2018 State Leadership in Clean Energy Awards Webinar Series

Expanding Solar PV Finance and Markets in Connecticut and Minnesota

August 2, 2018



Housekeeping



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Illinois
Department of Commerce
& Economic Opportunity













Renewable Development Fund

Xcel Energy®







































State Leadership in Clean Energy Awards

- Established in 2008, CESA's State Leadership in Clean Energy Awards recognize state programs that are most effectively accelerating adoption of clean energy technologies
- CESA-member organizations from across the U.S. submit nominations for the awards
- Entries are judged based on public benefits and results, cost effectiveness, leadership and innovation, and replicability
- Winners are chosen by an independent panel of distinguished judges
- Read more at <u>www.cesa.org/projects/state-leadership-in-clean-energy/</u>

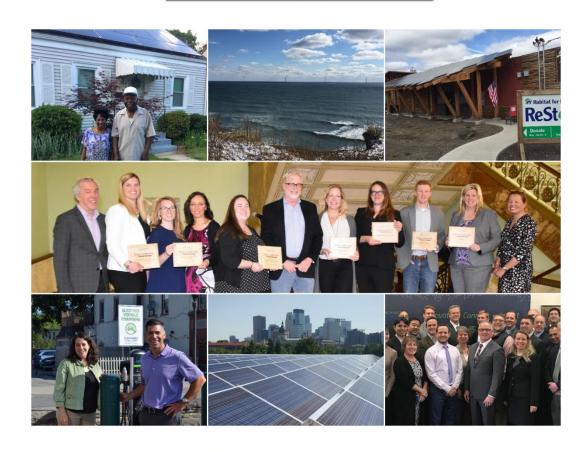


2018 Award Winners

- Connecticut Green Bank for its "Solar for All" Partnership
- Massachusetts Clean Energy Center and the Massachusetts Department of Energy Resources for the Advancing Commonwealth Energy Storage (ACES) Program
- New York State Energy Research and Development Authority (NYSERDA) for the Clean Energy Communities Program
- Oregon Department of Energy for the Renewable Energy Development Grant Program
- Rhode Island Office of Energy Resources for the Block Island Offshore Wind Farm
- Xcel Energy Renewable Development Fund for the MPRB Solar Demonstration Project

Learn more about the winning programs at: http://bit.ly/SLICE-2018







Advancing Clean Energy Progress: Past, Present, and Future

This report presents case studies of the six recipients of the 2018 State Leadership in Clean Energy Awards.

http://bit.ly/2018-SLICE



State Leadership in Clean Energy AWARDS

Advancing Clean Energy Progress: Past, Present, and Future

JUNE 2018





2018 State Leadership in Clean Energy Webinar Series

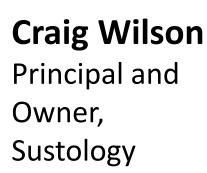
- State Programs for Clean Energy in Local Jurisdictions: Examples from New York and Oregon (7/11)
- Expanding Solar PV Finance and Markets in Connecticut and Minnesota (8/2)
- Building Markets: Energy Storage in Massachusetts and Offshore Wind in Rhode Island (8/9)

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Webinar Speakers







Mark Ritter
Renewable
Development
Fund Grant
Administrator,
Xcel Energy



Kerry O'Neill
Vice President
of Residential
Programs,
Connecticut
Green Bank





Beth Galante
Vice President
of Business
Development &
Government
Relations,
PosiGen



Diana Chace
Project Director,
Clean Energy
States Alliance
(moderator)









Minneapolis Park & Recreation Board (MPRB) Community Solar Demonstration Project







Minneapolis Park & Recreation Board (MPRB):





- is an independent park district that owns, maintains, and programs activities in public parks in Minneapolis, Minnesota.
- has 500 full-time and 1,300 part-time employees and an \$111 million operating and capital budget.
- has been called the best-designed, best-financed, and bestmaintained in America.
- was rated the #1 park system in the country for the 6th year in a row by the Trust for Public Land in 2013, 2014, 2015, 2016, 2017 + 2018.

Presenter: Craig Wilson, Grant Writer and Project Consultant, Sustology—Minneapolis-based sustainability consulting firm founded in 2005.

Renewable Development Fund (RDF) Overview





- MPRB received a grant from the Xcel Energy's Renewable Development Fund (RDF).
- The grant paid for "demonstration" projects throughout MPRB districts.
- The total renewable energy production is approximately 200 kWh.
- The project includes interpretive and educational programming about sustainable solar energy in Minneapolis parks.

