that after 9/11, it is on our agenda in a big way.

But, again, the reality is that whether you drive an SUV or a Saturn, you are not going to shape this issue, Arianna Huffington notwithstanding, with her commercial ads arguing that if people would only drive a more fuel-efficient vehicle, we could block money from going to Hamas or Al-Qaeda. Regrettably, it is too big a pool of money for those kinds of choices to have an impact. That is not to say I don't think we should do more in those areas, but that is not the solution to the diversion problem. The solution is aggressive diplomacy and aggressive activity on our part to get those regimes to alter their behavior.

The fourth concern is the depletion of resources: We are going to run out of oil. I have asked, and John Berry and the Department of Energy have asked, if the world is going to use more oil, is there going to be enough? The projections on this topic have ended up being wrong, over and over historically, and so one should take the projections with a grain of salt.

But most of the conventional wisdom today believes that the resources are physically there, and the issue is whether areas inside the United States and elsewhere are open to investment, with an investment climate that encourages exploration to happen.

Indeed, one of the important things that has happened over the last twenty years, and alluded to here, but not quite as aggressively as I think was important, is that we have seen around the world an openness to market economics and to foreign or private investment. We are getting oil production and other kinds of activity in many other parts of the world that were politically shut off, either because they were Soviet-dominated or because they had a political philosophy that, in fact, kept out any of these activities. And, it has been to our benefit that markets have opened up in this way.

I think the answer to depletion is that we are not about to go off the cliff; it is not something we have to have a crash program for. We would be wise to look quite distantly down the path and create alternatives for our country, but it is not something worth investing all our treasury in and thereby damaging our economy, out of a fear that we are suddenly going to face depletion.

Strategic Approaches

What strategic approach should the United States take? I have alluded to it. There are two broad alternatives, and let me quickly touch on them: The first is that it is our policy to promote and protect a resilient world oil market, and that, intentionally, has been our policy for about thirty-five or forty years. The second alternative, which we hear talked about regularly, prominently in speeches in the political world, and to some degree actually focused upon in the 1970s, is to dramatically reduce our dependence on oil use in the United States—dramatically, not just a million barrels or two million barrels a day, but so that somehow we would then be able to be indifferent to Saudi Arabia, not need to put troops anywhere, not need to accommodate our foreign policy, but simply be indifferent.

Stuart [Eisenstat] and others have said what sophisticated people know: That this is just not tenable as a solution, and yet it is amazing how often we hear it. Now, when I say it is not a solution, please understand it is not that we shouldn't worry about imports, or that we shouldn't take actions in the market; but this is a philosophy that believes that we can so significantly change that market that we can become indifferent to it. That is, in my view, an absolutely false promise.

Let me suggest that we would be better off, in terms of security and in terms of the environment, had we been able in the last thirty years to get off not only oil, but all fossil fuels. Let me suggest to you that the argument is often made, especially on the left politically, that the reason we didn't get off is because of the extremely considerable political influence of the oil industry and related industries that have such a stake in this market. I disagree with that. I believe they do have significant political power. They argue all kinds of things that I might disagree with, but the fact is that is not the reason that this country has not taken the path of extreme reduction of oil dependency.

The second reason sometimes given, which is more realistic, is that the cost of this transformation, in the view of most people and certainly most economists, is pretty significant. You have to be willing to bear for a considerable period of time a very high cost. The easiest way to do it would be to drive the price of oil up $20 or $30 a barrel and let the economy begin to respond. We do not like it when the price of oil goes up $5 a barrel, but we are talking about doing this big time, and that may not be enough. But whether by regulation, by subsidization, or by taxation, this change carries a big-time cost and you cannot get it free. You have to decide whether you are willing to pay it, and so far, of course, we have not been willing to.

The other reason is that this is not a static industry. It has been a very effective industry in adjusting to increasing demand, in adjusting to political problems in the marketplace, and in adopting new technology, new management techniques, and whatever necessary to make this market work. If you want to fight this market, you have to beat it with something that is cheaper and more effective at getting the resources to the people. We simply haven't had the political will to do this.

Let me just suggest then this second path is not going to work, so let's stick with the first one, and let's keep ourselves focused on it in a serious way. That is, there are several elements to protecting and promoting the marketplace. The world market in oil, as has been alluded to several times here, needs to be geographically diverse as to where the supplies are coming from. We do this to some degree today; we simply have to keep on the ball so that the Caspian Sea develops, as well as Nigeria and other places.

Second is emergency stockpiling. I do not recall hearing about SPRO, the Strategic Petroleum Reserve. I think we ought to continue to increase it. The Bush administration did the right thing a year ago, and then they caught foolish hell for it last year. Recently a Senate staff report criticized them for having bought oil last year, when they did the right thing. We did not know where the world was going politically, and we wanted to have a good supply of oil stored, whether we used it or not, and we did not use it during this crisis. Whether we use it or not, its existence gives us a margin of leeway that is very important. This asset is too important to our security and therefore we should preserve it.

The third point is that there is a panoply of things we ought to be supporting, many of them alluded to. Where it's cost effective, we want to be out there engaging in greater efficiency in transportation, which is where most of the oil goes, seeking greater advances in technology and cleaner fuels, things that will marginally take the pressure off of this marketplace over time. But also, if we are wrong about the projections about this oil market, if politics change internationally, we can't expect this to work very well as a world oil market. Then we will be in a position to begin to more rapidly develop those alternative sectors. In other words, we should hedge our bets.

Cost-Effective Interventions

The issue here is how much are you willing to pay, how much cost are you willing to put on the economy, and we are going to have an honest back-and-forth discussion about that. While the marketplace is central, we have to recognize that. We should not take a laissez-faire position; we should take a position that we are willing to make cost-effective interventions to buy an insurance policy that will help us with our security.

Finally, the carbon dioxide problem is not going to go away, and the smart thing for this country to do is not to ratify the Kyoto protocols. Instead, we need to begin to understand that we need to set the constraints that we expect to happen in carbon dioxide and the other greenhouse gases, project them out. In other words, set them early, but don't expect immediate reductions. The cost is too great to get immediate reductions in carbon dioxide, but serious projections tell people in the oil business, the gas business, electricity, that within ten to fifteen years, here is the path we are going to be on, so make your investments in research and development with that path in mind. This, I think, is the one enormous uncertainty out there in energy policy over the long haul; in the short term, the uncertainty in energy policy is in electricity.

Energy Demand

Alan Crane
Senior Program Officer, National Academy of Science

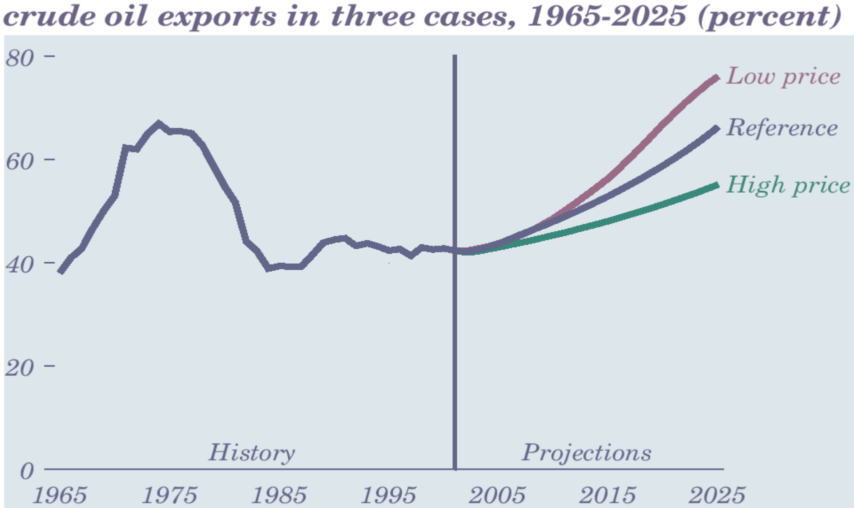
Even if petroleum reserves and production prove adequate over the next several decades, there are still at least two reasons why you would want to limit demand: The first is national security. I would be a little less alarmist than Congressman Phil Sharp just was, but we do have to take into account the potential instability in Saudi Arabia and the other Persian Gulf countries.

The reserves of the world are such that most of the additional production we get is going to come from the Persian Gulf. Over the next twenty years or so the percentage of the export market that is the international trade in oil from the Persian Gulf countries is going to go up. (Figure 35.) It is currently at about 40 percent and is likely to go up to around 60 percent or higher by 2025. In itself, that is not cause for alarm, but we have to look at some of the implications.

The other half of this equation is the domestic supply versus consumption, with the difference being made up by imports. (Figure 94.) The gap has not been all that large over the past few years, but it is widening now, and it is going to soar, and most of those imports again have to come from the Persian Gulf.

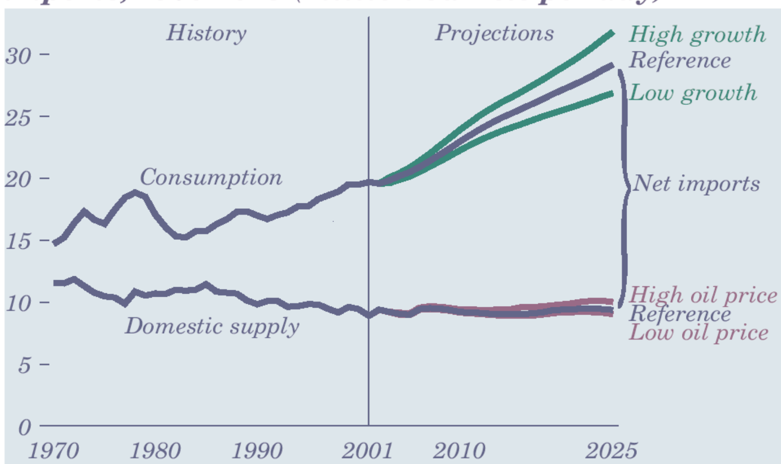
If you want to get a good scare, look at the recent issue of *Atlantic Monthly* (May 2003), with an article on the house of Saud and how rotten it is at the core. We can see the country imploding, undergoing an Islamic revolution, and deciding that maybe they need to export only three to five million barrels a day to satisfy all their wants. Poverty is good, and let the world worry about its demand. I have no idea if that is a plausible scenario, but maybe it is.

Figure 35. Persian Gulf share of worldwide crude oil exports in three cases, 1965-2025 (percent)



Domestic Supply and Demand

Figure 94. Petroleum supply, consumption, and imports, 1970-2025 (million barrels per day)

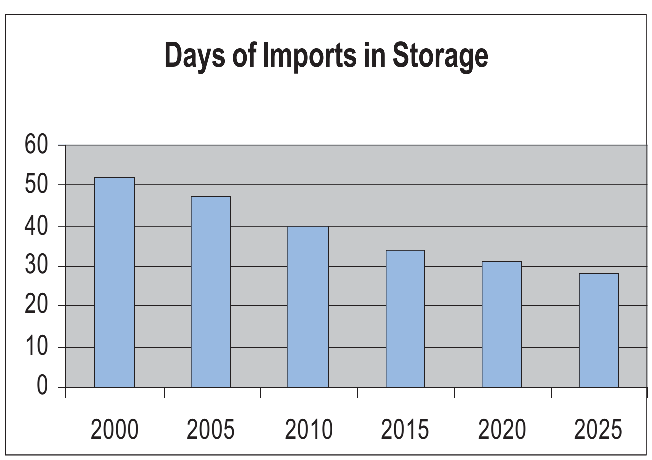


As we become more and more dependent on oil from that region, it is going to constrain our foreign policy. We badly need Saudi Arabia and some of the other countries right now, and we are going to need them even worse in the future. At some point that is going to start affecting relations toward Israel and other nations.

Strategic Petroleum Reserve

The other factor is the Strategic Petroleum Reserve (SPR); it is absolutely vital that we keep it. In 2000, there were 52 days' worth of storage in there. (Figure A.) It has dropped considerably from what it was back in the '80s.

