

## **Water Sustainability: Ethanol**

Ethanol plants consume roughly four gallons of water to produce each gallon of fuel, but that's only a fraction of ethanol's total water habit. Cornell ecology professor David Pimentel says that when you count the water needed to grow the corn, one gallon of ethanol requires a staggering 1,700 gallons of H<sub>2</sub>O.

Some corn-producing regions are already scrapping over dwindling supply. Kansas is threatening to sue neighboring Nebraska for consuming more than its share of the Republican River. The Grand Forks Herald reports local opposition to a proposed ethanol plant in Erskine, Minnesota, with anti-refinery yard signs sprouting up and residents concerned about well water. Backers of a proposed plant in Jamestown, North Dakota, recently withdrew their application when it became clear that the plant's million-gallon-a-day appetite would drain too much from a local aquifer. In Wisconsin, new ethanol plants are encountering opposition in Sparta and Milton.

"There are going to be conflicts," says Iowa State hydrogeologist Bill Simpkins, "and there are going to be lawsuits." Even in Iowa, which enjoys abundant rainfall, there are no guarantees that supply can meet the new demand. "The problem is we don't know enough about some of these areas to say whether people can pump out a lot more water," Mr. Simpkins says.

The political fights could get ugly, because plants tend to pop up near cities, not necessarily near the biggest water supplies. Ethanol needs a rail system to be distributed, and ethanol factories save money on boiler maintenance when they get the same kind of high-quality water that humans prefer. In states like Iowa, where ethanol plants are considered agricultural projects deserving of preferential treatment, ethanol can also muscle out other business uses.

Ethanol's big environmental footprint is not limited to water, because biofuels like ethanol are highly inefficient. In September, the Chairman of the OECD's Roundtable on Sustainable Development released a report entitled, "Biofuels: Is the Cure Worse than the Disease?" Authors Richard Doornbosch and Ronald Steenblik compared the power density of different energy sources, measured in energy production per unit of the earth's area. Oil -- because it requires only a narrow hole in the earth and is extracted as a highly concentrated form of energy -- is up to 1,000 times more efficient than solar energy, which requires large panels collecting a less-concentrated form of energy known as the midday sun.

But even solar power is roughly 10 times as efficient as biomass-derived fuels like ethanol. In other words, growing the corn to produce ethanol means clearing land and killing animals on a massive scale, or converting land from food production to fuel production. Peter Huber of the Manhattan Institute says that the best-case scenario promoted by ethanol cheerleaders will actually cause the greatest environmental disaster. If people can actually refine cheap, low-maintenance production techniques that don't

require huge water supplies, Mr. Huber predicts a world-wide leveling of forestland as farmers turn vegetation into fuel.

Writing in Science magazine, Renton Righelato and Dominick Spracklen estimate that in order to replace just 10% of gasoline and diesel consumption, the U.S. would need to convert a full 43% of its cropland to ethanol production. The alternative approach -- clearing wilderness -- would mean more greenhouse gases in the atmosphere than simply sticking with gasoline, because the CO<sub>2</sub>-munching trees cut down to make way for King Ethanol absorb more emissions than ethanol saves.

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