

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

Solar in Action



Milwaukee, Wisconsin

Includes case studies on:

- Training Local Installers and Site Assessors
- Developing a Solar Manufacturing Hub
- Developing Solar Financing in a Changing Environment
- Facing Challenges in Modifying a Solar Permitting Process



As part of a training workshop, a Milwaukee fire station installed a solar hot water system with materials donated by Caleffi. Photo from Caleffi, NREL/PIX 18702

Cover photos from iStock/5786751, Milwaukee 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.

Milwaukee's Starting Point

The City of Milwaukee was designated by the U.S. Department of Energy (DOE) on March 28, 2008, as a Solar America City. At the start of its engagement in the Solar America Cities program, Milwaukee was developing a focus on climate protection, having signed the Mayors' Climate Protection Agreement and having formed the Office of Environmental Sustainability as a cabinet-level office within the city.

Milwaukee's solar industry was gaining steam with significant long-term commitments from local utility We Energies and \$100,000 from an energy challenge fund earmarked by the Milwaukee Common Council (similar to City Council) to support solar installations. Some specific facts about Milwaukee's solar industry are as follows:

- Milwaukee counted 25 solar PV systems installed between 2002 and 2008, totaling 201 kilowatts (kW).
- Eight solar thermal, or solar hot water, systems were installed prior to 2008.
- We Energies was providing a solar electric buyback rate, incentives for siting solar electric and solar thermal systems at nonprofit and governmental sites, and incentives for siting solar water heating systems at homes with electric water heating systems.
- In 2005, the Solar Electric Power Association awarded a Business Achievement Award to the We Energies sustainable solar business plan.
- Focus on Energy, Wisconsin's utility incentive administrator, was providing funding for approximately 25% of the cost of installing solar electric and thermal systems as well as cost-sharing for site assessments, and solar business development.

Building Partnerships and Setting Goals

In proposing the Milwaukee Shines program (the name of Milwaukee's Solar America Cities program), leaders identified the most significant barriers to solar adoption and developed specific strategies to address them. The top three barriers were categorized as follows:

- Economic barriers

- Information barriers
- Procedural barriers

Key partners in the Milwaukee Shines program included the following:

- We Energies
- Focus on Energy
- Midwest Renewable Energy Association (MREA)

The team identified the following key activities to meet the city's solar goals:

- Promoting solar energy through city installations and publications, MREA trainings, and other means
- Training and certifying local installers
- Supporting new solar manufacturing businesses
- Developing city-supported and -promoted financing options
- Identifying and reducing unnecessary delays and costs in the solar installation permitting process.

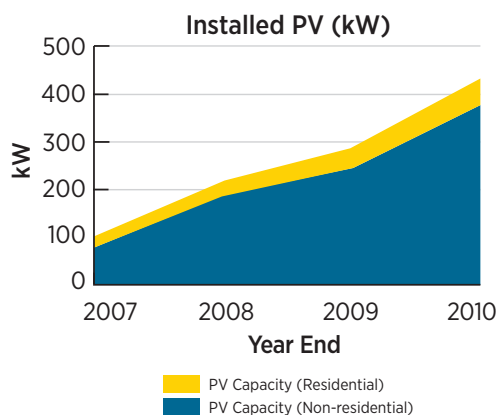
Accomplishments and Highlights

Addressing economic barriers:

- Developed a property assessed clean energy (PACE) program for the city, with Common Council approval
- Increased the number of solar installers (PV and solar hot water) in the Milwaukee area from 7 at the beginning of

Installed Capacity

Milwaukee



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

2009 to 24 at the end of 2010—of those, the number of installers certified by the North American Board of Certified Energy Practitioners (NABCEP) increased from 2 at the beginning of 2009 to 8 at the end of 2010

- Increased the number of solar site assessors in the Milwaukee area from 9 at the beginning of 2009 to 22 at the end of 2010
- Hosted more than 63 professional-level training workshops through the MREA partnership