RDF Site Selection Summary Overview





- I. Site Selection Criteria
- II. Evaluation of Sites
- III. MPRB Approved Sites

I. Site Selection Criteria:

A. Technical Criteria





- 1. No shading
- 2. South facing
- 3. Meter
- 4. Onsite electricity consumption
- 5. Roof: contiguous area
- 6. Roof: expected lifespan of 15+ years
- 7. Roof: structural capacity
- 8. Awning: structural capacity
- 9. Canopy: close to meter
- 10. MPRB property
- 11. Outside downtown core
- 12. Difficult to implement

I. Site Selection Criteria:

B. Value-Based Criteria



- 1. Highly visible to park visitors
- 2. Substantial or significant level of visitation
- Potential for unique public education opportunity
- 4. Innovative approach to solar energy production

1. Site Selection Criteria:

C. Other Considerations





- Balance across park districts, regional and neighborhood
- 2. Landmark or historic status
- 3. Zoning limitations
- 4. Security issues
- 5. Linkage with current capital projects or plans
- 6. No reflective glare
- 7. Diverse use

II. Evaluation of Sites





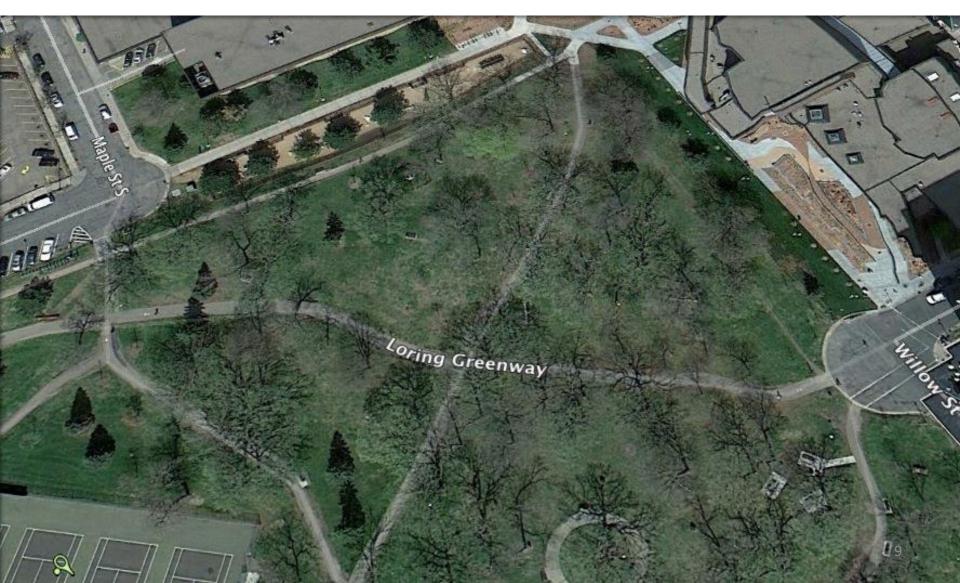
1. Public Open House (Fall 2013)

- 2. Evaluation of 52 possible locations:
 - a. Criteria matrix
 - b. MPRB staff feedback
 - c. Onsite analysis
- 1. Top 3 reasons for elimination:
 - a. Shading
 - b. Not south facing
 - c. No meter

