

Rising price of oil highlights affordable energy alternatives

With oil prices reaching near near-record highs in recent weeks, calls have grown louder for the U.S. to develop new sources of affordable, domestic energy. Work by experts from The Earth Institute at Columbia University suggests that relatively low-cost alternatives already exist to meet the country's growing energy demand that would at the same time reduce the need to rely on oil supplies from the Middle East and Latin America.

A report published by Klaus S. Lackner and Jeffrey D. Sachs of The Earth Institute at Columbia University that appears in the most recent issue of Brookings Papers on Economic Activity states that coal alone could satisfy the country's energy needs of the twenty-first century. In particular, coal liquefaction, or the process of deriving liquid fuels from coal, is already being used in places and with expanded infrastructure could provide gasoline, diesel fuel and jet fuel at levels well below current prices. Moreover, they argue that environmental constraints such as increased carbon dioxide emissions arising from greater use of coal and other fossil fuels could be avoided for less than 1 percent of gross world product by 2050.

"[With widespread use of coal liquefaction] the long-term price of liquid hydrocarbon fuels may be lower than it is today, even allowing for pessimistic forecasts for oil and gas reserves," the authors write. "Even with the most conservative assumptions about learning curves, it appears quite safe to predict that the cost of synthetic oil from coal or other processes, after some transitional pains, will be below \$30 per barrel." Sachs and Lackner also point out that the large deposits of coal in the U.S. and worldwide make it less prone to the political uncertainties that currently afflict world oil prices.

The most common process for converting solid coal into liquid fuels is known as the Fischer Tropsch reaction. In it, carbon monoxide obtained from partially oxidizing coal, is reacted with hydrogen to produce synthetic fuel. This synfuel can then be refined to produce virtually any liquid fuel. Currently, the South African energy company SASOL converts coal into gasoline at prices competitive with crude oil at \$35 to \$50 per barrel, but some studies suggest the conversion could be made at even lower cost.

Other promising alternatives include tar sands, which are already being tapped in Canada and oil shale, which still requires additional work to develop a cost-effective method of extracting oil. The energy content of Canadian tar sand deposits alone are estimated to be comparable to that of Saudi Arabian oil fields.

Given the size of non-oil alternative reserves already available and the supply limitations inherent in other, non-fossil sources, the authors maintain that the long-term limiting factor presented in greater use of fossil fuels is environmental rather than one of availability. The most serious of these environmental constraints is the risk posed by rising concentrations of greenhouse gases such as carbon dioxide in the Earth's atmosphere. However, Sachs and Lackner believe that global warming, human-induced climate change and other environmental impacts can be avoided through a comprehensive, global effort to capture and sequester carbon dioxide below ground. Such a program of geological carbon sequestration, the authors estimate, would cost less than 1 percent of gross world product by 2050, a level well within reach of developed and developing countries alike.

"Whatever we do, we know we are going to have to approach this complex problem in a multi-faceted way and from a global perspective," said Sachs, director of The Earth Institute. "The key is we have to start now and we have to commit ourselves to making a change before change is forced on us. Fortunately, there are promising technologies that may well offer us solutions at large scale and reasonably low cost."

Source: The Earth Institute at Columbia University

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