



What do leading solar communities have in common? It may not be what you expect.

By Megan Day, AICP

# Local SO



# SOLAR

The recently completed six-acre one-megawatt cooperative solar farm next to Walton Energy Membership Corporation headquarters in Walton County, Georgia, consists of 4,280 solar panels and is expected to produce approximately two million kilowatt-hours of solar electricity per year.

COURTESY WALTON ELECTRIC MEMBERSHIP CORPORATION



Dartmouth Solar is the larger of two solar farms that offset municipal electricity use for Dartmouth, Massachusetts.

**THE IVEY FAMILY FARM** hadn't produced a crop since 1950. When the family sought to put the Walton County, Georgia, land to use again, they didn't want it to become a sprawling subdivision or feedlot. Instead, the family wanted a productive use that was compatible with the rural community and neighboring family farms. So they decided to harvest solar energy.

"Discussions centered on this solar farm as a type of farming that would be a low-impact part of a family farm," says Walton County Planning and Development Director Mike Martin. "The land owners saw this as a better option than 130 acres of houses or agribusiness. It really has worked out."

The resulting 30-megawatt Simon Solar farm near Social Circle, Georgia (pop. 4,358), about 45 miles east of Atlanta, made Walton County the leading community in solar energy generation in Georgia. Walton County generates about 10 times more solar power than Atlanta, and all the power from Simon Solar is purchased by Georgia Power.

Like many other communities that lead their state in solar energy generation, Walton County had no land-use or zoning mechanism to allow for a solar farm when the idea first surfaced. Yet the county worked to accommodate the solar farm development, in this case by establishing a new agribusiness zoning category that includes solar farms as well as uses like chicken houses and greenhouses. The county also altered its code to allow for residential rooftop and ground-mounted photovoltaic installations.

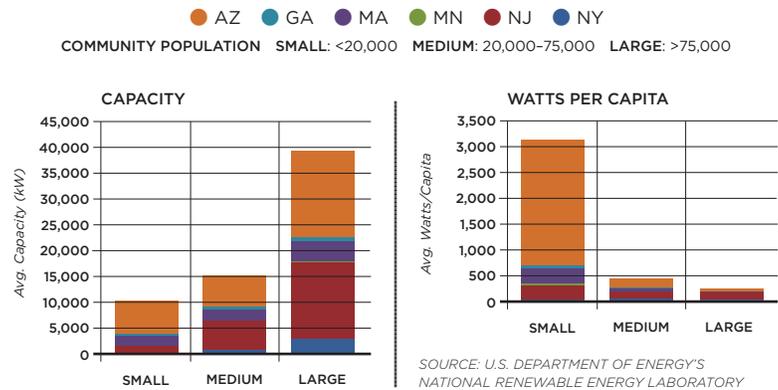
The Walton Electric Membership Corporation completed a six-acre, one-MW community solar farm this year under the county's new agribusiness zoning designation, with shares of the facility quickly selling out. The Simon Solar farm development increased community awareness and caused this second project to be well received. "People saw solar farms as not a bad neighbor to have," says Martin.

### Which communities lead?

Walton County exemplifies the U.S. Department of Energy's National Renewable Energy Laboratory research finding that the communities generating the most solar energy per capita are smaller and less urban places that have worked to facilitate the development of community-scale solar. Additionally, while one might expect wealthy or well-educated communities to lead in this arena, NREL's analysis

## Solar Production by Community Size—Two Different Views

While large cities have a greater number of solar installations and higher production capacities, small communities are leading the way in watts of solar energy produced per capita, in part because they have more space to build community-scale facilities.



disproved this common assumption.

State decision makers can use policy to require increased use of renewable energy resources. But what can local governments and planners do to increase solar energy generation within their communities? Local governments, lacking information on the most effective strategies to increase renewable energy, may be tempted to leave solar energy considerations to state decision makers and individual home owners.

Researchers at NREL set out to determine commonalities among communities that lead their state in solar energy generation in order to help inform local governments and planners.

NREL compiled cumulative solar installation data through the end of 2014 from state sources and the U.S. Department of the Treasury, and sought out population, land area, education, and income data from the U.S. Census Bureau. Because each state's policy context and solar resource differs significantly, communities were compared only with other communities within their state. Population groups were defined as: Small: <20,000, Medium: 20,000–75,000, and Large: >75,000. Data was collected for six states and more than 2,300 communities where comprehensive installation data was available.

As one might expect, larger cities have more solar installations and generate more solar energy on average than small communities.

On a per capita basis, however, the numbers tell a different story. In each state studied, on average, small communities generate more solar energy per person than larger cities.



Home owners and renters within the Walton Electric Membership Corporation's service area can purchase up to two blocks of solar energy. One block is equivalent to the output of 5.7 solar panels (between 180 and 260 kilowatt-hours) and costs \$25 per month.

