

Community Energy

Solar Gardens a Growing Trend

For years, Steffen Bradley considered the idea of putting PV modules on his 1950s ranch-style home in Ellensburg, Washington. Every now and again, he'd take a lap around his yard, hoping this time he'd find a novel way to overcome shading issues posed by the many trees on his and his neighbors' lots. For urban solar systems, it's a common challenge encountered in older neighborhoods—big, beautiful trees make the community attractive but prevent good solar access on roofs.

Fortunately, alternatives are springing up in communities across the country. Steffen counts himself lucky to live in one that has embraced an innovative solution to on-site solar: community solar arrays, sometimes called community solar gardens or farms. The concept? Provide a large, centralized PV power plant, allowing individuals who are otherwise unable to put PV on their roofs to invest in and benefit from a local, clean, renewable energy source.

With help from the Bonneville Environmental Foundation and Washington State University's Northwest Solar Center, the community built one of the first solar parks in the United States. The Ellensburg Community Renewable Park has grown from 36 to 111 kW through buy-ins from local residents, who benefit from the park's energy generation. Residents can buy in as much as they'd like—up to the point of zeroing out their monthly electricity bills.

Steffen and his wife, Carin, invested \$1,000 in the second phase of the park and plan to invest more in future phases. In return, the couple receives credits on their electricity bills for a portion of the system's production over the next 20 years. They also qualify for the \$0.30 per kWh state solar incentive.

No Solar Site? No Problem

Solar gardens put emphasis on small- and medium-scale distributed generation. Unlike large utility-scale solar facilities, these smaller, shared systems are closer to home, ideally on an existing, large rooftop or otherwise unusable land.

The primary push for these shared systems stems from the fact that on-site generation is not feasible for the majority of people. According to a 2008 study by the National Renewable Energy Laboratory, only 22% to 27% of residential buildings are suitable for hosting a PV system.

Most recently, the concept has gained momentum in Colorado, in part due to increasing concerns over "energy sprawl" from large-scale PV farms in the San Luis Valley. Aside from aesthetic concerns for the landscape, a point of contention among area residents was that the energy generated was not being sold locally, but rather exported to the Denver area.

"Locally produced solar is the best kind of solar. Using rooftop solar gardens instead of industrial solar farms helps protect important landscapes like Colorado's San Luis Valley," says Joy Hughes, founder of the Solar Garden Institute, a nonprofit cooperative that advocates community-based energy development. The group was instrumental in getting state lawmakers to pass the Community Solar Gardens Act last year.

The new legislation mandates that the state's investor-owned utilities provide net-metering credits to those who subscribe to solar gardens. The legislation allows groups of at least 10 subscribers to collectively own a share of a solar system in the county where they reside.

Ways To Grow Solar

Other utilities have followed Ellensburg's example and set up similar programs (see map on

Courtesy City of Ellensburg

Ellensburg, Washington



pages 16–17). At least a half dozen other entities and citizen groups are developing community-shared systems. That number is expected to rise as regulatory hurdles come down and models evolve.

Barriers to third-party power purchase agreements present a significant obstacle for community solar arrays, says Laurel Varnado, a policy analyst for the North Carolina Solar Center.

“If the state doesn’t have a vehicle for third-party power purchase agreements (PPAs),” she says, “then the group is forced to resort to cumbersome contractual agreements with their local utility to sell power to the utility.”

A variety of economic structures, each with unique advantages and disadvantages, has been used to bring these systems on-line. Leases and PPAs are most common, but in some cases, subscribers form an organization such as a limited liability corporation, a co-op, or a nonprofit.

Many programs utilize some form of virtual net-metering, which allows multiple individuals to receive credits on their electricity bills for a portion of one PV system’s output—though specific rules vary.

Currently, only nine states have laws in place that allow community or shared-system net-metering. Each has taken a different approach, adopting unique policies for dealing with joint ownership and billing, utility involvement, and meter aggregation, according to Varnado. For example, the parameters for participants’ geographic dispersal and incentives eligibility vary from state to state.

Other states, including Maryland and Connecticut, are considering changing their net-metering laws to address metering issues related to community solar, Varnado says. At the federal level, the Solar Uniting Neighborhoods Act, sponsored by Senator Mark Udall (D-Colo.), aims to extend the existing 30% federal renewable energy tax credit to group-owned solar installations.

Breaking Down the Barriers

A roadblock for grassroots efforts is that subscriptions to solar gardens are, by definition, financial securities and subject to federal and state regulations, says David Brosch, a founding member of the University Park Community Solar project in Maryland.



