

BREAKING BOUNDARIES

THE STORY OF SOLAR AT THE
CINCINNATI ZOO & BOTANICAL GARDEN

2010-2025

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Executive Summary

The Cincinnati Zoo & Botanical Garden has been a leader in on-site renewable energy generation for over a decade.

With a robust 4.55 MW on-site solar capacity by 2024, the Zoo's initiatives have resulted in a surplus of electricity production and reduction in utility costs, exemplifying the tangible success in investing in sustainable infrastructure.

The Cincinnati Zoo's rich history of 14 years in solar has initiated and contributed to the evolution of a comprehensive Sustainability program including water reclamation & reuse, organic waste recycling, local procurement, farmed food, and more. **Despite being the nation's second oldest zoo and landlocked in an urban setting, the Zoo has become synonymous with innovation and sustainability, earning the title of the Greenest Zoo in America since 2010.**

Beyond dramatically reducing our utility bills, the Cincinnati Zoo & Botanical Garden **has installed 4 different solar arrays totaling 68kW around the Cincinnati community, with many more to come.**

Moving forward with this investment, the Zoo is formalizing The Community Solar Resiliency Program (CSRP) which aims to extend energy and climate resilience to Cincinnati communities.

The CSRP is the Cincinnati Zoo's response to the increasing threats of climate change and the need for increased resilience in under resourced communities. **By annually supporting the installation of solar PV systems on community centers, schools, and churches, the program aims to not only reduce greenhouse gas emissions but also lower utility costs for community organizations. This enables them to redirect savings into mission-critical work, build organizational capacity, and better serve local communities.**

This document serves as a narrative and introduction to the Community Solar Resiliency Program. **Leveraging its experience, networks, and passion, the Cincinnati Zoo is positioned to ensure the program's success by providing technical assistance, fostering partnerships, securing funding and in-kind donations, and empowering the community to drive sustainable change.**

Where We Began With Solar

"The most important and impactful step we can take in lowering our footprint on this Earth, and the people, animals and plants that depend on it, is by dramatically reducing our use of natural resources in our own backyard. As a conservation-based organization, this is absolutely critical in terms of living our mission."

- **MARK FISHER**, Vice President of Facilities, Planning, and Sustainability

The Cincinnati Zoo & Botanical Garden's Sustainability journey can be traced back to 2006 when Mark Fisher found immense savings and sustainable impact through efficient utility use.

What started with fixing a water leak, led to a careful assessment of all of our utilities. This momentum allowed us to start networking with local experts and partners around energy use.

In 2006, the Cincinnati Zoo installed its first solar array, gifted by Duke Energy (20kW), on the Harold C. Schott Education Center

which was one of the largest arrays in the Midwest at the time.

The Zoo installed a much larger array over its Vine St. parking lot in 2011. It entered a PPA (Power Purchasing Agreement) in collaboration with PNC Bank and Melink Corporation to fund the project.

Neighbors and city officials were engaged for feedback, funding was sought from a mix of grants and private equity, technical assistance was provided by Melink Corporation, and labor was sourced locally. Scholarships were given to recruit students of Cincinnati State Technical & Community College to help with the installation of the 6,400-panel array and fulfill their training requirements for official certification.

This 1.56MW solar array was the largest urban, publicly accessible array in the nation at the time. After 7 years, the Zoo became the owner of the array.



Lessons Learned:

- Since 2010, the efficiency of new PV panels has increased significantly.
- PPAs are one tool available to organizations to acquire large solar assets.
- Visibility of solar arrays increase visitor awareness of Sustainability initiatives
- Leading by example in the region helps show projects like this are possible

With the climate crisis threatening wildlife and human populations across the world, it is critical to think globally and act locally. We knew that renewable solar energy was an important & necessary investment to make as an institution.

Ensuring access to affordable, reliable, sustainable & modern energy is one of the UN's Sustainable Development Goals (#7) designed to transform the world. Harnessing the sun's unlimited, free energy is also called out as an essential solution to climate change in Project Drawdown - one of the most influential research-backed databases of climate solutions.



