

The city of Columbia, Missouri, a relatively small city of roughly 110,000 residents situated far from the “Sunbelt”, is not a place that most people would guess as being on the forefront of solar friendly policy. Most people would be wrong. Columbia’s mix of local policies and programs, which include a local renewable portfolio standard combined with a green power purchase program, a solar rebate program, a solar loan program and an agreement with a private company to develop multiple solar farm project, distinguish Columbia as a solar leader among Midwest cities. The city owes its solar leadership status to strong community support, consistent private industry participation, and a receptive city council.

Solar Policy Development

The local solar policies and programs currently present in Columbia were kick started nine years ago. In 2004, 78% of voters approved a local renewables portfolio standard (RPS) requiring the municipal utility, Columbia Water and Light (CWL), to generate or purchase renewable electricity sufficient to meet 15% of total sales by 2022.ⁱ Internally, the utility set a goal of providing one percent of retail electricity sales using solar energy. In order to achieve the incremental RPS benchmarks, and correlated solar carve-out, Columbia developed the Solar One Program in 2008.

Solar One is a voluntary green power purchasing program that allows CWL customers to voluntarily purchase 100 kilowatt hour (kWh) blocks of solar

energy. This voluntary purchase program was deemed necessary because at the time the program commenced, solar electricity was still too expensive to meet the three percent customer rate impact limit in the RPS ordinance. The solar energy is generated by local solar systems installed on municipal property or on local businesses. The partnerships with local businesses, which are structured as power purchase agreements (PPAs), allow the utility to take advantage of commercial rooftops with good solar exposure, while the payments for energy benefit the local business. The 100 kWh blocks cost \$3.35 per month and are added onto the utility customer’s monthly electricity bill. Customers are limited to a total purchase of nine blocks. An initial 140 blocks were made available when the program launched in 2008; 50% of which was reserved on a waiting list prior to the program opening.ⁱⁱ In fiscal year 2012, subscriptions to the program generated just over \$9,507 and the purchased power costs were \$9,314.ⁱⁱⁱ

Funds raised in the Solar One program remain with the program and are not used for other projects. The annual amount of energy generated through the Solar One program is estimated to be between 44,160 and 51,520 kWh.^{iv} Though the initiative has thus far remained small in scale at roughly 37 kW of installed solar generating capacity, it is illustrative of how a locally beneficial program can be established even in the face of significant constraints.



Figure 1 - 10 kW solar system installed as part of the Solar One Pilot Program. Photo courtesy of Columbia Water and Light

In fact, two years after Solar One program launched, the Columbia City Council approved an agreement with Nebraska-based Free Power Company, Inc. Under the contract, the city is responsible for determining sites, preparing the sites and providing the electric systems connection point while Free Power is responsible for the purchase and installation of the solar system. Energy generated from the solar system will be sold by Free Power to the city of Columbia at a rate of \$54.95 per MWh. If the terms of the contract are fully met the lease agreement will put the municipality close to the local RPS benchmarks established for 2017 and 2020. During 2012, Free Power solar projects produced 241.6 MWh, or 0.02% of Columbia's electric portfolio, from installations totaling roughly 330 kW.

CWL offers its customers several solar energy programs in addition to the Solar One program and Free Power agreement.

Net metering is available to customers with small scale solar generators of 10 kW or less^v; although Missouri's net

metering policy carries a 100 kW statewide limit. Qualified systems must be designed to offset either part or all of a customer's electricity requirements, and any renewable energy certificates (RECs) resulting from customer generated solar systems are owned by CWL. The utility pays customers the residential retail electric rate for net excess generation. There are currently seven solar net metering projects in Columbia ranging from 1.44 kW up to 3.8 kW in capacity.^{vi}

Solar photovoltaic (PV) and solar water heater rebates are available for all CWL customers. Solar water heater rebates range from \$400 to \$800 based upon whether customers use electricity or natural gas water heating systems; PV rebates are set at \$500 per kW for systems as small as 0.25 kW and as large as 10 kW in capacity. Between 2007, when the rebate program commenced, and 2011 the amount of rebates awarded total \$5,830 for PV systems and \$10,800 for solar water heating systems.^{vii}

Solar water heater and solar space heater loans are also available to CWL customers. Residential customers can receive loans up to \$15,000^{viii}, and commercial customers can receive loans up to \$30,000.^{ix} Interest rates vary based upon the loan terms. A 3 year loan carries a 1% interest rate, a 4-5 year loan carries a 3% interest rate, and a 6-10 year loan carries a 5% interest rate.^x

Impact Locally

Due to Columbia's local solar policies and programs, there has been a steady increase in solar power generation in the

community. In 2012 alone, 271 MWh of solar energy were generated locally. This annual generation is a significant leap from Columbia's previous solar energy generation amounts of 1 MWh in 2008, 7 MWh in 2009, 9 MWh in 2010 and 28 MWh in 2011.