Courtesy City of St. George

Brosch and his neighbors in University Park have done what few others have, creating a community solar garden that is independently run and funded. The project—a 24 kW array on the south-facing roof of a local church—took more than two years to bring to fruition. Their inspiration came from the fact that many of their homes did not have suitable solar access due to the area’s expansive canopy of trees.

“We were a bit naïve going into the process. Securities regulations are rather complex, and each state is different,” Brosch says. “We quickly learned that it is very difficult for the small folks to do what the big companies do all the time.”

The group—University Park Community Solar (UPCS)—started from scratch, working through all the issues of insurance, utility connections, and accounting. Attorneys and advisors helped them explore the pros and cons of how different businesses handle tax structure, ability to pass through profits, and eligibility for available incentives.

Ultimately, UPCS formed a limited liability corporation and took on 35 investors, at levels ranging from \$2,000 to \$15,000, to fund the \$130,000 installation. The group set up a PPA, in which the church buys the generation from the system for 20 years, at a rate slightly lower than the utility rate. They also played a hand in helping change the state’s net-metering law so that the utility pays the group for any excess generation fed back to the grid (see map).

To comply with state securities regulations, UPCS could not have more than 35 investors and had to steer clear of certain phrases in advertising and other marketing materials, Brosch says. The group circumvented federal security regulations by accepting only in-state investors.

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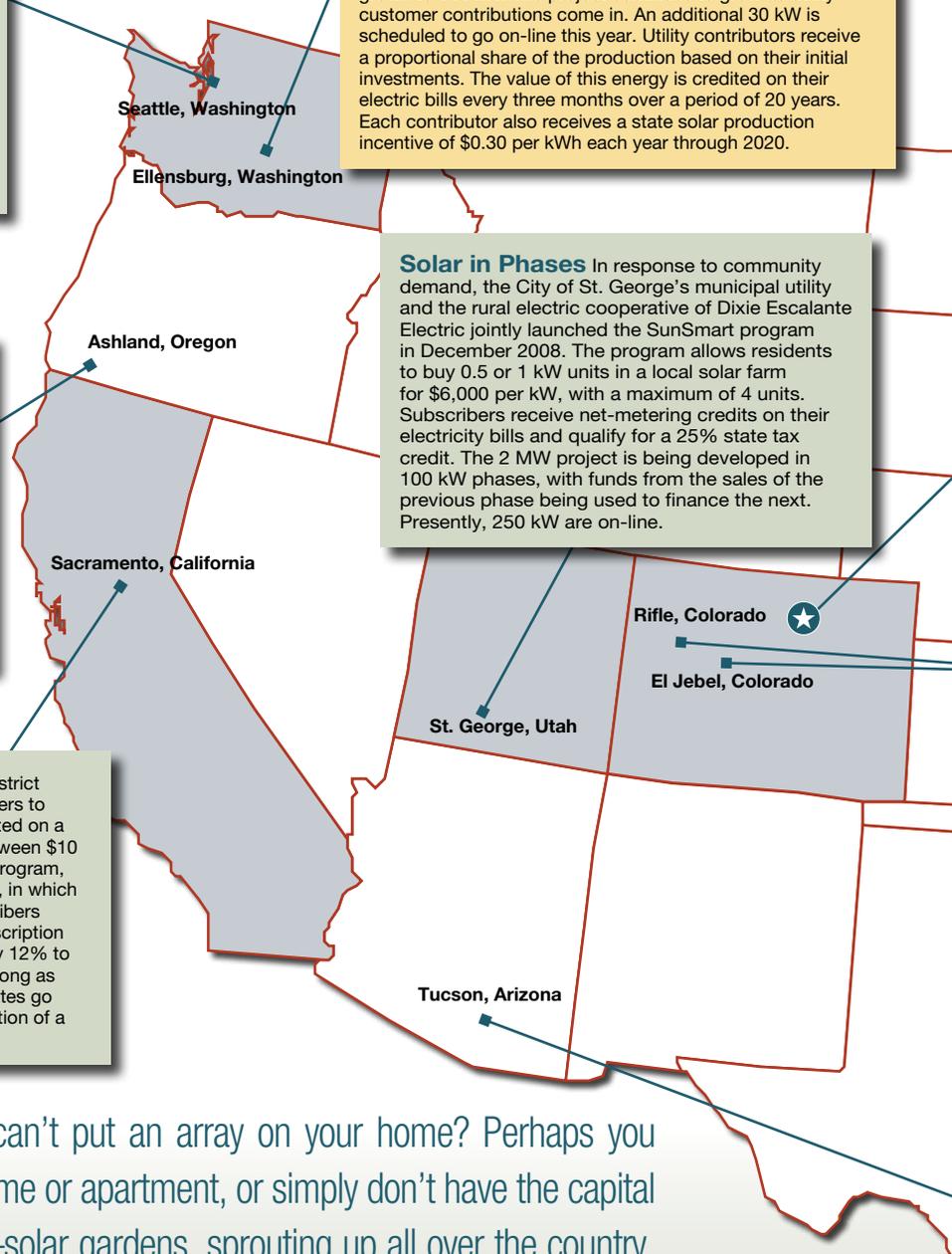
Gardens in the Park This summer, Seattle City Light will launch its pilot community solar program with a 24 kW PV array. In partnership with Seattle Parks and Recreation, the municipal utility is building three picnic shelters in Jefferson Park and equipping each roof with PV modules. Subscribers can purchase the output from a maximum of two “units” for an up-front cost of \$600 per unit. Each unit is estimated to produce roughly 48 kWh per month. Through 2020, subscribers will receive credits on their electricity bills and qualify for a \$1.08 per kWh production incentive through the state. This initial project is expected to sell out fast, and additional arrays are in development.

