U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Challenges and Successes on the Path toward a Solar-Powered Community

Solar in Action

San Antonio, Texas

Includes case studies on:

- "Bring Solar Home" Marketing Campaign
- Blue Wing Utility-Scale Solar Project
- "Level 3 Solar Home," a Net-Zero Model Home

SOLAR AMERICA CITIES

Part of the Solar America Communities program

October 2011

The San Antonio skyline provides the perfect backdrop to the Blue Wing Solar Project. *Photo from CPS Energy, NREL/PIX 19476*

Cover photos from iStock/11523132, San Antonio skyline and riverwalk

About the U.S. Department of Energy's Solar America Communities program:

The U.S. Department of Energy (DOE) designated 13 Solar America Cities in 2007 and an additional 12 cities in 2008 to develop comprehensive approaches to urban solar energy use that can serve as a model for cities around the nation. DOE recognized that cities, as centers of population and electricity loads, have an important role to play in accelerating solar energy adoption. As a result of widespread success in the 25 Solar America Cities, DOE expanded the program in 2010 by launching a national outreach effort, the Solar America Communities Outreach Partnership. As the Solar America Cities program evolved to include this new outreach effort, the program was renamed Solar America Communities to reflect DOE's commitment to supporting solar initiatives in all types of local jurisdictions, including cities and counties. Visit Solar America Communities online at www.solaramericacommunities.energy.gov.

San Antonio's Starting Point

The City of San Antonio was designated by the U.S. Department of Energy (DOE) on March 28, 2008, as a Solar America City.

San Antonio has been called the "Solar Power Capital of Texas" because it is home to the largest photovoltaic (PV) array and the largest solar hot water facility in the state. The City of San Antonio has possessed a long-term interest in energy conservation and renewable energy.

Prior to its involvement in the Solar America Cities program, total installed public and private PV capacity in San Antonio was estimated to exceed 500 kilowatts (kW). Signature projects included:

- A 10-kW PV demonstration and education facility located at the Institute of Texan Cultures was installed in 2003, as a collaborative effort with the University of Texas at San Antonio, the Institute of Texan Cultures, the City of San Antonio, and Solar San Antonio. The project was funded by CPS Energy, the municipally owned utility.
- Specialized applications of solar power were installed in San Antonio, such as park lighting, traffic signage, public trash compactors, and bus stop lighting.
- San Antonio is home to the largest solar hot water facility in Texas: The Bexar County Adult Jail Annex's solar thermal (hot water) system, which has a 20,000-gallon storage tank sited at grade level. This system is estimated to save taxpayers $55,000 per year in energy costs to produce hot water for the facility.
- San Antonio has several Military sector projects, including a 180-kW PV system at Fort Sam Houston.

The city also benefited by having a municipal utility, CPS Energy, that implemented solar energy projects (PV and solar thermal) and launched a solar PV rebate program in 2007. It also had strong partnerships with local organizations that support solar energy and energy efficiency, such as Solar San Antonio and the Metropolitan Partnership for Energy.

Building Partnerships and Setting Goals

The City of San Antonio understood that to realize a truly comprehensive solar program, a team approach was required. The Office of Environmental Policy, under direct supervision of the City Manager's Office, is the DOE point of contact for the city's Solar America Cities

activities. The Office of Environmental Policy has staff support from CPS Energy and assistance from the Development Services Department, Economic Development Department, Architect's Office, Mayor's Office, and City Council. To launch the Solar America Cities project, San Antonio partnered with several organizations and city departments that it has had long-standing and successful relationships with, including:

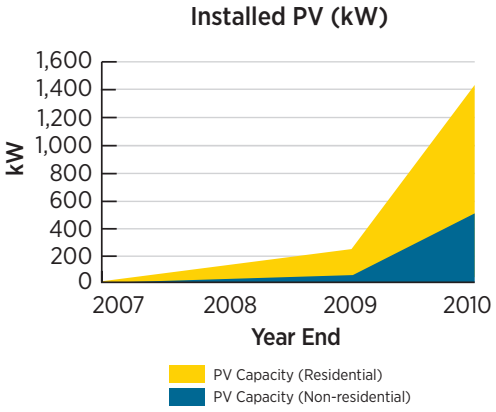
- Solar San Antonio, a private, nonprofit solar energy advocacy organization that brings together a knowledgeable board of directors and advisors in the San Antonio area to provide a local focus on solar energy opportunities and barriers
- CPS Energy, the municipally owned electric utility, whose goal is to achieve 1,500 MW of renewable capacity by 2020 through solar and other non-wind carve-outs, which equates to about 20% of the utility's total generation capacity
- Build San Antonio Green, San Antonio's residential Green Building Program, which receives funding from local governments and is administered by the Metropolitan Partnership for Energy.

