



Energy—A Taste Of Waste

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The first century of the Industrial Revolution, the 1800s, was powered by coal, whale oil, and slaves. The 20th was the century of petroleum (though 40 percent of U.S. train freight is still coal). World electricity generation is still two-thirds combustion (40 percent coal, 20 percent natural gas, six percent oil); plus 15 percent nuclear, 16 percent hydropower, and 2 percent other renewables. That's how we get energy.

Here's a taste of how we waste it: In the U.S., where tap water is safe, bottled water costs about 1,000 times as much as tap water and consumes tens of millions of barrels of oil a year (I've seen estimates from about 17 to 50 million barrels); it's been likened to having each bottle of water one-quarter full of oil. It takes three times as much water to make the plastic bottle as the bottle contains. America's refrigerators use twice the electricity of the European average, and four times as much as the most efficient refrigerators already available. Using the most efficient appliances, worldwide, would eliminate the need to build the 1,400 coal-fired power-plants that are projected to be needed by 2020.

Cars. With nearly the least-miles-per-gallon and nearly the most-miles-driven-per-vehicle, U.S. drivers—with more than a quarter of the world's cars—burn more gasoline than the next twenty countries *combined*, including Japan, Germany, China, Russia, plus Brazil—. If average fuel efficiency merely equaled some of the better cars now on the market (40 miles per gallon--5.9 l/100 km), Americans would halve their gasoline use. Just like that. Going to plug-in hybrids would drop driving costs to the equivalent of one dollar per gallon (from the current \$3.70/gallon average); gasoline use would drop by 80 percent—without reducing the number of cars or miles driven. This isn't sacrifice; we're already sacrificing efficiency. Eventually, the electricity powering plug-in cars could come from wind or solar. Those are some opportunities we're missing.

Henry Ford reputedly said that if he'd asked people what they wanted, they'd have said 'a faster horse.' What else might we be missing? Every hour, enough sunlight strikes Earth to power our world economy for a year. The upper six miles (10 km) of Earth's crust (people have drilled 7 miles--11 km) holds something like 50,000 times as much energy (in the form of geothermal) as all the oil and gas. With an investment equaling the cost of one coal plant (about a billion dollars) the U.S. could by 2050 generate geothermal energy equal to 250 coal-burning plants. North Dakota, Kansas, and Texas have enough wind to supply not just all the U.S.'s electricity, but all its energy. (Denmark and parts of Germany already get 20 to 30 percent

of their electricity from mere moving air.) On one windy quarter-acre, a farmer can grow \$300 worth of corn, or allow a company to put up a wind turbine capable of generating \$300,000 worth of electricity a year. If the company pays only one percent in royalties, the farmer still makes ten times as much by farming wind.

When ethanol made from corn puts people who need to eat in a bidding war with people who want to drive, drivers win. But some non-edible plants also produce oil. The seeds of *Jatropha curcas* are about one-third oil. Some algae yields up to 30 times more fuel than other energy crops. Airlines are already testing algae-based jet fuels. "The airplane performed perfectly," one test-pilot said. "It was textbook."

These aren't even all the options. Compared to the possible oceans of improvements, humanity is still dog-paddling in the shallow end of the kiddie pool. Sometimes we seem determined to drown there just because we won't stand up.

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References and Further Reading:

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