

Sour Pickles to Solar Garden

Through the RE-Powering America's Land Initiative, EPA encourages the reuse of formerly contaminated lands, landfills and mine sites for renewable energy development, when such development aligns with a community's vision for the site. This case study highlights a successful community solar project on a former brownfield, including information on how key challenges were addressed.

Pickle Power

In 2015, the city of Fort Collins, CO, transformed an old pickle plant, repurposing it into a community solar garden. The site was idle for nearly 30 years, but is now home to the Riverside Community Solar Project. The project gave the pickle plant property new life, while offering renewable energy for residents who were otherwise unable to install solar panels.

A Salty Past

Fort Collins is the county seat of Colorado's Larimer County and is situated 65 miles north of Denver. With a 2015 Census [estimated population](#) of 161,175, it is the [fourth](#) most populous city in Colorado. Founded as a U.S. Army outpost in 1864, Fort Collins has a history rich in agriculture, ranging from sugar beets to cucumbers. At one time, the city supported up to 3,000 acres of cucumber farms.

Pickles were processed at the Dreher Pickle Plant from the 1920s through 1988. William Dreher and his sons operated the business until 1975, at which point it was sold to Kansas-based Western Food Products Co. The plant went idle in 1988. In May 1989, an arson fire destroyed on-site buildings and structures. After a few intervening owners, the city of Fort Collins bought the plant in December 1995 and paid nearly \$300,000 for the vacant site to provide a buffer to the adjacent wastewater treatment facility.

The Property and Developer

In 2008, the city considered redeveloping the property as a park. Reusing the Dreher site as a park, however, was limited by several factors, including the presence of salts in the soil from historic pickling operations (which limited landscaping options); the bisecting of the parcel by a railroad right of way; and the site's location in the habitat buffer zone of the Poudre River. In addition, there was a need to create a buffer to the adjacent city wastewater treatment facility. These factors caused the site to remain underutilized.

In the meantime, the city had separately decided to develop a community solar site. The city conducted a multi-department review of more than 20 of its own sites for renewable energy. The city screened sites based on multiple criteria, including site size, visibility, accessibility, competing usage, related zoning and planning requirements, expansion potential, and site development costs. The process led to the decision to pursue a community solar development at the former Dreher site. While the above factors limited the site's use as a park, they were not prohibitive for a solar installation.

DREHER PICKLE SOLAR AT-A-GLANCE

- Fort Collins, CO
- Former pickling plant operated from 1921 to 1988
- 620-kW solar PV installation on approximately three acres of a 4-acre site
- 2,035-panel solar array
- Community solar system for residents of Fort Collins
- Low land lease cost for developer
- 25-year property lease with an option to extend an additional 10 years
- 207 individual residential subscriptions of various sizes sold

"The Riverside Community Solar Project is a success for our customers, who benefit from owning part of a shared solar project, and for Fort Collins by enhancing and beautifying an otherwise blighted site while expressing our values for clean energy."

John Phelan
Resource Conservation Manager
Fort Collins Utilities

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The first step in moving the project forward was to assess the site's contamination and clean-up status. A review of historical records (Phase I) and the collecting and analyzing of soil and water samples (Phase II) were conducted by the previous site owners in the early 1990s. Results of this monitoring were sent to the Colorado Department of Public Health and Environment (CDPHE). In 1995, the CDPHE issued a No Further Action (NFA) letter for the site. The NFA serves as acknowledgement that the state believes the site did not require any further remedial action to protect public health and the environment.

Over time, as the site remained undeveloped, additional environmental assessments were conducted to ensure the protection of public health and the environment. In 2000, a modified Phase I Environmental Site Assessment was completed on the Fort Collins downtown river corridor under the U.S. EPA Brownfields Pilot Assessment Program. In addition, another Phase II assessment of the site was conducted in 2008, as the city was determining how to best redevelop the property. During this second phase, the city removed the remaining buildings on the Dreher site.

