



Low-Income Community Solar Demonstration Project Case Study: Fort Collins Utilities

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COLORADO
Energy Office



Project Details

Fort Collins Utilities' Demonstration Project Highlights

- The Solar Affordability Program (SAP) is the first Fort Collins program to bring together solar energy, energy efficiency, education and financial assistance into one structure.
- Community solar bill benefit is tied to commitment from customers to participate in a structured energy efficiency and education process to ensure that energy savings are permanent. The program aligns customer and home types with available no or low-cost efficiency options.
- Subscribers will only be able to receive benefits for one year to ensure that the maximum level of different household's benefit from community solar within the 25-year timeline.
- Project focuses first on households with electric heat.
- Colorado's first rooftop community solar project dedicated to serving income-qualified residents

INTRODUCTION

Approximately 30% of Colorado households pay more than 4% of their annual income on energy bills. Although several financial assistance programs exist to relieve high energy burden for low-income households, additional opportunities remain to achieve deeper cost savings by specifically targeting reductions in electricity costs.

The Colorado Energy Office's (CEO) Weatherization Assistance Program (WAP) is committed to improving energy affordability for low-income households. Guided by this commitment and in response to a gap in electricity cost reduction programs, the CEO launched the Low-Income Community Solar Demonstration Project (Demonstration Project) in 2015. The Demonstration Project is a statewide initiative that aims to reduce electricity costs for low-income households by offering community solar options to households that are eligible for weatherization services.

OBJECTIVE

The Demonstration Project has eight utility partners, including the City of Fort Collins Utilities (Utilities), a municipal utility that provides electric, water, wastewater, and stormwater services for over 70,000 City of Fort Collins residences and businesses. This case study describes the Solar Affordability Program which blends the benefits of community solar and a customized energy efficiency program to ensure that subscribers permanently reduce their electricity expense and usage.

PROJECT PARTNER ROLES

Fort Collins Utilities partnered with the CEO and GRID Alternatives (GRID) to develop a 64 (kilowatt) kW community solar array for up to 25 income and heating payment assistance qualified electric utility customers. In addition, the utility is drawing on the efficiency and conservation

programs of Larimer County, Energy Outreach Colorado, and CEO WAP program to ensure that mobile, single-family, and multi-family households have customizable energy efficiency education and upgrades. By combining community solar and energy efficiency, the utility believes it will be able to provide permanent energy and cost savings to subscribers.



Each partner played a key role and will continue to play a key role moving forward:

- CEO provided project evaluation and funding support. Moving forward, the CEO WAP program will provide energy efficiency upgrades to qualified households.
- GRID provided the design and implementation framework, designed and lead the installation of the PV system, provided workforce integration, and planned a large kick-off event ("Solarthon") with Governor John Hickenlooper. Moving forward GRID will conduct primary operation and maintenance (O&M) activities and maintain equipment warranties.

- The Utility provided funding support, the rooftop and interconnection materials, conducted outreach, and managed subscriptions. Moving forward Fort Collins Utilities will provide solar credits and billing support, maintain full ownership, and support O&M.
- Larimer County's Low-Income Energy Assistance Program (LEAP) will provide an annual list of income-qualified residents that are eligible to receive heating bill financial assistance in the utilities region.
- Larimer County Conservation Corp Energy and Water Program, Efficiency Works Home, Consumer Products rebates, and Energy Outreach Colorado programs will provide energy efficiency education, upgrades, and/or funding to qualified households and help them navigate at optimal path through available offerings.

PROJECT IMPLEMENTATION

Since 1982, the utility has created innovative energy efficiency programs that generate significant economic and environmental benefits to the region. In addition, Utilities was the first in the state and one of the first in the nation to offer customers the option to purchase clean, renewable wind power in 1998. The programs have evolved into several official energy efficiency, renewable energy, and greenhouse gas policies. In 2014, Fort Collins City Council adopted aggressive GHG reduction goals:

- 20% below 2005 levels by 2020
- 80% below 2005 levels by 2030
- 100% below 2005 levels by 2050 (carbon neutral)

“Fort Collins Utilities has a long-running history of local support for renewable energy technology - like the Wind Pioneers Program that helped make community wind shares a reality in 1998, strong expansion of rooftop solar, community shared solar programs, and large commercial and institutional solar projects. Our current project, a shared solar array to provide both job-training opportunities and long-term benefits to low-income households, is a perfect example of a project that will deliver environmental, economic and social equity benefits to Fort Collins.”