The objectives identified by the project partners were to:

- Develop and formally adopt a realistic 2015 solar power goal for the City of San Antonio covering the residential, commercial, industrial, and government sectors that is consistent with CPS Energy's renewable energy goals

Installed Capacity

San Antonio



Installed PV capacity increase from December 31, 2007, to December 31, 2010

- Enact new and revised city policies and procedures to accelerate the use of solar power in existing and new city-owned buildings as well as in development projects approved by the city
- Provide useful information, examples, and templates for near- and mid-term solar energy planning for other cities
- Educate the public about the value of solar as a secure, reliable, and clean energy choice through a media relations and event campaign.

San Antonio's "Bring Solar Home" campaign launch garners support across the city. Shown left to right: Cris Eugster, chief sustainability officer, CPS Energy; Aurora Geis, vice president of lending, San Antonio Credit Union (SACU); Chuck Smith, senior vice president at SACU; County Commissioner Tommy Adkisson; Bill Sinkin, chairman, Solar San Antonio; San Antonio Mayor Julian Castro; and Lanny Sinkin, executive director, Solar San Antonio. *Photo from Solar San Antonio, NREL/PIX 19478*

This 11.28-kW PV system was built in 2010 for a net-zero solar model home that was certified as a Level 3 Solar Home by Build San Antonio Green. *Photo from Solar San Antonio, NREL/PIX 19479*

Accomplishments and Highlights

Since becoming a Solar America City, San Antonio has seen more than 14 MW of PV capacity installed, including the 14-MW Blue Wing PV plant and two high-visibility projects: Pearl Brewery (200 kW) and the San Antonio International Airport (235 kW). As of 2011, CPS Energy also has an additional 30 MW of PV contracted for development through a power purchase agreement, and in the spring of 2011, released a request for proposals (RFP) for 50 MW of PV generation. The RFP included a requirement to bring a manufacturing plant or assembly plant, provide an educational component, and include research and development.

After receiving more than 100 proposals at prices near grid parity, CPS Energy reissued the RFP requesting bids for 400 MW over five years.

The San Antonio Solar America Cities team's highlights include the following:

- Successfully implemented the first phase of the "Bring Solar Home" marketing campaign
- Completed the Blue Wing Solar Project 14-MW PV plant
- Completed a Net-Zero Home that is certified as a "Level 3 Solar Home" by Build San Antonio Green.

By bridging the gap between consumers and industry professionals, "Bring Solar Home" aimed to accelerate the number of solar installations in San Antonio.

Case Studies: Successes and Challenges

"Bring Solar Home" Marketing Campaign

Bring Solar Home is an initiative of Solar San Antonio to educate the community on the benefits of solar energy and increase solar energy adoption. Working with CPS Energy, the City of San Antonio, Bexar County, solar installers, and financial institutions, Solar San Antonio developed a campaign aimed to simplify the process of "going solar." A beta version of the campaign launched in the fall of 2010 and the campaign re-launched in May 2011. By bridging the gap between consumers and industry professionals, the overarching goal is to increase the number of solar installations in San Antonio. The campaign addresses two of the biggest barriers identified for solar development: lack of information and upfront costs.

There are six primary elements to the campaign:

1. **Community Leadership Support.** With the City of San Antonio adopting its Mission Verde Plan (a sustainability plan that encompasses environmental and economic policy) and CPS Energy adopting its Vision 2020 Plan (the utility's Strategic Energy Plan, a roadmap for supplying the power needs for a sustainable energy future in the Greater San Antonio area), the policies were in place. The city, CPS Energy, and Bexar County are among the campaign's financial supporters. To kick it off, Solar San Antonio held a press conference with the mayor, a county commissioner, the CPS Energy chief sustainability officer, and other community leaders.
2. **Easily Accessible Information to the Community.** Solar San Antonio set up a BringSolarHome.com website on its own website SolarSanAntonio.org to present the campaign information.
3. **Making the Pursuit of Solar Easy.** From the campaign website, a potential solar adopter simply fills out an application requesting Solar San Antonio assistance in going solar. Solar San Antonio takes it from there.

