

Americas Untapped Depths

Our nation has the resources - and the resourcefulness - to achieve energy independence

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When gasoline prices skyrocketed in the wake of hurricanes Katrina and Rita, America's excessive dependence on imported oil once again catapulted to prominence on the national agenda. What remains to be seen, however, is whether or not this latest warning about our increasing energy vulnerability will result in concrete action.

More than three decades have passed since the 1973 oil embargo first alerted the nation to the dangers inherent in an undue reliance on oil from abroad. Yet, despite volumes of rhetoric and myriad quick-fix attempts, we are far worse off today than we were three decades ago. Indeed, the proportion of domestic oil consumption accounted for by imports is almost 75 percent higher than it was in 1973 and, if current trends persist, will soon be double that amount.

Worse, the volume of U.S. oil imports from the unstable Persian Gulf region is five and a half times what it was just 20 years ago.

It doesn't have to be this way.

Myth of Energy Scarcity

Within five years, oil imports could be reduced by 40 percent. Within 15 years, they could be reduced by 75 percent, and within 25 years, oil imports could be eliminated entirely. Moreover, these goals can be met without discovering a technological breakthrough.

It is first necessary to dispel one of the most persistent myths about our energy dependence: the United States lacks energy resources. The facts say otherwise:

- According to the U.S. Geological Survey (USGS), the United States has almost 175 billion barrels of oil reserves. These include 21.9 billion barrels of "proved oil reserves" – oil that has been discovered and can be produced right now – and more than 150 billion barrels of "undiscovered" reserves.
- The USGS estimates that the United States has 1,430.6 trillion cubic feet of natural gas reserves.
- The USGS estimates that there are 23.6 billion barrels of natural gas liquids reserves – products such as propane, butane and ethane – in the U.S. resource base.

- The United States is the Saudi Arabia of coal, with 496.1 billion tons of demonstrated reserves – 27 percent of the world total.
- The United States has between 500 billion and 1.1 trillion barrels of oil in the form of oil shale.
- Finally, the United States has approximately 4.85 billion pounds of uranium reserves.

And those are just the so-called “conventional” energy resources. In addition, the nation also has renewable resources of a similar magnitude. According to Oak Ridge National Laboratory, a total of 1.366 billion tons of biomass is available for energy production annually.

Perhaps the greatest untapped energy resource, though, is found in America’s “methane hydrates.” Called “the ice that burns,” methane hydrates are composed of natural gas trapped in an ice matrix. It is believed that as much as half the world’s carbon is contained in these deposits.

According to the U.S. Department of Energy, the United States has some 320,222 trillion cubic feet of natural gas in the form of methane hydrates, the equivalent of 51.1 trillion barrels of oil. Indeed, one on-shore deposit of methane hydrates in Alaska contains 519 trillion cubic feet of natural gas, the equivalent of 82.9 billion barrels of oil. Yet, given its wealth of resources, the United States remains dependent on oil from abroad. As Pogo said, “We have met the enemy, and he is us.”

The bulk of our undeveloped energy resources are found on federal lands or federally controlled areas offshore. Since the 1970s these areas have increasingly become foreclosed to natural resource exploration and development. Even where development is allowed, stringent regulations make extraction much more costly than would otherwise be the case.

But regulation is not the only culprit. The oil industry was born in the United States. Indeed, America was the world’s leading oil exporter through the 1950s. As a result, most of the large North American oil fields that could be produced at relatively low cost have long been developed. Higher costs and a hostile regulatory environment have driven much of the investment in oil and gas exploration and development overseas.

Moreover, the availability of relatively cheap oil, until recently, has made the development of alternatives such as oil shale unattractive.

But in recent years, the global oil market has undergone a dramatic change. Demand for oil from the emerging economies of China, India and parts of Eastern Europe has placed enormous upward pressure on energy prices – pressure that is unlikely to abate. As a result, America’s tab for imports will continue to grow unless the United States reduces its growing dependence.

Solving the Problem

What, then, can be done? The answer lies in a three-phase program to make full use of domestic resources and alternatives that can bring about a 40-percent import reduction in five years, a 75-percent reduction in 15 years, and the complete elimination of imports within 25 years. In implementing such a program, it is essential to understand the role oil plays in our economy and how this impacts our ability to reduce imports.