- Kevin Gertig, Fort Collins Utilities Executive Director

In addition, Fort Collins Utilities has an energy policy that requires that their grid consists of 20% renewable energy by 2020, be 80% below 2005 carbon emissions by 2030, and 100% carbon-neutral by 2050. Alongside these goals, Fort Collins Utilities supports continuous energy use reduction in



all buildings types. As a percentage of community electricity use, Fort Collins Utilities hopes to achieve incremental annual electric portfolio savings of efficiency and conservation program savings of 1.5% by 2015, 1.75% 2016/17, and 2% by 2018/19, and 2.5% by 2020.¹

In 2014, Fort Collins Utilities proposed working with local housing authorities to identify the best solar options (i.e. community solar or rooftop PV) to reduce costs in their 2015 budgeting cycle. While researching the best option, GRID and the CEO approached them about the Demonstration Project. Since the project met multiple goals of increased renewable generation and supporting low-income households and Fort Collins Utilities had a very strong response with a community solar array built by the Community Energy Collective, they decided to move forward.

Even with dedicated support, Fort Collins Utilities struggled with the best way to structure the community solar project. Since the community solar is considered an Fort Collins Utilities generation asset there were concerns that the project must benefit all Fort Collins Utilities ratepayers. To work with this requirement, Fort Collins Utilities structured the Solar Affordability Program to require subscribers to participate in conservation education and efficiency opportunities. To qualify, subscribers had to qualify for LEAP benefits (income up to 165% of the federal poverty level index). By working with LEAP, Fort Collins Utilities did not have to worry about finding a way to income-qualify ratepayers.

In February 2017, the Solar Affordability Program passed first reading to City Council and final reading one month later. The community solar array was interconnected into Fort Collins Utilities' grid in March. Participants were selected in June to match with the LEAP program cycle which ends every year on April 30th. The first subscriber signed up in June 2017 with 100% subscriptions achieved within the month. Subscribers received their first financial benefit in July.

The project was implemented using a turn-key installation in a "barn-raising" community development model, where subscribers donated 16 hours of sweat equity and worked alongside GRID and Fort Collins Utilities. The panels were installed on a building owned by the City of Fort Collins City warehouse at 518 N. Loomis Ave.

¹For more information see: https://www.fcgov.com/utilities/img/site_specific/uploads/Fort_Collins_2015_Energy_Policy_1.pdf

ENERGY GENERATION

Fort Collins Utilities has committed to providing the benefit of community solar for 25 years. During that time, they expect the array to produce around 2,005 MWh. During the first 6 (summer) months of system operation nearly 9,000 kWh were produced per month. The estimated impact for each subscriber is a reduced energy costs of around \$35 per month during those summer months.

The City of Fort Collins self-generation is limited to a maximum of 1% of the community peak demand through an all requirements contract with Platte River Power Authority. However, even with the addition of this project renewable energy produced by the City of Fort Collins is well under the 1%. As a result, this was not an issue for this project.

PROJECT COSTS

The project cost \$195,000, with \$65,000 covered by CEO's grant and \$130,000 contributed by Fort Collins Utilities as cash-upfront. Direct project costs included operations (such as equipment, construction materials and GRID staff time), outreach, and administration. Operations accounted for approximately 96% of total project costs, while outreach and administration accounted for approximately 1% and 3% of project costs, respectively. Fort Collins Utilities provided in-kind support including billing software, ongoing program administration, and the donation of a rooftop.

Since Fort Collins Utilities is limiting program participants to one-year of benefits there will be higher overhead costs for recruitment and contracting since the Solar Affordability Program will benefit hundreds of households over the life of the program.

"Fort Collins Utilities decided to provide the customer management, instead of GRID, since we are very capable of doing this and conceptually we are in the best place to manage an ongoing process"

- John Phelan, Energy Services Manager at City of Fort Collins

PROJECT PRODUCTION

The estimated annual kilowatt hour (kWh) production of the solar garden was modeled using PVSyst. Long-term degradation is assumed to equal 0.7% per year. In Year 1, the system is expected to produce 87,181 kWh. Actual production data from April 2017 through September 2017 shows that the system produced 53,500 kWh, while estimated production during that same period was 58,004 kWh. During this timeframe, the system has produced 7.8% less electricity than expected.



