



Arizona State University
Tempe, Arizona
Energy

SCHOOL

Arizona State University, public 4-year, 67,000 students, Tempe, Arizona.

ABSTRACT

Arizona State University (ASU) has installed 1.8 megawatts of photovoltaic solar power with limited capital outlays through power purchase agreements. The university expects to continue this process so that a total of 7 megawatts of solar power are installed by the end of calendar year 2009, and with 20 megawatts as the ultimate goal. The current 1.8 megawatt installation will avoid emitting 3,976,700 pounds of CO₂, 72 pounds of volatile organic chemicals, 7,930 pounds of NO_x, 600 pounds of CO, 5,510 pounds of SO₂, 440 pounds of PM₁₀ particulates, and 24,734 milligrams of Mercury. Upon completion of 20 megawatts of photovoltaic solar power, these reductions will be increased by a factor of ten while the cost per kilowatt hour will be less than the university's peak rate for 2009.

GOALS AND OUTCOMES

Goals

As a charter signatory to the American College and University Presidents Climate Commitment, ASU expects to be the exemplar of sustainable operations. After completing one small scale project to power the lighting in a four story parking structure, the university planned to install 1.8 megawatts of photovoltaic solar power in calendar year 2008. This installation was one of many initiatives intended to achieve carbon neutrality and a reduction of other pollutants. The university will install additional installations in 2009 to achieve 10 megawatts of solar power, and in 2010 to achieve 20 megawatts of solar power. In addition, the university will find investors to install these solar arrays at no cost to the university in return for the sale of all power so generated to the university at a set rate per kilowatt hour. The university hopes that this set rate per kilowatt hour will be equal to or less than the university's current peak rate. Finally, the university expected that the cost per kilowatt hour would be fixed for the life of a 20 year contract so that real energy savings would accrue as the peak rate increased over the years.

Accomplishments and Outcomes

In January 2008, the university conducted a solicitation to find firms interested in engaging in solar power purchase agreements. Three firms were awarded contracts, and one completed installations of solar power arrays on the tops of two parking structures and one building. These installations exceeded the goal of producing 1.8 megawatts of solar power as they generate 1.9 megawatts. The arrays were installed at no capital cost to the university. The goal of obtaining a fixed rate per kilowatt hour was not achieved due to the uncertainty over whether or not the Congress would extend existing solar incentives. Accordingly, there is a Consumer Price Index escalator built into the rate. This will still produce a savings as the peak rate is expected to increase greater than the Consumer Price Index, especially if a carbon cap and trade program is initiated. As a result, the university will still save money on the cost of electricity produced through the solar installations, but it may take a year or two before these savings are realized. As the Congress did extend the solar incentives, the projects under award for 2009 are at a fixed rate that is lower

than the current peak rate. The university plans to also get this fixed rate for projects in 2010 and beyond. As noted above, the current 1.8 megawatt installations avoid emitting 3,976,700 pounds of CO₂, 72 pounds of volatile organic chemicals, 7,930 pounds of NO_x, 600 pounds of CO, 5,510 pounds of SO₂, 440 pounds of PM₁₀ particulates, and 24,734 milligrams of Mercury per year.

The current, and planned, reductions in pollutants will benefit wildlife in the adjacent Salt River riparian area and in our surrounding Sonoran deserts.

Challenges and Responses

The biggest challenge was caused by uncertainty on the part of solar contractors as to whether or not the Congress would extend solar incentives beyond December 31, 2008. Accordingly, these installations were planned to be complete and generating power not later than December 31, 2008. This deadline required a contractor willing to assume the risk that the projects would be done, especially as the two parking structure rooftop installations would employ elevated single axes tracking systems that required extensive engineering. The deadline was met. A second challenge was that the structures on which the solar arrays would be installed were bonded with tax exempt financing. In order to ensure that the commercial generation of power on these structures would not adversely impact the tax exempt status of the bonds, a standard power purchase agreement was not used. The solar installations are covered under qualified management agreements in which a flat monthly fee is paid to the solar power producer. This fee is calculated on the expected output of solar power at the contracted rate. The monthly fee is adjusted annually based on actual power output. The final challenge was to avoid the up-front cost of conducting engineering site surveys of facilities that might be suitable for solar installations. This was done by inviting the three firms under master solar agreements to do their own analysis and then recommend to the University the locations they wanted to place solar arrays.

Campus Climate Action: Your School's Carbon Footprint

As noted above, the completed 1.8 megawatts of solar power are avoiding nearly 4 million pounds of CO₂, as well as reducing other greenhouse gasses. Upon completion of 20 megawatts of solar power installations in 2010, the university will be avoiding 40 million pounds of CO₂.

Commentary and Reflection

Arizona State University is committed to assist any organization contemplating obtaining solar power by providing input to the Clinton Climate Initiative as they constructed sample solicitations and contracts for power purchase agreements. By making it easier for others to follow our lead, the university hopes that many other organizations will deploy solar power.

ENGAGEMENT AND SUPPORT

Leaders and Supporters

The photovoltaic solar power purchase projects were initiated by the Campus Sustainable Operations Office of the University's Global Institute of Sustainability, the University Services (facilities management) Department, and the Purchasing Department. Key individuals were Bonny Bentzin of the Global Institute of Sustainability, Dave Brixen and Ray Tena of University Services, John Riley of Purchasing, and Lee Feleciano of Carbon Free Technology, the solar power producer.

Funding and Resources

The installation of solar power arrays was done by the solar contractor under a power purchase agreement that guaranteed him a stable price for all the power produced. There were no capital costs to the university. Naturally there were the normal procurement and project review tasks, but these were not incremental costs.

Education and Community Outreach

These solar projects were publicized in local on and off-campus media, in university web sites, and at the monthly meetings of the Sustainable Cities Initiative, a group of local Arizona municipalities. The solar arrays are highly visible on campus and readily noticed by visitors.

CONTACT INFORMATION

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MORE ABOUT YOUR SCHOOL

Campus Sustainability History

The Global Institute of Sustainability evolved from over 30 years of environmental research conducted by the Center for Environmental Studies at Arizona State University (ASU). The Institute conducts research, education, and problem-solving related to sustainability, with a special focus on urban environments. Within the Global Institute of Sustainability there is a University Sustainability Practices group. This is a group of several individuals who are dedicated to oversee campus sustainability. We initiate and coordinate sustainability efforts of several campus community groups and stakeholders. University Sustainability Practices has established four goals for campus sustainability. 1) Carbon Neutrality, 2) Zero Waste, 3) Active Engagement and 4) Principled Practice. We have established several sustainability initiatives to help the university achieve these four goals. <http://sustainability.asu.edu/>.