### GO DEEPER

A more extensive list of resources for planning for solar power is available at [planning.org/webexclusive](http://planning.org/webexclusive).

## TOWN AND COUNTRY: TWO SOLAR CASE STUDIES *By Megan Day, AICP*

### DARTMOUTH, MASSACHUSETTS

With enough solar energy generated within its borders to power 3,250 homes, Dartmouth, Massachusetts (pop. 34,032) leads the state in renewable energy production. It is also one of the first communities in the country to offset 100 percent of its municipal government electricity use with renewables.

The 2007 *Dartmouth Master Plan* was a vehicle for the town's leadership in sustainable energy. The plan identifies support for renewable energy as a goal, with action steps such as changing local regulations to promote renewable energy, developing alternative energy sources to meet municipal needs, and establishing goals for renewable energy use for municipal buildings.

Dartmouth's solar leadership began with the pursuit of wind energy. In 2009, to meet the renewable energy commitment outlined in its master plan, the city began pursuing development of two utility-scale wind turbines to take advantage of its coastal breezes. Public concern about the planned turbines coincided with the city also considering solar on its capped landfill as a productive use for otherwise undesirable land. When the solar plans met with no community opposition and the solar farm proposal penciled out better than the turbines, their course was set.

Town administrator David Cressman led the charge, and Dartmouth soon embraced the low-impact nature of solar farms (he compares the land use to a cemetery). The city changed its

**The city changed its bylaws to allow ground-mounted solar in any zoning district. A flood of interested solar developers and solar farms followed, from which the town now stands to make about half a million dollars a year.**

bylaws to allow ground-mounted solar in any zoning district. A flood of interested solar developers and solar farms followed, from which the town now stands to make about half a million dollars a year.

Dartmouth generates revenue by purchasing power from one of the solar farms at eight cents per kilowatt hour and selling excess power back to Eversource Energy, the electric utility, for about 13 cents per kWh. In addition, Dartmouth is a solar exporter, generating property and sales tax revenues from solar farms in Dartmouth that sell power to other jurisdictions.

Dartmouth leverages its solar revenues to support residential solar installations and fund energy efficiency projects. All its streetlights and the lights at the town hall are LEDs; a retrofit of the library is next.

It hasn't all been smooth sailing. One solar project near a residential area spurred complaints, primarily due to poor community relations and excessive noise and dust during construction. This led to the zoning bylaws reverting back to

restricting solar farms to industrial areas. By that point, however, multiple solar farms had already been approved.

Thanks to its early and enthusiastic support for alternative energy and community-scale solar farms, Dartmouth leads the pack in solar generation (producing twice as much as Boston) in a leading solar state.

### MURRAY COUNTY, MINNESOTA

In rural Murray County (pop. 8,470), an agricultural area in eastern Minnesota, wind turbines dot the landscape. Solar wasn't a consideration until a developer showed up looking for a location for what would become the largest solar farm in the state. Three counties were under consideration, but solar energy generation wasn't allowed as a land use in Murray County. The county commissioners liked the idea of producing renewable energy locally without the visual impacts of wind turbines. They quickly set about clearing the way for such a project.

Building off of the existing wind ordinance and using a solar energy ordinance from another county as a model, the county created a Renewable Energy Ordinance, allowing for solar farms with a conditional use permit in all but Floodplain Management and Shoreland land-use districts.

When the developer returned, the regulatory path was clear and construction of the two-megawatt Slayton Solar project got

**Building off of the existing wind ordinance and using a solar energy ordinance from another county as a model, the county created a Renewable Energy Ordinance, allowing for solar farms with a conditional use permit in all but Floodplain Management and Shoreland land-use districts.**

under way. Jean Christoffels, Murray County's zoning administrator, found the approval process and the project to be "a pretty quiet development." Several residents voiced concern over potential glare from the solar panels, but that dissipated when they learned that the panels are nonreflective and would be set back from property lines much like buildings.

While difficult to make a direct correlation to the solar farm, Murray County saw increased lodging revenue during the project planning period and increased employment during the construction period. What is certain: the county will receive tax revenue on the sale of electricity over the life of the project.

Christoffels was surprised to learn that the county is a state leader in solar energy generation given the number of rooftop

installations in Rochester and the Twin Cities area. She attributes the county's solar leadership to the commissioners' willingness to move forward with an ordinance and their interest in encouraging renewable energy.

## Size matters

Why? On average, small communities in the six states examined have fewer, larger solar installations than large cities. All of the top 50 solar-energy generating communities in Massachusetts have at least one system 500 kilowatts or larger. These are most often ground-mounted systems that span multiple acres, many of them connected directly to the electrical grid, rather than generating energy for on-site consumption. Smaller communities generally have more land available and at lower costs than cities, enabling them to site larger, community-scale facilities that can provide energy to a greater portion of their population.

