

## ASSESSING NEW TECHNOLOGY

by Brad Allenby for the *Arizona Republic*  
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It is hard to remember, but 10 years ago we were all madly in love. The object of our affection – biofuel – was beautiful; the promise was less climate change, support for agriculture, a shift to renewables, better national energy security. But love is blind, and so were we.

When we actually adopted a biofuels policy requiring substantial production of corn-based ethanol, reality crashed down upon us. Farmers responded to price signals and started planting more corn and less of everything else. The laws of supply and demand turned out to work pretty well. The price of corn and therefore virtually all other foods started skyrocketing; poor Mexicans rioted as our ethanol policy drove tortilla prices sky-high.

To make matters worse, we had been duped by a pretty technology. Turns out using corn rather than fossil fuels did not reduce greenhouse-gas emissions much anyway. Moreover, we had failed to consider what large-scale biofuel production would do to all those other systems hooked into crops – the already-stressed nitrogen and phosphorous cycles, or water – and land-use patterns.

But, of course, this is just one cautionary tale because our world is full of emerging technologies. Robot gun platforms now prowl battlefields, our students *Google* the world while

we still lecture them just as professors did in the Middle Ages, a monkey with a chip and wireless transmitter in its brain makes a robot in Japan run, our kids play in the virtual reality of *Second Life* or *World of Warcraft* rather than among the cacti and washes of a beautiful state.

Nanotechnology, biotechnology, robotics, information and communication technology, and applied cognitive science are restructuring the world. What is to be done?

The honest answer is that we do not fully know yet. But at Arizona State University, we are developing the capabilities that we hope, in time, will allow us to work with these emerging technologies in a rational, ethical and responsible manner.

For example, at the Biodesign Institute, we are working on biofuels from cyanobacteria, which do not pose many of the problems associated with corn ethanol, because with many technology systems, there are technological alternatives that can avoid problem areas if we understand the systems well enough.

To help do that, we are creating the Center for Earth Systems Engineering and Management, housed at the Ira A. Fulton School of Engineering, because we understand that just like the climate or the nitrogen cycle, human technology is a powerful and important Earth system.

Moreover, ASU's Global Institute for Sustainability is not just a pioneer in sustainability, but in integrating technology and engineering into sustainability because we know that trying to understand sustainability without trying to understand technology is like trying to tie your shoes when you're wearing flip-flops.

When you combine all these efforts with the sunny optimism of Arizona, we hope to end up with a great bumper sticker: "Your Future: Made in Arizona."

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