A Shining Example The concept originated in 2004, but it wasn't until 2006 that the City of Ellensburg's municipal utility installed the first 36 kW phase of the Ellensburg Community Renewable Park. The system—prominently located along a highway for maximum exposure—has since grown to 111 kW. The project continues to grow as utility customer contributions come in. An additional 30 kW is scheduled to go on-line this year. Utility contributors receive a proportional share of the production based on their initial investments. The value of this energy is credited on their electric bills every three months over a period of 20 years. Each contributor also receives a state solar production incentive of \$0.30 per kWh each year through 2020.

Solar in Phases In response to community demand, the City of St. George's municipal utility and the rural electric cooperative of Dixie Escalante Electric jointly launched the SunSmart program in December 2008. The program allows residents to buy 0.5 or 1 kW units in a local solar farm for \$6,000 per kW, with a maximum of 4 units. Subscribers receive net-metering credits on their electricity bills and qualify for a 25% state tax credit. The 2 MW project is being developed in 100 kW phases, with funds from the sales of the previous phase being used to finance the next. Presently, 250 kW are on-line.

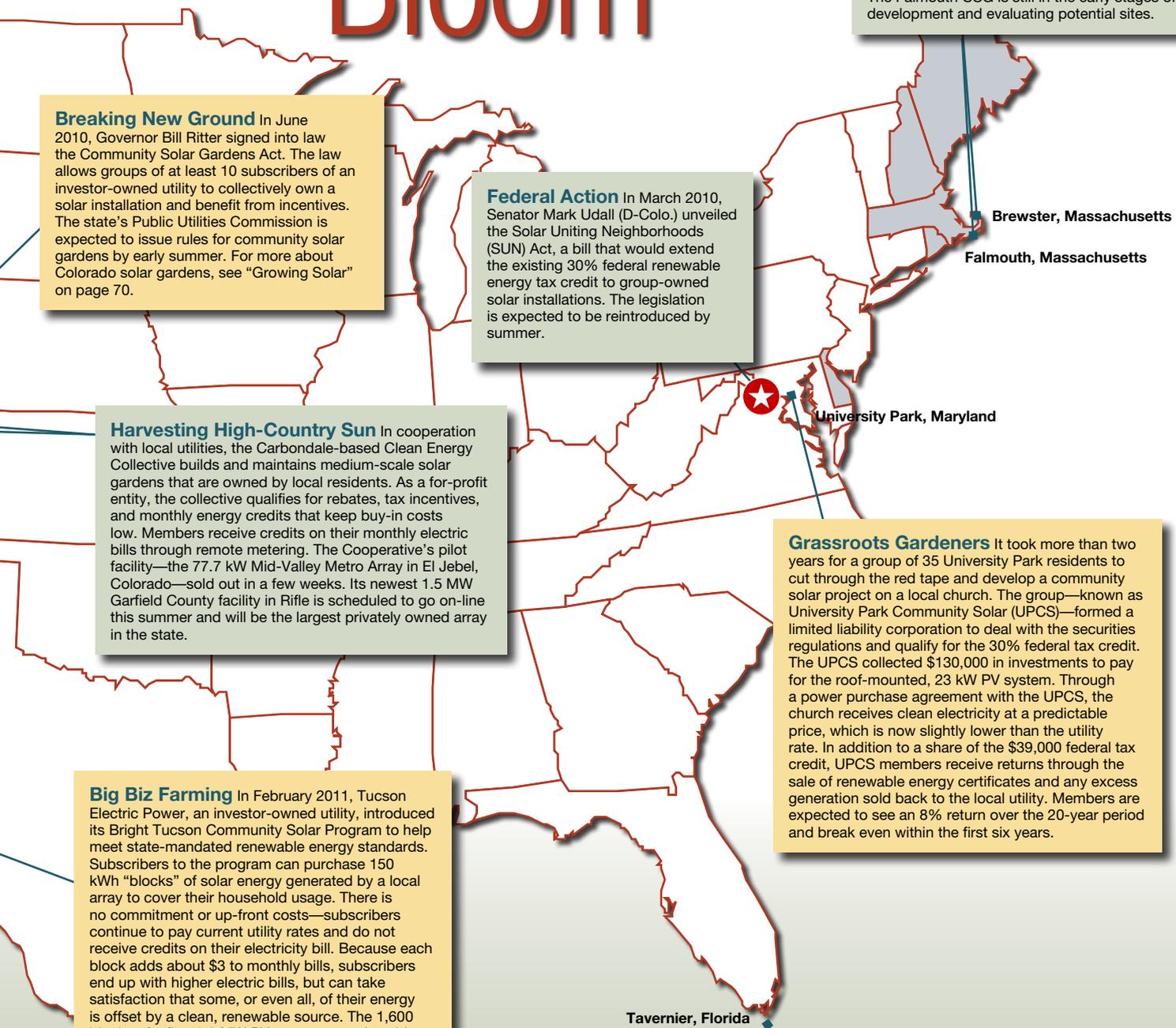
An Energized Community In the city of Ashland, where a thick tree canopy prevents good solar access for many homes, the Solar Pioneer Program allows residents and businesses to purchase the output from a 64 kW roof-mounted PV system located on the City's service center. The charge for one module is \$743, with the cost stepping down yearly and no maximum purchase restrictions. For the life of the 20-year program, subscribers receive a yearly credit on their electric bills based on current net-metering rates, and own the renewable energy certificates associated with the modules. The project came on-line in 2009, and so far, about half of the array is under contract.

