

Technology getting better at harnessing sun's power

Passing of Amendment 37 means rebate payments for solar-electric systems

August 5, 2005

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The sun shines in Boulder more than 300 days a year. That's all fine and good for enjoying the outdoors. But much more importantly, conservationists say solar technology is playing a more critical and practical role in fighting rising energy prices.

Scientists say that on a sunny day, the sun emits the equivalent of 1,000 watts of energy per square meter of the Earth's surface.

"We only need around a hundredth of a millionth of 1 percent of that energy to meet our power needs many times over — if we could harness it effectively," says Amy Ellsworth, energy program director for the Center for ReSource Conservation, a nonprofit in Boulder that promotes sustainable energy use.

Slowly — but it appears surely — humans are getting better at harnessing the sun's rays. Two of the more popular solar-energy technologies out there are solar thermal and solar photovoltaic.

During the energy crisis of the 1970s, Ellsworth says, solar technology was added to thousands of U.S. homes, and she estimates that about 1,200 of them were in Boulder County.

Solar-thermal technology includes solar collectors with small tubes filled with water or another liquid that are covered with a heat-absorbing plate. They're installed on a south-facing surface — often the roof. Sunlight heats the water, which is then pumped into a well-insulated hot-water tank.

Solar photovoltaic, or PV, technology converts sunlight directly into electricity — the same technology that powers many calculators and watches. Commonly, solar PV systems are wired directly into a home's electrical system. When sunlight hits cells in solar PV systems, DC electricity is formed, which is then converted into AC electricity and connected to the home's electrical supply.

In Boulder, the solar PV system is part of the electricity grid and is metered, and homeowners can add excess electricity to the grid and draw from that when they need to.

Ellsworth says the initial cost of investing in solar power and the amount of savings realized later depends on home size, energy efficiency and the number of residents. A typical solar-thermal system could produce 100 gallons of hot water a day — what a typical family of four needs — and might cost between \$5,000 and \$6,000 to install. It would then save the family about \$400 to \$500 per year, so it would pay for itself in about 10 to 15 years.

Ellsworth says a 2,000-watt PV system could "reasonably provide" for about half of the electricity needs of an energy-efficient 2,000-square-foot home. Such a system would cost about \$16,000 and would save the homeowners about \$250 per year on electric bills.

“So, obviously people that are installing PV are doing so for reasons other than economics,” Ellsworth says.

But under Amendment 37 – the renewable-energy legislation that passed in Colorado last November – Xcel Energy is required to start a rebate program for PV systems — a minimum rebate of \$2 per watt.

“However, it’s likely that the financial incentives will be greater, maybe \$4 to \$4.25 per watt,” Ellsworth says.

She says with a \$2-per-watt rebate, the cost of the PV system described above would be reduced to about \$12,000; with a \$4 rebate, the cost would be about \$8,000. “This is all based on today’s energy costs. With higher natural-gas and coal costs, it’s likely that future energy cost savings will be greater and paybacks shorter.”

Blake Jones, president of Namaste Solar Electric Inc., a solar photovoltaic company in Boulder, says that solar PV’s cost per watt today is more than 80 percent less than what it was just 10 years ago.

He adds that worldwide demand for solar PV technology has been growing at 25 percent per year over the past 20 years and at more than 30 percent a year over the past five years.

“We’ve barely uncovered the tip of the iceberg; the solar PV industry is projected to explode in the coming years,” Jones says.

Jeff Scott, an associate at SolSource in Denver, says other reasons solar PV costs are declining rapidly are because of the increasing efficiency of solar cells and economies of scale. “The solar PV industry now globally generates over \$3 billion to \$4 billion in revenues from the sale of solar modules, other equipment and the installation of those systems,” he says.

Ellsworth says the Center for ReSource Conservation tries not to emphasize payback in the decision to install solar systems. “Does a homeowner consider the payback of installing granite countertops or stainless-steel appliances? We encourage people to consider things like the increase in property value of their home, as well as other local and global benefits of solar, which far outweigh the benefit of these luxuries,” Ellsworth says.

Ellsworth and others say there are many examples of solar power being installed in Boulder County. The Center for ReSource Conservation will host a tour of homes this fall that will highlight 10 area homes that use solar technologies (see story, Page 16C).

Solar Village in Longmont is a 24,000-square-foot mixed-use development of condos, lofts, flats and retail space that has solar PV panels on the roofs. In addition to solar technology, the development features cleaner building materials, radiant heat and an efficient centralized water system.

The solar panels will directly offset a portion of the buildings’ energy load during the day by producing free solar energy. Any surplus energy generated will cause the electric meter to spin backward and lower the electric bill.