

Letter from the Desk of David Challinor  
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This morning (8/22/05) when I drove our hybrid Prius past the local filling station, the big blue sign by the pumps showed premium gasoline up by more than a dollar a gallon, to \$2.95. By the time you get this letter, goodness knows what the price will be. The rapidity with which gasoline prices have risen has abruptly focused the attention of our flagrantly consumptive society on a global problem that (ostrich-like) we have tended to ignore, despite the fact that even at current prices gasoline in the U.S costs about half that in many European countries. More than a decade ago, I predicted that the petroleum age, as we know it, would end in this century. Perhaps I will be proven wrong, but evidence is accumulating that Saudi Arabia, Russia, Venezuela, Iraq and the few other nations with allegedly large oil reserves seem unable to pump more oil to meet global demand. This month's letter will consider how our lives might change when the era of cheap oil ends, when cost becomes higher than people are willing or able to afford.

Resource experts can only guess how much oil remains unexploited. The late M. King Hubbert, a petroleum geologist with excellent credentials, calculated that sometime between 2000 and 2008 we would reach the tipping point at which we will have extracted half of the world's accessible oil. Should this be accurate, and it's becoming evident that it is (only four wildcat wells were drilled in the North Sea in 2003), global consumption of the remaining underground oil will occur much faster than the century it took to pump the initial half of the world's oil deposits. If we have reached the tipping point, the balance of our unexploited reserves will be far more expensive to extract than the easily accessible first half.

The developed world has taken cheap fuel for granted and has done little since WWII rationing to reduce its consumption. Our attitude has been to let the market solve the problem. In other words, when the price of a finite resource becomes too high (uneconomical), the market will furnish the incentive to provide an alternate energy source. The U.S., especially, seems to have a blind eye to this looming problem. Rather than initiate policies to reduce consumption of petroleum-based fuel (while we invest heavily in developing alternatives), our country has instead sought to exploit remote, expensive reserves on Alaska's north slope wildlife refuge, whose optimistic oil estimate would furnish only six month's consumption of fuel at our current rate of use. European nations with minimal or no natural oil reserves are already preparing for a precipitous drop in oil supplies—France, for example, now gets 80% of its electrical power from nuclear energy and Denmark about 20% from wind energy. These two sources are appropriate for supplying a national power grid, but are still impractical for powering cars, trucks or planes.

Optimists predict that alternatives to carbon petroleum-based fuel will come from hydrogen, methane, liquid natural gas and/or ethanol from corn or bagasse (dried sugar cane after the juice has been extracted). Of these sources, two have been tried: corn in the U.S. in response to heavy lobbying by corn growers, and bagasse in Brazil where virtually all crude oil must be imported. All are valid fuel sources but are economically uncompetitive and will become increasingly expensive as the petroleum component of their conversion to fuel increases in price from oil scarcity. For example, corn and bagasse (monocots) are planted, cultivated and harvested by “cheap” oil-fueled tractors and equipment. In the U.S., farm machinery fuel, unlike that of autos, is virtually untaxed, but when it becomes scarce enough, it is unlikely to be any more readily available than the high-taxed fuel of cars, trucks and busses.

Current U.S. oil consumption is close to the global limits of its supply as has become apparent from the shutting down of off-shore oil wells because of Hurricane Katrina. These fields normally pump about a quarter of our domestic production, but our domestic production furnishes less than half of what we consume. Our remaining domestic supply is now so tight that the President has authorized tapping the Strategic Petroleum Reserve currently stored in the salt mines of the Midwest. Such an extreme measure would have been undreamed of four or five years ago.

What should the country do? First, I believe there should be a public acknowledgment by the administration that we are facing depleted oil reserves. Until now the administration has turned a blind eye to the predicament; this problem may be related to the favorable position enjoyed by the oil industry at the top level of the current administration. With crude now selling at \$70.00 a barrel, major producers and related service industries are doing well.\* Think what it will cost the taxpayers to replenish the drawdown of the Strategic Petroleum Reserve if indeed any thought has been given to doing so. Most reasonable people, I think, would opt for measures to reduce oil consumption (by rationing, taxes, incentives, etc.) and give the country time to develop alternatives to our dependence on oil. Such steps would take courage as they are not politically popular, but the administration has made no serious attempt to promote this approach. Since there is no governmental reaction or even recognition of an impending oil shortage, any preparation will have to be done at the individual, local or state level. Already governors in the six New England states and several other states have sought to impose auto fuel efficiency and particulate emission standards that are more stringent than the Federal government's, which has fought the stricter standards in court. Individuals and local communities, however, can still build fuel-efficient houses, schools, etc. which, although initially more expensive than conventional structures, may easily recoup their extra costs within a few decades. Such fuel-saving structural improvements are ideal for modest government subsidies along the lines of those generously given to agriculture, oil and other large industries.

