Testimony of Philip Sharp, President, Resources for the Future

Prepared for the Senate Committee on Agriculture, Nutrition, and Forestry

Submitted January 10, 2007

1616 P Street NW, Washington DC 20036-1400 Tel: 202-328-5000; www.rff.org

Mr. Chairman, Thank you for inviting me to testify. My name is Philip Sharp and I am president of Resources for the Future (RFF), a nonpartisan, social science think tank, which has dealt with energy and natural resource issues for more than 50 years. As an institution, however, RFF does not take positions nor engage in advocacy, so the opinions expressed here are my own.

For the record, I have been involved with energy issues in a number of ways. I chaired the Energy and Power Subcommittee of the Energy and Commerce committee, during my tenure in Congress, from 1975 to 1995; taught a course in electricity policy, while on the Harvard Kennedy School faculty; led the Secretary of Energy's Task Force on Electric Systems Reliability; am the congressional co-chair of the National Commission on Energy Policy; headed the advisory panel to the MIT study on the future of nuclear power as well as the advisory panel for the forthcoming MIT study on the future of coal; and served as a member of the task force on energy security of the Council on Foreign Relations, which issued its final report in October 2006. In addition, I have been a member of several energy-related corporate and non-profit boards.

I have been asked to comment briefly on the energy challenges we face, especially with respect to oil dependence, as part of the committee's effort to examine the role agriculture can play in America's energy future.

At the outset, it is important to recognize that we have always had trouble settling on the goals we want energy policy to serve. Indeed, there are a variety of goals that cannot easily be reconciled: economic prosperity, national security, environmental protection, and equity.

Basically we want reliable supplies of energy to fuel our prosperity without undermining our national security or doing major damage to the environment on which healthy life depends. That is a very tall order. And surely we all understand, after years of contention, that there are no silver bullets for hitting such a complex target.

Let me first provide a few factual reminders of where we are in terms of oil use.

Our dependence on the global oil market is projected to grow, in the absence of a major, persistent crisis in the world oil market or the imposition of dramatic U.S. policies and the costs they entail. U.S. consumption may grow from 22 million barrels a day to as much as 28 million barrels a day by 2030. And global demand is expected to also grow especially rapidly in countries like China where automobile use is dramatically increasing.

Chart I, attached to this testimony, illustrates the history and expected growth of our oil

imports.

For most analysts, a more telling measure of the relevance of oil to our economy is not the import figures, but rather the intensity of oil in our economy - meaning the relation of oil to our gross domestic product. As illustrated in Chart II, we saw by this measure, a major improvement in the years since the oil crisis of 1973. Indeed, this development in part explains why the economic consequences of the recent rise in oil prices has not been as past predictions would have suggested.

Many argue that we will serve the country well by focusing on the goal of reducing oil intensity through the promotion of greater transportation efficiency and the development of alternative transportation fuels.
Chart III provides the fuller energy picture, comparing the relative importance of oil to other fuel sources in today's economy and projections for 2030. The striking point is how little the proportions change, though all fuel sources grow in use. Petroleum, which makes up 40 percent of our energy use today, will provide the same proportion in 2030, while total energy consumption is projected to grow from 100 quads (quadrillion BTUs) to an estimated 125 to 130 quads.

It must be noted that these projections by the U.S. Energy Information Administration take into account the higher price levels of the last couple years and the various government policies in place and adopted in the 2005 Energy Act, which included numerous incentives to push for greater efficiency and increased production as well as the fuels mandate to expand ethanol use.

Such projections, of course, have many limitations. Fortunately, we are witnessing exciting technology developments that can significantly improve efficiency throughout the energy system from production to end use. We see exciting developments on the research front, especially in the biological field. We see new investments in alternative fuels.

You will certainly be hearing today from other witnesses about these positive possibilities. But, given our past history, no one should assume that that these developments will automatically gain widespread acceptance in the market place in the absence of effective and persistent public policies.

Oil Dependency Risks

Our growing consumption of oil, concentrated in the transportation sector, entails major risks associated with our dependence on the global oil market. And this consumption is a major contributor of carbon dioxide (CO2) to the atmosphere and hence to global climate change.

Among concerns about the oil market is the possibility of a serious supply disruption caused by political turmoil or terrorism; the pressure to compromise important U.S. foreign policy goals for the sake of oil supply; the possibility that global oil production will not keep pace with global demand and dramatically intensify national competition for supplies; and the pressure to militarily protect oil markets.
Concerns about the impact of oil dependence on our security and foreign policy have been

effectively articulated by Members of this committee.

In the last few years, there have been new calls for action from several bipartisan or nonpartisan groups such as the Energy Futures Coalition and the National Commission on Energy Policy. More recently, a group of business leaders and former military leaders formed the Energy Security Leadership Council and spoke to these issues. Last October, the Independent Task Force of the Council on Foreign Relations issued its report, "National Security Consequences of U.S. Oil Dependency."

These groups vary in the urgency with which they advocate action; they also differ in their belief about the speed with which we could change consumption and production patterns, but they all stress the importance of the United States taking major steps to reduce our dependence on oil.