Figure A



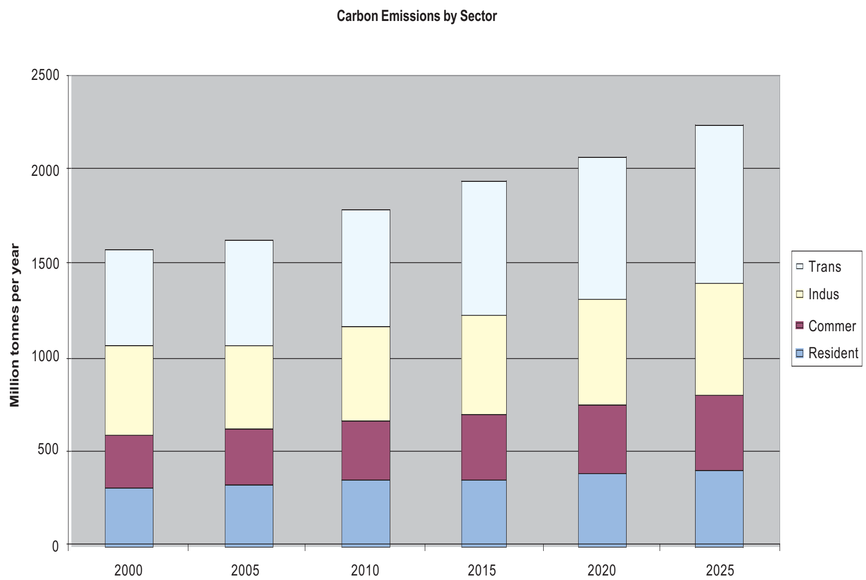


Figure B

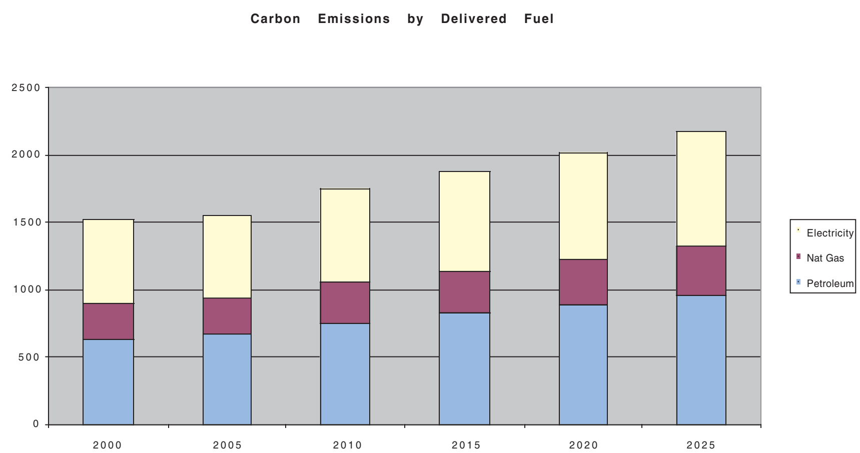
As imports have gone up, the volume of reserves has stayed roughly the same, so its value for replacing imports has gone down. That is what is going to happen over the next few years, if it is 52 days right now, and it goes down to 28 or so.

Granted, you do not have to replace all your imports, since some are from very stable, safe regions. But if you want to be secure through a reserve, you are going to have to increase it big time. That is expensive, and it takes a while.

My second major point deals with the global warming issue. I am convinced it is real. If you ask 90 percent of the scientists who know anything about it, they will tell you it is real. If that is not a consensus, I do not know what is. We have huge emissions of carbon dioxide, which is our main greenhouse gas in this country. Figure B is a projection from EIA (Energy Information Administration) starting in 2000. It is broken down by sector, and the top part, which is from transportation, will continue to grow almost under any scenario, even if we put constraints on it. It is going to keep getting bigger and bigger, both relative to the other sectors and in absolute terms.

Figure C shows usage by fuel. This does not show coal directly, but shows electricity, natural gas, and petroleum. Again, you see that petroleum is going up, with natural gas now much smaller, even though the use of it is comparable, but it is much more efficient from an emissions point of view.

Figure C



Finally, electricity represents a lot of coal and natural gas usage, and that will go up.

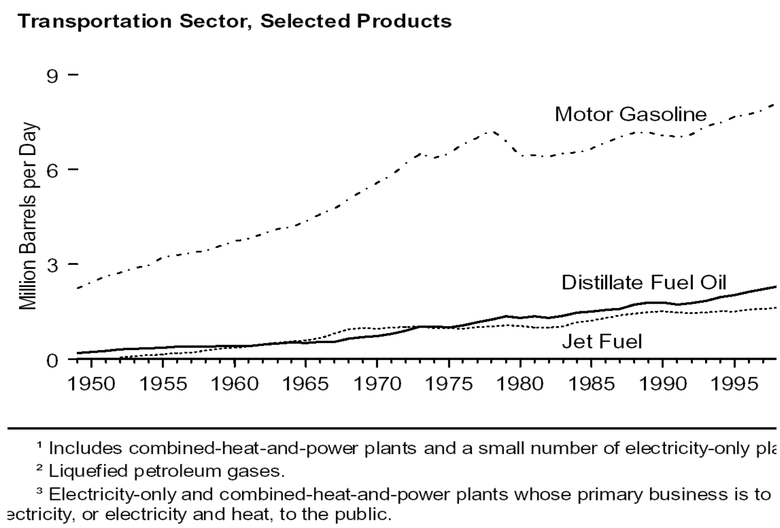
What we are saying is that it is important, if you are worried about emissions, to do what you can in the transportation sector. It turns out that it is fairly hard to cut a lot from the transportation sector; decarbonizing electricity is much easier, but every sector has to carry its share of the burden.

Figure D shows trends in recent years, for the past 50 years or so, in oil use. Again, most of the usage is for motor gasoline and, of course, jet fuel is increasing some, as is diesel fuel, but the big increase is in motor gasoline and that goes into light vehicles. That tells us that if we want to reduce the use of oil for light vehicles, then automobiles and small trucks are the place to focus.

Four Technological Solutions

Looking at the problem from a technical basis, to reduce usage we have a lot of little choices, which I can clump under four major headings: The first one is incremental improvements to current technology—doing better what we are doing now, making the current type of cars and trucks more efficient. This was the focus of the NAS (National Academy of Science) report, of which I was the study director, that came out a year ago. We concluded that there is a lot of room for improvement: For perhaps a ten percent increase in the price of a car, you can get something like 20 percent better fuel economy. It will not necessarily pay for itself at $1.50, $1.75 a gallon, but over the lifetime of the car, there would still be substantial savings. Certainly some initial price increase is warranted, purely on a strictly economic basis.

Figure D



The second area is diesels. Many of you have observed that in Europe they have a new generation of diesel-powered cars. When I was there two years ago, I purposely rented one. You could walk behind the car, and there would be no smoke, no odor, no particular noise, except a little bit when you first started up cold. It is an amazingly clean vehicle compared to the diesels that we think of. I had one of those awful Oldsmobile diesels back in the '80s, and people behind me certainly knew they were behind a diesel. Again, it is a couple of thousand dollars price increment, but you get much better—maybe 30 percent better—fuel economy.

Next we get into gasoline electric hybrid cars. You are going to hear more about them shortly. They represent yet another point on the continuum; they get wonderful fuel mileage, but at a considerable cost, which for most people is probably not warranted at $1.50 or so per gallon.

Finally, a lot of people have been talking about hydrogen. When you look at the research elements that have to be solved before it becomes practical, it is astonishing what has to still be done, both in the production of hydrogen and in implementation of fuel cells that will be required to use it efficiently. It is not clear at this point whether they are really going to make it. It is not an option you can count on.

Implementation of Change

Finally, as to how you implement these changes, there are three general approaches, which I have categorized with a lot of variants. The first is fuel taxes, and every energy expert or economist who looks at it says taxes will really help. If they are big enough, they affect the vehicles people drive; they also affect how they drive and how far. And you get a quick turnaround in behavior.

The second one is regulation, which means, in particular, CAFE, which I think has worked. It is a clunky policy, with a lot of problems, but we actually had three economists on our committee looking at it and they all agreed it worked. It saved a lot of fuel; particularly when prices came down in the late ’80s and ’90s, it kept the manufacturers from producing worse vehicles, that is, less efficient vehicles.

And finally, there are various incentives that can be applied, too. We heard about some of them earlier: giving people money back for buying efficient vehicles, or for experimental new ones. These all work, with their pluses and minuses. Right now fuel taxes are probably not politically viable, but maybe some day they will be. In the meantime, there is a lot we can do, and I think we have a lot of motivation for doing it, but it is going to take a long, long time to make a big difference. You cannot tell the manufacturers to increase their fuel efficiency now. You cannot do anything for three years, because the fleets are locked in, except for a certain juggling of classes, but over the next ten to fifteen years, it can make a big difference in the forthcoming vehicles. It will start to make a big difference in the fuel used.

Energy Demand: Improving Fuel Economy

Steven Plotkin
Argonne National Laboratory for Transportation Research

Between the years 1981 and 2003, fleet fuel economy has gone up 1 percent—in twenty-two years, 1 percent improvement in fuel economy. The average weight of the vehicles has gone up 24 percent. The average horsepower of vehicles has gone up 93 percent. The average zero-to-60 time has become 29 percent faster.

During this period, lots of new fuel-saving technologies have actually gotten into the fleet, but this improvement has not been used for fuel economy; it has been traded off for increased power, size, weight, luxury features, four-wheel drive, etc. Whether it is the [choice of] auto manufacturers or consumers—and it is probably both—the decision has been to ignore the fuel-economy benefits of these technologies in favor of these other features.

While we have been doing basically nothing since the original CAFE standards were implemented, Europe and Japan have both taken substantial action in this regard. They both have much higher fuel taxes than we do, and they also have more efficient fleets. (See Figure 1.) Yet both Japan and Europe have established new fuel-economy standards. The Japanese hope to achieve a 23 percent improvement in their fuel economy by 2010; Europe is looking for 33 percent by 2008.

Additionally, both Japan and Europe have a whole array of economic incentives to get people to buy more efficient vehicles. For example, in many European countries and in Japan, you pay vehicle taxes when you buy a car and also on a yearly basis, depending on weight, in some cases on fuel economy, and in some cases on the size of the engine. There are incentives for hybrid vehicles. In fact, the U.S. does have an incentive for hybrid vehicles that is almost an accident, as it was passed as an incentive for alternative-fuel vehicles.

Figure 1

The rest of the world is taking action.

- **Europe and Japan have much more efficient fleets than U.S. does….but they are far more proactive**
- **Europe and Japan have established new fuel economy targets.**
  - **Japan: weight-class standards, 23% by 2010**
  - **Europe: fleetwide standard, 33% by 2008**
- **Most countries maintain much higher fuel prices than we do.**
- **Japan and most European countries have established additional economic incentives to get people to buy more efficient vehicles – purchase and annual taxes based on efficiency, etc.**

Different Assumptions in Framing Questions

Before I talk about standards, I would like to talk briefly about raising the price of gasoline. There is a lot of controversy about how much of an impact raising the price of gasoline would have in this country. The most current data show that if we increase gasoline prices by about 50 percent—that is, on the order of 75¢ a gallon—in the long term we could hope to get higher fuel economy by about 10 percent, lower travel by about 10 percent, and overall, lower gasoline usage by about 20 percent.

If we are looking at new fuel economy standards, the very first question we should ask is "How much?" Let's look at a ten-to-twelve-year time frame, because anything much sooner than that makes no sense. It is just too difficult for the manufacturers; it is too expensive.

If you ask the automakers, they would probably say—if they would even admit to a number—perhaps a few miles per gallon: one, two, or three. In fact, the new NHTSA (National Highway Traffic Safety Administration) proposed standards for light trucks—22.5 or 22.4 miles per gallon, I believe—was vigorously denounced by General Motors and the other American companies.