In 2014, before developing the community solar garden, the city conducted groundwater and soil sampling and site evaluation to confirm current site conditions. It was determined that no major grading was required to accommodate the solar array, and that pilings could be driven into the soil surface to anchor the panels.

Due to pre-existing environmental conditions, both engineering and administrative controls were implemented in the design and construction of the solar array, minimizing excavation and soil disturbance. Additionally, the city accepted ongoing responsibility for the pre-existing environmental conditions.

The city issued a request for proposal for development of community solar at the site. The site was ultimately developed by the Colorado-based [Clean Energy Collective](#) (CEC). CEC owns, operates, and maintains its community-shared clean energy facilities, and this arrangement provides worry-free participation in a solar project for subscribers. Utility customers subscribe to portions of the solar project and receive credits on their electricity bills just as if the panels were on their own property. Electricity from the project is fed into the electrical grid and managed by Fort Collins Utilities, the city's municipal utility. The Dreher site is one of 21 CEC solar installations in Colorado and the CEC's second project with a municipal utility.

In addition to the array, improvements to a pedestrian trail are planned for the site and are expected to be implemented as the adjacent Riverside Avenue corridor is developed.



Dreher Pickle Plant site prior to solar installation.
Photo credit CEC.

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From Agricultural Roots to a Community Solar Garden

Community solar, sometimes referred to as a solar garden, is a solar installation subscribed to by individual community members who receive power and/or financial benefits from the system. It is a voluntary program that provides an option for clean renewable energy to homeowners, renters, and businesses who may not be able to install solar panels on-site. There are two models for ownership of community solar, one in which participants buy individual solar panels, and another in which participants buy kilowatts (kW) of capacity or kilowatt-hour (kWh) of production. A community solar installation offers unique opportunities to participate in a solar project.

The Riverside Community Solar Project is eligible for tax credits and incentives and CEC charges a standard rate for the panels¹ where the effective cost for participants was \$1.89 per watt.² Subscribers receive a credit on their utility bills for the electricity “their panel” produces (i.e., a proportionate amount of the total power generated). To implement this arrangement, CEC has developed and uses a proprietary software called Community Solar Platform to manage the customer outreach and acquisition process; monitor the array's production; integrate with the utility's billing system to calculate and apply production credits to individual accounts; and provide an online dashboard displaying current and historic production, savings, and environmental benefits specific to each customer.

Customers participating in the community solar project can take their shares with them if they move within the utility's territory. If they move out of the city or service area, their solar share can be sold.

Success

The solar installation was completed in July 2015. The site is part of a main entry corridor for the city. The former rail switchyard and abandoned pickle plant will be further improved by landscaping, the installation of an art feature through the Art in Public Places program and the addition of a natural habitat buffer zone on the north end of the site.

The Fort Collins community was receptive to the solar installation. The initial plans for development of the Riverside Community Solar Project were for a 330-kW system, but demand was so high that CEC nearly doubled the system capacity to 620 kW. The array sold out quickly; in fact, all 207 individual residential subscriptions of various sizes were sold prior to the installation's ground-breaking.



Completed Riverside Community Solar Project at the former defunct Dreher Pickle Plant site. Photo credit City of Fort Collins.

¹ Fort Collins Utilities provides a rebate per watt of capacity purchased, and the installation qualifies for the 30 percent federal Investment Tax Credit (ITC) on the net price paid to CEC. CEC aggregated the rebates, which were based on varying capacities and rates, and Fort Collins Utilities paid a lump sum at the end of the 2-year period. CEC made the pricing variations invisible to the customer and charged a standard, blended rate for the panels, providing equitable pricing for project participants. CEC initially calculated the projected tax credit value customers could claim on their tax returns without accounting for the value of the rebated deduction in their purchase price, but later refunded this amount (\$0.30 per watt) to participants to comply with the tax credit rules.