The Task Force of the Council on Foreign Relations summarized many of its concerns in the opening paragraph from the report:

The lack of sustained attention to energy issues is undercutting U.S. foreign policy and U.S. national security. Major energy suppliers - from Russia to Iran to Venezuela - have been increasingly able and willing to use their energy resources to pursue their strategic and political objectives. Major energy consumers - notably the United States, but other countries as well - are finding that their growing dependence on imported energy increases their strategic vulnerability and constrains their ability to pursue a broad range of foreign policy and national security objectives. Dependence also puts the United States into increasing competition with other importing countries, notably with today's rapidly growing emerging economies of China and India. At best, these trends will challenge U.S. foreign policy; at worst, they will seriously strain relations between the United States and these countries.

Hitching meaningful and sustained actions to these concerns is far from easy. For more than 30 years, our rhetoric has seldom matched reality. We abhor the risks posed by dependency but we have not been willing to pay the price - very likely, much higher oil prices - necessary to change the path of dependence. We must also recognize that many past dire predictions about oil disruption did not come to pass.
The recent rise in oil and natural gas prices and the conflicts and war in the Middle East have brought a new surge of market activities, public interest, and government action.

We certainly have seen renewed interest in vehicle efficiency and investment in alternatives to conventional oil just as we did during past energy crises.

Among the uncertainties we face is where oil prices will go in the years ahead. Just as the dramatic rise in oil and natural gas prices over the last two years was not predicted, it is now unclear whether oil prices will rise further, drop back to the $40 per barrel range as some have predicted, or, if the global economy slows, take a nose dive as they did in 1986 and 1999.

The history of price uncertainty has meant a history of on-again, off-again interest by consumers, investors, and government in fuel efficiency and in alternative fuels.

Because of that uncertainty, many have concluded that the United States, and other governments, must maintain policies that push markets to improve fuel efficiency, to advance alternative fuels, and to expand public transit options - in order to mitigate global market risks and to reduce growth in CO2 emissions.

Greenhouse Gas Emissions

With the growing consensus that we must over time reduce greenhouse gas (GHG) emissions such as CO2, it is important that we recognize the interplay between the goal of energy security and the goal of carbon or GHG constraint.

The tough long-term challenge of dealing with GHG emissions may be made much harder by investments expected over the next decade here and around the globe, where there are no policies of carbon restraint - that is, no cost to CO2 or other greenhouse gas (GHG) emissions.

In this country, for example, we are seeing a big new wave of electric power plant construction - at this point, much of it planned to be coal combustion. The electrification underway in China and India includes dramatic additions of coal-fired power plants. All of this, of course, means considerable growth in CO2 emissions.

On the oil front, where worldwide use already accounts for 40 percent of C02 emissions, we also see expansion of GHG emissions, not simply because of increased oil use, but because of the changing nature of petroleum production. It is widely expected that significant investments will be made in unconventional petroleum sources, such as oil shale and tar sands, which already are being produced in Alberta. These fuels require greater energy to produce than does conventional oil, and thus they generate more GHG emissions per barrel of useable product.

Many of the actions we could take to reduce the growth in carbon emissions from oil would also help meet the goal of energy security. But some of the actions that could enhance energy security could also worsen our carbon path.

For example, we can serve both goals by improving the efficiency of our vehicle fleet. Oil substitutes like ethanol, especially celluosic ethanol, serve both goals. But making gasoline from coal, while helping us with energy security, compounds our CO2 problem.

Chart IV, created by Dr. Richard Newell, a former RFF senior fellow who just joined the Duke University faculty, provides a picture of how alternatives to conventional oil compare in terms of their costs and their green house gas emissions. The differences are considerable. The table displays the alternative fuels in such a way as to compare them to conventional oil and to the expected world price for oil.

The differences in GHG emissions, of course, result not simply from the basic feedstock but also from the energy necessary to produce and process the fuel. Corn ethanol, for example, is only about a 20 percent improvement over gasoline because of the use of fossil fuels like natural gas for growing and processing. Celluosic ethanol has considerably greater potential advantage over gasoline. Turning coal into "gasoline," however, is estimated to create as much as 75 percent more GHG emissions than conventional gasoline.

Although there are many factors that will affect the development of these alternatives to conventional oil, the most compelling factor is likely to be the world price of crude oil. And as

long as CO2 emissions are free to the producers and users of energy, the market is much more likely to bring into play new fuels with greater rather than lesser GHG emissions.

While not reflected in Chart IV, it is critical to note that action by Congress and various state governments to provide major financial subsidies for the production of corn ethanol, biofuels, and celluosic ethanol, has dramatically changed the market prospects for these alternatives to oil. If current policies are sustained, corn ethanol remains competitive at oil prices as low as $20 a barrel and biofuels may become competitive in the expected range of world oil prices.

U.S. Petroleum Supply, Consumption, and Net Imports,1960-2030 (million barrels per day)
30
25
20
15
10
5
0 1960 1970 1980 1990 2000 2010 2020 2030
Consumption Domestic supply History Projections 58% Net Imports 62%

? The import share in total U.S. oil use is projected to grow slowly
CHART I

CHART II
Total Domestic Energy Use by Source (Percent of Total)
2005 Projected 2030
Energy, Renewable
including Energy, Hydro including 6% Hydro 7%
Sources: Energy Information Administration, Monthly Energy Review (November 2006), Tables 1.3 and 10.1, and Annual Energy Outlook 2006 (February 2006), Table 1 (Reference Case).
CHART III