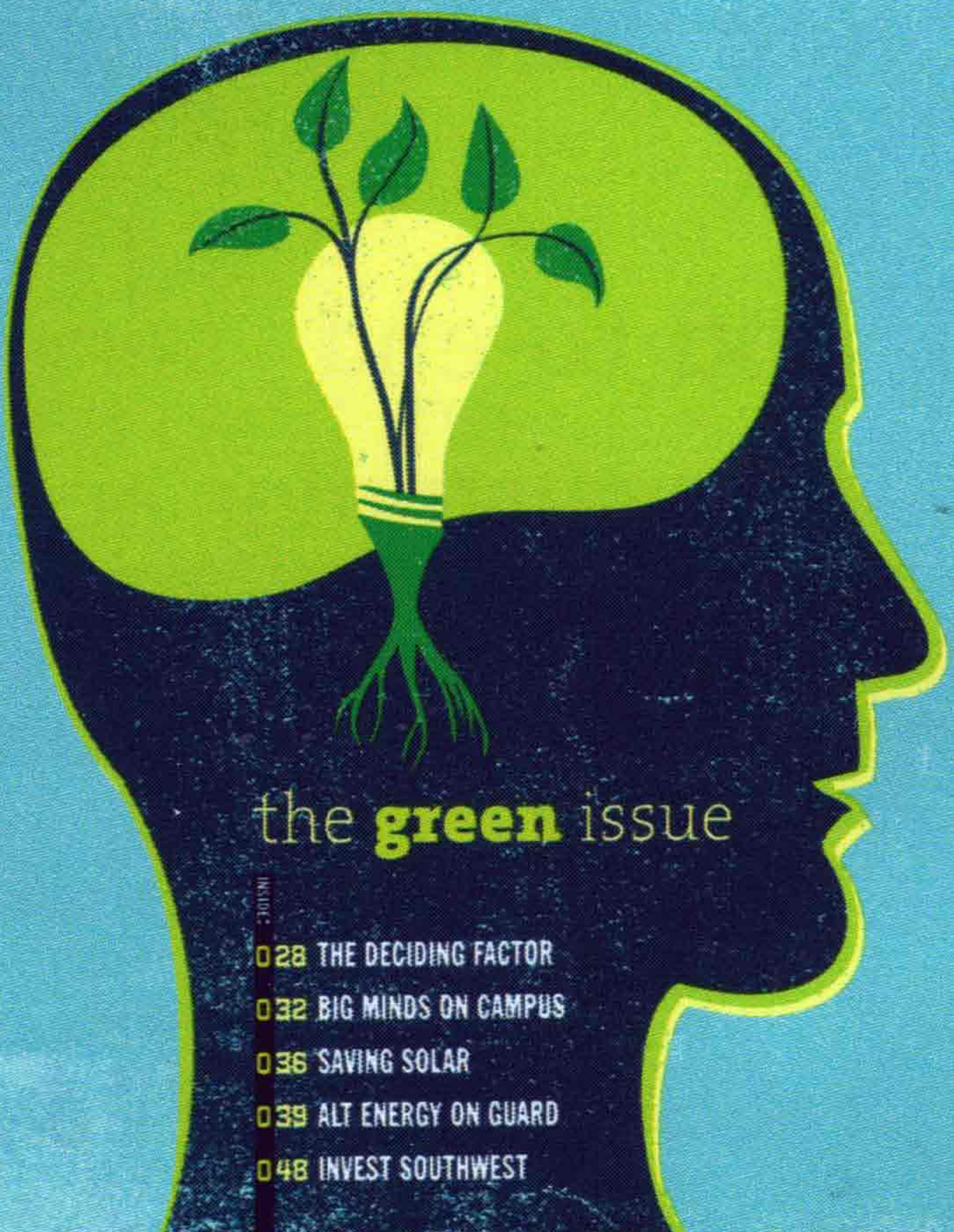


TECH CONNECT

ARIZONA'S TECHNOLOGY MAGAZINE



the **green** issue

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FOR PROFIT: ANOTHER KIND OF

green



ALTERNATIVE ENERGY INNOVATIONS BORN IN THE ARIZONA BOONIES ARE GOING GLOBAL. GET READY FOR THE REVENGE OF THE HICKS.

WRITING BY JIMMY MAGAHERN

BACK IN THE EARLY 80'S, DAVID CALLEY AND ANDY KRUSE WERE JUST TWO FRUSTRATED COLLEGE KIDS LIVING OFF THE ELECTRICAL GRID OUT IN THE BOONIES OF NORTHERN ARIZONA, ABOUT 40 MILES NORTH OF FLAGSTAFF. WHILE THE REST OF THEIR GENERATION WAS BUSY DISCOVERING NINTENDO AND PERSONAL COMPUTING, CALLEY AND KRUSE WERE STILL BEGGING THEIR FOLKS FOR RATIONS OF THE SCARCE ELECTRICITY PRODUCED BY THE BIG, NOISY DIESEL GENERATORS COMMONLY FOUND ON RURAL HOMESTEADS.



“I was living on a cattle ranch, and David was living about 10 miles away from me, and we were getting electricity from these big diesel generators,” says Kruse, who met his future business partner while both were working at the W.L. Gore plant in Flagstaff. “And we thought, ‘There has to be a better way.’”

Kruse did some research on solar power and tried building a wind-powered generator—without much success. Meanwhile, Calley already had launched a little side business building small wind turbines for his neighbors. He reportedly built his first wind generator at age 12 just to store enough battery power to run his bedroom lamp and play rock tunes on his cassette player.