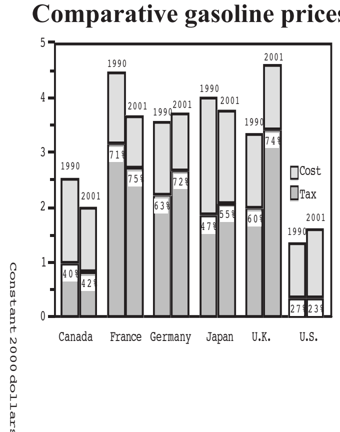
The National Academy of Sciences report talked about a wide range of improvements, but the average was about 20 percent for autos and 30 percent for light trucks. There is a new Argonne National Laboratory report, in which I played a role, which looks at about a 20 percent to 25 percent improvement. And finally, the environmental community is much more optimistic and is talking about 40 percent or 60 percent, or even higher.

Now, the key differences among these studies are not differences about how good the technologies are or how much they cost. There is some controversy, but actually that has lessened quite a bit. The differences are really in the questions that they are trying to answer.

Figure 2

Raising gasoline prices by 50% could push gasoline use down by 20%.

Comparative gasoline prices



Lots of debate about size of effect….but my best guess:

- Fuel economy: up 10%
- Travel: down 10%
- Gasoline use: down 20%

When you look at these competing answers, you have to realize that they are driven largely by the different assumptions that the authors of the reports are using. The environmental community may use a low discount rate in looking at future fuel savings. We use a 12 percent rate, much higher, and the auto companies would perhaps use a 20 percent rate. How many years of fuel savings do we consider? The auto companies are likely to answer based on what they think their customers will look at—a few years, three, four years maybe—whereas if we answer the question from society's viewpoint, we look at lifetime fuel savings. Then there are a variety of other assumptions that, if changed, would drastically change the answer; e.g., whether you look at a few years or lifetime fuel savings changes the answer to, on the one hand, a very few miles per gallon, or, on the other hand, 20 to 30 percent or more.

Do CAFE Standards Make Sense?

Now, your attitude about new standards may depend on whether you believe that the current CAFE system makes any sense. A myth is that the miles per gallon improvements that we achieved in the standards were mostly achieved by downsizing and reducing weight. This is wrong; only a small fraction, about one-fifth or one-fourth of the total improvements were achieved by reducing weight in the fleet. Most of the improvements came from better technology.

Were there major market dislocations? Yes, but they were not caused by the basic 27.5 miles per gallon fleet average standard. They were caused by the very simplistic one-size-fits-all CAFE structure, which we can fix in the future.

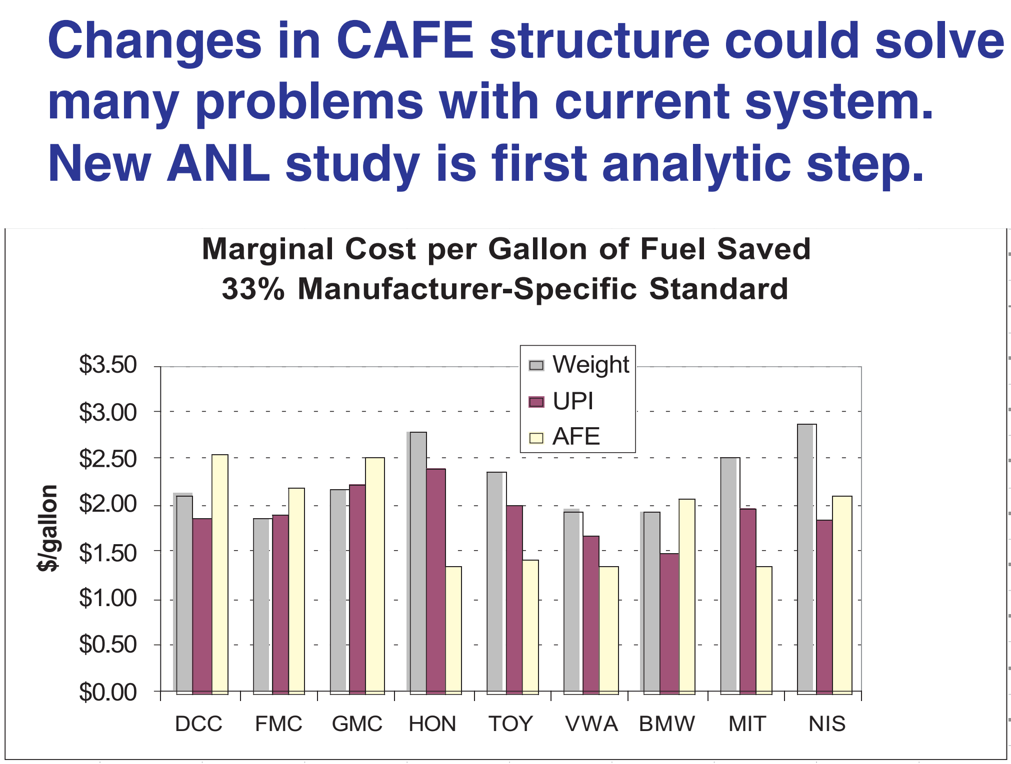
Our previous speaker said that CAFE didn't really save lives. I think that is nonsense. About the 2,000 extra fatalities per year that NHTSA claims is the outcome of the previous CAFE standards and the weight reductions accompanying the standards, two very quick remarks: The National Academy of Sciences, before they did the fuel economy study, looked specifically at this claim, and they basically concluded that the data just was not good enough and our analytical capabilities were not good enough to justify this number. Additionally, Honda Motors of America sponsored a study using exactly the same methodology that NHTSA used, but they used more up-to-date data. They found, basically, no safety impact from weight reduction.

I mentioned that the current CAFE standards, with their one-size-fits-all pattern, are the cause of many of the complaints about the CAFE system. The new Argonne study looked at changes in the CAFE structure. Figure 3 shows the results we got. On the left-most bar are the results of a weight-based standard. The middle bar is a result of uniform percentage increase, which was the kind of standard that was called for in the early '90s; the one on the right is CAFE. Now if we are looking at how much it costs each company to save the next gallon of gasoline when they reach the target, each one of those standards is quite unfair. The least fair is CAFE. We still have a long way to go to identify a standard that will be truly fair to the companies, but it is within reach, if we are willing to do the hard work.

Multiple Technology Options for Improving Fuel Economy

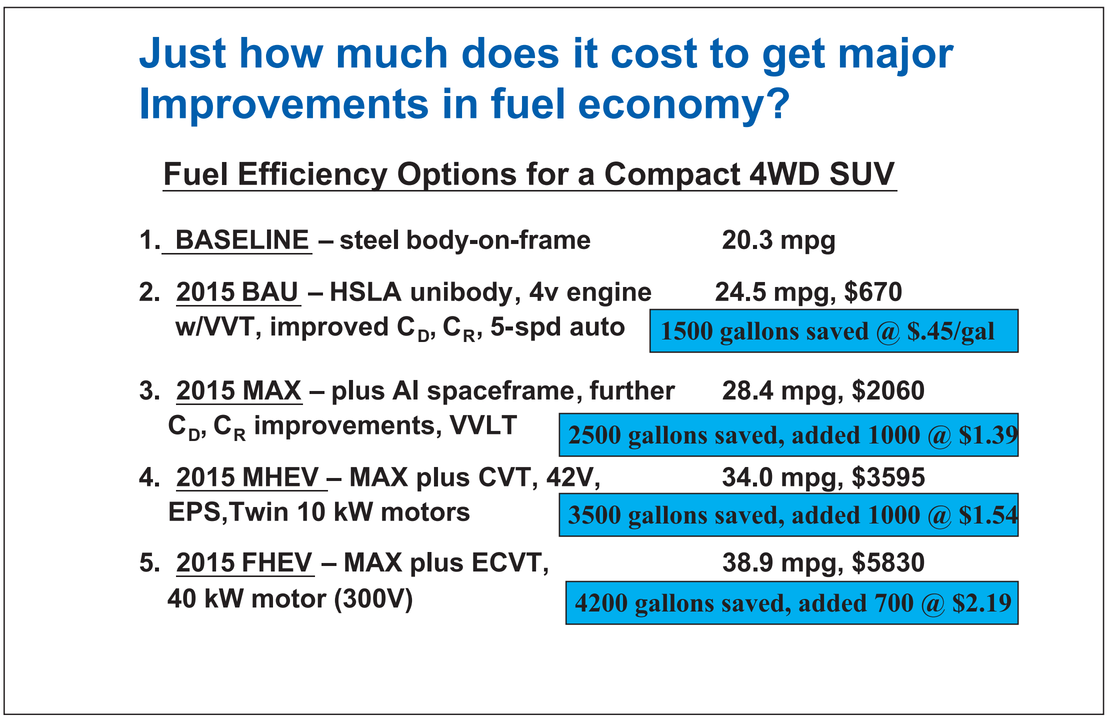
Another thing I would like you to come away with is that there are multiple technology options for added fuel economy. Here is a brief list of the currently available technologies. There are lots more technologies that seem practical, but need a few more years to get to the marketplace. But we need to use these technologies to improve fuel economy, not to increase power or to increase size.

Figure 3



Here are a couple of technology packages to achieve a higher fuel economy for a compact four-wheel drive SUV. (Figure 4.) One of the things you have got to see here is that technology is not free, and that if you use too much of it, it is not economical. The last package, for example, the full hybrid, achieves a 92 percent increase in fuel economy; however, it costs, at the margin, $2.19 a gallon to actually achieve that level of fuel economy. If gasoline is $1.50 a gallon, it makes no sense. On the other hand, with a 40 percent improvement, the marginal cost is $1.39, below today's value again, though these are lifetime fuel savings, which customers may not value.

Figure 4



Conclusions

Let me close with a few remarks. First, we are heading toward no improvement in fuel economy, and that is not likely to change unless we have a major policy change. Now, what that means is that CAFE today is actually holding up the fuel economy of the market; without the current standards, the fuel economy of the fleet would probably go down. It also tells me that if we were to have a policy which provides an economic incentive for buying a hybrid, and that brings a change in 5 percent or 10 percent of the fleet, that would be nice but it might not yield a fleet fuel economy any better than today. Because if we don't change the current policy, what might happen is that we have these hybrids in the fleet which make room for the companies to add more power and more size to the rest of the fleet. It is not enough to just have the incentives for individual technologies.

Secondly, there are a lot of improvements in fuel economy available, at prices that seem reasonable from society's perspective, but maybe not from the consumer's. Look at emissions standards. Nobody would pay much money for a vehicle that had improved emissions over the current fleet; it just has no market value to the consumer. Yet the American public has been willing to pay substantial amounts of money for everybody to have higher emissions standards, to have improved vehicles. So if we could convince the American public that improved energy security, lower oil use, and reduced carbon emissions were equally important public values, I see no reason why they would not accept an increased price to their vehicles, so long as they believed that everybody had to do it.

A third point, if you want new CAFE standards, new miles per gallon standards, there is a lot of good information available, but it is not enough to look at the claims on their surface. You have to look beneath the claims at the assumptions used to understand what question these people are actually answering.

And finally, if you buy the idea that we value these changes from a societal viewpoint, I think, with fairly conservative technology assumptions, you can achieve about 20 percent to 30 percent improvement by the year 2012, maybe as late as 2015. But we need a lot more work, especially on looking at different kinds of standards and different structures of standards to fix the problems in the current system.

Energy Demand: Hybrid Electric Vehicles

Michael Canes
Logistics Management Institute

I would like to share with you the research I've been doing on hybrid electric vehicles over the past year. It's striking that, as Americans, on the one hand we like the idea of cheap and reliable energy; on the other, we would like to reduce our dependence on oil—and there's an inherent conflict between those two positions. The question is: What do you do in that situation?