Milwaukee and Madison celebrate being named as Solar America Cities. Left to right: Milwaukee Mayor Tom Barrett; Milwaukee Library Director Paula Kiely; Wisconsin Governor Jim Doyle; Madison Mayor Dave Cieslewicz, Department of Energy Project Officer Steve Palmeri; and Tehri Parker, executive director of Midwest Renewable Energy Association. Photo from Milwaukee Shines, NREL/PIX 18704



A Milwaukee fire station features a new solar hot water system, courtesy of the city's hands-on workshop. Photo from Caleffi, NREL/PIX 18703

- Commissioned the report, *Solar Products Manufacturing in Milwaukee*, which helped to identify solar supply chain goals.

Addressing informational barriers:

- Created the website www.milwaukee shines.com and other marketing materials to connect consumers to information on solar technology and financial resources
- Presented at more than 100 community events and met with a variety of organizations and at educational facilities
- Hosted monthly “Intro to Renewable Energy” events held open to the public
- We Energies and MREA hosted several “Solar 101 for Consumers” events, 3-hour seminars to help Milwaukee residents understand options for going solar
- Milwaukee Mayor Tom Barrett proclaimed the city’s first “Milwaukee Solar Week” in conjunction with state and national solar events hosted in Milwaukee.

Addressing procedural barriers:

- Hosted two popular trainings focused on structural design considerations for solar professionals
- City permitting staff members attended trainings to help them understand important considerations for permitting of solar systems.

While Milwaukee Shines focused heavily on laying the groundwork for wider-scale adoption of solar, much progress was made in actual solar installations over the course of Milwaukee’s Solar America Cities project, for example:

- Solar water heating systems increased from 8 at the beginning of 2008 to 46 in October 2010 with a trend pointing to 2010 as having the greatest number of new installations of any year to date.
- PV systems in the city increased from 25 to 56 from the beginning of 2008 through December 2010.

Case Studies: Successes and Challenges

Training Local Solar Installers and Site Assessors

Milwaukee Shines contracted with MREA to serve as Milwaukee’s “solar coach.” The largest task of the solar coach was to provide professional-level training and, as a result, increase the number of solar installers and site assessors in the immediate Milwaukee area. Working with a reputable outside organization made this project successful, but it was not without its challenges.

In looking back on the program, the team identified several factors that were key to its success, which are highlighted below.

Training Legitimacy. Milwaukee contracted with MREA, a nonprofit organization whose PV training programs are accredited by the Institute for Sustainable Power Quality through the Interstate Renewable Energy Council. With more than 20 years’ experience in renewable energy promotion and education, MREA opened an office in Milwaukee, ramped up professional training, and hosted networking events in a very short period of time.

Partnering with an existing, reputable nonprofit was vital to the success of this task and enabled Milwaukee Shines to establish goodwill in the solar community.

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All MREA solar electric and solar hot water training programs meet the requirements for state solar incentives and NABCEP certification. The NABCEP PV installer certification is a voluntary certification that provides a set of national standards by which PV installers with skills and experience can distinguish themselves. MREA was able to encourage new professionals to work toward certification immediately.

Scope and Frequency of Trainings. By working with an existing training organization, Milwaukee Shines did not offer just one or two basic-level classes. It was able to point potential installers to an accredited curriculum that could get a person interested in becoming a solar installer with NABCEP certification in less than one year. MREA offered its full slate of classes in Milwaukee, from Basic PV through hands-on trainings that count as “lead installs,”—a requirement to obtain NABCEP certification.

MREA offered workshops continuously throughout its 18-month contract, with a flexible schedule that allowed people who were out of work or fully employed to train for a new profession. MREA was contracted to provide 40 workshops over 18 months, but ended up hosting nearly 70 workshops.