Figure 2 - Columbia's solar program success is in part due to installations on local businesses, such as above pictured Bright City Lights. Photo courtesy of Columbia Water and Light.

A catalyst to this growth has been the city of Columbia's education and outreach to the community on available solar programs. As a part of this outreach, CWL continually partners with local public schools, as well as universities, and hosts public events for community education programs centered on solar energy. One such partnership was in 2006 when solar energy systems were donated to the Columbia Public School for use in their Career Center Simulated Aeronautics Program by CWL.

In addition to partnerships with academic institutions, a significant component to the solar development in Columbia has been the amount of private industry support from companies such as Quaker

Oats and Dow Chemical Company. In 2010, the city of Columbia entered into an agreement with Dow Chemical Company to install solar shingles on the city owned West Ashe Pumping Station. The installation was mutually beneficial to the city and Dow Chemical Company. The company was able to conduct research and development to make an efficient solar shingle for commercial distribution and the city was able to gain the benefits of the solar energy generated from the system without having to finance the installation.

Significance

Small scale cities across the nation working to successfully enable and encourage solar development in their communities should look toward Columbia as a real-world example. In order to do so, communities should consider some of these best practices suggested by CWL Utilities Services Manager Tina Worley:

- Establish goals of the solar program
- Educate all entities involved in the review and permitting of solar systems
- Include all relevant stakeholders. i.e. city departments, electric distribution provider, etc.
- Foster an open dialogue
- Create a policy a procedures flow chart that identifies the necessary steps involved to insure all parties involved clearly understand program objectives

- Host public events that demonstrate the benefits of solar energy

Not content to stand idly, the city of Columbia continues to look forward. In doing so, Worley spoke of the municipal utility's interest in developing a Community Solar Program. The prospective program would offer customers interested in the installation of solar at their home or business a more economical approach than constructing the array themselves. The launch of such a program would be a logical next step for this small scale city which has already worked so hard to forge a path for solar energy development far outside the reaches of the 'Sunbelt'.

Additional Resources:

Columbia Water & Light. "2012 Renewable Energy Report."

<http://www.gocolumbiamo.com/WaterandLight/Documents/RenewReport.pdf>

City of Columbia. "Solar One Program."

<http://www.gocolumbiamo.com/WaterandLight/Electric/SolarOne.php>

City of Columbia. "Net Metering Agreement".

<http://www.gocolumbiamo.com/WaterandLight/Documents/NetmeteringForm.pdf>

ⁱ Database of State Incentives for Renewables and Efficiency. "Columbia – Renewables Portfolio Standard". <http://www.dsireusa.org/incentives/incentive.cfm?IncentiveCode=MO04R&re=0&ee=0>

ⁱⁱ Semelika, Sara. "Solar One set to tap sun". Columbia Daily Tribune, October 8, 2008. http://www.columbiatribune.com/news/solar-one-set-to-tap-sun/article_ae728b95-a25f-5d35-a79c-2d37ea18f18d.html

ⁱⁱⁱ Columbia Water and Light. "Draft 2013 Renewable Energy Report". February 2013. <http://www.gocolumbiamo.com/WaterandLight/Documents/RenewReport.pdf>

^{iv} City of Columbia, Missouri. "Solar One Web Site".

<http://www.gocolumbiamo.com/WaterandLight/Electric/SolarOne.php>

^v City of Columbia, Missouri. "Net Metering Web Site".

<http://www.gocolumbiamo.com/WaterandLight/Home/netmetering.php>

^{vi} Columbia Water and Light. "Draft 2013 Renewable Energy Report". February 2013.

<http://www.gocolumbiamo.com/WaterandLight/Documents/RenewReport.pdf>

^{vii} Columbia Water and Light. "2012 Renewable Energy Report". February 2012.

<http://www.gocolumbiamo.com/WaterandLight/Documents/RenewReport.pdf>

^{viii} Database of State Incentives for Renewables and Efficiency. "Columbia Water and Light – Residential Super Saver Loan".

<http://www.dsireusa.org/incentives/incentive.cfm?IncentiveCode=MO68F&re=0&ee=0>

^{ix} Database of State Incentives for Renewables and Efficiency. "Columbia Water and Light – Commercial Super Saver Loan".

<http://www.dsireusa.org/incentives/incentive.cfm?IncentiveCode=MO105F&re=0&ee=0>

^x City of Columbia. "Home Performance Super Saver Loans".

http://www.gocolumbiamo.com/WaterandLight/Home_Performance/HomePerformanceLoans.php

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