

**AlwaysOn  
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IT Newswire<sup>1</sup>

**Executive Summary**

The issues of clean and green technology, global warming, and the environment have gone beyond partisan politics and sensible countries and political leaders are taking steps to right the wrong. Solar power costs, especially from photovoltaic, are dropping dramatically. Europe leads in developing new technologies; the United States lags behind. But we are always good in responding to crises, be it the space race or the energy crisis.

**Note:** You can watch the entire conference webcast archives for free at:

<http://alwayson.goingon.com/page/display/18244>

once you sign up at <http://alwayson.goingon.com/>.

**Tony Perkins, Founder AlwaysOn**

According to the *U. S. News and World Report*, UC-Davis is the most environmentally friendly campus in the U. S., followed by Harvard. Village Homes in Sacramento was building an entire solar community over 25 years ago.

**Nicole Biggart, Dean, UC Davis Graduate School of Management, and Barry Klein, Vice Chancellor, UC Davis Office of Research**

Over the last three years, UCD has received over \$1.5 billion in research. UCD also held a three-day boot camp in Lake Tahoe last year involving 20 business schools and greentech entrepreneurs. The business school students developed business and go-to-market plans for the entrepreneurs. UCD recently launched Energy for the Future Initiative to commercialize many new technologies. This included biotech, renewable energy, innovative lighting, and a hydrogen filling station on I-80. Over 20 startups have emerged from UCD over the last 10 years. Energy and environmental problems have no overnight solutions. Green is good, green is good for the environment, green is good for business.

**Ed Ring, Editor, *EcoWorld***

Entrepreneurs, not big governments, are the ones that will save the planet. We will discuss five topics—three sureties and two wild cards.

Solar is now truly global. We all know Germany leads in solar power installations, followed by Japan and the U. S. Zytech<sup>2</sup> has HQ in Spain, manufacturing in China, and R&D in Germany. Greentech is energy, water, materials, building, cities, car, and nanotech.

***Surety***

We are finally making breakthroughs in **thin film photovoltaic** (TFPV) technologies. Although the TFPV worldwide market share is still less than 10 percent, this market will grow exponentially. Santa Clara, California-based Applied Materials is building a 500 MW plant in Oregon, while the entire production in the world in 2006 was about 3 GW, mostly crystalline PV. There are companies in India, China, and South Africa that are all breaking ground in TFPVs. Efficiency-wise, if you get 10 W per sq. ft., it is god enough. There are

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<sup>1</sup> <http://www.itnewswire.us/>

<sup>2</sup> <http://www.zytech.es/about/en/about.htm>

plenty of rooftops to replace all the energy consumed in the world. Thin film costs are coming down, about \$1 per watt wholesale. In fact, Germany is getting rid of subsidies for PVs.

**Water** It takes 2.5 KWH to desalinate a cubic meter of water; that is about 60 cents. We pay almost three times for a bottle of water! There are huge opportunities in this area—think of solar-powered desalination plants, especially in power-starved developing countries.

**Energy storage** is another opportunity. Lithium-ion is interesting. You can also have thermal storage—both heat and cold. Efficient storage helps decentralize the grid and reduce transmission and distribution costs and increase efficiency.

### **Wild Cards**

**Biofuels** can be developed from crops, from crop mass (cellulosic fiber), and be grown in a tank from algae. Cellulosic from ethanol is not there yet, but we are close. The 10 billion gallons of biofuels we are getting today is from rain forests. We need six million sq. miles to replace the oil we use, but we only have three million sq. miles of rainforest left!

**Fossil fuel** is responsible for 80 percent of the world's energy production and it is increasing. Do we go to China with CO<sub>2</sub> sequestration proposals or with ultra-efficient scrubbers? There is more of fossil fuel than is normally acknowledged. There are three trillion barrels of heavy oil in Canada in an area about 70,000 sq. miles. It is better to tear it up than destroying rainforests.

We need to question conventional wisdom in all areas of environment and cleantech. There are many shades of green.

### **William McDonough, Architect and Designer<sup>3</sup>**

McDonough painted a fascinating picture of future industrial and civil designs that will have net positive impacts on the environment. He described his “cradle to cradle” certification criteria. The term is taken from his book<sup>4</sup> of the same title and his popular manifesto, and designates companies that produce only biological or technical nutrients, use reverse logistics, produce drinkable water, and practice social fairness. Believe in *Something Lived, Something Dreamed* is his motto. We need to live dreams. Both Gorbachov and Thomas Jefferson felt if you have just five percent of the thought leadership of a country, we can have revolution or petroiska. Bill used to live in a house within 60 miles of which Washington, Jefferson and Madison wrote the

**Our goal is a delightfully diverse, safe, healthy, and just world with clean air, water, soil, and power—economically, equitably, ecologically, and elegantly enjoyed.**  
—William McDonough

book on American Revolution. We are Jefferson's seventh generation. Jefferson saw himself as a designer. His first design was a house; his last design was his tombstone. On his tombstone he recorded only three things: author of the declaration of the American independence, statute of Virginia for religious freedom which matured into the Bill of Rights, and founder of the University of Virginia, but no mention of the fact that he was President of the United State for two terms. Jefferson didn't want to record his activities, but only his legacies.