Back to the wealth assumption that the NREL data debunked: Communities leading their state in total solar energy generation or installed watts per capita were, on average, at or slightly below state income and education averages.

That's because leading solar communities tend to be smaller communities with larger solar installations or larger cities with higher numbers of installations, not wealthy enclaves with residential rooftop installations.

## Solar planning policies

Next, NREL looked at communities with local-level codes, development regulations, and comprehensive plans that address solar and compared that with the number and capacity of solar installations within those communities to get at the impact of such policies on solar development. Data sources included APA's SolarOPs solar planning and zoning data, the Database of State Incentives for Renewables & Efficiency, and NREL policy research.

In all six states studied, communities with known solar planning policies had more installed solar, on average, than those without such policies. And in four of the six states, communities with solar policies had more installed watts per capita than those without.

The most common local policies expressly addressing solar were development regulations, followed by comprehensive plans, and then sustainability, climate, or energy plans.

Many communities lack the mechanisms to allow for ground-mounted, primary-use solar installations in their land-use and zoning regulations when the initial prospect of a solar farm arises. But in the leading solar communities interviewed as part of this analysis, planners and elected officials acted fast, enacting necessary code provisions within a year.

Meriwether County, Georgia (pop. 21,298), had no provision for solar in its code when developers approached it seeking to build a three-MW solar farm next to an electrical substation.

"We did everything we could do to let them locate there," says Ron Garrett, the county's building and zoning director. "We know solar energy is one of the alternatives to fossil fuel and the big push by Georgia Power for solar is just all part of going green. The solar farm brings a lot of property tax revenue to the county and has no adverse side effects like pollution, noise, or traffic," he says.

Indeed, each community interviewed found solar farms to be a low-impact land use that generates additional tax revenue without placing a burden on public services.

## Local strategies for increasing solar energy

Regardless of a community's size, wealth, or solar resource (i.e., the same PV system would generate about 25 percent more electricity

in Phoenix than it would in Minneapolis), there are local actions that tend to increase solar energy generation.

**COMMUNITY SOLAR** facilitates the development of solar gardens or community solar projects, where one or more subscribers receive credit on electricity bills for solar energy generated off-site. Harvard, Massachusetts, employed this tactic ([harvardsolar.org](http://harvardsolar.org)).

**GROUP PURCHASING** supports expanded access to solar energy by establishing group purchasing arrangements where multiple residents and businesses receive lower cost installations. Portland, Oregon did this, developing the Solarize model for cities ([portlandoregon.gov/bps/51902](http://portlandoregon.gov/bps/51902)).

**SOLAR-POWERED CITIES** offset city electricity use with rooftop PV as well as solar farms, which was the approach in Dartmouth, Massachusetts (see sidebar).

**ELIMINATE RED TAPE** by reducing fees, removing prohibitive regulations, expediting approvals and inspections, and allowing for primary use, ground-mounted solar farms. Cities in Colorado can become Solar Friendly Communities by following 12 best practices for streamlining solar permitting ([solarcommunities.org](http://solarcommunities.org)).

**FRANCHISE AGREEMENTS** leverage significant negotiating power with utility companies to request more renewable energy generation and programs—particularly when it comes time to re-up franchise agreements, which allow a utility's electric infrastructure within the city. In Minneapolis, Xcel Energy committed to supporting city renewable energy goals under a Clean Energy Partnership ([mplscleanenergypartnership.org](http://mplscleanenergypartnership.org)).

NREL's research finds that increasing local solar energy generation need not depend on wealthy residents or deep subsidies. Local solar leadership is instead achieved by eliminating barriers to solar installations of all sizes and actively supporting community-scale solar. ■

Megan Day is a project leader in the policy and technical assistance group at NREL in Golden, Colorado. She thanks APA; APA Senior Research Associate David Morley, AICP; the U.S. Treasury Department; Southface; the Minnesota Department of Commerce; and colleagues at NREL for their contributions to this research. This research and article was made possible with support from the Department of Energy's SunShot Initiative.

## RESOURCES

### FROM APA

The SunShot Solar Outreach Partnership, a U.S. Department of Energy initiative led by APA with other partners, includes a number of free resources, including the SolarOPs Solar Planning & Zoning database, the PAS Report *Planning for Solar Energy*, a webinar, briefing papers, and more: [planning.org/research/solar](http://planning.org/research/solar).

### ONLINE

NREL's state and local government resources, technical assistance, a solar scenario tool, and more: [nrel.gov](http://nrel.gov).

Database of State Incentives for Renewables & Efficiency: [dsireusa.org](http://dsireusa.org).

Murray County, Minnesota's renewable energy ordinance: [tinyurl.com/ouq6q3m](http://tinyurl.com/ouq6q3m).