One answer is that you go to the technologists and ask for new technologies; you pay for them and wait to see what comes up. We had a program in this country called "The Partnership for a New Generation of Vehicles," which yielded a number of solutions to the demand for an 80-mile-per-gallon car. Hybrid technology in this country was developed considerably within that program; it was developing overseas as well, but diesel hybrids were one of the main solutions to come out of that program. For now I'm not going to speak about diesel hybrids, but rather about gasoline hybrid electric vehicles.

Currently Available Models

There are about 40,000 hybrid automobiles in the United States now on the roads. Honda and Toyota have gotten a jump on the American companies: Honda has two models on the road now, the Incite and the Civic. Its model of the Civic and Toyota's Prius are by far the most popular of the models.

Even though there are only a few models out so far, a lot more are on the drawing boards. The Ford Escape, which is a small SUV, is scheduled to come out either late in 2003 or early in 2004. Dodge has a version of the Ram truck scheduled to come into the fleet in 2005. GMC has announced two hybrid models, a Sierra SUV and a Saturn, both of which are scheduled for approximately 2005, and a Lexus RX-330, another SUV, is scheduled to come into the fleet in the next couple of years. Thus the choices are growing.

There's a great deal of interest in hybrid technology in the military. It is considered a very exciting and important technology for the military, and we may see considerable numbers of hybrids going into military fleets in the next decade or so—particularly the Army Hummer. Those in the Army will know something about the

Humvee; they have been around for a long time, and the hybrid Humvee is now in prototype and likely will be produced in larger numbers.

The Technology of Hybrid Vehicles

When we talk about hybrid technology, what do we actually mean? The word hybrid refers to multiple sources, meaning at least two, and in the case of hybrid electric vehicles we are speaking about vehicles powered by internal combustion engines and electric motors in some combination. They also have energy storage sources of some kind, usually batteries.

Hybrid electric vehicles are able to take advantage of regenerative braking—basically the ability, as you brake, to take the kinetic energy of a moving vehicle and transform it into electrical energy stored in the electrical storage system and reuse it to power the electrical motor. There are gains in [fuel] efficiency from this, and also it cuts down on the wear and tear on the normal braking system. Hybrids also have a potential for onboard power generation, that is, power generation that can then be used by external sources.

Savings and Costs of Hybrids

Where do the savings come from for hybrid vehicles? Mainly from reduced fuel consumption; hybrids are more fuel efficient than internal combustion-driven vehicles. Numbers vary, depending on the model, how the hybrid is put together, and how much use is made of the batteries, and how much use of the motors. Reduced brake maintenance adds some savings. You can replace a stand-alone generator, which is not a money savings on the civilian side, but it does replace the stand-alone generator that one might have to drag along, and there is a convenience side to it as well.

There are incremental costs associated with the hybrids, and these come from there being two sources of propulsion instead of one: You have an internal combustion engine and an electric motor in a hybrid. You also have some type of storage system—batteries are the usual form, as in the Prius and the other vehicles on the road today. They have quite a sophisticated propulsion control system as well, but all vehicles have some form of propulsion control. In a hybrid it is a little bit more sophisticated and perhaps a little more expensive.

Then there is the problem of battery life—how long batteries will last before one has to replace them, as batteries go through a certain number of cycles before they begin to lose energy and energy storage capability. Lead acid batteries have relatively short lives and are somewhat less expensive than other forms of batteries, such as nickel metal hydride, used in the Prius, which lasts longer. There are yet others that have longer lives and have varying qualities, some of which are attractive and some of which are not so attractive.

The Economic Factors over a Car's Lifetime

My analysis has focused mainly on the economics of hybrids, to understand how the economic costs come out and what might be done with regard to incentives to make a difference. I've also looked at some of the emissions data and the value of the emission reductions.

My method of analysis is to look at the savings over a period of time, taking into consideration the additional outlays at the beginning when you buy a hybrid, and later as you have to replace the batteries, and discounting the numbers to the present using a market rate of interest, so that one can make comparisons among different hybrid models and between hybrids and their conventionally powered counterparts. The comparison is done vehicle by vehicle, with the conventional counterpart compared with the hybrid version of the same vehicle.

For example, in analyzing the Prius, I wanted to show you what my main assumptions were. The incremental cost of the Prius as compared to a Toyota Echo, which is the nearest comparable internal combustion-powered model, is, to be a little generous, about $3,000, depending on the model of the Echo. I chose a rather well-furbished model of the Echo to keep the numbers relatively close, because if the hybrid doesn't make it at a $3,000 difference, then it certainly won't make it at a larger difference.

Replacing the batteries after eight years adds a cost of about $3,000. We don't yet know the battery life of the Prius, but Toyota has offered an eight-year warranty on the batteries, so I used that as the minimum time by which someone would have to make a change. It may be that they will last longer, and we will look at the consequences in my analysis.

The lifetime gasoline cost for the car was figured at $1.50 a gallon in today's dollars, which could rise with inflation; the assumption was that the car is driven 13,000 miles a year, a bit under the American average, but not much, with a twelve-year vehicle lifetime, again slightly under the average life of an American vehicle, but not necessarily for small vehicles. I used an 8 percent interest rate for the cost of financing a vehicle today.

With that set of assumptions, what do we get for the relative value of a Prius compared to an Echo? The Prius is assumed to get 48 miles per gallon average over its driving cycle, while the Echo gets approximately 34 miles per gallon. This is a 14-mile-per-gallon increase coming from a fairly high figure, 34 miles per gallon, to begin with. In the base case the result is a negative $2,983, or approximately negative $3,000 [favoring the Echo].

Now if we vary the assumptions, let us see what the effects might be. For example, suppose that you never have to replace the battery in the vehicle over its lifetime of twelve years; this changes the economics, but it is still a negative number, about $1,400 over the lifetime of the car in a present value sense. If you drive 20,000 miles per year, the more that you drive the hybrid, the higher the payoff, since it is a more fuel-efficient vehicle than its internal combustion-powered counterpart, but it's still a loss of $2,300. If gasoline is assumed to cost $2 per gallon that helps a little, but it is still a loss, by about $400 in present value terms. Changing the interest rate makes almost no difference at all.

Other Incentives to Buying a Hybrid

I've looked at a number of other automobiles, and you get basically very similar results. Looking at a different type of hybrid vehicle, the Dodge Ram truck, the situation is a bit different. The assumptions are largely the same, except that Dodge has announced the incremental cost will be about $5,000, and it will have a fifteen-year lifetime. The difference in concept between the Dodge Ram truck and the Prius is that the Ram truck will be sold not for fuel efficiency, but for onboard power generation, that is, as a substitute for a stand-alone generator.

With this analysis the base case shows a negative $4,600. Doubling the fuel efficiency gain doesn't really help people in fundamental economics. Replacing the battery still leaves it negative $3,000. The interest rate doesn't matter, but if the onboard generator is worth as much as $400 a year to the owner of the Dodge Ram truck, then there is a positive return to the vehicle. For a building contractor, people who go camping with trucks, or others who might use this power on an ongoing basis, there may be value here, and this particular segment of the market may have some payoff.

To give a sense of how much gasoline prices would have to increase or fuel economy gain would have to increase for the hybrid Prius or the Dodge Ram truck to break even, I did some sensitivity analysis. The price of gasoline would have to run between $5 and $6 a gallon before the Prius or the Ram truck would break even.

A word on incentives to hybrid buyers: There is a federal income tax deduction of $2,000, which is scheduled to be phased down over the next few years. It is worth about $600 to the 30 percent taxpayer. Present energy bills do contain new tax incentives in the form of tax credits that will have a little more value for most users than the federal tax deduction. Some states have tax write-offs. The big incentive is what Virginia does, allowing hybrids access to HOV lanes. What is a reasonable value for the saved time—perhaps $10 or $20 an hour? This is by far the greatest incentive for this vehicle.

Conclusions

Thus I conclude from my analysis of hybrids in the civilian sector, at least to date, that savings to buyers are insufficient in most cases to offset the incremental cost of hybrids. They simply aren't going to pay in an economic sense. The value of onboard power generation may exceed the incremental costs for certain people such as building contractors. Current tax incentives are insufficient to make hybrids economical, but there are some new ones coming that will help, if they get passed. HOV access, which is low-cost given the numbers in the HOV lanes right now, could become high cost if lots of people participated. These incentives would, in most cases, make it economical to purchase these vehicles, and dealers tell me that they are selling them on that basis.

Thus the U.S. light-duty hybrid market is likely to be based mainly on non-economic factors. That is not to say that hybrids will not sell in the United States, but that they will be sold to people who like their green characteristics, or like a technologically advanced vehicle, or just like the hybrid vehicles for themselves. My goal is not to shoot down solutions to our energy problems, but to provide information about what is going to work.

QUESTIONS AND ANSWERS

Mr. PLOTKIN: Toyota has just announced that the 2004 Prius has gone from a compact to a mid-size; its acceleration has gone from 12 seconds plus for zero to 60 to 10 seconds plus, comparable to a Camry. They believe that the battery will last the life of the vehicle, and finally, the fuel economy has increased to about 55 miles per gallon, whereas the comparable vehicle's fuel economy has gone down substantially. It would be interesting to see how your model works out with those kinds of numbers.

Dr. CANES: That is interesting information, and I'll be glad to look at it. I did not actually say this, but I was simply using the EPA ratings. The Prius is rated at 48 or 50, but, in fact, people get closer to 42 on the road, and some have told me they get into the middle 30s on the road. What you say may well turn out to be decisive, but let's see.

UNIDENTIFIED SPEAKER: I have two questions: What would the price of gasoline have to be to break even, and how far can you reduce a hybrid's cost by going to a fuel hybrid?

Dr. CANES: On the first question, I did show some information on how high the price of gasoline would have to go, and the range for these two vehicles was in the

$5-to-$6-a-gallon range for breakeven to occur, given the rest of the assumptions. On the question of the technology used in what is called a series hybrid, where you drive the motor through the internal combustion engine into the generator on to the motor, that is actually the technology that is used in the Dodge Ram truck. It is a series hybrid, and it turns out that what we call parallel hybrids, where both the internal combustion engine and the electric motor are working together, is a little bit more efficient than the series hybrid.

Mr. PLOTKIN: It's also cheaper.

UNIDENTIFIED SPEAKER: The first two speakers cautioned us to look at the analysis, the underlying assumptions, and who is doing the analysis. I would like to ask Dr. Canes, who funds your organization, what are the prejudices as it were that go into your kind of analysis, and how can we get public interest groups to do an analysis of alternative energy in terms of raising the public interest?

Dr. CANES: I think that's a very fair question to ask. The group I work for works almost exclusively for the federal government—99 percent of our work. I did some of this analysis through internally generated funds at my place of business, but a lot of it for the Postal Service. For them we were looking at trucks, not at the vehicles I show here, but I came to very similar conclusions in my analysis of how the economics of hybrid trucks play out relative to internal combustion-powered trucks. I am doing some work for the U.S. Armed Services on hybrids, and there I see a different picture, because many different considerations come into play.

UNIDENTIFIED SPEAKER: The one impression I'm getting from all of the speakers is that nothing has been done about effectively getting to the public and asking how they feel about all this. It's very clear to somebody who is not an expert that the only way you are going to get change in public behavior is by persuading the public. People who are selling the Prius and the Dodge know how to affect public behavior, to get people to buy what they want them to buy, but I haven't heard a word about how the government is getting people to buy the necessary changes in public behavior. I would suggest that we incorporate Madison Avenue concepts into selling the new innovations, so at least the public can become knowledgeable about the facts.

If the Congress, which is a very knowledgeable sector of our country, were asked what CAFE referred to, I would guess that only five members would know, and the rest wouldn't.

Closing

David Garman
Assistant Secretary for Energy Efficiency and Renewable Energy
Department of Energy

The energy situation is a marathon, not a sprint. It is going to take time, and it is going to take effort.

President George Bush in his State of the Union message said something that bears note. He said that he is proposing a $1.2 billion research program over the next five years so that America can lead the world in developing clean hydrogen-powered automobiles that do not use oil at all and, at their point of use, do not create any criteria pollutants[1] or greenhouse gases, only water vapor. That is a bold statement.