A Balancing Act In 2007, Sacramento Municipal Utility District launched a program called SolarShares, which allows subscribers to source up to 40% of their energy from a 1 MW solar array located on a local turkey farm. Subscribers pay a monthly fee—typically between \$10 and \$127—to subscribe to “shares” in the array. Through the program, subscribers essentially enter into a power purchase agreement, in which the utility buys the output from the subscribers' shares. Subscribers receive net-metering credits on their monthly bills, but the subscription fee typically cancels out any credits. The program adds roughly 12% to a subscriber's bill. Subscribers are able to lock in a rate for as long as they are SMUD customers and will save money as electricity rates go up. Shares in the first array are currently sold out, but construction of a second 1 MW array is expected early next year.



Interested in solar electricity but can't put an array on your home? Perhaps you have a shaded property, rent a home or apartment, or simply don't have the capital for an entire system. No matter—solar gardens, sprouting up all over the country, allow customers to use renewable energy without having a rooftop system at their residences. Also known as solar farms, this strategy is a viable alternative, giving individuals the opportunity to purchase a portion of an off-site array and benefit from its clean energy generation. Organizers, big and small, are breaking new ground across the country, cultivating a variety of models and financial structures. The movement is young but blossoming fast, with nurturing from newly enacted energy policies at the local, state, and federal levels.

Solar Gardens Bloom



Planting Solar Seeds Cape Cod residents formed limited liability corporations in Brewster and Falmouth with the hope of developing community solar gardens under the Massachusetts Green Communities Act of 2008. Both groups are working with My Generation Energy of South Dennis—a for-profit entity pioneering an innovative community solar garden (CSG) model in the region. The Brewster CSG won support from the town council and should be on line by the year's end. The Falmouth CSG is still in the early stages of development and evaluating potential sites.

Breaking New Ground In June 2010, Governor Bill Ritter signed into law the Community Solar Gardens Act. The law allows groups of at least 10 subscribers of an investor-owned utility to collectively own a solar installation and benefit from incentives. The state's Public Utilities Commission is expected to issue rules for community solar gardens by early summer. For more about Colorado solar gardens, see "Growing Solar" on page 70.

Federal Action In March 2010, Senator Mark Udall (D-Colo.) unveiled the Solar Uniting Neighborhoods (SUN) Act, a bill that would extend the existing 30% federal renewable energy tax credit to group-owned solar installations. The legislation is expected to be reintroduced by summer.