PROJECT OUTREACH

Fort Collins Utilities led subscriber outreach by informing local agencies of the program, performing information tabling events, and by mailing its 226 LEAP customers a prequalification letter and program application. They had an approximately 10% response rate, allowing them to accept all eligible customers into the program. In future years if number of applications is greater than the number of subscriptions available, Fort Collins Utilities will conduct a lottery to select participants.

"Fort Collins Utilities intent is to work with various household's and ownership types such as mobile, single-family, multi-family, owners and renters to better understand how we can better address energy costs for different groups"

-John Phelan, Energy Services Manager at City of Fort Collins

SUBSCRIBER STATISTICS

The 64kW solar garden will serve between 20 and 30 subscribers, with each household receiving an equal share of solar energy from the garden. All subscribers use

electric heat; therefore, their electricity usage is higher than households that utilize natural gas and/or propane for heat. Systems are sized to offset approximately 50% of subscribers' electricity costs based on the subscribers' previous 12-month electricity consumption. Subscribers are limited to a 1-year benefit with Fort Collins Utilities.

COST STRUCTURE

The subscriber pays SMPA the retail rate for electricity. The subscriber pays Fort Collins Utilities the retail rate for electricity consumed plus fixed monthly charges. By participating in the SAP, Fort Collins Utilities provides a bill credit to subscribers for their share of the electricity produced by the system.

The 2017 base residential retail rate is \$0.09733/kWh and is expected to continue to increase over time. The bill credit is the same as that provided to Fort Collins market rate community solar project, currently at \$0.0762 per kWh. The solar payment will increase annually for the term of the contract at the same percentage as the standard residential rate.

This model provides subscribers insulation against rising electricity costs and helps subscribers budget for long-term energy costs. In addition, subscribers can carry credits forward month to month through the end of subscription period or the credits may offset other elements of the combined Fort Collins Utilities bill (water, wastewater and stormwater).



Using 2016 usage numbers, the Fort Collins Utilities' project would be expected to save a total of \$6,643 for all subscribers (~\$300 per household). Assuming an average annual electric cost of \$900, subscribers will save on average 33%. In addition, Fort Collins Utilities has committed to encourage non-weatherized households participating in the program to reduce electricity use through the CEO WAP program, Energy Outreach Colorado program Colorado's Affordable Residential Energy, and the Larimer County Conservation Corps Water and Energy program. Therefore, the impact could be much greater than 33%.

FORT COLLINS UTILITIES' NEXT STEPS

The City of Fort Collins Climate Action Plan² has set the following renewable energy goals for Fort Collins Utilities:

- Reduce the carbon intensity of utility-scale electricity by 80% by 2030 (compared to 2005 level).
- Ensure that by 2030, 50% of new construction will have enough solar PV to achieve net zero energy use.
- By 2030, ensure that 22% of existing homes and 50% of existing businesses have installed solar.

To aim for these targets, Fort Collins Utilities has committed to a drastic increase in community solar, utility-scale solar, and rooftop solar. Fort Collins Utilities is currently partnering with Platte River Power Authority to provide community solar with the other member cities of Estes Park Light and Power, Longmont Power and Communications, and Loveland Water and Power for 5 MW of solar. Since there are few places in Fort Collins where ground-mounted solar is the best use of land, this next community solar project will be located at the Rawhide Energy Station.

In addition, in the next year Fort Collins Utilities will provide grants to two housing authorities - Habitat for Humanity and CARE Housing- to complete 40 kilowatts of rooftop solar projects for income-qualified residents.



²For more information see: <http://www.fcgov.com/environmentalservices/pdf/cap-framework-2015.pdf>

Subscriber Spotlight: Laura Wilson

Laura Wilson has been a Fort Collins resident since 1989 and lives in a tri-level single-family home. Laura is always looking for ways to save costs for her household including one of her household's largest costs - electricity. Even though she has already aggressively pursued electricity savings by weatherizing her home through the Colorado Energy Office Weatherization Assistance Program, Laura's electricity bills still average \$180 per month. The house only uses electricity since they use electric baseboards for heat.

When Laura received a letter notifying she was prequalified for Fort Collins Utilities Solar Affordability Program she quickly jumped at the opportunity.

"I am all in with renewable energy and I love supporting this program. Having the ability to participate in a program like this I couldn't imagine not signing up."