A few days later, he commented that he had said that we can change our dependence on foreign sources of energy through hydrogen fuel cells. Why is that important? If you look at the demand for oil in the transportation sector plotted against our domestic production, you can see the growth in demand, particularly in the light duty category—light trucks, automobiles, what we refer to as passenger vehicles. There is where the greatest opportunity for reducing our petroleum dependence will lie.

A point that has been made again and again: There is an oil imbalance globally. We have nations that have oil against nations that need oil, and it is not surprising that 64 percent of the proven reserves on the planet are found in just five Persian Gulf nations. This has significant implications for the future.

The Hydrogen Solution

What does Energy Secretary Spencer Abraham say we need to do about it? He says we need to use technology to leapfrog over the status quo. We need to pursue dramatic environmental benefits. We have to change the game completely.

The way to change the game is through hydrogen. Hydrogen is a very unique energy carrier. You can derive hydrogen through a variety of methods. You can use it both to drive transportation and to power distributed generation. You can use renewable energy. You can use nuclear energy, and if you use what we call sequestration technology, or technology that captures and stores carbon dioxide emissions, you can produce hydrogen at zero or near-zero emissions on a net basis, and that is also very important.

Thus hydrogen has great strengths, by virtue of its diversity, and this initiative wasn't something thought up on the way to the podium for the State of the Union message. The president's energy plan was released two years ago in May. You hear a lot about the plan. I've heard it said, even this evening, that the president's energy policy is really about digging or drilling, or that it is focused solely on the Arctic Natural Wildlife Refuge (ANWR). The truth of the matter is that there were 105 recommendations in that plan, and 54 of those recommendations pertained to increasing energy efficiency or expanding our use of renewable energy. So it is a very balanced plan, and that plan, even two years ago, started talking about hydrogen and about leapfrogging technologies.

In May 2001, the president's national energy policy was released, and in January 2002 the Freedom Car Program was announced. During the State of the Union message, January 2003, the president's hydrogen initiative was announced, and there is something else we're looking at called Future Gen, a way to use coal, something we have in plentiful supply, to produce both electricity and hydrogen, again on a net-zero emissions basis.

We've been doing a lot of work on the analytical side creating technology road maps, to understand what it is that stands between us and that vision of the future. What we think these initiatives make possible is a very different kind of energy world than we have today, where the principal energy carriers are electricity and hydrogen, generated without emissions on a net basis, from multiple, widely available feed stocks that are available in this country, and using a variety of processes and methods. Our long-term vision is a transportation system powered by hydrogen that is derived from domestic resources.

Energy Strategy and Technical Challenges

Our strategic approach is to develop the technologies we need to enable mass production of affordable hydrogen-powered fuel-cell vehicles and the infrastructure needed to support them. At the same time we are going to continue support for those interim technologies, such as hybrid electric, clean diesel, advanced internal combustion engines, and even renewable liquid fuels, such as ethanol and biodiesel. We will continue to work in those areas as interim strategies.

We have some daunting technical challenges that stand between us and that goal. For instance, right now we can't store enough gaseous hydrogen on board a vehicle to give the vehicle the kind of range that consumers are going to expect and demand. There is a Toyota Highlander fuel-cell vehicle available at least in California that gets roughly 160 miles between refueling—but that's not good enough. American consumers need 300 to 350 miles before refueling the vehicle. The nature of gaseous hydrogen is such that this is not something that is easily attained without using very, very high pressures, and you pay some energy penalties if you do that.

Hydrogen production costs are another thing. We produce a lot of hydrogen in this country today, roughly nine million metric tons a year of hydrogen. We need 40 million metric tons to run a fleet of 100 million vehicles. So it's not orders of magnitude more than we produce today, but the cost is too high. Today the cost is around $3 or $4 per gallon of gas equivalent for hydrogen. We believe that by 2010 we can get that cost down to $1.50 per gallon of gas equivalent for hydrogen.

Fuel-cell cost is also way too expensive today. Fuel-cell costs would be around $250 to $350 per kilowatt, if we were to take the models and designs of fuel cells we have today and mass produce them to bring the unit cost down. An internal combustion engine, by way of comparison, costs around $35 a kilowatt. Thus we are going to have to get the fuel-cell cost down to $45 a kilowatt or less to be competitive. Again, that is our 2010 research and development goal, and we think we can do it. The administration has just committed for fiscal year 2004 over $270 million in these different areas, to focus on fuel-cell production and hydrogen production.

To sum up, the pathway to the hydrogen economy, while there are some technical challenges along the way, requires a few things: It requires a strong national commitment, as the president expressed during the State of the Union address. It requires a diversified technology portfolio, not putting all of our technology eggs in one basket. We need to look at different ways of doing some things. And it is going to take a public-private partnership approach, and we have that in place through our Freedom Car structure where we are collaborating with both the auto makers and soon the major energy companies.

QUESTIONS

1. Could you expand a little bit about the partnership and what kind of cooperation you are getting from the automakers and the energy companies?

General Motors has committed close to half a billion dollars to hydrogen fuel-cell vehicles, and they are committing on order of $100 million a year. The other automakers as well—and here is why. They are not doing it out of altruism or because they can't sleep at night because of our growing and increasing dependence on foreign oil. They know something that is very important to understand: Twelve percent of the folks in the world have access to what we refer to as personal mobility; only 12 percent have cars or trucks. The other 88 percent wishes they had cars or trucks, or wants to have cars or trucks.

The auto industry knows that it can't take the kind of car they are building today, which has 15,000 parts, and the kind of business they have today that has various model lines based on different platforms, and succeed in the developing nation marketplace. They have to build a car that is simpler—much more simple.

General Motors actually went through this kind of concept thinking and asked, "What if we had a blank sheet of paper and could reinvent the automobile? What would we build?" They basically came up with something that you'll see on the *Today Show*, the High Wire, also known as the Autonomy, where all the necessary components to drive the vehicle are in a chassis about six inches thick. It has fuel cells, some electric storage, electric-drive motors, and a chassis that you can build for about a twenty-year life. And on that chassis you can essentially snap various bodies.

This gives the capability of building a variety of different vehicles affordably, on just one or two different platforms, and is a platform that you can market and sell all around the world and at a rate, if you get the numbers up and unit costs down, much cheaper than vehicles are built today.

That's one concept that they think they can actually make money on. Think of it just from this standpoint. If you believe, as I do, that there is a certain amount of fashion involved in automobiles—and if you don't believe it, look at what automakers are paying designers—and right now an automobile designer is constrained by the fact that he has to put a large engine in the front, a tunnel for the drive train if it's a rear-wheel drive, and some other components. Imagine not having any of those constraints if you were a designer. Suddenly, you can begin to offer a totally different value proposition to a consumer. You not only give them a car that can do all of the things that their car today can do, but you give them a car with features that their car today isn't capable of: Let's say you want to have one chassis and two bodies, a roadster-type body and an SUV-type body, and drive-by-wire capability that gives lots of low-end torque and some performance characteristics that you just don't get in today's cars. There's something in it for the automakers. They are in it to make money, and that's the important thing about all the sustainable energy technologies we have to keep in mind. If we are going to be successful at marketing environmentally sustainable technologies, we are going to have to find a way to make them economically sustainable in the marketplace.

As for the energy companies, we have a great deal of interest on the part of [oil] companies such as Exxon Mobil, Chevron Texaco, and others, in addition to Shell and BP, which have pretty good credentials, in terms of the coming hydrogen economy. They are very interested, and here's another reason why: There are alternatives to hydrogen production that don't necessarily have to involve vertically integrated oil companies such as the ones we have today. If you want to have an electrolyzer in your home that creates hydrogen, that is possible; you can do that and you wouldn't have to go to a gas station at all. Exxon Mobil wants to make sure you are going to the gas station 30 years from now, even if they are selling you hydrogen instead of gasoline.

The truth is that energy companies today—what we used to call oil companies—

really don't regard themselves as oil companies anymore. They regard themselves as energy companies, and want to be there to sell you not only the gasoline you need today, but the hydrogen you will need tomorrow, because they want you to come in to their convenience-type settings and buy bottled water, which is where they really make their money.

2. You have pointed out that there is a lot in the way of making this a viable reality. Is there a time projection as to when you will start making a dent in the market?

Yes, and I think the president said it best. We spent a lot of time on this issue—I spent over two hours with the president just on this issue, as we talked about this and many other issues that were of concern to him. His words during the State of the Union message were chosen very carefully, as all words of the President are chosen very carefully. It is his vision that a child born today will have the opportunity to purchase a hydrogen fuel-cell vehicle when he or she is capable of purchasing their first car. The reason we came up with that goal is because the real time frame that we want is to put the automakers in a position to make the commercialization decision in 2015, with mass-market penetration of the vehicles in 2020. That doesn't sound so good to a State of the Union speechwriter, and so we came up with that "child born today." And that was easy for me to come up with because, frankly, I had a son born about the time those words were penned.

3. Why has the Bush Administration not directed more of its R & D efforts and budgetary priorities toward energy conservation and renewable sources of energy rather than toward new kinds of automobiles?

The truth of the matter is that this is a surprising comment because this president has sought more money, not only in his fiscal year '04 budget, but in his fiscal year '03 budget, for energy efficiency and renewable energy technologies than Congress has provided in any year in the last twenty. In fact, it may surprise you to learn that this Department of Energy is spending more on energy efficiency and renewable energy technologies than it is on fossil fuel technologies and nuclear technologies combined. That surprises many people.

In my office I manage a portfolio of over $1.3 billion a year focused on energy efficiency and renewable energy technologies. Now you may argue, and it can be argued, that that is not enough, and we should be doing more. That is an argument often put forth for Congress, but we are actually asking for more money than Congress has given us—not just the Republican Congress of last year, but the Democratic Congress prior to that.

I think we have a very good record on what we are asking for, but money isn't the total answer. There has to be a little bit of time as well for learning cycles. For instance, we know that fuel-cell vehicles work. We build them today; we drive them today. I will drive one this week, and I drove one last week in California. The issue is making this vehicle something that the consumer will want to buy. We have a long legacy of alternative fuel vehicle technologies that, frankly, the consumer has just not been interested in.

I drive a Toyota Prius, so I was fascinated to learn [in the previous presentation by Dr. Michael Canes] that I had made a poor economic choice and, perhaps, that's true on purely economic points, but those are exactly the kinds of questions we need to focus on. If you are not offering the consumer something he wants, I don't think there is a mandate that will force him in the direction you necessarily want him to go. It is an important and humbling thing for those of us who work in public service to realize, at least in terms of this issue, that it is much more important for us at the end of the day to help the automakers build environmentally responsible cars that consumers will want to buy. Washington has tried and failed to try to force consumers to buy the kind of car that Washington wanted them to drive, not what consumers wanted to buy.

That's the challenge, and that is where we think the public-private partnership is critical.

4. Should gasoline taxes be used as an instrument to shape our energy policy?

Gasoline is already a very highly taxed commodity. Bulk purchases of plain untaxed gasoline by the first purchaser are probably somewhere between $.70 and $.90 cents a gallon. The rest is taxes. So let's keep in mind that gasoline is already a very highly taxed commodity, and I'll guarantee you that this administration is not looking to raise taxes on working Americans, particularly at a time when we are trying to climb out of an economic downtown in the business cycle. Instead, this is a very long-term effort, and we are going to have to take long-term measures to get the right technology and build up the infrastructure. This is the role of government; we have to work on the infrastructure so that when the vehicles are ready, consumers will have an opportunity to fuel them and a place to fuel them as well.

As you know, the last administration tried and failed to impose a large BTU-based energy tax. Again, the political will, irrespective of any kind of what you might refer to as leadership, was just not there. The Congress is not going to do it.

5. Why has it taken so long for the private and the governmental sectors to get together to develop fuel-cell technology to the point that it is possible to use it to power automobiles?