Harvesting High-Country Sun In cooperation with local utilities, the Carbondale-based Clean Energy Collective builds and maintains medium-scale solar gardens that are owned by local residents. As a for-profit entity, the collective qualifies for rebates, tax incentives, and monthly energy credits that keep buy-in costs low. Members receive credits on their monthly electric bills through remote metering. The Cooperative's pilot facility—the 77.7 kW Mid-Valley Metro Array in El Jebel, Colorado—sold out in a few weeks. Its newest 1.5 MW Garfield County facility in Rifle is scheduled to go on-line this summer and will be the largest privately owned array in the state.

Grassroots Gardeners It took more than two years for a group of 35 University Park residents to cut through the red tape and develop a community solar project on a local church. The group—known as University Park Community Solar (UPCS)—formed a limited liability corporation to deal with the securities regulations and qualify for the 30% federal tax credit. The UPCS collected \$130,000 in investments to pay for the roof-mounted, 23 kW PV system. Through a power purchase agreement with the UPCS, the church receives clean electricity at a predictable price, which is now slightly lower than the utility rate. In addition to a share of the \$39,000 federal tax credit, UPCS members receive returns through the sale of renewable energy certificates and any excess generation sold back to the local utility. Members are expected to see an 8% return over the 20-year period and break even within the first six years.

Big Biz Farming In February 2011, Tucson Electric Power, an investor-owned utility, introduced its Bright Tucson Community Solar Program to help meet state-mandated renewable energy standards. Subscribers to the program can purchase 150 kWh "blocks" of solar energy generated by a local array to cover their household usage. There is no commitment or up-front costs—subscribers continue to pay current utility rates and do not receive credits on their electricity bill. Because each block adds about \$3 to monthly bills, subscribers end up with higher electric bills, but can take satisfaction that some, or even all, of their energy is offset by a clean, renewable source. The 1,600 blocks of a first 1.6 MW PV array are nearly sold out, but a new 2 MW PV array will be on-line by early summer, and more arrays are in the works.

The Sunshine State Through its Simple Solar program, Florida Keys Electric Cooperative allows customers to lease PV modules at the cooperative's solar farm in Marathon. In return for leasing one or more modules for \$999 each over 25 years, members receive monthly credits on their bill for the full retail value of the electricity generated by their leased modules. The program rolled out in early 2010 and was off to a slow start, only attracting 10 subscribers as of early spring 2011.



States allowing community or shared-system net-metering

Now, the group has plans for a larger community array and hopes to receive an exception through the state securities commission that will allow the project to take on as many as 125 investors.

Pioneers & Pros

While Luke Hinkle admires the persistence of the UPCS, he recommends that people leave the nuances to professionals. "It is an extremely complicated process. There's no need for small groups to reinvent the wheel over and over again," says Hinkle, who is credited with coining the term "solar garden."

Under the umbrella of his company—My Generation Energy, a solar energy installation and development company in South Dennis, Massachusetts—Hinkle intends to establish a solar garden consulting service to help groups implement a unique solar garden model he developed. The pilot program is expected to launch in Brewster later this year.

Other companies are breaking into the market as well. Seattle-based Tangerine Solar is working with groups, large and small, to develop community solar arrays through its SolarSlice model. The Clean Energy Collective LLC, of Carbondale, Colorado, is pioneering a unique model for medium-scale systems that uses a proprietary remote metering system (see "Green Power for your Home" in this issue).

To help streamline the process for utility companies, the RE policy organization Interstate Renewable Energy Council

has developed model program rules that can be adapted to each group's circumstances and the policy preferences within their respective states.

The Finer Details

While there are many benefits to shared systems—lower upfront costs and a hedge against rising electricity rates—there are tradeoffs. In most cases, the controlling entity retains ownership of the renewable energy certificates associated with the system. This means subscribers cannot legally claim to use "clean" energy.

In addition, the rate of return on solar gardens tends to be lower than with on-site residential systems. Subscribers may see a modest reduction in their electricity bills, but fees and buy-in costs often cancel out any savings. On the upside, subscribers are not responsible for the system's maintenance and operations costs.

For Joan and Myron Porter, the City of St. George's SunSmart program ended up being a perfect fit. The retired couple first subscribed to the program while living in a townhouse community where PV systems were prohibited. They've since moved to a new home in town and were able to transfer their shares with ease. "We get a small credit on our bill each month," Joan says. "We're not getting rich, but we're doing what we think is right."

—Kelly Davidson

Courtesy Pam Rutter