The legacy that will be left by entrepreneurs will be what will be remembered as time passes. It is almost an issue of human rights which we won't share. We can't have human rights if we can't share. As Jefferson wrote to Madison in 1789 trying to determine the term of the Federal Bond, he decided it should be for one generation; his logic was that the earth belongs to the living, not the dead. No man may by his natural right be obliged to own his land longer than his life.

<sup>3</sup> <http://www.mcdonough.com/>

<sup>4</sup> [http://www.mcdonough.com/cradle\\_to\\_cradle.htm](http://www.mcdonough.com/cradle_to_cradle.htm)

Designed by McDonough, Ford Motor has a building with a grass roof where birds lay eggs. There is no reason humans can't leave behind good positive ecological footprint, instead of asphalt. Human design being practiced today is strategically tragic. It is time for change and it requires humility. We are not that smart—it took us 5,000 years to put wheels on our luggage! The words 'humble' and 'architect' don't appear together in the same sentence. We talk about strategy of hope. What do we intend for? We dominate the planet; 99 percent of large mammals are under human management. How do we love all the children of all species all the time?

"I was born in Tokyo in 1951, where night carts—honey wagons—collected the night soil (a. k. a. human waste) that went to the farms, and in the morning came carts carrying tofu, foods, vegetables, and meats. *Out with the waste, in with the food.* In Hong Kong, with a population of four million at that time, we used to get four hours of water every four days. Away has gone away, there is no moral way. I have been trying to design things that don't go away. **Negligence is when you know something is bad but you do it anyway.**" (bold added)

At the New College in Oxford University, 300-year old wooden beams were rotting and architects were looking to replace them. Brown oak is expensive. When the building was completed 300 years ago, the architects also planted brown oak trees on the campus because they knew the wood would rot eventually. Bill built a skyscraper in Warsaw near the Warsaw Ghetto on one condition — and the city agreed — to plant 10 acres of plants and trees, five to make up for the building and five for its operation. If the current climate-change trend continues, pH of the oceans will drop from 8.8 to 7.9 by the end of the century and the coral reefs will be completely gone.

***Being less bad isn't being good, but is simply being bad less so?***

*Cradle to Cradle:* "I look at the world through its lens of the natural world and the ancient lenses. Waste = food, use current solar income, and celebrate diversity. It isn't just being eco-efficient. I want to go to Canada and I am driving south at 100 mph. Then, when I realize I am going the wrong

way, it doesn't help to slow down to 30 mph — I am still driving the wrong way! France has 400 types of cheese; we have perfectly 3" square pressed cheese that is nothing but PVC. We need diversity.

"I believe in five criteria in designing new architecture: no more cancer, no more disruption of endocrine systems, no more genetic mutations, no more reproductive toxicity, and no birth defects. The textile industry used to use 8,000 chemicals; we reduced them down to 38. The Airbus A380 uses clean, almost-edible carpets, so the next time you fly, if you are low on fiber at 38,000 feet, you can eat the carpet — especially good for frequent fliers!"

Build like a tree — something that gives out O<sub>2</sub>, sequesters C, fixes N<sub>2</sub>, makes water, makes complex sugars and food, accrues solar energy. We have one in nature and it is called the Honey Locust tree. We built the Gap office building in San Bruno with windows that open, and reached the low point in western civilization when windows that open made the news in *The Wall Street Journal*.

Eighty percent of the world's population will be living in cities by mid-century. One million people per week in the world are moving to cities. When they get there, 35 percent of them find they have no water, no housing, and no food. China will house 400 million in new housing by 2014. China is banning bricks because of the coal being burned to make them. China is facing astonishing environmental devastation. Waste equals food for cities. China has estimated they can do 20 percent of their cooking from waste-treatment plants.

*"...the city has elements at once of biological procreation, organic evolution, and esthetic creation. It is both a natural object and a thing to be cultivated; individual and group; something lived and something dreamed."*

In Brazil, there is a city that loves to love its children. Its slogan is "Garbage is not garbage." They built libraries (also known as Beacons of Knowledge) not in the center of the city, but all over and on the edges of the city so no

child needed to walk more than 12 minutes to get to a library. Parents got angry when kids from the neighboring poor suburbs not paying taxes started using their libraries. The Mayor responded, "Look, if they go to our libraries, they will learn and grow up to love our city. If you don't let them use our libraries, they will grow up hating our city and destroy it."

