

All That Glitters Is Not Gold: How to Get Real Benefits from Biofuels
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There is a gold rush mentality around ethanol and biodiesel these days. As with most gold rushes, some investors will make a lot of money, and a lot of investors will make some money, at least for a while. Then comes the inevitable shakeout that will sort good bets from bad.

But there's more than money at stake. Also on the line is whether the biofuels technologies that emerge at the end of this financial cycle are ones that will actually meet the environmental and energy security needs that so many of us are talking about.

Two things that we know for sure are that our current technologies, agricultural practices and patterns of energy use are not sustainable, and that over time they will change as a matter of sheer necessity. The question is whether they will improve fast enough to stave off irreparable damage to the global environment.

Consider global warming: We have about 10 years to reverse current emission trends before scientists say it will be too late to fix the problem. Meanwhile, our addiction to oil threatens more than just the environment – it jeopardizes our nation's economy and national security as well.

Biofuels can be a huge part of the solution to both these challenges. Or it can make things worse. We have to choose.

For starters, biofuels can never replace all of the oil we currently use, much less meet the huge increases in demand that are projected if everything else continues on as usual. If we are limited to current feedstocks and conversion technologies, we will never do more than scratch the surface of forecast total oil demand.

Even the industry association forecasts, read closely, do not claim that existing biofuels technology could meet more than 10 to 20 percent of business as usual *transportation* oil demand, which is just 6 to 12 percent of *total* oil demand.

Not that existing technologies aren't hugely important. They are building the markets and infrastructure we need to move away from gasoline and diesel. But much of the public debate and current policies are premised on the notion that today's biofuels are all we need.

For biofuels to be truly worth an all-out national and international effort, first we need to be on a path to reduce our overall demand for transportation fuel. The math is simple: cut our oil demand in half, and biofuels become twice as important in meeting our remaining demand.

Then we need to bring to market our best technologies and practices so that we get more biofuels out of every acre with less environmental impact. And finally, we simply need to get more total gallons of biofuels.

Technologically, reducing our demand for oil is simple. It is just a matter of political will. Improving the fuel economy performance is the single most important thing we can do to free ourselves from our addiction to oil, and the technologies to do this are already on the shelves. All we need is some political leadership to put smart performance standards in place.

Increasing the environmental benefits per gallon of biofuels is straightforward enough as well. After all, the alternative is a gallon of gasoline or diesel.

On average a gallon of ethanol produced by the corn-based industry in the United States today reduces global warming pollution by 18 percent for every gallon of gasoline displaced. But not all gallons are created equal. Many of the newest corn ethanol plants rely on natural gas for process heat, and are much more efficient, reducing emissions by about 35 percent.

If one of these plants were to spec corn grown using conservation tillage practices -- which reduce both soil carbon loss and fertilizer need -- they would produce ethanol that reduced global warming pollution by about 60 percent per gallon.

Better still is the growing handful of plants under development that will use renewable energy such as biomass gasification and methane from manure for process heat. If these plants used corn grown with conservation tillage, they could cut emissions by more than 80 percent.

At the other end of the spectrum are plants using coal to process corn grown with aggressive tilling, inefficient fertilizer application and heavy irrigation. Put that corn in these plants and we might actually increase global warming pollution.

Ethanol from cellulose is often described as the Holy Grail of biofuels. Our research says it could reduce global warming pollution as much as 88 percent compared to a gallon of gasoline. But simply using cellulose as a feedstock is no guarantee of good environmental performance. For example, if we cut down our forests to feed our fuel addiction, we will only create a new set of problems.

Where cellulosic and other technologies really shine is the ability to increase total production capacity by unlocking new and more productive supplies of biomass.

The choice is ours: We can produce ethanol with big benefits, modest benefits or no benefits at all. Biofuels can either meet a small part of an unsustainable demand, or play a much larger role in a balanced solution that attacks the problem from *both* sides of the supply and demand equation.

Advanced technologies will make it easier to get the big benefits, but it won't happen by just letting the gold rush run its course. Unless we set performance standards that guide the market toward the environmental improvements we need, we will get whatever is quickest and dirtiest.

The answer involves three things: fuel economy performance standards to shrink demand and make biofuels relevant; environmental performance standards to make sure we get the benefits per gallon that we need; and a commitment to grow the market for the best performing technologies to get more total gallons.

Competition is a great thing. Even in today's rough-and-tumble market, good decisions are already happening. The number of companies working on cellulosic processing is increasing and other advanced technologies are being developed including biomass gasification and algae feedstocks.

Now we need to harness the competitive forces behind the gold rush—encourage competition between today's technologies and tomorrow's, and encourage entrepreneurs to bring more

technologies to the table—while also maintaining clear environmental performance standards so that we don't end up with a lot of fool's gold.