The key to reducing import dependence lies primarily in addressing transportation needs. Roughly two-thirds of U.S. oil consumption is accounted for by the transportation sector. The lion's share of this oil goes to power more than 220 million privately owned vehicles. But reducing oil consumption for transportation is not a simple task. The average life of a car or light truck is 16.8 years, and the average age of a fleet is 8.5 years, so conventional fuels will be needed for some time to come, even if every new vehicle purchased used an alternative. Therefore, the first task is to provide new sources of conventional fuels to make the transition to non-petroleum alternatives. Fortunately, new sources are available, and together they can provide a 40-percent reduction in imports within five years.

PHASE I: A 40-PERCENT REDUCTION

Use Alaska's "stranded" gas. Approximately 104 trillion cubic feet of natural gas have been discovered on Alaska's North Slope. Much of that has been identified at the Prudhoe Bay oil field. The Fischer-Tropsch process, a technology to convert natural gas into clean-burning motor fuel, has existed since the 1920s. Indeed, it was used by Germany during World War II to manufacture the fuel that powered its tanks and planes. Up to 1.2 million barrels per day of fuel could be produced in Alaska using this process and transported to the lower 48 states through the existing pipeline.

Use offshore gas. Thirty percent of the 1,430 trillion cubic feet of natural gas reserves is in federal offshore areas, many of which are foreclosed to exploration. Opening these areas could provide another 1.5 million barrels per day of motor fuel using the Fischer-Tropsch process.

Expand the use of ethanol in motor fuel. Currently, about 4 percent of all motor fuel is blended with up to 10 percent ethanol. By simply extending the use of ethanol to all motor fuel, some 630,000 barrels of oil per day could be offset. So-called "flex-fuel" vehicles can use fuel blends that contain up to 85 percent ethanol. If all new vehicles using internal combustion engines were required to have "flex-fuel" capability, another 900,000 barrels of petroleum fuel could be replaced daily for a total of 1.5 million barrels per day.

Take advantage of non-transportation opportunities to reduce imports. Currently 500,000 barrels of oil per day are used for home heating. A program to replace oil heating units with geothermal heat pumps could eliminate this use entirely. Moreover, because these heating and cooling systems only use about 10 percent as much energy as a conventional

system, the cost of installation would be more than offset, saving the consumer money while saving energy.

Provide incentives for alternative fuel vehicles. Encouraging the purchase of hybrid electric, plug-in electric, propane and natural-gas vehicles could reduce import requirements by 325,000 barrels per day in five years.

Taken together, the steps outlined above would result in a reduction in our import requirements of 42 percent.

PHASE II: A 75-PERCENT REDUCTION

In achieving the initial 40-percent reduction, the process of moving away from conventional petroleum is initiated. In the next phase, this process accelerates, along with the development of certain domestic alternatives with longer lead times. They include:

Develop Alaska's North Slope

The last "supergiant" oilfield known to exist in North America, the Arctic National Wildlife Refuge has the potential of adding at least 1.5 million barrels per day of new oil production within 10 years. Oil fields in the Naval Petroleum Reserve, Alaska, could raise this total by as much as 1 million within a similar time frame.

Develop oil shale and biomass alternatives. Within 15 years, we could be producing up to 2.5 million barrels of oil from shale and/or biomass.

Growth in alternative fuel vehicles. Expanded use of hybrid electric, plug-in electric, propane, natural gas and alcohol-fueled vehicles could reduce import requirements by an additional 4.2 million barrels per day.

Added to the reductions achieved in Phase I, Phase II would result in a 75.3-percent reduction in import requirements despite an estimated 20-percent growth in overall demand.

PHASE III: ELIMINATE IMPORTS ENTIRELY

In Phase III, the transition to hybrid and other alternative-fuel vehicles will be completed. In addition, technologies to economically recover natural gas from methane hydrates and for the conversion of cellulose to petroleum substitutes will be fully developed in this phase. Oil shale production also will be well-established. The transformation of the private motor vehicle fleet from conventional internal combustion-powered vehicles to alternative-fueled and hybrids will result in a reduction in conventional motor-fuel requirements of at least 50 percent. The perfection of new technologies will permit the substitution of renewable or unconventional sources for crude oil and conventional natural gas. With these changes, oil imports no longer will be necessary.

The stunning energy price increases of the past two years are a clear signal that the time has come to get serious about reducing America's excessive dependence on imported oil. It is a signal that no longer can be ignored. Fortunately, the problem can be solved. The United States has the natural resources and it has the technology. All that is required is the political will.

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