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# Innovation as Energy Policy for the World

The new U.S. administration is spreading hope in a world that could use it. Of Obama's top policy priorities—economic stimulus, energy, healthcare, and education—energy could have the most international significance in the long run. What should he do?

Let's start with the obvious: We need to enhance the efficiency, fairness, and stability of energy markets by pursuing options that are cleaner, more affordable, and more widely abundant. Now for the not-so-obvious: how do we do this? What particular role should the Obama team play?

We already know why we need energy policies and not just energy markets. Commercial energy gives those of us who can afford it a high quality of life. With electricity and natural gas, we no longer need to burn candles or oil lamps to see after dark, or heat our hearths and homes with smoky wood, dung, or peat. With petroleum, we no longer need to travel by horse or slow boat. But commercial energy carries heavy baggage including global warming, smog, volatile prices, unbalanced international money flows, oil wars, and petro-dictatorships. And that's before the lagging one-third of the world has even joined the energy economy.

It is less clear that there could ever be one energy policy for the world. Different nations have different interests. The major divides are between producer and consumer nations, and industrialized and developing nations. For resource-poor Japan or Singapore, policies obviously emphasize energy efficiency. Resource-rich

Saudi Arabia and Russia instead encourage international trade in energy, preferably on advantageous terms. Many countries lie in between these extremes, producing some but not all of the energy needed for their domestic markets. The United States carries a toxic residue of energy policies left over from when it used to be a net exporter of energy, even though it has been a net importer for decades. China became a net importer more recently, and it has been driven by the relentless growth in the scale of its economic activities into new and dangerous geopolitical games.

Markets that work well should mediate between the interests of producers and consumers. Working markets need willing buyers and sellers, a wide range of available choices, and clear, enforceable rules of engagement. We lack those today. Many buyers and sellers have become codependent, as in "addicted to oil," rather than constructively interdependent. Existing suppliers of petroleum, natural gas, and electricity fight actively to keep alternatives off the table so that they can continue to enjoy market power.

Domestically, the game has rules, but they are tilted to favor the status quo. Internationally, the rules of the game are sometimes undefined—think of Russia's use of natural gas as a geopolitical weapon last winter.

Markets are less likely to resolve conflicts between nations on different rungs of the economic ladder. Energy poverty and energy debt afflict many nations, and the financial flows needed to electrify Africa and South Asia are orders of magnitude greater than what is being spent. Political stability and reduced official corruption in these nations are prerequisites

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for increased access to financing. But given the recent global experience with investments in the “safe” U.S. housing market, perhaps electrification of the developing world may become more attractive to risk-savvy investors.

Obama’s energy policies need to start domestically but aspire to global influence. The basic philosophy should be to rely on markets whenever they work well, but to step in aggressively when market failures appear. This means making the costs of global warming, air pollution, and energy security visible to energy consumers. It means seeking ways to recirculate more dollars domestically in order to reduce trade deficits. It means encouraging a greater diversity of institutional arrangements in energy industries, perhaps encouraging more community energy cooperatives alongside the investor-owned utilities. It means encouraging regional diversity that takes advantage of local resources, thus producing bioenergy from solid waste in urbanized New Jersey and from switchgrass in rural Kansas. Obama’s policies should privilege consumer interests over producer interests when those interests conflict, because everyone is a consumer. Obama should aggressively pursue innovations in the energy sector because they can help sidestep painful tradeoffs among objectives.

In the long run, an energy policy that is good for the world and Obama’s United States will expand the range of cleaner, domestically available primary energy sources, especially solar thermal, solar electric, wind, biomass, geothermal, and next-generation nuclear. It will de-emphasize continued use of carbon-rich coal and petroleum.

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In the medium run, energy policy should encourage highly efficient energy conversion technologies such as combined heat and power plants, efficient appliances, efficient buildings, efficient vehicles, efficient settlement patterns, and industrial energy efficiency. It should improve the flexibility of energy systems by encouraging the use of energy storage technologies, flex-fuel vehicles such as plug-in hybrids, and energy carriers such as electricity, district heating and cooling, and eventually hydrogen and synthetic liquid fuels. A key domestic priority should be to modernize the antiquated electricity transmission network which needs additional links, systematic use of direct-current, and smart grid features to make demand more responsive and renewables more cost-effective.

In the short run, Obama needs to improve the investment climate for desirable technologies such as wind power so that incentives are stable and match payback periods. He needs to link automobile industry financial assistance to improvements in automotive efficiency and fuel flexibility. He needs to make public buildings, including schools and colleges, much more energy efficient. Above all, Obama needs to invest more federal funds—and incentivize more private investment—in basic energy sciences research because materials science, chemistry, biology, and physics are each potential sources of truly disruptive, game-changing solutions to domestic and global energy problems.

Most urgently, Obama needs to put friends of innovation in prominent roles and move apologists for the status quo to the sidelines. This is too big a crisis to waste.