Kruse immediately seized the genius of Calley’s wind generators, which the Northern Arizona University physics major had fashioned out of cheap car alternators, and together the two wound up dropping out of college to begin mass-producing them in the garage of Calley’s dad.

Today, Southwest Windpower, the company founded by Kruse and Calley from those humble beginnings, is the world leader in the \$42 million per year residential windmill market. Production doubled in each of the past two years and sales now stretch to 88 countries.

CATCHING ON

Venture capitalists are looking at such innovations as Southwest’s sleek tri-blade Skystream, which can optimally provide as much as 80 percent of the average household’s electricity in wind speeds as low as 9 mph, as the next hot technology to bank on. For example, Denver-based Altira Group recently sank \$6 million into the enterprise. Former President George H.W. Bush even installed one at the family’s summer home in Kennebunkport in November.

Call it the “Revenge of the Hicks.” After years of devising their own power sources out of necessity in dinky rural communities virtually ignored by the technology boom, business-savvy bumpkins are suddenly on the cutting edge of alternative energy.

“I don’t know if I’d call it revenge,” Kruse says, with a laugh. “I just looked at these small wind turbines David was building for his neighbors, kind of as a hobby, and thought, ‘This might really be a great idea to turn into a business.’”

Kruse and Calley, whose story reads like a backwoods Jobs and Wozniak, typify the unlikely entrepreneurs driving the current thrust in alternative energy innovation. From new ways to harness wind and solar power to methods of controlling rice-field-eating rodents without harmful chemicals,

today’s green goldmines are largely the products of misplaced technology geeks working from locales more Green Acres than Silicon Valley.

“This whole industry really developed in the garage shop, science shop mentality,” says Tim Teich, vice president of sales and marketing for Global Solar Energy. The 12-year-old Tucson company has risen to become the leading manufacturer of thin-film photovoltaic Copper Indium Gallium DiSelenide (or CIGS) solar cells, a product that enables builders to put flexible solar wafers into conventional roof tiles and walls.

Teich says that over the years, he’s seen his share of techie Jed Clampetts sitting on gushers of green innovation, folks who’ve figured out a clever way to power their world with only Mother Nature’s help and have shared their secret with just a few friends and family. “But they’ve never been enabled into a different fashion of applying it,” Teich says.

STATEWIDE SUPPORT

That may now change, thanks to the efforts of a variety of organizations around the state charged with turning Arizona into a leader in alternative energy R&D. Between the Northern Arizona Center for Emerging Technology (NACET) in Flagstaff, the Arizona Solar Energy Association (ASEA) in Tucson and the Phoenix City Council Sustainability Subcommittee and City of Scottsdale Green Building Program in the Valley, the hunt is on for the next alternative energy whiz whittling away on rural Arizona’s front porches.

“There have been a few entrepreneurs here who, by hook or by crook, have managed to get their product off of the ground,” says Tom Rainey, president of NACET’s Business Incubator Program. “But we’re trying to develop a more systematic approach to high-tech businesses. We’ve developed an infrastructure here to support the development of new high-tech start-ups so that the success of these entrepreneurs is not so much left to chance.”

John Grahame, NACET’s project coordinator, puts it a bit more simply. “We basically have a big board of all the movers and shakers in economic development who are interested in sustainability, and we say, ‘You guys should be talking to you guys, who should be talking to you guys,’” Grahame says. “The people in this field are very siloed. They get in their own worlds and chug away, not realizing that there are others who may be able to help them or resources they can use.”

Sometimes one person’s invention will

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even help power another’s. “With the thin-film solar cells that we’re producing, we’re actually enabling the creation of other

products that never could exist before,” says Teich. Unlike the old heavy, rigid and breakable solar panels, Global Solar Energy’s foldable, flexible thin-film modules will be able to go right into shingles and skyscraper panels, clearing the way for a potential sub-industry or two.

‘GOLD RUSH IS ON’

Since reaching out to the silos and barns of the state’s rural inventors, NACET, ASEA and the Valley’s sustainability programs have turned up dozens of fascinating alternative energy projects. A company out of tiny Overgaard called Algae Biosciences, run by a former Arizona Game and Fish manager, has discovered a salt-water reservoir a thousand feet below the surface and is finding ways to develop alternative fuels from their own lab-produced algae. “Their slogan is, ‘We’re cutting out the middle fish,’” laughs Rainey.

Navajo-owned Keya Earth is developing new sustainable building techniques for Native American communities in the Southwest. Even Flagstaff’s Mogollon Brewery is busy inventing environmentally friendly solutions to beer production and beverage packaging waste.

“It’s kind of like the gold rush is on to find alternative energy solutions,” says Rainey. “And there are a lot of creative minds at work here trying to crack the code and find the Holy Grail to a lot of different energy challenges.”

The rural outposts of Arizona aren’t just populated by unsophisticated rubes anymore. “We also have a high level of PhD’s here, who are drawn to northern Arizona not only for the natural beauty and quality of life, but also for the academic and technological focus that’s developed here,” Rainey says. Combine that pool with the well-heeled potential investors with second homes throughout the state and the creative locals with their own unique energy solutions, and you’ve got an incubator that, Rainey says, could easily become the green movement’s next Vermont.

“There you have dairy farmers talking with scientists, talking with municipalities, and the same thing could happen here,” he says. “The innovations in alternative energy will come from cross-fertilizing a lot of interesting people coming at solutions from different angles.”