² The gross panel price was \$3.70 per watt, which is \$1,128.50 per 305-watt solar panel. The incentives aggregated by CEC substantially reduced the cost of each panel so that the net price participants paid was \$2.70 per Watt. The effective cost participants experienced after claiming the tax credit for the purchase was \$1.89 per watt, or \$576.45 per 305-watt solar panel. This per-panel pricing applied to system sizes less than 3 kW, which was the rebate limit. Watts purchased beyond 3 kW were not eligible for the rebate, but were eligible for the federal tax credit for solar.

RE-Powering America's Land: Siting Renewable Energy on Potentially Contaminated Land and Mine Sites

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Citizens and community leaders were interested in community solar as a way to provide solar to residents with the inability to install solar themselves, either due to inappropriate rooftop sites (e.g., shading) or simply preferring to have the benefits of solar without the responsibility (e.g., upkeep and maintenance). Success and interest in the community solar installation at the former Dreher Pickle Plant site is also due in part to the Fort Collins [Energy Policy and Climate Action Plan](#). This plan has some of the most aggressive goals in the nation to reduce community greenhouse gas (GHG) emissions. The city's [Plan](#) calls for reductions in community GHG emissions of 20 percent below 2005 by 2020, 80 percent below 2005 by 2030, and carbon neutrality by 2050. In its [Resolution 2015-2030 of the Council of the City of Fort Collins Updating Community Greenhouse Gas Reduction Goals](#), the city recognizes that, "actions to reduce community GHG emissions also improve community resilience to climate disruption and provide multiple ancillary benefits such as reduced risk through a diversified energy portfolio, reduced air pollution and associated health benefits and increased mobility choices."

The partnership between the city and CEC was also vital to the success of this project. CEC provided a turnkey project for design, construction, recruitment, and ongoing subscriber management. In turn, Fort Collins leased the land at a low cost, provided incentive funding, and agreed to manage the various billing arrangements. CEC and the city collaborate on ongoing site management.

Stakeholders secured the financing for the project through a combination of solar rebates from Fort Collins Utilities and the panel purchases of subscribers. The solar rebates from Fort Collins Utilities totaled \$495,000 to CEC, which then discounted the buy-in price for customers. As previously noted, the installation is eligible for the federal ITC.

For More Information

For more information about the RE-Powering America's Land Initiative and tips on developing renewable energy on contaminated lands, visit [EPA's website](#). Information about energy generated and benefits from the installation can be viewed [here](#).

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Key Takeaways from Project Participants

- *Community solar projects are popular with residents who cannot or choose not to site solar on their own properties. Community solar subscriptions can provide a procurement strategy to realize the benefits of solar and the redevelopment of a local, formerly contaminated property.*
 - *The sold-out status of the project indicates clear interest in this type of local community solar development. Local media coverage highlighted the repurposing of an environmentally compromised site as well as the associated habitat restoration on the adjacent river corridor.*
 - *The economies of scale of a community solar installation may make it more advantageous to be a subscriber than to host and own a smaller array.*
- *Liability, operations and maintenance issues associated with brownfields can be overcome when stakeholders share information and clarify responsibilities. The brownfield status of the site required some negotiation with the solar project developer as well as the city's acceptance of some ongoing responsibility for the site within the land lease, which is a departure from prior city policy.*
- *Turnkey arrangements can facilitate community solar projects for both the site host and subscribers. The city's key partner in this installation is CEC. CEC provided a largely turnkey project for design, construction, recruitment, and ongoing participant management. The city in turn provided the land at a low cost lease, as well as offering incentive funding and managing the billing arrangements (virtual net metering). CEC and the city are collaborating on ongoing site management.*
- *Community input can lead to beneficial design enhancements. The initial development plans called for a 330-kW system, but early demand prompted CEC to nearly double the final system capacity. The solar panel subscriptions were fully reserved before construction was completed.*
- *Careful consideration should be given to the use of rebates and tax credits. Managing and understanding rebates can be a complicated process; developers have to ensure that appropriate discounts are being taken at the appropriate time in the process. Doing so will allow incentives to be properly leveraged, which can help reduce the cost of a solar installation.*