Alternatives presently being considered to cheap oil are a long way from being viable. Even nuclear power requires a vast amount of oil-fueled construction machinery

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\* Stock in Halliburton sold for \$8.60/share in early 2003. On 1 September 2005 it hit a record price of \$63.44.

both to build plants and to distribute the energy to the grid. Furthermore, production of oil from tar sands and oil shale requires about two barrels of oil to produce just three. The ratio is much closer to 1:1 to produce ethanol fuel from corn or bagasse. Hydrogen as a fuel supplement, when analyzed carefully, is not the panacea it was originally thought to be. It is a gas, not a primary fuel, and requires much energy to produce. It would have to be liquefied to be stored and transported and its conversion from gas to a hazardous liquid also takes much energy.\*\* Thus, there does not yet seem to be any equivalent cheap energy source to replace oil.

The reader should realize some of the other problems we have created for ourselves thanks to many years of cheap fuel. For example, in West Texas it was economical for me to pump “fossil” water\*\*\* from 300 feet down to irrigate 400 acres of cotton and sorghum, because liquid butane fuel for my two pump motors was only 8¢ a gallon in 1952. That aquifer was pumped dry in less than 50 years. Cheap fuel, therefore, has allowed us to irrigate about a third of all U.S. crop land; combined with cheap fertilizer produced from natural gas, our country is the most agriculturally productive one in the world. In the process of achieving this exalted state, however, we have been as profligate with our cheap potable water (washing cars, spraying lawns, etc.) as we have been with our fuel.

The fragility of our lifestyle is manifestly evident in the New Orleans disaster whose causes were both natural and man-made. A situation that most of us imagined could only happen in Fallujah or Lagos was now visible on the nation’s TV screens. The deserted and seemingly unmourned dead scattered around the city’s football stadium made the viewers wonder if this was indeed XXI century United States. New Orleans, long threatened by its location below adjacent water levels, was a disaster waiting to happen, but the warnings were not heeded. Are the Dutch the only ones willing to invest the necessary resources to protect below sea-level cities and communities? The frequent and evidently more violent hurricanes now being spawned in the warm waters of the mid-Atlantic may easily be related to global warming. How long can the United States, the greatest energy consumer of all, ignore the efforts of most all other industrial nations to cut emissions?

Perhaps the greatest cultural change anticipated before the end of this century is the demise of the distant suburb, access to which is gained only by autos. They may survive on electric cars and busses when cheap gasoline gives out. We have become jaded by the instant transportation gratification afforded us by cheap fuel. The real challenge is whether we can alter our behavior and needs to accommodate new living conditions. I am optimistic because there are examples of profound behavioral changes. For example, most U.S. cigarette smokers have heeded the cancer warnings and have stopped smoking. The risk of AIDS caused many men in San Francisco’s gay community to alter their behavior, although the threat from this lethal disease has not yet altered lifestyles in other parts of the globe, particularly in the Third World.

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\*\* Refers to a short technical discussion of the problems with hydrogen as a car fuel by David Schneider (2005), “Filling up with Hydrogen;” *American Scientist*, 93 (5): 410-410.

\*\*\* Subsurface water accumulated in strata over 10’s of 1,000’s of years.

My optimism persists nonetheless that a comparable energy source alternative will emerge as I doubt that oil will be as abundant and cheap a few decades hence. Development of more sophisticated batteries designed to store energy more efficiently and easily rechargeable by handy wind- or solar-powered devices might be one solution. I am not a prophet of doom, but rather a realist who believes most impending global problems can be solved or at least mitigated when all agree that the problem exists and are willing to make a concerted effort to face it. Economical global energy is one challenge that can be met. The cost may be a radical change in our extravagant and profligate lifestyle, but humans have successfully faced such challenges before and I am confident they can do so again.

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P.S. Much information in this letter came from John H. Kunstler's (2005) "The Long Emergency;" *Atlantic Monthly Press*, NY.