- Laura Wilson, Subscriber

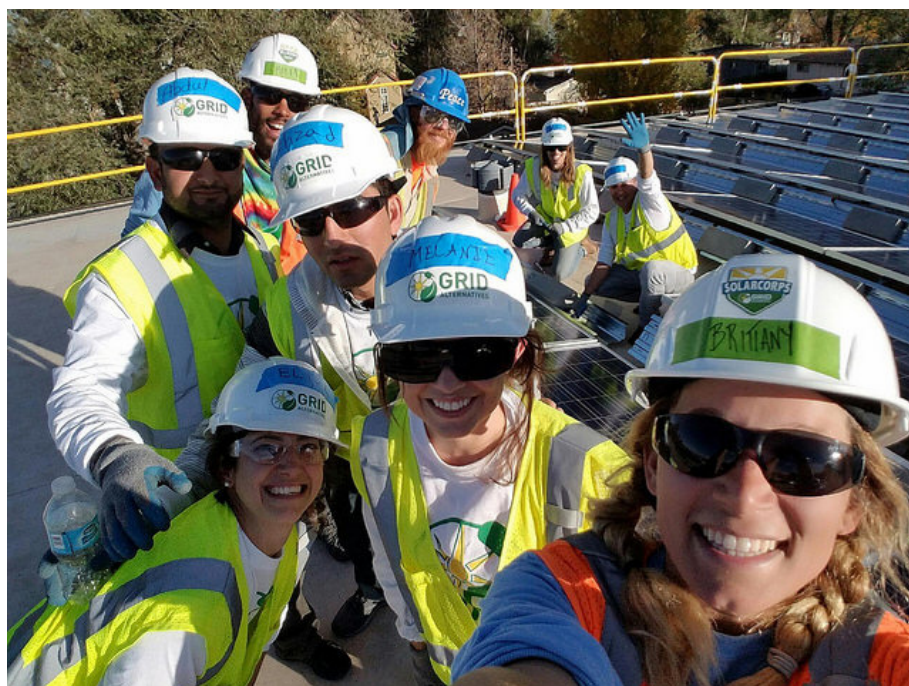
Signing up for the program only took Laura a few minutes to fill in the form. She also attended an orientation session that outlined the program in greater depth. As part of the requirement of participating in the program Laura committed to completing four milestones. Due to Laura's previous experience weatherizing her home, she could already check off the first milestone. Through the Colorado Energy Office Weatherization Assistance Program, Laura replaced her fridge, lightbulbs, had pipes wrapped, and insulation installed. In return, her bills were notably reduced.

"Efficiency already made an enormous difference for costs and comfort. My house is tri-level so there was a significant difference in temperatures from floor to floor. During the winter, with baseboard electric heat, my first floor was warm while the top floor cold. In the summer, it is the opposite. Weatherization significantly helped reduce this temperature difference."

- Laura Wilson, Subscriber

As part of the Solar Affordability Program, Laura completed an additional free energy audit. To reach the second milestone, Laura will need to attend an energy conservation activity such as supporting a GRID installation or attending a "nuts and bolts" energy workshop that highlights energy efficiency upgrades and behavioral changes. To reach her third and fourth milestones she will have to attend an additional energy conservation activity, get a Larimer County Conservation Corps Water and Energy Assessment, and complete a final progress report.

Once Laura was approved she started receiving benefits immediately. Currently she estimates that she saves an average of \$30 every month on her utility bills and expects to save over \$360 in utility costs during her time in the program.



"I will be sad when the program is over but I hope the efficiency work will keep my bills down as much as possible."

- Laura Wilson, Subscriber

Lessons Learned

SUCCESES

- The project has low operating costs and minimal O&M.
- The project aligns with Fort Collins Utilities' core values of increasing affordability for low-income customers and increasing the amount of renewable energy on the grid.
- Subscriber electricity costs were reduced.
- When coupled with efficiency and conservation savings, this project has the potential to reduce energy costs by over 33%.
- Increases the number of low-income households pursuing energy efficiency.

CHALLENGES

- Finding a location for the system.
- Without the CEO grant, the project would have been substantially smaller and less cost effective for Utilities Fort Collins Utilities.
- The program took considerable time to set up due to formalizing city council approval.
- The program will take some oversight to ensure that participants participate in energy efficiency.

- Since each household is limited to one-year benefit the program will have to do outreach every year.

BEST PRACTICES

Fort Collins Utilities' case study provides insight on how to optimize future low-income community solar garden projects.