We would not have gotten this partnership together just five years ago, because fuel cells, instead of being at a market price of $250 to $450 per kilowatt as they are today, were an order of magnitude higher. They were $4,000 a kilowatt or higher. Again, that is the mass-produced cost.

The fact is that we have made such a startling amount of progress in the last five to eight years in this technology. This is not a new technology; we've been putting fuel cells onto spacecraft. In fact, the first fuel cell was actually invented in the 1800s, so it is not a new technology. What is new is that, through advances in material sciences, we've been able to lower the amount of platinum and some of the other high-value metals in these proton exchange membranes, or in polymer electrolyte membrane fuel cells, so remarkably that suddenly the world has woken up and said, "Wow, this was kind of an esoteric technology, but now it looks like we are really getting in the ballpark with this technology." Investment in PEM [polymer electrolyte membrane] fuel cells and associated technologies has skyrocketed, not just in this country, not just in the private sector, but globally—in Europe and Japan. It is like the movie *Show Me the Money*; the money is starting to flow into the technologies. Folks are betting that this is happening for real.

You are absolutely right that there have been a lot of other technologies; we had high hopes for battery technologies as well, and we seemed to hit the wall and have not really developed a new battery technology that would do the job. But, in essence, a fuel cell vehicle is really the same vision, an all-electric vehicle with all those attributes; it just has a refueling time of minutes rather than hours. And so it is really the logical progression [from the battery to the fuel cell].

6. You mentioned that hydrogen is going to be produced from natural resources in the United States. Could you be more specific?

In the early years, most of the hydrogen will come from natural gas. That is where the nine million metric tons that we make today comes from.

The great thing about hydrogen is that you can make it from a variety of resources. If you have 3¢ cent electricity, you can make it from water at competitive prices, just by electrolyzing the water. You can gasify biomass, agricultural residues that are left in fields today, if you have a means of gathering those residues and bringing them to a gasifier. You can make it out of coal or any hydrocarbon; you can gasify it, split off the hydrogen stream from it. You can take the other bad actors, the pollutants, the carbon dioxide, and sequester that back into the ground.

The great thing about hydrogen is that it gives you options, and today with oil we really don't have an option. It comes from the Middle East. In fact, even with hydrogen, you can use it chemically—thermochemically splitting water, using either the high heat of a nuclear reaction or the high heat of concentrated solar power. There are just lots of different ways to make it. The technology and the challenge are to bring down the costs of the different and various methods that we do have to make it.

1. Criteria pollutants are six common pollutants for which the EPA has set national air quality standards: ozone, nitrogen dioxide, particulate matter, sulfur dioxide, carbon monoxide, and lead.

Statement on Energy

Adopted by the AJC Board of Governors, February 8, 2002

The American Jewish Committee has long believed that the development of a comprehensive U.S. energy program is essential to the economic and social well-being of our country, our national security and the continuance of our broad role in world affairs. Twenty-five years ago, prompted by the then-recent Arab oil embargo, AJC first adopted a policy statement on energy. Over the succeeding years, as the nation coped with an energy supply shock that ensued from the 1979 collapse of the Shah's regime in Iran and concerns about the environment, safety, and tanker dependency raised by the Exxon Valdez oil spill in 1989, AJC adopted and acted on several additional statements on energy policy. Overall, these statements reflected the agency's concern that our nation address its increasing dependence on imported oil, and the impact of that dependency on our economic health, and strategic and social stability, in a fashion consistent with protection of the environment and attention to the impact of policy changes on the disadvantaged.

Throughout the past twenty-five years, national considerations of energy policy have focused primarily on U.S. vulnerability to steep prices and supply fluctuations, and the resulting economic burdens. However, the recent terrorist attacks against the U.S. underscored another crucial consideration, that our national security and our position as the leader of the free world are seriously undermined by America's dependence on foreign nations, many unfriendly or potentially unstable, for a primary energy supply. Thus, just as this nation is taking extensive actions at home and abroad to protect the safety of our citizens, it is imperative that we take the steps necessary to enhance our national energy security. Moreover, as we have experienced in the past, energy prices may decrease for periods of time, and with such fluctuations, Americans may become less sensitive to the need for this type of policy. Nevertheless, history demonstrates that, even when faced with public indifference, the country must, for the sake of our nation's security and stability, forge ahead in pursuit of energy independence.

In addition, a quarter-century after AJC's first energy policy statement, the need to limit dependence on foreign energy sources, both by assuring safe and stable energy sources and through renewed attention to issues of conservation and efficiency, remains no less critical to AJC's mission to safeguard the welfare and security of people in the United States and throughout the world. We therefore make this statement today to modify and expand upon, with even greater urgency, the energy policy statements previously adopted by the American Jewish Committee.

Our dependence on oil is of particular concern. While the U.S. comprises approximately 5 percent of the world's population, it consumes approximately 25 percent of the world's oil.[1] Nationwide, two-thirds of all oil consumed is for transportation and most of that for automobiles, trucks and other vehicles.[2] A drop in domestic oil production, coupled with increased consumption, has created a scenario by which the U.S. is more reliant on foreign oil sources than ever before. In 1973, the U.S. was approximately 28 percent reliant on imported oil.[3] Currently, the U.S. is approximately 58 percent reliant on foreign sources for oil.[4] If this trend continues, the U.S. will become even more reliant on oil from countries that have not traditionally been friendly to American strategic interests and that have the potential to disrupt oil supplies worldwide, thereby adversely affecting the world and U.S. economies with resulting lost jobs, a decreased quality of living, and harsher conditions for low-income families. In addition, Japan and Western Europe are even more reliant on imported oil than the U.S.[5] Therefore, a disruption of supply from, for example, the Persian Gulf could have an even more severe impact on the U.S. and worldwide economy than in the past.

Moreover, U.S. dependence on foreign oil is projected to increase as the U.S. depletes its 2.8 percent share of the world's proven oil reserves.[6] In contrast, the Middle East has at least 67 percent of the world's proven oil reserves.[7] At present, an estimated 51 percent of U.S. oil imports come from member nations of the Organization of Petroleum Exporting Countries (OPEC) and 27 percent from the Persian Gulf members of OPEC.[8] Inevitably, if the U.S. continues to increase its reliance on foreign sources of oil, our dependence on OPEC member nations and rogue states (overlapping categories that include the nations with the largest share of the world's proven oil reserves) will increase. In addition, U.S. dependence on foreign fossil fuels has led to coalitions with nations that are fomenters of terrorism and/or that lack democratic values and operate with few environmental constraints.

By scaling back dependence on imported oil, the U.S. will both strengthen our national security and also enhance America's ability to attend to human rights and environmental concerns. Furthermore, by reducing dependence on foreign sources of fossil fuels, there is potential for the United States to reduce greatly military expenditures now allocated for the protection of oil fields, pipelines, oil shipping routes, and refineries throughout the world. It is estimated that America currently spends $56 billion per year on imported oil itself, but spends another $25 billion on the military defense of oil supplies, shipping routes and pipelines.[9] These energy sources and supply routes provide numerous targets that hold great potential for damage, and are therefore vulnerable to attack by terrorists, pirates, and other groups, and leave the U.S. susceptible to price manipulation and embargo.

Overall, the foregoing trends present a grave danger that the U.S. will become increasingly susceptible to pressure from oil-producing nations and vulnerable to terrorist attacks, further jeopardizing this nation's security and ability to remain an independent actor on the world stage. Additionally, supply disruptions would adversely impact economic growth, the environment, and the economically disadvantaged, who may not be able to afford higher energy prices. With these and other matters in mind, we believe that U.S. energy policy, or the lack of a well-considered one, will have a crucial impact on our country's strategic and social stability, as well as on economic growth in the years ahead. Energy decisions will help determine whether we have an expanding or contracting economy. These choices will affect employment levels; cost, quantity, and quality of housing, food, and clothing; and the established lifestyles of whole regions of the country. Moreover, societal dislocations caused by energy shortfalls could well exacerbate group tensions in this country. Perhaps most importantly, and as noted at the outset, America's dependence on foreign nations for its primary energy supply threatens this nation's national security and position as leader of the free world.

The American Jewish Committee, therefore, urges that the United States set as a primary national goal a comprehensive energy policy aimed at a substantial reduction in U.S. dependence on imported oil, with the potential for energy flexibility and near independence in the longer term. Such a policy should encompass vast increases in vehicle fuel efficiency, a reduction in wasteful energy consumption, increases in domestic supplies with appropriate attention to environmental safeguards, further diversification of foreign oil sources, development and commercialization of alternative sources of energy, and strategies for coping with supply cutoffs. This program, which should be pursued with an urgency and a commitment of resources comparable to that of the Manhattan Project and NASA's intensive program to land a man on the moon, requires a partnership between government and the private sector working together and separately as appropriate.

The American Jewish Committee urges that the following steps be taken in furtherance of this agenda. These recommendations are not set forth in order of priority. While some items may be more urgent than others, all are essential to an effective and integrated U.S. energy policy.

1. Expansion of efforts to efficiently use and conserve energy

Conservation and increased efficiency represent the most immediate and implementable means of reducing energy dependence. Conservation and efficiencies in energy use must be achieved even at the expense of limited increases in the short-term cost of living and personal comfort. Federal commitment is essential—through mandates and requirements, as well as through encouragement and incentives—and public apathy must be overcome in order to reduce overall energy consumption. These efforts must include swift adoption of significant, tough, and more consistent corporate average fuel economy (CAFE) and appliance efficiency standards, exploration of mass transit options, tax policy, and subsidies, all of which are energy dependency reducing methods that AJC has long supported. Unfortunately, most Americans are not conserving energy at home, on the highways, in their leisure activities or in the workplace. Industry has demonstrated that energy conservation and increased efficiency can often save money and increase profits. Industry must be encouraged and, in some instances required, to produce more energy-efficient automobiles, trucks, heavy equipment and appliances, and industry and consumers alike must accept conservation measures which may not be economically advantageous or may necessitate lifestyle changes. Such measures may also counteract alarming trends toward global warming and other forms of environmental degradation.

2. Expansion of domestic energy resource

Government and industry must intensify their efforts to expand development and utilization of domestic energy resources, including oil, natural gas, coal and nuclear, even though cost per unit may rise in the short term. Such programs must incorporate stringent environmental and other safeguards, but they must also be propelled by an understanding of the serious security, economic, and political hazards of dependence on foreign energy sources.

3. Development and commercialization of alternative energy sources

Government and industry must undertake much more intense research and development programs on the various alternative energy sources, especially for vehicles, such as fuel cells, hybrid cars, synthetic fuels, biomass, solar, wind and any others that give promise of technical and commercial feasibility in the middle and long term. Government and industry should also create and support—through demonstration projects and other incentive programs—the widespread use and commercialization of viable alternative sources.

4. Modernized and expanded energy infrastructure

One outgrowth of the absence of a national energy policy has been the failure in recent years to maintain an infrastructure adequate to move energy to the locations where it is needed most. The nation's energy infrastructure should be modernized and expanded in order to make domestic and foreign energy resources available where they are needed most. The federal government and industry must take steps to improve the reliability of the interstate transmission system (including continuing research and development on transmission reliability and superconductivity), remove constraints on the interstate transmission grid, improve pipeline safety, and provide for timely consideration and approval of additional transmission lines and pipelines that are consistent with sound environmental principles. As part of the effort to improve our nation's ability to provide and deliver energy supplies to consumers, and in light of recent difficulties in California and elsewhere, state governments must examine (without any prejudgment on our part as to the results of such reexamination) the advisability of deregulation of the electric power market at the generating and distribution levels.

5. Maintenance of the Strategic Petroleum Reserve as protection against foreign price and supply manipulation

In light of the ever-present danger of manipulation of the price and supply of oil by foreign actors, it is essential that the U.S. oil reserve be maintained so as to protect our nation from an actual or threatened disruption in oil supplies. The national commitment to the Strategic Petroleum Reserve program must continue, and be expanded beyond its present maximum levels. There must also be a willingness to use the Reserve when needed.