Key Factors for Success:

- Public-Private Partnerships & Funding Sources
- Collaboration with Local Industry Experts
- Leadership Support
- Proven Savings from Reduction in Utility Use

PROJECT
DRAWDOWN

Our Journey with Solar On-Site



Harold C. Schott Education Center array (2006)



Vine Street Parking Lot array (2011)

The following solar arrays have been installed **on-campus** by leveraging capital investments over time (building renovations, new habitats, parking expansions):

- 20 kW array on Education Building (2006)
- 1.56 MW array over Vine St Parking Lot (2011)
- 35 kW array on Hippo Cove Building (2016)
- 33 kW array on Painted Dog Building (2017)
- 155 kW array on Elephant Trek Barn (2024)
- 2.8 MW array over Euclid Ave Parking Lot (2024)

Future On-Site Installations:

- Dury Ave Parking Lot array
- Upgrade Vine St Parking Lot panels

NEW! Euclid Ave Parking Lot Solar Array

Based on the success of the original parking lot solar array, the Zoo is building another solar array with nearly double the capacity over the new Euclid Ave surface parking lot.

This 2.8 MW solar array will be another visible example to visitors of the Zoo's commitment to renewable energy and climate resiliency.

A large battery storage system and microgrid will also be installed. These aspects of the project help manage peak demand and maintain essential operations during a blackout.

Key Factors for Success:

- Maintaining a queue of "shovel ready" projects for when funding opportunities arise
- Inflation Reduction Act (IRA) Tax credits
- Leveraging Capital Project Funding
- Benefits to Visitors - Shade Cover
- Increased Efficiency of PV Panels



Rendering: Euclid Avenue Parking Lot array (2024)

& More Solar Off-Site

In addition to the 78-acre land-locked campus in Cincinnati, the Zoo owns 600+ acres of land in Warren County, called Bowyer Farm. Over the past decade, this land has seen over 100 acres of wetland restoration, grown and sold over 8,000 native plants, grown food for our very own animals, and hosted research on hundreds of wildlife species.

Now, Bowyer Farm is home to one of the largest solar arrays (28 MW) in SW Ohio.

Farming The Sun & Sheep

The Zoo is leasing 125 acres at Bowyer to Harrison Street, a power producer. The renewable energy produced will be bought by companies in the region to help them reach sustainability goals. We are also partnering with Ohio Solar Grazers to utilize 800 grazing sheep and pollinator habitat for vegetation management. This keeps farmland in farm production, restores soil health, eliminates mowing emissions, and provides a local, organic meat source.

By 2025, properties owned by the Zoo will produce 4x more energy via solar than is used by our operations, including both electricity and natural gas. This will continue to increase as we add more arrays in the next 10 years.

4x

more energy
produced on Zoo
properties than the
Zoo uses

In addition to Zoo-owned properties, for the last 5 years the Zoo has installed solar arrays in the community, sparking the desire to create a sustained program to continue this implementation.

Key Factors for Success:

- Community engagement from the beginning
- Sheep grazing supports local farmers
- Attracting other key corporate partners
- Important tax revenue for local school district
- Enhanced pollinator habitat



Going Beyond Industry Norms

The Cincinnati Zoo has been at the forefront of on-site renewable energy generation for over a decade. Cincinnati is facing climate effects that amplify the occurrence and length of extreme heat and precipitation. These changes have been shown to disproportionately affect low-income communities due to lack of green space and expansive hardscapes that create impermeable heat islands.

It's essential that we recognize our privilege and use our experience and networks to work alongside our neighbors in Avondale and other historically under-resourced communities to spread access to solar energy.

"The Cincinnati Zoo prides itself on being involved in the communities it serves, paying forward the generosity of supporters that help the Zoo achieve its mission each and every day."

- THANE MAYNARD, Executive Director

The Zoo has created a funding framework for positive impact, in part to fulfill our Net Zero Energy and emissions reduction goals. Rather than the industry norm of purchasing outsourced Renewable Energy Credits (RECs) with intangible environmental impact, **these funds will support various climate and conservation initiatives, including the formalization of the Community Solar Resiliency Program.**

By creating an annual program that supports solar installation, the Cincinnati Zoo's mission pillar of "serving community" comes to fruition through reducing our neighbors' energy use and lowering utility costs, **allowing them to redirect savings into their mission-critical work, build organizational capacity, and further serve their communities.**



Solar in the Community

Since 2013, the Cincinnati Zoo & Botanical Garden has partnered annually with the Red's Community Fund team to direct resources into Cincinnati neighborhoods by upgrading and renovating community centers, recreation areas, and community gardens.