4. **Cooperation of Local Solar Companies.** More than 20 solar companies signed agreements to participate in the campaign. Each application received through the website was given up to three of the participating solar companies. The companies agreed to contact the applicant within 10 days to initiate the process of providing a bid.

5. **Solar San Antonio's Ongoing Involvement.** In the 2 ½-month beta test of the campaign, Solar San Antonio staff made or fielded more than 2,500 calls. The staff verified when installers called applicants, monitored progress, and performed trouble shooting if problems arose.

6. **Solar Improvement Loan Product Developed with a Local Credit Union**. The low-interest loan covers all upfront costs of the solar installation and offers borrowers the opportunity to reduce the loan by giving the credit union the CPS Energy rebate and the amount of the 30% federal tax credit. After these reductions, the loan has reasonable monthly payments. The value of the electricity generated by the solar energy system brings the net cost down even more. In some cases, the difference between the loan payment and the value of generated electricity is only $35 to $50 per month.

The beta test of the campaign produced more than 500 online applications for assistance. Solar San Antonio estimated that a total of 70 to 75 new installations would result from the campaign by May 2011, with a value of $2.5 million, and a capacity of approximately 500 kW. The initial campaign cost was approximately $60,000 for personnel, materials, and media and was funded by the public and private sector (including the City of San Antonio, CPS Energy, Bexar County, and Wells Fargo, LLC). Solar San Antonio raised additional money from its own fundraising events.

The following are highlights of the successes and challenges seen by the campaign's initial phase:

Successes

- Broad support from key institutions and political leadership
- Development of website to present easily understood information and simplify the process for going solar
- Extensive use of online applications to request assistance in going solar
- Homeowners pleased with designated installers contacting them instead of having to search for contractors by themselves
- Participation by numerous solar installation companies

The Blue Wing solar project will provide 14 MW of power when completed. *Photo from CPS Energy, NREL/PIX 19477*

- Extensive follow-up by Solar San Antonio staff, resulting in positive experiences for applicants and resolving problems that arose during the campaign
- Development of a solar loan product to make going solar affordable
- More than 500 applications, resulting in 70 to 75 installations valued at approximately $2.5 million, adding approximately 500 kW to the utility's distributed energy system
- A limited investment of $60,000 that leveraged approximately $25 million in returns.

Challenges

- Limited reporting by solar companies on progress
- Some smaller companies overwhelmed with too many leads
- Slow down in utility processing of applications and inspections
- Lack of education on the basic concepts of solar energy
- Only one lending institution participated in beta test
- Some homeowners did not respond to Solar San Antonio's follow-up calls and emails
- No successful contracts for solar hot water primarily because another program offered additional subsidies.

The second campaign phase launched in May 2011 and generated more than 250 applications by August 2011. New techniques, such as direct mail, are being implemented to test their effectiveness.

Blue Wing Utility-Scale Solar Project

CPS Energy, the City of San Antonio's municipal utility, entered into a contract with Duke Energy and juwi solar Inc. to develop a 14-MW PV farm that is currently the largest PV plant in the state. CPS Energy is purchasing all of the output from the solar farm and associated renewable energy credits from Duke Energy Generation Services, under the terms of a 30-year Power Purchase Agreement. The project is located at the intersection of two highways and is clearly visible from both highways. During the construction phase, nearly $2 million was spent in local purchases, and more than 100,000 labor hours were generated. At the peak of construction, 115 workers were on site. The Blue Wing project has contributed to creating jobs in the state. The 2010 National Solar Jobs Census ranks Texas third in solar jobs among all 50 states, with an estimated 6,400 solar jobs at 170 companies.

The Blue Wing Solar Project is expected to produce more than 26,570 megawatt hours of electricity per year, which is enough to power 1,800 average households. CPS Energy estimates that the emissions-free power is equivalent to taking 3,800 cars off the road.

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The installation began full operations on November 4, 2010, nearly 2 months ahead of schedule. It contains a demonstration area that is being used to test the efficiency of eight PV technologies, including a 50-foot tall concentrating PV unit that tracks the sun's movement. Duke Energy Generation Services acquired the project early in 2010 from juwi solar, which developed, designed, and built it. Construction began in April and took less than seven months to complete.

