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## Aspen Times Weekly cover story: What is Aspen's energy future?

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ASPEN — In 1986, a pair of pack lamas carried electrical solar panels from Ashcroft over rock-strewn Pearl Pass at 12,700 feet to the Friends' Hut. The panels were installed on the hut roof to produce off-the-grid lighting with the goal of doing away with flammable candles and gas lamps. The project was purely utilitarian. It was also symbolic of how energy alternatives can replace outmoded types of energy when traditional sources are no longer appropriate.

Today, solar panels are found in every city and county in our region, generating enough electricity to offset a measurable share of coal-based energy. As we advance into the new millennium, however, coal is still king, satisfying our electrical energy appetites in a very traditional way.

### Fossil fuels still rule

Cut a turn on manmade snow at any of the regional ski mountains and you're skiing through carbon. Snowmaking has been essential to the resort economy this year, even though it is a huge consumer of electricity, the majority of which comes from coal. Snowmaking on a winter night at Vail, Beaver Creek, Avon, Ski Sunlight and the Aspen Skiing Company collectively uses more electricity than a small city. The millions of Christmas lights that decorate these resort communities are mostly lit by carbon.

As customers of coal, we export the costs of strip mining and power generation to other communities. Impacts include smokestack emissions, toxic coal ash, and the attendant boomtown scenarios where once rural communities struggle with socio-economic upheavals from rapid industrial growth.

Natural gas is making strong inroads against coal, but also at a cost. Turn on a light bulb fueled by natural gas or coal-bed methane and you're impacting a vast area of Western Colorado in Garfield, Mesa, Rio Blanco, Gunnison and Delta counties. The drill rigs that stand out across the stark landscape of the 6,000-square-mile Piceance Basin produce a growing share of fuel for electrical generation, fuel that comes with controversial fracking and is known to degrade air and water quality. Natural gas is also a political hot potato, as evidenced by the Thompson Creek Coalition's protest against drilling in a roadless area west of Carbondale.

Still, natural gas burns cleaner than coal and makes gas-fired power plants more flexible for shutdowns and startups. Flexible generation becomes key as renewables like wind and solar are called upon to offset fossil fuels. Shutting down a gas-fired plant when alternatives come on line takes roughly one hour compared with 24 hours to shut down a coal plant.

Fossil fuels dominate our local energy picture, but getting energy from solar, hydro, wind, biomass and geothermal is becoming more common. If you ride the Cirque Lift at the top of Snowmass, you're riding the wind, because that lift runs solely on wind-powered electricity. Attend an event at the Garfield County Fairgrounds and know that half the electricity used there is powered by the sun with an on-site solar array. Use a computer at the Pitkin County library in Aspen and you're harnessing more than a third of your electric current from hydropower at the Ruedi dam.

In the future, biomass – the burning of waste materials to generate electricity – could become a regional energy producer, especially when dovetailed with tree removal programs proposed for areas stricken by beetle kill. Any such program, however, would need to meet stringent emissions criteria.

Environmental concerns over climate change and drilling for gas and oil and are precursors to heightened public awareness, leading to a concerted shift in energy sources. Individual energy entrepreneurs are realizing opportunities in this changing world.

### **Solar visionaries**

Paul Spencer is not the valley's first energy entrepreneur, but he's taken solar to a larger scale than anyone else. Spencer founded the Clean Energy Collective (CEC) in January 2009 with the idea of saving the planet – one solar panel at a time.

Spencer, 40, grew up in the Roaring Fork Valley, went through the Basalt school system, and earned a degree in electrical engineering at CSU. “I knew I had to leave this valley to be able to afford to live here,” he said of a lucrative software career that took him to Atlanta and eventually allowed him and his wife to move back, build an off-the-grid, solar-powered home on East Sopris Creek, and start a grassroots energy company.

The idea behind CEC is to install large solar arrays in which consumers can become owners to save on utility bills and reduce carbon footprints in their homes and businesses. Spencer's local solar collectives operate in cooperation with Holy Cross Energy, the largest electric utility in the valley, which credits solar generation to individual accounts through “remote metering”. Starting small with an array near El Jebel, Spencer installed last summer the largest commercial array in Colorado, at the Rifle airport.

“I've made a living over the years doing what I'm passionate about,” reflects Spencer, “and always being on the cutting edge. I want to build a vehicle here that could be taken to scale and drive enormous energy adoption. We are turning solar into a very good investment,” he affirms. “It provides a better return today than a bond or a CD.”