A. Shading



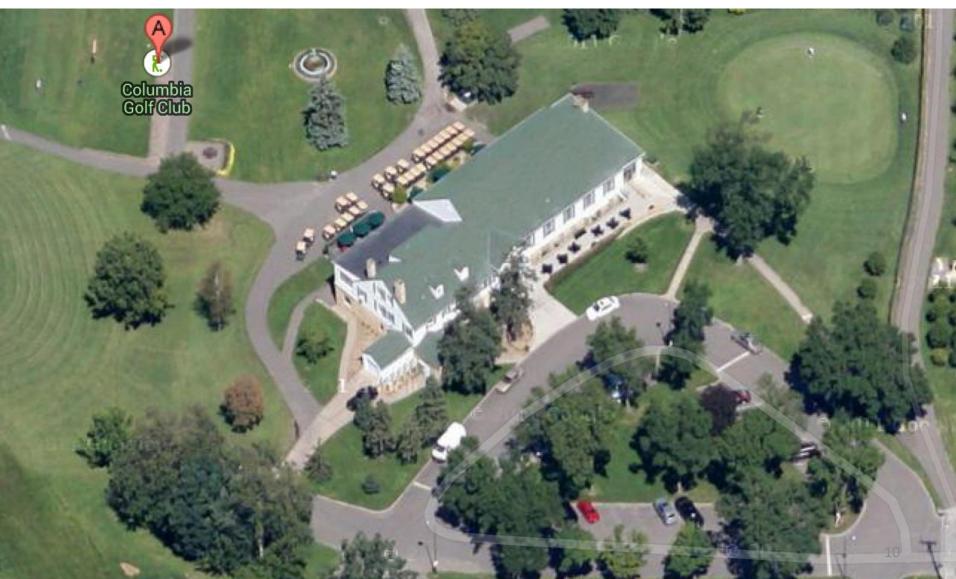




B. Not South Facing



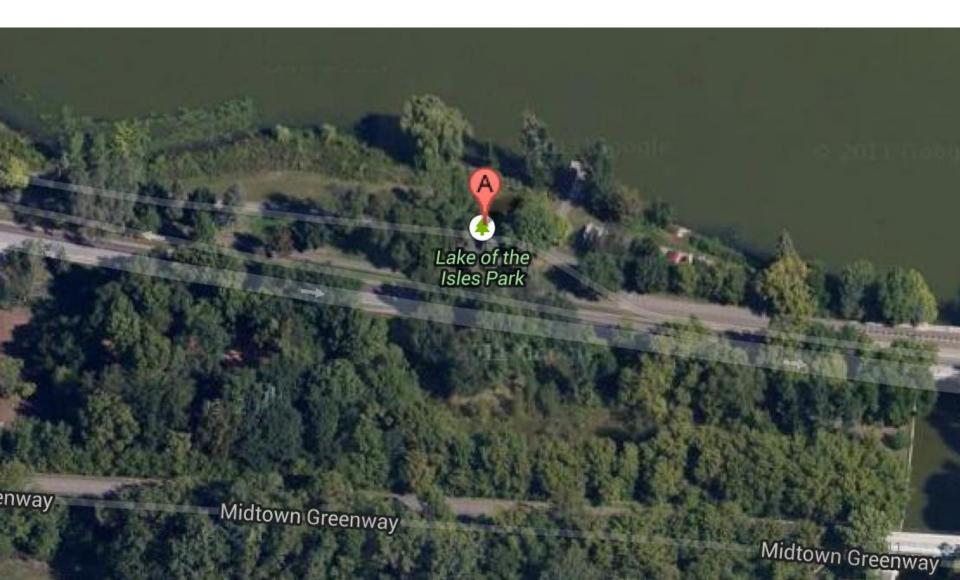




C. No Meter



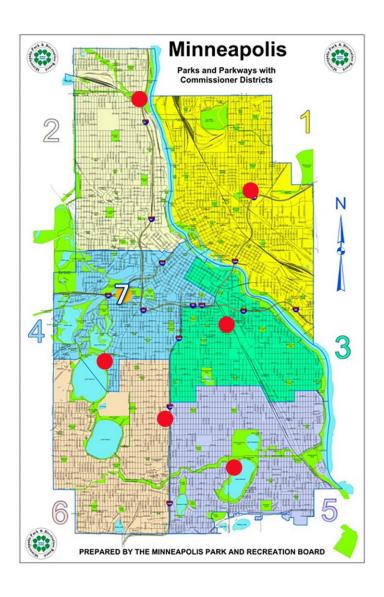




III. MPRB Approved Demonstration Sites







- NE Park Rec Center (District 1)*
- 2. Webber Park (District 2)
- 3. East Phillips (District 3)
- 4. Bde Maka Ska Concessions Building (District 4)**
- 5. Lake Nokomis Beach (District 5)
- 6. Rev. Dr. Martin Luther King Jr. Park (District 6)
- 7. Parade Ice Garden

*tabled to 2018 due to construction schedule, became non-RDF funded project.

