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[*The Environment*]

The Fuel Subsidy We Need

Oil dependence is still the Achilles' heel of the American empire. It doesn't have to be—and if we don't want to lose economic ground to Europe, it can't be

BY RICARDO BAYON

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Terrorists intent on damaging the United States need not fly planes into America's buildings; they need only do something to raise the price of oil. Far-off international crises—and relatively mild forms of extortion—have in the past brought the U.S. economy to its knees. The price spikes caused by the Arab oil embargo of the early 1970s and the Iranian revolution of 1979 each led to economic misery for the United States in the form of a deep recession, increased unemployment, and mile-long lines for gas. The Gulf War and its aftermath produced a milder version of the same phenomenon in the early 1990s. Every major U.S. recession of the past three decades has been preceded by a rise in the price of oil.

Further reading
selected by Ricardo Bayon

The United States remains acutely vulnerable to such price fluctuations today. The American economy is, after Canada's, the most energy-dependent in the advanced industrialized world, requiring the equivalent of a quarter ton of oil to produce $1,000 of gross domestic product. We require twice as much energy as Germany—and three times as much as Japan—to produce the same amount of GDP. Overall the United States consumes 25 percent of the oil produced in the world each year. This binds us to the Middle East, which still holds more than 65 percent of the world's proven oil reserves. Even if we were to buy all our oil from Venezuela, Canada, and Russia, or to find more oil here in the United States (which currently holds only 2.9 percent of proven reserves), Persian Gulf producers with excess capacity, such as Saudi Arabia and the United Arab Emirates, would still largely dictate the price we paid for it.

America's economic vulnerability to oil-price fluctuations has led Washington to strike a tacit bargain with Saudi Arabia and other Persian Gulf oil producers. In return for U.S. military protection and silence about the more unsavory aspects of their societies, these countries increase production when prices get too high and cut it when they get too low. In addition, they price their oil in dollars and recycle their petro-profits through U.S. financial institutions. But this has made the United States vulnerable not only to a sustained spike in oil prices but also to the possible fall of the dollar. In part because the

dollar has been strong, we have been able to consume more than we produce and then to make up the difference by borrowing from abroad. As a result, our current net international debt has risen to $2.3 trillion, or 22.6 percent of GDP. What would happen if a war in Iraq went badly or if Islamic extremists gained ground in key oil-producing states? Oil prices could rise and the dollar could fall, inflicting a double blow to the U.S. economy from which it could not easily recover.

he way to escape this abiding insecurity is to wean the U.S. economy—and the world economy, too—off oil. And the way to do that is to encourage the commercial development of a technology called the hydrogen fuel cell. Solar power and windmills will surely be important parts of our energy future, but only the fuel cell can address our oil dependency by challenging the primacy of the internal-combustion engine.

Fuel cells are actually a relatively old technology (they were invented in 1839, Jules Verne wrote about them in the 1870s, and they were used by U.S. astronauts in the 1960s), and the concept underlying them is simple: by mixing hydrogen and oxygen, fuel cells generate both water and electricity. Not only do fuel cells turn two of nature's most abundant elements into enough energy to power a car, but they create no toxic emissions (drinkable water is their only by-product). And fuel cells are completely quiet, meaning that it is now realistic to imagine living in a world of silent cars and trucks.

The technology is not science fiction: fuel cells are on their way toward commercial viability. Fuel-cell-powered buses are running in Vancouver, Chicago, London, and parts of Germany. BMW has a prototype car powered solely by fuel cells. Honda, Toyota, and DaimlerChrysler announced recently that they would begin shipping fuel-cell cars to retail customers around the world; General Motors and Ford are not far behind. Honda's car was shipped to its first major customer—the city of Los Angeles—at the beginning of December.