CEC customers include homeowners like Paul and Michelle Dioguardi of Basalt, who said it was an easy decision, and didn't have major headaches with the modifications..

Glenn Silva, also of Basalt, echoed that idea: “It feels good to know I'll never have to pay another power bill.”

Clark's Market, with stores in Aspen and Basalt, considered installing panels on its stores, but the costs were too high. Instead, Clark's invested with Spencer and the Coalition to meet its sustainability goals. Today, the Coalition is building new collectives in Colorado Springs and Telluride, and is recognized nationally as a solar leader.

“Paul's solar farms are more like community gardens,” says energy analyst Randy Udall of Carbondale. “It's not on your rooftop, as bragging rights, but as a form of shared

community and cooperation.”

Udall, who got into solar electrics a decade before Spencer formed the CEC, did it on his own. Motivated by a personal environmental ethic to step lightly on the land, Udall took stock in his home energy impacts. “Fifteen years ago, I discovered that my hand-built, passive solar, so called ‘energy efficient’ house was a tremendous polluter, because it used so much carbon-intensive electricity. That's what drove my initial foray

into solar.”

Udall took notes while watching Mike Tierney of Aspen Solar install a solar hot water heater at his home. “I concluded I could learn how to sweat copper pipe, so I installed two more solar thermal systems, one on the house, one on a detached office. In the late ‘90s, I had the kind folks at Solar Energy International help me install one of the first grid-tied solar electric systems in the Valley.”

On a sunny day, Udall watches his electric meter spin backwards. He estimates savings of about \$1,000 per year on an initial investment of about \$20,000.

“That's not bad,” he reasons, “since savings accounts are paying five times less and my greenhouse gas emissions

are down 80 percent. On a larger level, I've come to believe that something is terribly broken in our relationship with energy. Never have any people used more energy than we Americans, and thought about it less."

Awareness may be growing, however, as alternatives like solar become more visible, cropping up at El Jebel, the Colorado Rocky Mountain School in Carbondale, and at the Rifle Airport.

Solar, however, provides limited practical offsets to coal and natural gas because of winter energy spikes that occur after sunset when the panels have stopped generating. Evening is when most people come home to cook meals, watch TV, and otherwise raise energy demands in their homes. Solar, however, may become more of an offset in a warming world. Climate change forecasts call for summer energy spikes that will raise demand for air-conditioning at midday when solar panels are typically at maximum production.

Mike Tierney is known far and wide for his endurance exploits on a unicycle, but his name is also associated with alternative energy as one of the first solar practitioner in our region. Tierney, who has run Aspen Solar since 1982, calls himself "the original." He got started during the Carter Administration and muses that he "survived the Reagan years."

Tierney took on solar to supplement ski patrolling and river running, but he considers it "the right thing to do." Despite growing pains in the industry that include false prophets and failed systems, says Tierney, "I'm still a believer. If you have sun, it needs to be part of the mix."

Carbondale's Solar Energy International was founded in 1991 as a nonprofit educational organization to advance renewable technology and sustainable building practices (solarenergy.org). Solar Energy International's vision is to create a more sustainable future. Laurie Guevara-Stone, director of its International Program, said she became environmentally aware during studies at Colorado College. Later, while living in Central America, she became a disciple of solar.

"I saw many people who lived without electricity and how difficult that made their lives. I decided that solar was the way to improve the lives of people all over the world. Also, seeing what energy use in the U.S. is doing to the planet, I determined to live with the least impact possible – and that means renewables."

When she and her husband, Anibal, decided to build their dream home in Carbondale, the first order of design was energy and resource efficiency. "With careful attention to the details and a little bit of research," she says, "we built a high-performance, beautiful, efficient home that will consume a fraction of the energy and resources used by the average American home."

Attesting to the staying power of alternatives, Johnny Weiss, who works with SEI, has done local solar installations for 30 years, including most of the 10th Mountain and Braun ski huts. "Even in extreme conditions of cold and snow, these systems work well today," he confirms. "It's all part of an emerging ethic that's moving away from fossil fuels."

Electric utilities are moving in the same direction by making important strides toward reducing carbon emissions as part of a social contract based partly on ethics and largely on expedience.