Alongside Cincinnati's most iconic institutions - the Reds, P&G, Cincinnati Children's, and Kroger - several months of planning & design culminate in a day with hundreds of volunteers who come together to contribute to transformational outcomes.

- **30 kW** array at New Prospect Baptist Church (2019)
- **12.5 kW** array at Rockdale Academy (2021)
- **12 kW** array at Lincoln Heights Elementary (2022)
- **13 kW** array at John P. Parker Elementary (2023)

In addition to contributing the inherent expertise in horticulture as a Botanical Garden, we have also utilized our experience and expertise in solar installations.

The Zoo, in close partnership with SonLight Power, has installed solar arrays at public schools and community churches via the Community Fund projects. The Zoo will continue to be a critical partner for these projects, but we plan to expand our investment in community solar installations.

68 kW

total solar capacity installed
in the Greater Cincinnati
community between 2018-2023



Upcoming Community Installations



Leveraging Capital Projects for Additional Benefits

As part of the Zoo's new 2024 parking lot solar array, there was space left in the last shipping container of panels. Instead of paying to ship a half-empty crate, extra panels were ordered to fill the container and the extra 165 kW of panels will be donated to the Community Solar Resiliency Program (#1 & #2 below).

1

Lydia's House, Norwood

The Cincinnati Zoo's Facilities and Sustainability teams are working with SonLight Power on a solar array for Lydia's House. Eighteen solar panels and labor for the June 2024 installation will be donated by The Cincinnati Zoo.

The mission of Lydia's House is to provide safe, stable, and supportive housing for women and children in crisis. The organization provides both short term and permanent housing solutions.

2

Horses on the Hill, East Price Hill

Horses on the Hill (HOTH) will be receiving a solar array in June 2024 using a portion of the extra panels ordered by the Zoo.

HOTH is part of Bloc Ministries, a nonprofit that has worked in Price Hill for 25 years. HOTH serves economically disadvantaged youth and their families, as well as abused women and individuals in recovery, through nature-based and equine-assisted learning services.

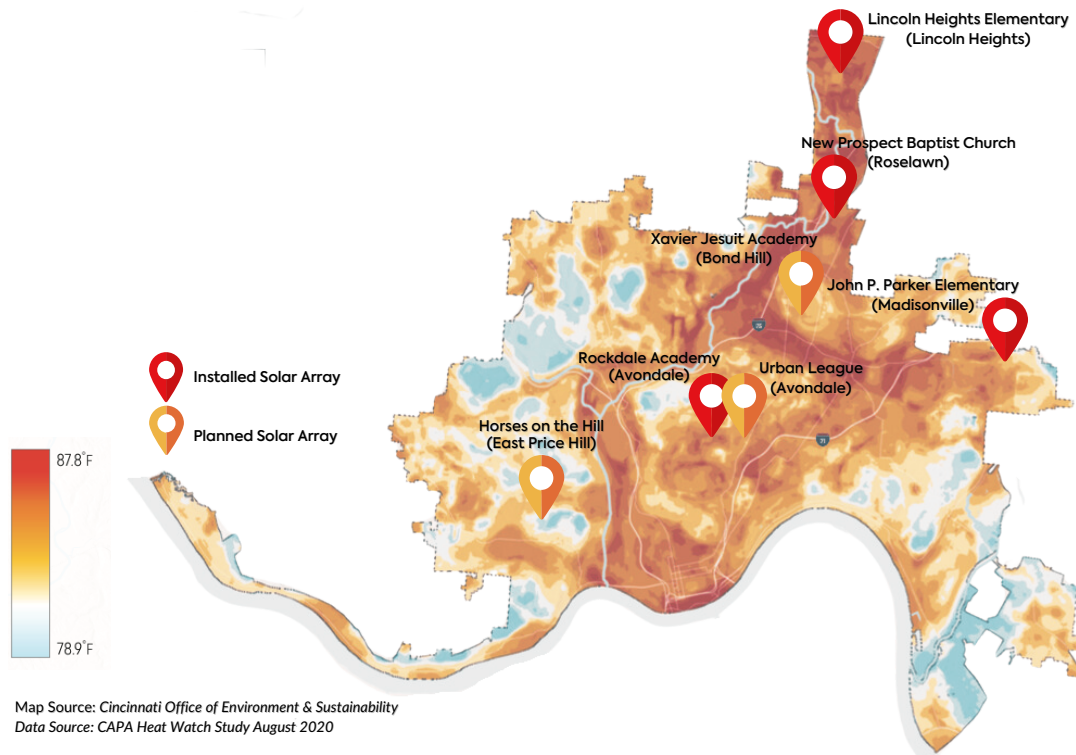
3

***Potential Project Location:* Urban League, Avondale**

The Urban League of Greater Southwestern Ohio is a potential future project in Avondale. If funded, the organization would receive a portion of the extra panels ordered by the Zoo.

