Reinventing Energy

Investing in promising new technologies.

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The world economy is being battered by sharply higher energy prices. While a few energy-exporting countries in the Middle East and elsewhere reap huge profits, the rest of the world is suffering as the price of oil has [soared] and that of coal has doubled. Without plentiful and low-cost energy, every aspect of the global economy is threatened. For example, food prices are increasing alongside soaring oil prices, owing to increased production costs and conversion of farmland from food production to bio-fuel production.

No quick fix exists for high oil prices, which reflect basic conditions of supply and demand. Coal is in somewhat larger supply, and can be turned into liquid fuels for transport. Yet coal is an inadequate substitute, partly because it emits large amounts of carbon dioxide per unit of energy, and therefore contributes to man-made climate change.

For developing countries to continue to enjoy rapid economic growth, and for rich countries to avoid a slump caused by high energy prices, it will be necessary to develop new energy technologies. Three objectives should be targeted: low-cost alternatives to fossil fuels, greater energy efficiency, and reduction of carbon dioxide emissions.

The most promising technology in the long term is solar power. The total solar radiation hitting the planet is about one thousand times the world's commercial energy use. This means that even a small part of the earth's land surface, notably in desert regions, which receive massive solar radiation, can supply large amounts of the electricity for much of the rest of the world.

Perhaps the single most promising development in terms of energy efficiency is "plug-in hybrid technology" for automobiles, which may be able to triple the fuel efficiency of new automobiles within the next decade. The idea is that automobiles would run mainly on batteries recharged each night on the electricity grid, with a gasoline-hybrid engine as a backup to the battery.

The most important technology for the safe environmental use of coal is the capture and geological storage of carbon dioxide from coal-fired power plants. Such "carbon capture and sequestration," or CCS, is urgently needed in the major coal-consuming countries, especially China, India, Australia, and the United States. The key CCS technologies have already been developed; it is time to move from engineering blueprints to real demonstration power plants.

For all of these promising technologies, governments should be investing in the science and high costs of early-stage testing. Indeed, most major technologies that we now take for granted—airplanes, computers, the Internet, and new medicines, to name but a few—received crucial public financing in the early stages of development and deployment.

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It is shocking that public financing remains slight, because these technologies' success could translate into literally trillions of dollars of economic output. For example, according to the most recent data from the International Energy Agency, in 2006 the U.S. government invested a meager $3 billion per year in energy research and development. In inflation-adjusted dollars, this represented a decline of roughly 40 percent since the early 1980s, and now equals what the United States spends on its military in just one and a half days.

Of course, developing new energy technologies is not America's responsibility alone. Global cooperation on energy technologies is needed both to increase supplies and to ensure that energy use is environmentally safe, especially to head off man-made climate change from the use of fossil fuels. This would not only be good economics, but also good politics, since it could unite the world in our common interest, rather than dividing the world in a bitter struggle over diminishing oil, gas, and coal reserves. ◆

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