We make 2.5 trillion car parts in the U. S. every year. If we could make 2.5 trillion solar panels, we would have no energy problem. Turn sewage into drinking water.

### **The Green Energy of Tomorrow**

Energy efficiency is at the tip of the iceberg; bio-based plastic bottles, utility-scale energy, solar and demand-side energy savings, and dramatic change in traffic patterns will all change the landscape. Can any of the new energy sources compete with conventional energy sources? It will take a while before they become cost-effective; however, in solar-thermal we will be competitive very soon. Sydney, Australia-founded [Ausra](http://www.ausra.com/)<sup>5</sup> has plans to build a 175 MW solar-thermal plant. The company, with offices in Palo Alto and financed by Khosla Ventures and Kleiner, Perkins, Caufield & Byers (KPCB), claims a utility-grade solar-thermal plant can deliver power at 10 cents/kWh now, and under 8 cents/kWh in three years.

Comparing costs of new energy sources with coal costs is too U. S.-centric; look at India and Japan where coal is not cheap and energy costs are expensive. The first coal and nuclear plants were neither cheap nor efficient, over the years they became inexpensive and more efficient as technology improved. We shouldn't just look at return on investment, but at the industry from global warming and polar icecaps melting perspectives. It will take multiple technologies to address the problem.

Europe is ahead of us in many aspects, but nuclear power as France has embraced is not the silver bullet. Incidentally, Germany has plans to shut down all nuclear power plants, whereas the Province of Ontario in Canada has plans to shut down all coal-fired plants and turn to nuclear and hydro! We need transmission lines and better government policies. The best source for transportation is electric; we can't use food to produce ethanol. The big replacements for coal are nuclear, solar, and geothermal. Many of today's startups will fail, but there will be some Googles, Yahoo!s, eBays, and Amazons. Investment decisions should be based on incentives and not subsidies.

Carbon tax is the most elegant, said Ray Lane, Partner, KPCB, who is a Republican. The U. S. is brain-dead, said Bill Green, Partner, Vantage Point Venture Partners: Two-thirds of the carbon being emanated will never be covered by the Kyoto agreement. Boards are waking up to clean and green issues. You won't see any breakthroughs from large companies. The U. S. has a tendency to respond to wake-up calls and we will respond equally to the looming energy crisis. We developed this country over the last 150 years on coal, why can't China? Where is the 'clean' in cleantech? We believe in companies that scale. If you destroy rain forests to make clean energy, it is not wise. We don't want to create new bad guys to replace the current bad guys.

### **The Green Water of Tomorrow**

Water covers treatment, distribution, and storage. Companies like GE and ITT are investing heavily in water-treatment companies. Many VCs are focusing on companies that depend on water heavily. The technology is here to clean water; we just need to find the resources. Fox River in Green Bay used to be polluted with paper waste, but has been completely up and you catch salmon there now. We have lots of water, but not properly allocated. Some of the pipes in the northeast are over 100 years old; it may take a calamity, such as the I-35 bridge collapse in Minneapolis, for us to wake up. A lot of water is lost in ex-filtration. The U.S. has the EPA, but many developing countries don't have an equivalent agency. We wrongly believe in bigger-the-better model — centralized power, water, gas, etc. We should have more local, community-based water purification, distribution, and recycling models, because in today's model about 30 percent of the cost is in the energy required to pump the water to end users.

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<sup>5</sup> <http://www.ausra.com/>

## Tidbits

- 100 percent of the U. S. electric power could be generated by a 92 sq. mile solar thermal power park.<sup>6</sup>
- PCs waste \$5.5 billion of power every year. The average PC/monitor combination consumes 588 kWh of electricity every year, according to a comprehensive report from Arthur D. Little (now TIAX) published in 2002. There are tools available that typically save 100 to 300 kWh per year per PC/monitor combination.
- It takes six barrels of water to refine every barrel of crude oil.
- Fifty-one percent of ALL cleantech/greentech startups in the world are based in California.
- The Air Force is moving to synthetic fuels and the U. S. Department of Defense uses 400,000 barrels of oils per day.
- Whiskey is for drinking; water is fighting for, said Mark Twain. Seventy percent of water in California is used for irrigation.

We were disappointed one of the most interesting sessions we were looking forward to on photovoltaic, with panelists from Applied Materials, Silicon Valley Solar, SunPower, and Innovalight, was canceled because apparently two of the panelists didn't show up. What a bummer!

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<sup>6</sup> *ibid.*