** issue with structural capacity + site redevelopment timing

Stakeholder Involvement





MPRB staff, Commissioners, and members of the general public were engaged in the design development and feasibility study process:

- A Technical Advisory Committee comprised of MPRB staff from various departments along with subsequent updates
- Site visits with MPRB staff
- Informal and Formal Commissioner updates
- Master Plan Open Houses
- Engagement of neighborhood organizations and community groups
- Communication about project installation
- Video, media outreach
- Signage

Overview of Parade Ice Garden Demonstration Project



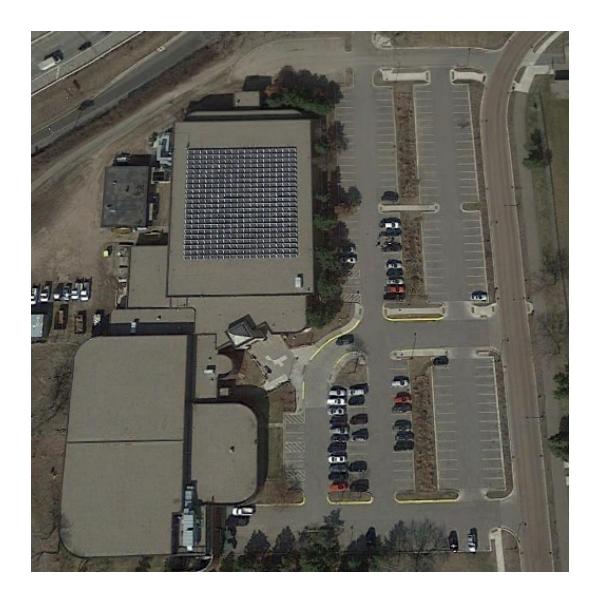




Parade Ice Garden had a 153-kilowatt solar array installed on the roof of its north rink.



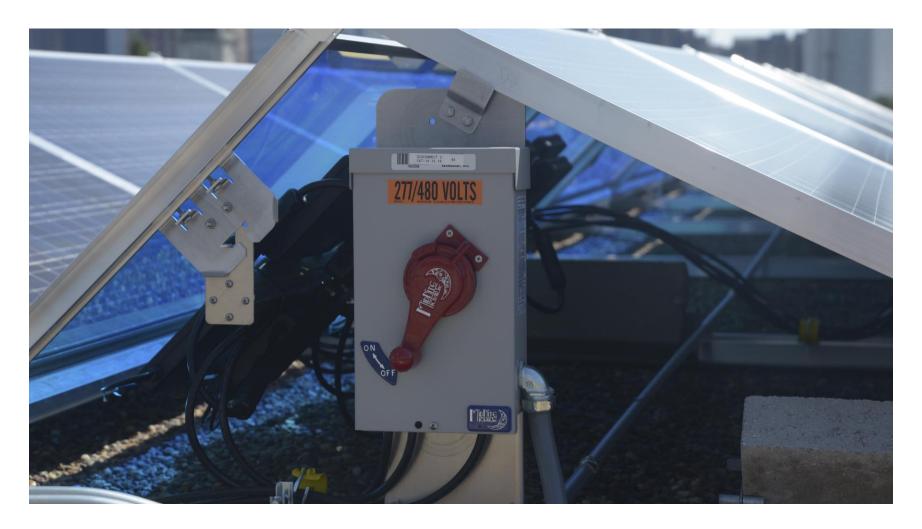




The conventional roof-mounted system is made up of 374 x 410W tenKsolar RAIS XT PV Modules, which were manufactured in Minnesota.







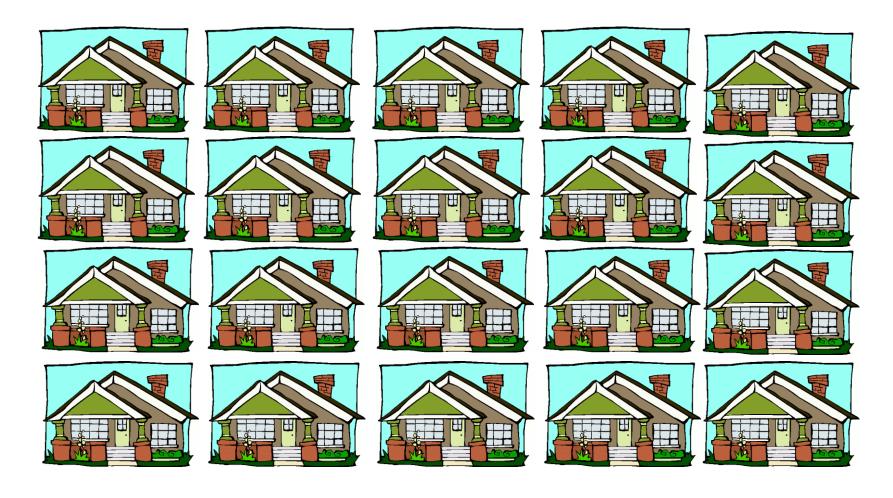
The solar array produces about 184,000 kilowatt hours (kWh) of electricity, or 15% of the facility's total electricity usage.





