An Equitable Solar Access Pilot Project in Minnesota benefitting Manufactured (Mobile) Home Residents

August 31, 2023

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CESA members—mostly state agencies—include many of the most innovative, successful, and influential public funders of clean energy initiatives in the country.

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Scaling Up Solar for Under-Resourced Communities

How can we ensure that solar technologies benefit all Americans regardless of income?

Three tracks: single-family homes, manufactured homes, and community institutions.

Funded by the US Department of Energy's Solar Energy Technology Office.

www.cesa.org/projects/scaling-up-solar-for-under-resourced-communities
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An Equitable Solar Access Pilot Project in Minnesota benefitting Manufactured (Mobile) Home Residents

Minnesota Clean Energy Resources Team, Detroit Lakes Public Utilities, Mahube-Otwa Community Action, the Minnesota Department of Commerce, and the Chan Lab at the University of Minnesota Humphrey School of Public Affairs

This Clean Energy States Alliance webinar is part of US Department of Energy-funded Scaling up Solar for Under-Resourced Communities project. Funding to pursue this project has been received from the Clean Energy Research Teams (CERTS), the National Association of Energy Officials (NASEO), the National Energy Assistance Directors Association (NEADA), and the Clean Energy States Alliance (CESA).
Presenters

Dan Josephson - MAHUBE-OTWA CAP

Gabe Chan - University of MN

Steve Coleman - University of MN
Equitable Solar Access Pilot Project

Inclusive Shared Solar Initiative (ISSI)

Gabe Chan and Steve Coleman
DLPU’s first community solar garden built in 2017 serves ~50 customers at up to ~40% of annual energy consumption.

Photo credit: Clean Energy Resource Teams
Mahube-Otwa Community Action

Energy Assistance Program Dashboard
10/1/22-8/28/2023 (Updated Weekly)

$122,828,851
AWARDED TO HOUSEHOLDS

$927
AVERAGE HOUSEHOLD BENEFIT

How does Energy Assistance award benefits?

Energy Assistance has helped 132,493 households this program year.

- 43% have a person over 60
- 39% have a disabled member
- 18% have a child under 6

Emergency Assistance
Emergency assistance helps households at risk of losing heat or power.

- 50,701 DISCONNECTIONS PREVENTED
- 17,929 HEATING FUEL DELIVERIES
- 6,010 FURNACE REPAIRS
We are thrilled to announce that Detroit Lakes Public Utilities has interconnected a new 11 kilowatt (kW) solar array as part of our shared Equitable Solar Access project.
MAHUBE-OTWA CAP

- Background of MAHUBE-OTWA and role in ISSI, Equitable solar access
- Regional relevance of Detroit Lakes
- Necessity of CAP participation to identify low-income residents with energy profiles best suited for solar subscriptions
- How to utilize and integrate the Energy Assistance process and program with the utility billing process and crediting for Energy Assistance clients.

https://mahube.org/
MAHUBE-OTWA CAP

- An analysis of the criteria to prioritize Energy Assistance clients such that this model will deliver meaningful energy burden reduction to these households.
- Why are manufactured homes included in this project?
  a. Manufactured Homes have many challenges to deploying on-site solar arrays
     i. Land is not owned by utility customer, Little desire to invest/
     ii. Building is not capable of supporting much solar. Roof setbacks,
- 11 Participants and 6 sample usage amounts
DLPU PARTICIPATION

- Hosting 11kW Array on available capacity on current Community Solar System.
- System components provided by grant from CERTS
- Will utilize an administrative system to manage billing with CAP MAHUBE-OTWA
- Avoided Demand Cost to DLPU for DG
- Positive value for utility and EA Customer

City of Detroit Lakes Public Utilities

https://cityofdetroitlakes.com/utilities
(1) Initial investment

DLPU solar array

(2) DLPU avoided wholesale purchase cost

EAP Home

(3a) Monthly kWh deposits

(3b) EAP transfer ($ transfer in heating season)

MAHUBE-OTWA CAP kWh “bank”

(4) Solar EAP benefit (monthly kWh credit in heating season)

(5) Monthly bill
Model Functionality

Model that tracks:
- Solar output that fluctuates based on historic weather
- Utility avoided cost based on:
  - Solar project cost
  - Solar avoided wholesale energy and demand (based on historic peaks)
  - EAP transfer
  - kWh credit lost revenue
- Solar EAP tracking account (kWh bank)
- Customer impact:
  - kWh credits in heating months; monetized on bill as a kWh credit
  - Customer bills pre- and post- kWh credit

Data and Model Used:
- Solar production from NREL SAM model
- Utility wholesale rates applicable to DLPU
- Project Cost Base from LBNL Tracking the Sun and LBNL Utility Scale Solar
- Monthly customer load profiles from NREL End User Load Profiles and Mahube-Otwa CAP
Solar production creates an “energy bank”
4kW solar subscription generation fluctuates but subscriber benefits accrue at fixed rate in EAP months
Customer bills before and after solar subscription
Solar subscription create bill reductions of $15-20/kW-mo in heating months

Customer A with 4kW subscription corresponds to ~$72/mo in EAP months (24% annual bill reduction on NPV basis)

Customer B with 5kW subscription corresponds to ~$95/mo in EAP months (22% annual bill reduction on NPV basis)
Customer bills before and after solar subscription
Solar subscription size can reduce bills throughout heating season at a comparable level to continuous enrollment in LIHEAP
Utility cost impact
Subscription model can create net benefits to the utility

Solar production valued at DG export rate

Solar production valued at utility avoided energy and demand costs
Open Questions

- **How to best create benefits for subscribers:**
  - “Shaping” customer benefits and risk sharing: the model grows a kWh balance at CAP and then annual production is fully allocated to consumers after initial period of production, but the initial kWh balance could act as a buffer which could provide ability for the CAP to give the customer a fixed benefit or flatten bills
  - Will solar subscriptions prove “stickier” than EAP enrollment?

- **How to best create benefits for the utility:**
  - Complexity of financing options for DLPU (esp tax treatment)
  - Opportunities to build scale across multiple municipal utilities in the same power provider

- **How to best minimize administrative complexity:**
  - How to manage the complexity of billing, financial transfers, and “banking” credits

- **How to scale the concept:**
  - Opportunities to scale under the EPA GGRF Solar of All program; particularly for munis and co-ops and manufactured and multi-family housing