

Tolbert – 8/27/09 – Solar Fusion reception

Welcome – to guests, industry partners, UA members!

We face an energy crisis of unprecedented dimensions. The industrialized world is consuming energy at a rate that's unsustainable. The US has become dependent on foreign oil, with obvious political ramifications – and the emissions we produce as we consume energy at an astonishing rate are damaging our planet, probably irreversibly.

Steven Chu, the US Secretary of Energy, was recently quoted as saying that what we do now as a country – along with what China does – will “determine the fate of the world.” I don't think he is exaggerating! If we don't become intensely innovative, finding ways to *harness* energy from renewable sources, and being more efficient in our *use* of energy, we imperil the future of life on earth. That sounds like an overstatement to many in the general public, but we in this room know that it is not.

I was credited by someone yesterday with having used the term Solar Revolution. I hadn't, but I think it's a wonderful term. What is required now is clearly a revolution in the ways we produce useful energy and, in fact, in the way we *think* about energy use. We must understand that like the overweight person counting calories, we must at every moment be thinking about the impact we are having on our environment. Once it sinks in that each of us in our high-consuming society is using more than our fair share of

the planet's resources, then we will be motivated to tread more lightly – both by consuming less and by consuming less wastefully.

Scientists and engineers have a mandate to make a difference here. We don't know where fuel efficiency breakthroughs will come, what advances in solar-energy collection and conversion will make the biggest difference, or how efficient energy storage and transmission can become – so we need bright minds from a broad variety of technical backgrounds to be working together on these problems! Every step in the energy pathway – from harnessing energy from a variety of sources, to storing that energy, to efficient ways of distributing it to consumers – is there to be pushed and pulled and tweaked until we maximize the energy we can capture from renewable resources. At the same time, we need to be finding ways simply to use less energy in our daily lives, from the industrial setting to our homes and cars.

The challenge to our scientists and engineers is to *re-conceive* energy production and use. A parallel challenge is given to social scientists to understand deeply the influence of policy on human behaviors that surround energy use and to create enlightened public policy that will drive the desired behaviors.

Policy will have to creatively harness the entrepreneurial spirit that drives our economy, recognizing that new ways of producing and delivering power offer economic opportunity on a massive scale. We need policies that will encourage investment in renewable energy, and we need investors to jump at the exciting opportunities that will arise.

Policy also will have to capture the imagination – or the pocketbook – in ways that encourage adoption of new technologies and conservation.

To be blunt, we need innovations – large and small, in science and in the public arena – if we are to survive the energy crisis.

What can the University of Arizona do? We can use – and we are using – the interactive, cross-pollinating way of doing things that characterizes our university. Working across departments and colleges, and forming important partnerships with industry, utilities, and other relevant entities, our faculty and students are helping to lead the search for solutions at all levels.

We are rooted in a campus that, for decades, has employed passive and active solar energy methods in the design of our buildings. Many people don't realize this! We make ice at night, when our desert air is cool, to produce chilled water efficiently for daytime use. We have the largest sod-covered classroom building on any university campus. And we eagerly embrace membership in organizations that promote and promise ever "greener" campuses, as we commit to building every new building on our campus to at least silver LEED specifications.

Long before the recent resurgence of interest in the environment, faculty at the UA started to cluster into small groups that focus in a variety of critical areas, including (outside of the solar arena): safeguarding our water supply and detecting minute levels of contaminants, desalination and clean manufacturing methods,

deciphering climate history from the record laid down in tree rings, and providing economic, legal, and policy expertise regarding water use as well as renewable energy issues.

Students and faculty from across the campus, in these areas and others that include solar energy, now come together under the auspices of several externally and internally funded centers, and the comprehensive umbrella Institute of the Environment, co-directed by Jonathan O and Diana Liverman.

Because a focus on environmental issues is one of the university's top strategic priorities, our president and provost are investing in it. Next week, we will be announcing a major new initiative in environmental science, engineering, and policy. (But you didn't hear that, because I can't tell you about it now!)

AzRISE –the AZ Research Institute for Solar Energy – is a key component of the university's broad Environmental Sustainability focus. Directed by Joe Simmons and Ardeth Barnhart, it serves as the umbrella organization for people working on a wide range of solar energy issues, bringing them together for the synergies that arise when people talk across traditional boundaries and connect between academia and industry. The goal is to use sun-drenched Arizona as a laboratory for discovery and innovation that revolutionizes the solar industry. People affiliated with AzRISE work on: optimization of collection of solar energy, improved photovoltaic materials, new batteries for energy storage on every time scale, compressed-air storage,

solar-powered water desalination,
distributed power generation and solar systems optimization,
effective policy tools,
and many, many other projects.

Many, perhaps most, of those projects are being conducted in close partnership with solar companies and electric utilities. Those partnerships are absolutely central to the way projects are being approached.

Arizona, with its abundant sunshine, is poised to lead in the solar revolution. Tonight and tomorrow, we celebrate the drive and success of the University of Arizona's solar scientists, engineers, and students of public policy.

In the Solar Fusion event that we are kicking off this evening, we will have opportunities to see and hear about, first-hand, activities that promise to change the course of the world, leading the way to increased reliance on renewable energy sources and greater energy efficiency – those things we have to do to respond to Energy Secretary Chu's challenge.

We'll get the first public tour of the student-designed and student-built Solar Energy-Efficient Dwelling. This house was created in response to an invitation by the US Dept. of Energy to our students to compete with students from 19 other u's in the national Solar Decathlon. The house will be taken apart, put on a truck, and driven to Washington in October, to be reassembled for competition on the National Mall starting on October 8.

The UA Solar Racing Team students will show off their very cool solar car . Each year a team of students builds and races a novel hybrid-solar car. What a way to combine innovation with education!

And UA faculty members will tell you about their forays into everything from collection of the sun's rays with what are essentially telescope mirrors, to development of new solar conversion materials, to the use of huge testbeds for use of solar power on a practical scale for cities, to development of Supercourses (Joe Simmons and Kelly Potter can tell you about those!).

The “Fusion” in “Solar Fusion” is about an even broader network of creativity that will be on display. You're going to hear poetry and music and see sculpture inspired by – and in some cases powered by – solar energy. This mix of arts with science, technology, and public policy is at the crux of *real* creativity. If you know the Keating Building that is the home base of the UA's BIO5 Institute, you know that the walls are covered with art, in many cases contributed by the artists. That art is there as a constant stimulus to the Institute residents to be creative. The art in Solar Fusion reminds all of us to think beyond our own areas of expertise, because the critical paradigm shift often grows from novel intersections.

I want to extend a special thanks to our many partners from the public and private sectors. Your willingness to collaborate with us makes great strides possible. We all also extend our appreciation to Joe Simmons and Ardeth Barnhardt, co-Directors of AzRISE, for the passion, energy, and intelligence they bring to solar energy research and development. Their leadership of this growing enterprise is inspirational. And of course we all thank Dean

Jan Cervelli, for her key role in the Solar Decathlon House and also for hosting this lovely event.