

Green energy field is fertile ground for wild concepts

By Tiffany Hsu, Los Angeles Times

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Clean-tech ideas that have received government funding include using bacteria to make a gasoline-type fuel. Solar proposals seeking funding include sending collectors into space and beaming the sun power back to Earth.

Spray-on solar panels, power beaming down from outer space and gasoline-like fuel made from bacteria.

Sound far-fetched? Maybe, but these and other futuristic concepts for producing power are being taken seriously in scientific, business and academic circles. Some have even raised millions in funding.

This is the dream era for green technology, when even concepts that sound wildly innovative or insane — depending on who's describing them — are getting attention.

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"People who aren't afraid to take chances in completely uncharted waters sometimes succeed beyond their wildest dreams and turn the world on its head," said industrial designer and entrepreneur Richard Alan Hales.

Investment firm Khosla Ventures of Menlo Park, Calif., considers fringe ideas to be a virtue. The outfit, which lists former British Prime Minister Tony Blair as a consultant, provides seed money to those with "a crazy idea that may have a significantly non-zero chance of working," according to its website. Among the companies in which Khosla has invested is AltaRock Energy Inc, which has a geothermal plan to inject water into the Earth as far down as three miles, and then use the steam that rises up to produce energy.

"In the areas where there's very little risk, the upside is also a lot smaller," said David Mann, who holds the chief of staff title at Khosla.

Khosla, founded in 2004 by former Sun Microsystems Inc. Chief Executive Vinod Khosla, doesn't mind if 90% of its ventures fail, as long as 10% hit the jackpot, Mann said.

U.S. Energy Department Secretary Stephen Chu had just about the same ratio in mind when he announced last year that the agency was giving \$151 million to clean-tech ventures — including one that proposed bacteria be used to produce gasoline-

like fuels — in the form of 37 grants. Chu said that only three of the projects had to work out for the funding program to be a success.

"We are trying to hit home runs, not base hits," Chu said.

Last month, Chu announced a \$3-million grant for Makani Power Inc.'s project to develop its Airborne Wind Turbine, which looks like a giant wing. The unmanned device flies about 1,500 feet up, connected to the ground by a tether, to use wind currents to produce electricity.

"Technology like this could solve so many problems," said the Alameda company's CEO, Corwin Hardham. "But people are naturally afraid of the unknown. So the only way to mitigate that is to prove the technology."

Some of the more edgy ideas in the alternative energy field come under the heading of solar power. Solaren Corp., a Manhattan Beach company, plans to put solar collectors a lot higher up than the roofs of buildings. It hopes to launch the collectors 23,000 miles into space, from where they'll beam the power back to Earth.

That notion, which may sound like something out of a sci-fi comic book, got the attention of California utility giant PG&E Corp., which has signed a contract to buy power from Solaren.

San Francisco-based PG&E, which provides power to about 15 million people, has not invested money in the project, however. And Solaren needs a lot of money — more than \$2 billion — to get the project literally off the ground.

Solaren CEO Gary Spirnak is optimistic. He said that if the project works out, "we'll be able to provide power at a cost that's comparable with anything on Earth."

Nanotechnology experts hoping to create solar panels that can be sprayed or painted onto surfaces are working with particles just a few billionths of a meter in size that can absorb and convert sunlight into electricity. The so-called quantum dots are mixed into an ink that could potentially charge electronics, vehicles and buildings. That technology is being worked on at several academic institutions, including the University of Texas in Austin, New Jersey Institute of Technology and University of Toronto.

UC Santa Barbara professor Alan J. Heeger — who won the Nobel Prize for chemistry in 2000 — is developing flexible plastic solar cells that could end up costing far less than rigid silicon-based panels. And at the California Institute of Technology and the Lawrence Berkeley National Laboratory in Berkeley, experts are trying to conjure liquid fuel from thin air by using technology — and a \$122 million federal grant — to replicate the photosynthesis process used by plants to derive energy from sunlight.

More down to earth is a venture at New Energy Technologies Inc. in Maryland to develop a device that, when installed into roads, would collect kinetic energy from braking cars and convert it into power for street lights.

The gee-whiz ideas might be exciting, but investing private funds in them is another matter, cautioned Walter L. Schindler, managing partner with clean-tech venture capital firm Sail Venture Partners in Costa Mesa.

"There are an awful lot of deals in this marketplace that look good, but the fat lady hasn't sung yet," Schindler said.

Of the roughly thousand clean-tech pitches that the firm looks at each year, it only pulls the trigger on five at most.

"There are companies that have been funded out there that I have been surprised were funded," Schindler said. "We have trouble sometimes raising money from institutions who think the whole space is flaky because they see all these questionable deals being done."

Which is why some project heads are taking a non-bombastic tack when seeking funding. Siblings Gia and Abe Schneider, founders of Natel Energy Inc., are developing small, water-driven generators to generate power in slow-moving streams and manmade waterways such as canals.

"We're taking a very measured approach," Abe said from Natel's office, which is on the same former naval air base that houses Makani. "We haven't tried to oversell it as the most amazing thing since sliced bread."

The entire clean-tech market suffers when companies make green products that end up having little practical purpose, said Frederic Scheer, CEO of El Segundo-based bioplastic maker Cereplast Inc. The public company creates compostable resins from starch that are used in utensils, containers and other products. Scheer plans to begin doing the same with an algae byproduct.

"When you're cutting edge, you still need to make sure you have all the elements to make your product mainstream," Scheer said. "At the end of the day, we're a business, not a lab."

Others throw caution to the wind. Hales, 64, is developing his FreeWind concept that would strategically place turbines and generators at airports to use aircraft exhaust blasts to produce power. So far, however, he's not been able to get investors to chip in the tens of thousands of dollars needed for a prototype.

"Most people don't want to stick their neck out, and I understand that," Hales said.
"They want hard numbers, something that already has legs."

But he's not about to apologize for coming up with the idea.

"You have to be a little crazy" he said. "And I guess I'm a little crazy."