Geoffrey Ballard, the founder of the Canadian manufacturer Ballard Power Systems has said, "The internal-combustion engine will go the way of the horse. It will be a curiosity to my grandchildren." Even large oil companies believe that they must embrace hydrogen power. In a recent analysis of future energy scenarios Royal Dutch/Shell put forth the possibility that hydrogen could displace oil as the fuel of choice within the next thirty to fifty years.

hy haven't fuel cells moved into commercial use more quickly? There are two main reasons. First, the cells themselves are relatively expensive. Fuel cells capable of producing one kilowatt of electricity now cost more than $3,000—several times what it costs to produce a gas turbine or an internal-combustion engine that can deliver the same amount of power. That will not be a big problem for long, however, because with investment from car manufacturers and oil companies pouring in, the price of fuel cells is falling fast. (When oil was first introduced, in the early 1900s, it, too, was much more expensive than the alternatives—primarily coal—but it was soon overwhelmingly preferred, because of its cleanliness, efficiency, and ease of use.) Thus the real obstacle is the second one: we do not yet have the infrastructure necessary to deliver hydrogen

cheaply and effectively to cars, trucks, and generators throughout the country. Such an infrastructure would include technologies capable of extracting hydrogen from natural gas or water, along with the means to transport that hydrogen to a network of "gas stations" nationwide.

How fast hydrogen enters the mainstream will be determined largely by how much support the government provides. Bear in mind that government choices and government subsidies account for much of our oil dependence in the first place: automobiles truly conquered America (helping oil to become the fuel of choice) only after the mid-1950s, when—partly as a way of promoting national security—Washington agreed to pay as much as 90 percent of the cost of building what was then called the National System of Interstate and Defense Highways. This program cost the federal government more than $1.2 trillion from 1958 to 1991. Some of this money came from taxes, license fees, and so forth, but David Roodman, an analyst at the Center for Global Development, estimates that the federal government still subsidizes automobiles at a rate of $111 billion a year above and beyond what it reaps in auto taxes and fees. (And that estimate does not include the associated environmental, health, and military costs of burning fossil fuels.) Other sources of energy and productivity—such as nuclear power, the national power grid, coal, and the Internet—have benefited from substantial government subsidies over the years. A similar federally sponsored project to build a hydrogen-distribution infrastructure would surely pay back the investment many times in the long run.

Even if the government did not actively subsidize a hydrogen infrastructure, it could point the nation toward a hydrogen future by ceasing to subsidize the burning of fossil fuels. Unfortunately, however, Washington is at the moment neither encouraging hydrogen development nor discouraging fossil-fuel use. President Bush's energy plan proposed considerably more in subsidies for fossil fuels and nuclear energy—$2 billion over ten years to support the development of oxymoronic "clean coal," and billions more for nuclear energy—than for hydrogen fuel cells, wind, or any other form of renewable energy. Currently the government is spending about $77 million a year on hydrogen fuel cells, or about a third of what the President has proposed for "clean coal."

Obviously, there would be short-term costs to building a hydrogen infrastructure—but the costs of inaction would be higher. If the United States does not take the lead in this industry, some other country will. It is no accident that the first fuel-cell-powered cars to hit the market will be European (DaimlerChrysler) and Japanese (Honda and Toyota). Consider that while the Bush Administration was proposing more support for coal and nuclear energy, the European Union was announcing that it would henceforth be obtaining 22 percent of its electricity (and 12 percent of all its energy) from renewable sources. The EU also announced that it would spend some $2 billion (twenty times previous amounts) on renewable-energy research over the next five years. A central focus of that money is expected to be hydrogen energy. Additionally, a number of European companies, including DaimlerChrysler, have pledged billions of dollars to the EU's work on fuel cells. Meanwhile, the Japanese government—which prior to the EU's announcement was widely believed to have the most ambitious hydrogen-energy program on the planet—is believed to have spent as much as $220 million on fuel-cell research in

2002. That is three times what the U.S. Department of Energy spent on such research, and 50 percent more than the Energy Department is requesting for *all* forms of hydrogen-related spending in 2003.

If the United States is left behind in adopting a promising new technology, it won't be the first time. In the 1970s America was the undisputed leader in both wind- and solar-energy technologies. By the early 1980s, however, federal support for these technologies had been drastically cut, falling far behind what both the Japanese and various European governments provided to develop them. Today—when wind is becoming cost-competitive with natural gas as a source of energy, and the solar-energy industry is growing by a remarkable 30 percent a year—the largest producers of wind energy are Danish (Vestas and NEG Micon), and the largest producers of solar energy are Japanese (Sharp and Kyocera) and European (BP Solar and Shell Solar).

History repeats itself: if current trends continue, the leaders of tomorrow's hydrogen economy will not be American. For the United States this will mean continuing vulnerability to oil-price shocks, increased insecurity, and diminishing economic competitiveness.