### **Greening the Valley**

Customers of Holy Cross Energy today can become Wind Power Pioneers by subscribing to a wind farm in eastern Colorado. Holy Cross also offers education and energy saver tips to make homes and businesses more efficient. This industry-wide trend is in keeping with the notion that it is cheaper for utilities to gain transmission volume through efficiency savings than it is through developing costly new energy production. That's why Holy Cross also offers incentives for customers to generate their own power and feed it into the Holy Cross network. Individual producers are offered up to \$9,000 as an incentive.

"This valley is arguably the leading hotbed for solar photovoltaics in the entire Rocky Mountain region," says Randy Udall. "Holy Cross doesn't brag on what they're doing, but they are kicking ass."

Xcel Energy, which serves eight states, 70 percent of Colorado's population, and the bulk of Holy Cross Energy needs, offers rebates for energy-saving home appliances, insulation rebates, subscriptions to wind power, and support for solar power. Xcel confronts climate change head-on. "We are taking action today," says the company website, "because there are risks associated with just waiting for federal policy and regulation. Our customers, communities, shareholders and employees expect us to act prudently."

Glenwood Springs is also taking proactive measures. It began by contracting in 2000 for wind power from the Ponnequin Wind Farm in northeast Colorado. In 2006, the city doubled its wind-generated energy purchases when it became a customer of the Municipal Energy Agency of Nebraska (MEAN).

In 2009, the city commissioned a detailed study exploring geothermal potential by tapping vast underground sources from which the Yampa and other local hot springs derive hot water. The study concluded that water hotter than 180-degrees could be harnessed to power turbines. Warm water could be channeled for space heating and district heating within the city. The city also has an ambitious Climate and Energy Plan to reduce CO2 emissions.

Aspen's "Canary Initiative" targets CO2 cuts by evaluating electrical energy use and applying alternatives wherever possible. With its long history of hydropower, the city opened a lively debate in 2010 about harnessing Castle Creek for a new hydropower project. Most recently, Aspen has embarked on a geothermal project by trying to tap underground mine water.

In 2000, the city joined Pitkin County in creating the Renewable Energy Mitigation Program (REMP), which levies energy assessments on excessive energy users and applies those funds to energy efficiency grants to individuals and businesses. REMP provides a kind of Robin Hood scenario, taking from the rich and giving to the poor, all with the idea of cutting carbon.

### **Green skiing**

Ski resorts tend to be the most progressive local businesses on efficiency and energy alternatives because their business model depends on snow, which is threatened by climate change from carbon emissions. The Aspen Skiing Company, starting in 1997, became the first large ski resort in the U.S. to buy renewable wind power credits from Holy Cross Energy. Skico has since dropped out of wind as it actively develops its own renewable projects and focuses on energy conservation. Its "Save Snow Campaign," begun in 2006, raises public awareness of climate change and ways to reduce carbon emissions. The Skico also promotes a long-range, far-reaching environmental commitment through myriad programs in all aspects of its operations.

Several years ago, the Skico tapped into hydropower by installing and operating a 115-kW turbine generator at Fanny Hill on the Snowmass ski area where water diversions to a snowmaking pond drive a turbine that operates from May through August. In 2009 the Skico built a large solar electric array at Colorado Rocky Mountain School to reduce part of the valley's carbon footprint. Included in the Skico's energy portfolio today are six solar arrays. The Aspen Times reported last week that the Skico is now pursuing feasibility studies for burning coal mine methane as a potential energy fuel. "If you make power from this waste gas," explains Auden Schendler, the Skico's Vice President of Sustainability, "you capture a resource that was going to waste, you destroy a potent greenhouse gas, and you get electricity in the process, which is actually hugely carbon negative due to the methane destruction."

At the other end of the valley, Ski Sunlight's campaign – "Help Keep Winter Cool!" – offers tips to customers for ride sharing, living efficiently, and buying clean energy for their homes.

### **Looking to the future**

Green energy alternatives have a long way to go before they offset traditional fossil fuels. Meanwhile, concludes Randy Udall, conventional energy economics is a value system masquerading as mathematics. "That math," he says, "only works if you assume that the environment and the future are worthless."

"Arguably," says Udall, "we Americans ought to have a day of thanksgiving dedicated to energy, but on the contrary, all we seem able to do is bitch about the price of gas, or, as environmentalists, hypocritically complain about the pollution produced when we burn it. Healing our relationship with energy is essential. And a good place to begin is making some of your own."

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