Urban League is recognized as the oldest and largest community-based organization devoted to empowering African American individuals and families through advocacy, education and development.

Across the Street



& Across the Globe

The Cincinnati Zoo & Botanical Garden has facilitated solar installations outside of the United States in Panama and Puerto Rico. Recently, as part of our efforts to collaborate more actively with our global conservation partners, we have co-designed a solar array with our partners in Africa.

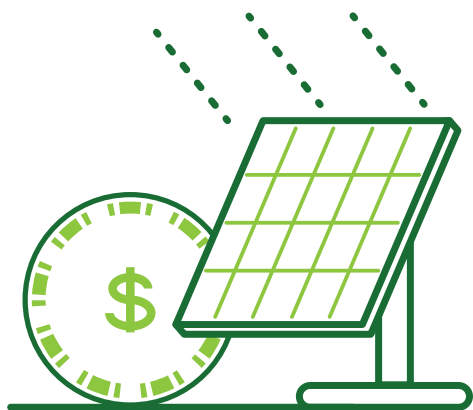


The Community Solar Resiliency Program

The Cincinnati Zoo & Botanical Garden is developing the Community Solar Resiliency Program to increase the energy and climate resiliency of community organizations in Avondale & the Greater Cincinnati area.

Based on years of experience and extending from the Zoo's mission of "serving community," this annual program aims to reduce our neighboring facilities' energy use and greenhouse gas emissions while lowering utility costs. Ultimately, these **organizations can redirect savings into their mission-critical work, build organizational capacity, and further serve our communities.**

The Cincinnati Zoo will facilitate this program and ensure maximum impact can be achieved and repeated **by providing technical assistance, leveraging partnerships, sourcing funding and in-kind donations, and empowering the community.**



Goals

- Increase the energy, climate, and financial resiliency of community-critical organizations such as community centers, schools, and churches in Avondale (with potential to expand beyond the Avondale neighborhood).
- Reduce greenhouse gas emissions and maximize renewable energy generation.

Objectives

- Facilitate the installation of at least one solar renewable energy system per year coupled with a battery system and building energy efficiency upgrades when feasible.
- Reduce energy use and lower utility costs for receiving organizations.
- Collaborate with partnering organizations that align on the Zoo's sustainability and climate resiliency plans for vulnerable neighborhoods.
- Source funding to provide program services at no-cost to the receiving entity.
- Enhance or increase greenspaces when feasible (i.e. planting trees or native plant gardens on the project site).

General Annual Timeline

1. Identify Partners and Project Location
2. Annual Kick-Off Meeting
3. Community Engagement
4. Assessment & Optimization Plans
5. Assess Solar + Battery Potential
6. Propose SOW, Timeline, & Budget
7. Project Implementation

Current Partners

- SonLight Power
- Melink Solar
- B&J Electrical
- TMI Energy Solutions
- Donovan Energy
- Groundwork Ohio River Valley
- Avondale Development Corporation
- The Cincinnati Office of Environment & Sustainability

How to Get Involved

By getting involved, you become an integral part of creating a more resilient and sustainable future for our Cincinnati communities. Together, we can make a lasting impact towards climate resilience.

If you're interested in getting involved, please reach out to Megan O'Keefe (megan.o'keefe@cincinnati-zoo.org) or Mark Fisher (mark.fisher@cincinnati-zoo.org).

- **Volunteer and Partnerships:** Whether you have technical expertise or a commitment to community engagement, your involvement makes a meaningful impact.
- **Sponsor An Array:** Sponsor an array in the community.
- **Donate:** Donations will directly fund the installation of solar PV systems in community centers, schools, and churches.



Thank you for your support of the Community Solar Resiliency Program.

Acknowledgements

The Community Solar Resiliency Program is made possible through the collaborative efforts and support of various individuals, organizations, and partners. We extend our heartfelt gratitude to Partnering Organizations, Technical Experts, Donors, and of course Community Partners.

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