Organization Brings Faster Results. Working with an existing organization, a quality product, and a proven track record is better than hiring just one individual as a solar coach. MREA had the infrastructure to make promotional materials, place ads, conduct professional installation training, and community outreach, and manage a grant budget. These results, obtained in less than two years, would have been nearly impossible to achieve had the city contracted with a single individual.

Sustainability in Mind. One of the project’s goals was to have a long-lasting solar professional development program. Due to the contract, MREA was able to establish a firm footing in southeast Wisconsin. Now, after funding has ended, MREA will stay in Milwaukee and continue to offer the full slate of professional training opportunities and community outreach.

When hiring a solar coach or advocate, a community should consider what happens when the initial funding stream ends. MREA was able to leverage grant funding to build a foundation for self-sufficiency while advancing solar initiatives, and it remains a strong partner for Milwaukee Shines.

The team encountered a handful of challenges, outlined below:

Brand Confusion. There was sometimes difficulty in pairing the existing brand and communications of MREA and Milwaukee Shines, especially at the beginning. MREA’s logo and branding is well known in the solar community. Milwaukee Shines was not well known, and did not have a logo established until well into the solar coach contract. To connect Milwaukee Shines to the solar community,”



Installers get hands-on experience installing solar hot water panels on a Habitat for Humanity home. *Photo from MREA, NREL/PIX 18705*

(professional and general public), there should have been a closer connection between the activities of MREA and Milwaukee Shines. Confusion with co-branding when partnering with an outside organization could be addressed by having a clear marketing message and logo ready upfront.

Training Competition. While MREA was the only Institute for Sustainable Power Quality accredited organization in the area, there may have been push back from other training venues in the area that Milwaukee was not supporting a local training facility. While there were no other solar training programs running at the time, Milwaukee Shines had to show an extra effort to promote other legitimate workshops or training institutions (e.g., technical schools, International Brotherhood of Electrical Workers) as they enter the solar training arena.

Developing a Solar Manufacturing Hub

One of Milwaukee’s strengths is its manufacturing industry. Milwaukee Shines suspected this could be an important connection to building a strong solar industry in the community. In addition to focusing on the end users of solar, Milwaukee Shines also focused on building the solar manufacturing business. Lessons learned from the city’s experience include the following:

Do Your Homework. Milwaukee Shines did not just go with a hunch, it did its homework. It leveraged Solar America Cities special projects funding to commission CH2M HILL to do a full analysis of Milwaukee's ability and opportunity to attract and grow solar products manufacturing.

In addition to providing a picture of the current state of Milwaukee's manufacturing industry, CH2M HILL's report, *Solar Products Manufacturing in Milwaukee*, also provided suggestions for how the city should position itself to support growth in various areas of the solar industry supply chain.

Applying Research. The CH2M HILL report was a great starting point, but the challenge is how to use the information to move the industry forward. Several recommendations provided in the report require a partnership with community development organizations such as Milwaukee 7 (a regional, cooperative economic development platform for the 7 counties of southeastern Wisconsin); the chamber of commerce; the Department of Community Development; and other stakeholders. Work remains to be done to make the case to economic development officials for solar in local business promotion and incentives.

The CH2M HILL report contained an analysis of Milwaukee's assets and challenges, along with recommended next steps. It is important that some of these recommendations are implemented in the near term, rather than allowing the report results to stagnate. Since the CH2M HILL report was released, Milwaukee Shines has organized the Solar Hot Water Business Council, which is working on making some of these goals a reality.

Backing Up Claims. Although the commissioned report does not contain much new information, it is compiled in a way that adds legitimacy to the "hunch" that solar energy solutions can help the manufacturing industry in Milwaukee. It is valuable to have a report to point to when meeting with potential companies, policy makers, and other potential stakeholders. It also helped focus Milwaukee's efforts on component manufacturing where it can be most successful rather than on certain high-tech elements of solar manufacturing.

Developing Solar Financing in a Changing Environment

Milwaukee Shines wanted to bring the success of the PACE financing model to the Milwaukee solar market. PACE allows homeowners to pay for solar energy installations through an assessment on their property tax bill over a fixed period, usually 15–20 years.