6. Diversification of foreign oil sources

To reduce U.S. strategic vulnerability stemming from dependence on nations that are potentially unreliable sources of oil, as exemplified by past attempts to manipulate and fix prices worldwide and in the U.S., AJC encourages the continued exploration and development of alternative sources of foreign oil around the world, with stringent environmental safeguards.

7. International cooperation

Because of the economic and political interdependence of the nations of the world, an effective U.S. energy policy must involve cooperative international efforts and strategies with both other industrialized nations and with non-oil-exporting countries in the developing world.

8. Energy costs for the poor

AJC is sensitive to the negative impact that certain energy policies may have on the economically disadvantaged, and supports programs to provide energy aid to low-income households to help them meet their energy needs.

9. Increasing public awareness

The American public must be educated to the need to face our energy crisis and its foreign policy and national security implications, the urgency of conserving and expanding our national energy resources and about the critical energy decisions to be made in the months and years ahead. This effort requires the commitment of organizations such as the American Jewish Committee and other civic and religious groups, in coordination with government, industry, universities, and research groups, working to further such education among their own constituencies and pressing their federal, state, and local officials for urgently needed action towards our stated goals.

Adopted by the Board of Governors, February 8, 2002

Endnotes

1. U.S. Department of Energy, Energy Information Association, ("DOE, EIA"), *Oil Market Basics: Trade, Import Dependency*, (http://www.eia.doe.gov, December 17, 2001).

2. DOE, EIA, *Oil Market Basics: Demand, U.S. Consumption by Sector*, (http://www.eia.doe.gov; United States Energy Fact Sheet: Oil-Consumption/Marketing, October 2001 (http://www.eia.doe.gov/cabs/usa2.html, December 17, 2001).

3. DOE, EIA, Annual Energy Review 1997, DOE/EIA-0384(97)(Washington, DC, July 1998), Table 5.1, *Imported Oil as a Percent of Total U.S. Consumption*, (http://www.eia.doe.gov, December 18, 2001).

4. DOE, EIA, *United States Energy Fact Sheet: Oil, Imports/Exports*, October 2001 (http://www.eia.doe.gov/cabs/usa2.html, December 17, 2001).

5. DOE, EIA, *Persian Gulf Oil and Gas Exports Fact Sheet: Oil, Other Export Routes*, October 2001 (http://www.eia.doe.gov/emeu/cabs/pgulf.html, December 17, 2001).

6. *BP Statistical Review of World Energy 2001*, Proved Reserves at End of 2000/Share of Proven Reserves, (http://www.bp.com/centres/energy/world_stat_rev/oil/reserves.asp, December 28, 2001).

7. DOE, EIA, *Oil Market Basics: Supply, Global Oil Supply by Region*, (http://www.eia.doe.gov, December 17, 2001).

8. DOE, EIA, *Monthly Energy Review: Crude Oil Imports, 1973-Present*, (http://www.eia.doe.gov/pub/oil_gas/petroleum/data_publications/petroleum_supply_monthly/current/txt/table_s03.txt, December 18, 2001).

9. Rob Nixon, *New York Times*, "A Dangerous Appetite for Oil," October 29, 2001.

AJC Statement on Energy Legislation

Adopted by the Board of Governors, June 24, 2002

In its Statement on Energy adopted on February 8, 2002, the American Jewish Committee called for the United States to adopt a comprehensive energy program that seeks to substantially reduce U.S. dependence on imported oil as a crucial element in achieving energy flexibility and near energy independence in the longer term. Recent events, including the Iraqi oil embargo and the interruption of Venezuelan oil production, have reinforced the critical importance of enacting such a program. In light of these concerns, and the specific measures recommended in AJC's policy statement, AJC urges Congress to seize the opportunity presented by the pending energy legislation to enact a comprehensive energy program.

The overall effort to reduce our nation's dependence on foreign energy sources must be balanced in its approach and encompass the following principles:

- Substantial increases in vehicle fuel efficiency, including the swift adoption of significant, tough, and long-term corporate average fuel economy (CAFE) standards. This is the most effective way to decrease our dependence on foreign oil, year after year, on a consistent basis. While neither the House nor the Senate bill currently calls for such measures, AJC hopes that meaningful action may yet be taken by Congress in this area. At the very least, provisions of the energy bill already adopted by the Senate, which require a study, should be implemented in a fashion that is cognizant of the need for early and substantial increases in efficiency standards.

- A sharp reduction in wasteful energy consumption through mandates, requirements and other incentives to encourage industrial and consumer efficiency and conservation, including standards for new buildings and appliances, as well as automobiles.

- Responsible increased development of domestic sources of energy including oil, natural gas, coal, and nuclear, with sound environmental and other safeguards.

- Intense research, development, and commercialization of alternative sources of energy, through demonstration projects and other incentive programs, especially for vehicles, such as hybrid cars, fuel cells, synthetic fuels, biomass, solar, wind and any others that give promise of technical feasibility in the middle and long term.

- Hybrid cars, made by many auto manufacturers, have the prospect of rapidly reducing oil usage if tax incentives are in place.
- Maintenance and expansion of, and willingness to use, the Strategic Petroleum Reserve program.
- Strengthened energy infrastructure, including timely consideration of additional energy transmission facilities (electricity transmission lines, natural gas and liquid fuels pipelines) consistent with sound environmental principles; improved reliability and efficiency of the interstate electricity transmission system; and effective pipeline safety regulation.
- Diversification of foreign oil sources including the continued exploration and development of alternative sources of foreign oil around the world, with sound environmental safeguards.
- Programs to provide energy aid to low-income households to help them meet their energy needs.

The various sides on these issues must look beyond narrow interests in order to ensure that our nation is less susceptible in the future to international energy coercion. In particular, the final energy bill should promote increased development of domestic sources with appropriate attention to environmental and other safeguards, but this development must take place within the context of a comprehensive energy program that includes substantial increases in vehicle fuel efficiency, and a sharp reduction in wasteful energy consumption.

As is well known, proposals for development of the Arctic National Wildlife Refuge (ANWR) have been fraught with controversy for a variety of reasons, including the potential environmental impact, a protracted production start date, conflicting oil quantity estimates, and the existence of alternative oil fields in less protected areas. Thus, although AJC has a firm commitment to increased development of domestic energy sources, these considerations evidence the need for more research into the amount of recoverable oil present in the area.

Assuming research bears out the presence of sufficient recoverable oil, AJC would, given the urgent need for the United States to move toward increased energy independence, accept provisions allowing for exploration and development of ANWR accompanied by sound environmental safeguards, but only as part of an overall package that mandates substantially strengthened CAFE standards, and other measures to encourage efficiency and conservation that are necessary elements of a balanced approach to achieving greater energy independence.

Afterword: A Legislative Update

Richard Foltin

Looking back on the labyrinthine progress and ultimate demise of the 2003 energy bill, we can see Ambassador Stuart Eizenstat's comments at the AJC energy symposium last May as very prescient:

> … sometimes I think that we are not really serious about energy at all. We talk a good game, but when it comes down to brass tacks, the interest groups on all sides checkmate each other, and any tough decisions end up with a blank...

The administration's 2003 energy bill now awaits an uncertain fate in 2004, following the failure to bring over two Republicans out of six who had voted to sustain a filibuster against the measure. Regardless of the initiative's fate, some would argue that its particulars, together with the recent history of comprehensive energy bills generally, demonstrate the accuracy of Eizenstat's analysis.

The 107th Congress

Energy bill S. 517, introduced in 2001 by Senator Jeff Bingaman (D-NM), chairman of the Senate Committee on Energy and Natural Resources, focused on increasing energy conservation and efficiency and promoting renewable fuels. The $16 billion package, considered in April 2002 by a then-Democratic-controlled Senate, was almost equally divided between incentives for traditional energy producers and renewable fuel producers. To promote alternatives to oil, the plan required electricity suppliers to obtain a rising percentage of their energy—10 percent by 2020—from renewable sources and increased the Corporate Average Fuel Economy (CAFE) standards.

The Senate bill lacked many of the incentives for energy producers that the administration wanted, but these were included in H.R.4, the Securing America's Future Energy Act, introduced in the Republican-controlled House in July 2001 by Rep. Billy Tauzin (R-LA), chairman of the House Energy and Commerce Committee. Besides its $33 billion package of tax incentives for increased domestic energy production, the bill included some modest measures directed at conservation, energy efficiency, and the environment, but did not include the Senate bill's mandatory CAFE provisions. Its most controversial difference from the Senate bill was its provision for drilling in the Arctic National Wildlife Refuge (ANWR).

To bridge the gap on energy efficiency standards, on March 13, 2002, the Senate voted, 62-38, in favor of an amendment to strip out the Senate bill's CAFE provisions and instead to mandate the National Highway Traffic Safety Administration (NHTSA) to undertake a study for up to two years, with a view toward adopting new CAFE standards. On April 18, 2002, most Democrats, joined by a handful of Republicans, voted to reject an amendment that would have adopted the Administration's proposal to allow oil exploration in ANWR. Days later, the bill was passed by the Senate and was sent to conference with H.R.4, which had been passed by the House the previous year.

Thus, while the House- and Senate-passed bills were similar in many respects—both provided for the development of energy infrastructure security and low-income (LIHEAP funding) assistance—they differed on two major areas of contention: the House's provision for drilling in ANWR and the Senate's inclusion of (now very weak) CAFE provisions. The conferees on the energy bills failed to achieve a reconciliation of the two initiatives by the end of the 107th Congress. With the exception of an enactment directed narrowly at pipeline safety, no energy legislation emerged.

On a more positive note, in late 2001, the Bush administration began reviewing an NHTSA proposal requiring auto manufacturers to make modest improvements in the fuel efficiency of SUVs (sport utility vehicles) and light trucks, roughly one-half mile per gallon each year from 2005 to 2007. A White House spokesperson stated that its decision would reflect its belief that fuel efficiency should be raised in a way that protects lives and jobs. Several environmental groups and Representative Edward Markey (D-MA), a senior member of the House Energy and Commerce Committee, criticized the NHTSA proposal as inadequate in the event of a war with Iraq, which could disrupt oil supply from the Middle East.

The 108th Congress

When the 108th Congress convened at the beginning of 2003, with both houses under Republican control, the issue of drilling in the ANWR returned to the energy agenda. Senators Pete Domenici (R-NM) and James Inhofe (R-OK), serving as new chairs of the Energy and Environment Committees, respectively, were both strong supporters of ANWR development, and Senator Inhofe was not generally known as a supporter of regulations aimed at conservation and environmental protection. Together with Senator Don Nickles (R-OK), incoming chairman of the Senate Budget Committee, they sought to revive President Bush's proposal for ANWR drilling, but given Republican as well as Democratic resistance, it was clear from the outset that ANWR would face tough sledding in the Senate.

Lost in the collapse of energy negotiations at the end of the 107th Congress was a tax package in excess of $20 billion that would have included support for alternative fuels such as ethanol. Senator Bingaman, divested of his Energy Committee chairmanship, asserted it would be difficult to revive such a provision given the worsened fiscal climate.

On April 11, 2003, the House passed the Omnibus Energy Bill, H.R.6, by a vote of 247-175. The measure, sponsored by Representative Joe Barton (R-TX), was similar to the House bill that had died with the close of the 107th Congress. The bill emphasized greater domestic energy production and specifically called for oil and gas drilling in the ANWR. The House rejected 162-268, an amendment offered by Representatives Sherwood Boehlert (R-NY) and Markey to raise fuel efficiency standards.