The completion of this project reiterates CPS Energy's commitment to a diversified energy portfolio in meeting the future needs of the local community. At the end of 2010, CPS Energy projected that 13% of its energy capacity came from renewable resources. The company is committed to 1,500 MW of renewable capacity by 2020, which equates to approximately 20% of total capacity. The city recognizes and continues to emphasize to the public the potential for economic development that can come with additional solar investment.

"Level 3 Solar Home," a Net-Zero Model Home

Build San Antonio Green is San Antonio's award-winning residential green building program. The program was developed specifically for San Antonio and the unique climate conditions in South Texas and automatically incorporates elements specific to San Antonio into its green building guidelines, including CPS Energy and San Antonio Water System rebates, the San Antonio Water System WaterSense and Landscape Care Guide, and the Net Metering Ordinance.

The program offers several options for builders wishing to build green, from the Level 1 High Performance Home, which is 15% more energy efficient than city code, to the Level 3 Solar Home, which is a net-zero energy solar-powered home. During San Antonio's participation in the Solar America Cities program, Build San Antonio Green certified its first Level 3 solar home. BuiltSmart Custom Homes constructed a 3,900-square-foot house that will serve as a model home for the builder and an education center about solar technologies and the efficiency and sustainable measures incorporated into the design. The home includes the following features that contribute to its net-zero status:

- **Airtight Insulation.** Spray foam insulation that seals the house like an envelope. The temperatures in the attic never deviate by more than 5 degrees from the rest of the house, and the 6-ton heating and cooling system runs less frequently.
- **Rainwater-Harvesting System.** Funnels water into underground pipes and stores it in a 30,000-gallon tank. Before flowing indoors, the water is filtered through ultraviolet light. The system allows for a continuous supply of water, even under drought conditions.

- **PV System.** 11.28-kW PV array expected to produce slightly more energy than a family of five would use in a year.

Top Takeaways

Bring Solar Home Campaign

- A key component to the success of the campaign was broad support from key institutions and political leadership.
- Extensive follow-up by committed individuals at Solar San Antonio resulted in positive experiences for applicants and the ability to resolve any problems that arose during the campaign.
- Providing solar financing options had a significant positive impact on program participation.

Blue Wing Solar Project

- A utility-scale solar farm can positively impact the local economy by creating jobs and providing education and training for a future solar workforce.
- To ensure the positive impact on the local economy, CPS Energy plans to include an economic development requirement in the Power Purchase Agreement that commits the developer to have a local presence for green job stimulus.
- Cooperation with local code authorities is essential to the success of any project; however, participants should be prepared to discuss code relevance and requirements for utility-scale solar farms because few standards exist for such projects.

Next Steps

The City of San Antonio continues its solar programs and is recognized as a national leader in solar project and program development. The projects highlighted here will expand the city's activities as follows:

- Continue the Bring Solar Home campaign based on lessons learned from the beta launch in 2010
- Continue working with local financial institutions to encourage more providers to offer solar loans
- CPS Energy has entered into Power Purchase Agreements for 30 MW of PV to develop three 10 MW projects which will help it reach its solar and renewable energy goals.
- CPS Energy is continuing its solar development by issuing a Request for Proposals for an additional 50 MW of solar generation in 2011.
- Continue the Level 3 Solar Home program with Build San Antonio Green and proactively encourage and educate additional builders to participate in the program

Additional Resources

- City of San Antonio Office of Environmental Policy: www.sanantonio.gov/oep/
- CPS Energy: www.cpsenergy.com
- Solar San Antonio: www.solarsanantonio.org www.bringsolarhome.com/
- Build San Antonio Green: www.buildsagreen.org

For more city information, contact:
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Clockwise from top left: *Photovoltaic system in Philadelphia Center City district (photo from Mercury Solar Solutions); rooftop solar electric system at sunset (photo from SunPower, NREL/PIX 15279); Premier Homes development with building-integrated PV roofing, near Sacramento (photo from Premier Homes, NREL/PIX 15610); PV on Calvin L. Rampton Salt Palace Convention Center in Salt Lake City (photo from Utah Clean Energy); PV on the Denver Museum of Nature and Science (photo from Denver Museum of Nature & Science); and solar parking structure system at the Cal Expo in Sacramento, California (photo from Kyocera Solar, NREL/PIX 09435)*

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