Milwaukee Shines needed to usher approval for the PACE financing program through the Common Council. This process was an opportunity for educating the public about solar and its potential for the City of Milwaukee. Council members were supportive, and saw this as a way to have city government offer something helpful to residents.

However, due to a statement from the Federal Housing Finance Agency expressing concerns about PACE programs, DOE recommended that Milwaukee suspend the PACE financing program, just prior to roll-out. This halt of the program was frustrating for solar professionals, and there was confusion among city staff, council members, and the public about what, if any, financing program was available.

Milwaukee is working to implement an alternative financing program. Lessons learned from the city's experience include the following:

Finding a Viable Option Takes Time: Finding an alternative to PACE financing took longer than what most staff, the public, and installers would have liked. Milwaukee could not simply adjust and switch to a revolving loan program because the total fund was too small to facilitate new loans being made until at least three years into the program. Developing a city-run financing program may not have been the way to change the solar market in the short term, but it may be a long-term solution. Milwaukee is still developing its alternative financing program, but aims to launch a private subsidized loan program in 2011.

Manuals Should Help, Not Confuse the Process: The goal of the PACE financing program was to make solar installations easier in the city. It is important that the process not be so cumbersome that it deters installers from participating. During PACE financing program planning, staff developed a manual for installers and the general public. However, this manual sometimes brought more questions than answers, and some of the recommended processes (such as approved structural calculations for building permits) would extend the city permitting process by at least two months. This process was frustrating for installers, but the city never officially tested this process because PACE was suspended. It is recommended to seek input from solar installers or site assessors on program design and, in particular, on guidance materials that will be distributed to installers and homeowners.

Facing Challenges in Modifying a Solar Permitting Process

Milwaukee Shines wanted to reduce the procedural barriers to installing solar energy solutions. It was challenging to get a solid understanding of what the city required in terms of codes, permitting, and inspections, so making recommended changes to the process proved difficult. City staff in one department followed one set of rules, while another department followed a different process.

By beginning this conversation, the process has actually become more difficult in the short term. As various departments were forced to give attention to solar permitting, they took a more cautious approach and began requiring building permits with structural calculations. Due to the existing process for building permits, this frequently takes two months.

To improve its permitting process, Milwaukee must first gain a clearer understanding of current processes and then create a step-by-step checklist for the current process. This will enable staff to develop recommendations to streamline the process and clear the path to wider solar adoption.

Top Takeaways

- Keep the end user and real barriers in mind when developing programs (financing, permitting, etc.) to ensure the programs promote solar installations.
- Partner with existing, reputable organizations that can become a sustainable part of the solar program after initial funding sources end.

- Invest only in training programs that provide long-lasting educational benefits to installers or solar professionals.

Next Steps

Milwaukee is working on several solar projects aimed at increasing solar installations and adding jobs to the area. The following projects are among them:

- Developing a “Business Council” to promote the manufacture of solar water heating system components in Milwaukee;
- Working with local high schools to develop curriculum and hands-on solar system design and installation experience for students;
- Revising the Milwaukee PACE program into a city-subsidized loan program in partnership with a local credit union;
- Developing an informational workshop and materials directed at professional services industries—such as insurance, real estate, legal, finance, and tax—so these industries better understand the solar market and the potential business opportunities it creates.

Additional Resources

- Milwaukee Shines: www.milwaukeeeshines.com
- Midwest Renewable Energy Association: www.midwestrenew.org

For more city information, contact:

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Email: aheart@milwaukee.gov Telephone: 414-286-5593

For more information on going solar in your community, visit *Solar Powering Your Community: A Guide for Local Governments* at http://solaramericacommunities.energy.gov/resources/guide_for_local_governments/

For more information on individual cities' solar activities, visit www.solaramericacommunities.energy.gov/solaramericacities/action_areas/

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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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