Provisions to allow drilling in the ANWR were included in the budget-reconciliation bill passed by the House in March 2003, but efforts to include similar provisions in the parallel Senate measure failed. The 2003 Senate energy bill, S.14, similarly ran into trouble over ANWR provisions. The Senate did, however, approve, on June 12, an amendment to allow the Interior Department, using a variety of technologies, to try to measure the amount of oil and gas beneath the nation's outer continental shelf. The sides of the debate correlated not only with party allegiance, but with geography. Thus, Senator Domenici was joined in defending the measure by senators from oil-producing states such as Texas and Louisiana, who have long maintained that other states should do their part in energy production. The opposition was led by officials from coastal states, such as Senators Barbara Boxer (D-CA) and Bob Graham (D-FL), who saw the move as a precursor to development in areas viewed as environmentally sensitive.

After some three months of on-again, off-again debate, S.14 stalled short of final passage. The Senate leadership, seizing on an off-the-cuff suggestion by Minority Leader Tom Daschle (D-SD), substituted the provisions of the bill that the Democratic-controlled Senate had passed the year before. That bill passed on July 31 by a vote of 84–14, but it soon became evident that the Senate leadership viewed this as little more than a vehicle to move ahead to a conference.

House-Senate negotiations to agree on conference language were stalled for weeks by heated debate over electricity provisions, proposed tax guarantees for the developers of a natural gas pipeline from Alaska, and a provision affording a liability waiver to manufacturers of the fuel additive MTBE, which, like ethanol, makes for cleaner-burning gasoline but, unlike ethanol, contaminates groundwater.

The report released on November 18 contained no provisions to raise CAFE standards (unlike the Senate-passed S.14 bill) and instead emphasized tax breaks. The Joint Tax Committee estimated that these tax breaks would total $25.7 billion over ten years, far more than the $8 billion set forth in the administration's proposed budget. The report also contemplated an increase in direct spending of $5.4 billion from

2004 through 2013. In the end, there were no ANWR provisions in the conference report, nor did it provide for an inventory of off-shore oil reserves where drilling had been prohibited, a measure the Senate had earlier voted to adopt.

The vast bill included many provisions directed at winning the votes of particular legislators based on their regional interests. Thus it required ethanol production to be more than doubled, a provision that caused Minority Leader Daschle to split with his caucus and support the bill; provided $1.1 billion in coastal restoration funds, largely for Louisiana; afforded another $1.1 billion to build an advanced nuclear reactor in Idaho; and extended loan guarantees for coal-burning power plants on the Great Plains, a provision that brought Senator Byron Dorgan (D-ND), previously a strong critic, over to the plus column.

In other provisions, the conference report directed the energy secretary to fund a limited number of hydrogen fuel cell demonstration projects, but provided no specific level of authorization for this initiative. The total authorization for all hydrogen- and fuel cell-related programs, including research, development, and demonstration initiatives, was $2.15 billion. While the Senate bill mandated minimum fleet requirements for fuel cell vehicles and purchases of fuel cell stationary power plants, the conference report did not provide any mandate for government purchases of fuel cell vehicles. The federal government, as the single largest energy consumer in the nation, is a prime candidate for early adoption and deployment of portable, stationary and mobile fuel cell applications. The conference report calls for a commitment by automakers to offer safe, affordable, and technically viable hydrogen fuel cell vehicles in the mass consumer market by 2015 and for the production, delivery, and acceptance by consumers of model year 2020 hydrogen fuel cell vehicles.

The conference report easily passed the House—on the very same day that it was issued and with scant time for members to review the mammoth bill or for debate. But, as expected, the Senate proved more treacherous grounds, where many Democrats, joined by several Republicans, argued that the bill was environmentally unfriendly and overly generous to energy companies. Critics maintained that it was loaded with tax breaks and subsidies for the oil, gas, coal, and nuclear industries, while lacking a broad vision for reducing America's debilitating addiction to oil and other fossil fuels. They maintained as well that the bill weakened clean air and water protections, opened up more of America's coastline to exploitation, contained no standards for the purchase of renewable energy or higher fuel efficiency, and did not address the issue of global climate change.

But the hurdle to closing debate in the Senate was the inclusion of the MTBE waiver. Even after the Senate voted 57–40 on November 21 not to limit debate, House Majority Leader Tom DeLay (R-TX), chief champion of the waiver, refused to acquiesce to removal of the waiver provision from the conference report. With that, on

November 24 the Senate leadership announced that the matter would have to await the 2004 session.

Other measures before the Congress in 2003 also related to energy issues: In his 2003 State of the Union address, President Bush proposed enhanced support for research on the use of hydrogen-based fuel cells to power cars; he allocated $1.2 billion for this purpose in the budget that he subsequently sent to Congress. Asserting that the president has not done enough to solve oil import and pollution problems, Senators Dorgan (D-ND) and Hillary Clinton (D-NY) introduced the Hydrogen Fuel Cell Act of 2003, S.461, which called for $6.5 billion over 10 years, in contrast to the president's $1.2 billion. Also in the Senate, Senators Olympia Snowe (R-ME) and Dianne Feinstein (D-CA) introduced the Automobile Fuel Economy Act of 2003, S.255, which would close the "SUV loophole" that allows SUVs to consume more fuel per gallon than other cars. On April 21, Senator Richard Durbin (D-IL) introduced another bill directed at increasing CAFE standards.

Prospects for Reduced Energy Dependence

Supporters of the energy bill conference report maintain that its package of tax incentives for energy production and conservation would move the nation toward reduced dependence on foreign oil. But critics attacked the bill for, among other things, its failure to include CAFE standards and provisions dictating that a certain percentage of electricity be generated from clean renewable energy sources; its repeal of current federal law that requires utilities to buy renewable energy when it is cheaper from other sources; its extension of a loophole in the dual-fuel efficiency program that allows car manufacturers to claim efficiency credits for producing vehicles that run on gasoline or alternative fuels, even when the vehicles in question use alternative fuels less than one percent of the time; and its new, redundant requirements for NHTSA studies to be carried out before that body may require increases in automobile fuel economy.

Whatever else may be said about the energy package, it seems clearly to be a huge expenditure—both in dollars and in lost opportunity, given the likelihood that once it passes we will not soon see another comprehensive energy bill—for relatively little gain. The most controversial proposals to encourage production, use of alternative fuels, and increased efficiency and conservation have been shelved again. It is instructive that neither strengthened CAFE standards nor an inventory of off-shore resources (to say nothing of ANWR) were part of the package. Indeed, while it is easy to find senators who voted against both ANWR and CAFE, there are precious few who have voted for both.

How We Can Move Forward from Here

In September 2003, New York Times columnist Nicholas Kristof cited Yale University Professor Daniel Esty's proposal of a deal to break "the national deadlock on environmental policy." That package could include careful oil exploration and, if the exploration pointed to vast resources, careful drilling in the ANWR—in exchange for "additional financing for solar, wind and hydrogen energy, and significant increases in vehicle mileage standards."

That grand deal, reflective of the gravity of the threat posed by America's growing dependence on oil imported from unstable and unreliable regimes, is what the American Jewish Committee has urged in its policy statements on energy. (See pages 61-68) Whatever the specifics of that deal, the time is long past due for our nation's leaders to move toward an energy program that is not only truly comprehensive and well-funded but that moves us away on all possible fronts from our dangerous dependence on foreign fuel sources.

Contributors to this Volume

Dr. Michael Canes is a senior research fellow at the Logistics Management Institute, a nonprofit in McLean, Virginia, that serves the public sector through provision of studies and other services. Dr. Canes serves in the Energy and Environmental Group at LMI, with his work focused mainly on energy management. He has done extensive research on hybrid electric vehicles.

Alan Crane is the senior program officer at the National Research Council. He has directed projects analyzing fuel economy standards for cars and light trucks, and the role of science and technology in countering terrorism against energy systems in urban infrastructures. Prior to this current appointment, he worked as an independent consultant on energy, environment, and technology issues for government and private sector clients.

Henry Dubinsky is a past president of the St. Louis Chapter of AJC and current chair of AJC's national Energy Committee. He is president of Waterway Gas and Wash Company, and former head of the International Car Wash Association.

Ambassador Stuart Eizenstat heads the international practice of Covington and Burling, a Washington-based law firm. He was President Jimmy Carter's chief domestic policy adviser. Under President Bill Clinton he served as deputy secretary of the treasury, undersecretary of state for economic, business and agricultural affairs, and undersecretary of commerce for international trade. He was ambassador to the European Union from 1993-96. Among the international initiatives that he spearheaded were the negotiation of the Transatlantic Agenda with the European Union, the development of agreements with the European Union on the Helms-Burton Act and the Iran-Libya Sanctions Act, the Japan Port Agreement, and the Kyoto Protocol on global warming. He also headed the Clinton administration's anti-money laundering efforts. Most recently, he negotiated major Holocaust restitution agreements with the Swiss, German, Austrian, and French governments, and authored a book based on this experience entitled *Imperfect Justice; Looted Assets, Slave Labor and the Unfinished Business of World War II*. He is also an AJC honorary vice president and founding chairman of the Dorothy and Julius Koppelman Institute on American Jewish-Israeli Relations.

Dr. John Felmy is the chief economist and director of the American Petroleum Institute's Policy Analysis and Statistics Department. John earned a bachelor's degree and a master's in economics from Pennsylvania State University, and a Ph.D. in economics from the University of Maryland. He serves as the chairman of the policy committee of the Alliance for Energy and Economic Growth.

Richard Foltin is AJC's legislative director and counsel, based in Washington, D.C.

David Garman is the assistant secretary for energy efficiency and renewable energy at the Department of Energy. He was nominated by George Bush to serve as secretary on April 30, 2001, and was confirmed just about two years ago, assuming the position on May 31. Assistant Secretary Garman previously served in a variety of positions on the staff of two U.S. senators, two senate committees, and most recently, as chief of staff to Alaska Senator Frank Murkowski, and also on the professional staff of the Senate Energy and Natural Resources Committees and the Senate Select Committee on Intelligence. His work has focused on energy in the environment and on the newly emerging field of environmental intelligence and security. He holds a Bachelor of Arts degree from Duke University and a Master of Science in Environmental Sciences from Johns Hopkins.

Robert Hanfling served in a variety of positions in the U.S. Department of Energy/Federal Energy Administration in the Ford, Carter, and Clinton administrations. He was the chief adviser to Secretary of Energy Hazel O'Leary at the beginning of President Bill Clinton's first term, assisting in the reorganization of that department. Currently he is an energy consultant for Charles River Associates and serves on the Secretary of Energy's Advisory Board of which he is a former chair. He holds a B.S. in chemical engineering from Rensselaer Polytechnic Institute, a Masters in nuclear engineering from West Virginia University, and an MBA in international trade from the City University of New York.

Steven Plotkin is a transportation, energy, and environmental analyst with the Center for Transportation Research of the Argonne National Laboratory. His current work focuses on advanced automotive technology and greenhouse gas reduction strategies. He was the coauthor, with Dr. David Green of Oak Ridge National Laboratory, of *Scenarios of U.S. Carbon Reductions: Potential Impacts of Energy Technologies by 2010 and Beyond* and a follow-up study, *Scenarios for a Clean Energy Future*. He is currently co-managing a study of long-term transportation fuel futures to 2050 for the Department of Energy and of potential reduction in greenhouse gases from the transportation sector for Toyota Motors. He holds a bachelors degree in civil engineering from Columbia University and a Masters in Engineering (Aerospace) from Cornell University, with post-graduate work in urban and regional planning from George Washington University.

Phil Sharp, a former member of Congress from Indiana (1975-95), was chairman of the Energy and Power Subcommittee of the House Energy and Commerce Committee until 1975. He is currently a senior research fellow with the Environment and Natural Resources Program at Harvard University's Kennedy School of Government.

Leslie David Simon, a retired IBM vice president and currently a senior policy scholar at the Woodrow Wilson International Center for Scholars, is president of AJC's Washington Chapter, which organized the AJC Energy Symposium.

The American Jewish Committee

The Jacob Blaustein Building
165 East 56 Street
New York, NY 10022

The American Jewish Committee publishes in these areas:
Hatred and Anti-Semitism   Pluralism   Israel
American Jewish Life   International Jewish Life   Human Rights

December 2003   *www.ajc.org*