Make the connection between energy efficiency, conservation and savings. Subscribers are required to pursue energy efficiency programs and take part in education opportunities. Fort Collins Utilities hopes that by taking advantage of energy efficiency programs, subscribers will still experience utility cost savings, once they are termed out after 1-year from the community solar program.

Partner with established community organization that work with low-income community. Fort Collins Utilities partnered with Larimer County's Low-Income Energy Assistance Program (LEAP), Larimer County Conservation Corp Energy and Water Program, Efficiency Works Home, Consumer Products rebates, and Energy Outreach Colorado programs to provide energy efficiency education, upgrades, and/or funding to qualified households and help them navigate at optimal path through available offerings. These organizations are trusted by low-income communities and enable easier, targeted marketing. In addition, the partners provide energy efficiency upgrades at a low cost.





Lessons Learned

Install the array on City-owned property. Installing the array on a City-owned warehouse can simplify interconnection and reduce costs.

Set a realistic expectation of savings. Fort Collins Utilities believes that you must provide a realistic expectation of cost-savings from the program upfront to ensure the subscribers don't expect larger savings they receive.

Align the number of participants with the amount of solar and minimize length of participation. Due to the small size of the array, Fort Collins Utilities put a cap on the number of participants. By keeping the distribution small, more households can benefit. In addition, Fort Collins Utilities limited each household benefit to one year.

POLICY CONSIDERATIONS

Lessons learned from the Fort Collins Utilities community solar garden present the following policy considerations.

Require energy efficiency. Since the community solar is considered an Fort Collins Utilities generation asset there were concerns that the project must benefit all Fort Collins Utilities ratepayers. In order to work with this requirement, Fort Collins Utilities structured the Solar Affordability Program to require subscribers to participate

in conservation education and efficiency opportunities which do benefit all Fort Collins Utilities ratepayers. In addition, energy efficiency ensures that households will achieve lower costs on their utility bills even when they are no longer receiving the community solar benefit.

Fixed charges play a significant role in the potential for reducing energy costs. Community solar incentives are typically provided as bill credits – credits on utility bills – and are issued as a dollar per kWh amount at a value less than retail rates. Fixed charges are not affected. While a subscriber's bill will be reduced by the bill credit amount, the subscriber will always be responsible for paying fixed charges. The degree to which a subscriber's energy costs are reduced is a direct function of the amount of fixed charges relative to the cost of electricity. In the Fort Collins Utilities' solar model, subscribers have a very low monthly fixed cost of \$6.14. If the fixed costs do not completely cover the costs to serve a customer and the community solar program offsets all electricity costs, then the additional costs that are not covered to serve that subscriber will potentially be covered by non-participating members. On the flip side, low monthly fixed costs may disincentive utility from moving forward with a similar program due to a lower return-on-investment of a project.

Project Snapshot

QUICK STATISTICS

- 64 kW solar garden
- Maximum 25 subscribers
- 100% subscribed
- 100% of subscribers have received LEAP benefits and utilize electric heat

UTILITY TYPE

- Municipality
- Serves 70,500 homes and businesses members in Fort Collins area
- Receives wholesale electricity from Platte River Power Authority

ENERGY BURDEN

- Approximately 18.6% of City of Fort Collins Utilities live below the poverty line, compared to a statewide average of 12%.

PROJECT GOALS

1. Reduce members' electricity costs for households with electric heat
2. Provide a local, resilient electricity source

3. Provide locked-in energy prices
4. Provide renewable energy and diversify energy supply

PROJECT PERFORMANCE

- Project target is approximately 50% cost savings
- Expected to produce 87,181 kWh annually
- To date, the system has produced 7% less electricity than predicted by Developer Grid Alternatives

PROJECT COSTS

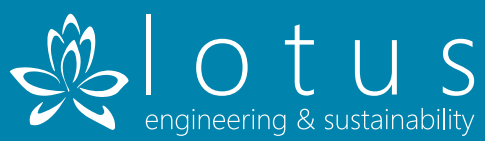
- Total project cost \$195,000
- CEO grant \$65,000
- Fort Collins Utilities contribution \$130,000 plus in-kind support

SUBSCRIBER PAYMENT STRUCTURE

- Costs and credits for 2017:
 - Average retail rate \$0.09733/kWh
 - Monthly fixed charges ~\$6.14
 - Solar credit rate \$0.0762/kWh



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