That's a savings of about \$20,000 per year and is equivalent to powering 20 homes' electricity.

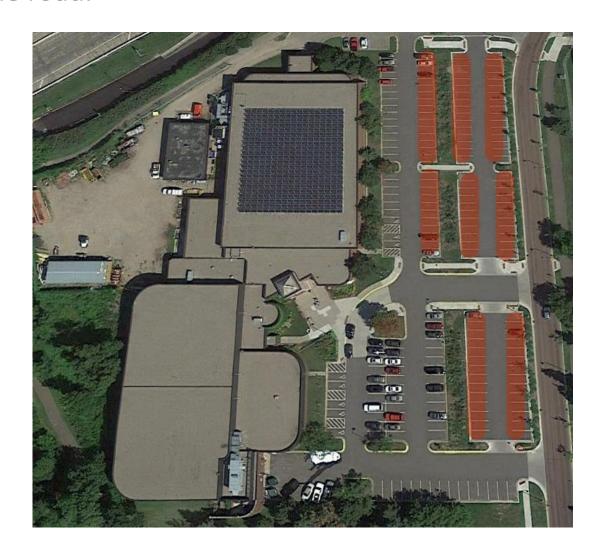




Previous energy efficiency improvements reduced annual greenhouse gas (GHG) emissions equivalent to 515 metric tons of CO₂—equivalent to taking 109 cars off the road.



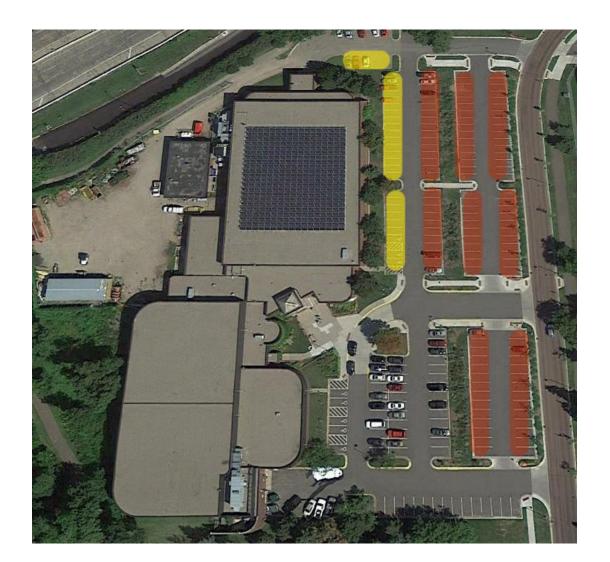




The new solar array offsets an additional 127 metric tons of CO₂ annually—equivalent to taking 27 cars off the road.







Review of Plans for Demonstration Projects





- Rev. Dr. Martin Luther King Jr. Park
- East Phillips
- Webber Park
- Lake Nokomis Beach

Rev. Dr. Martin Luther King Jr. Park – context







Rev. Dr. Martin Luther King Jr. Park – context



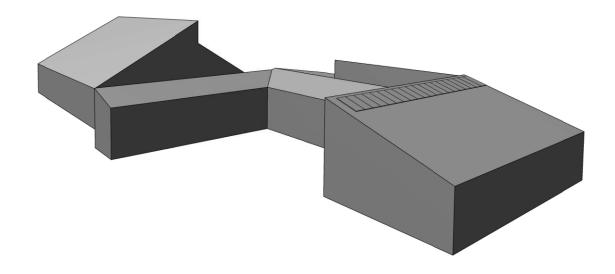




Rev. Dr. Martin Luther King Jr. Park – 3D view + highlights







The solar installation at Rev. Dr. Martin Luther King Junior Park is located on the site's Multi-Purpose Room. Here are some facts regarding the installation:

- 20 Made In Minnesota Solar PV Panels
- Size (kW): 6.2kw
- Estimated annual kWh production: 8,040kw
- Approximate percentage of annual energy at park supplied by solar: 4.5%
- Demographics:
 - 74% People of Color
 - 38% under the age of 18 years old
 - 36% earn less than \$35,000 annually

East Phillips – context



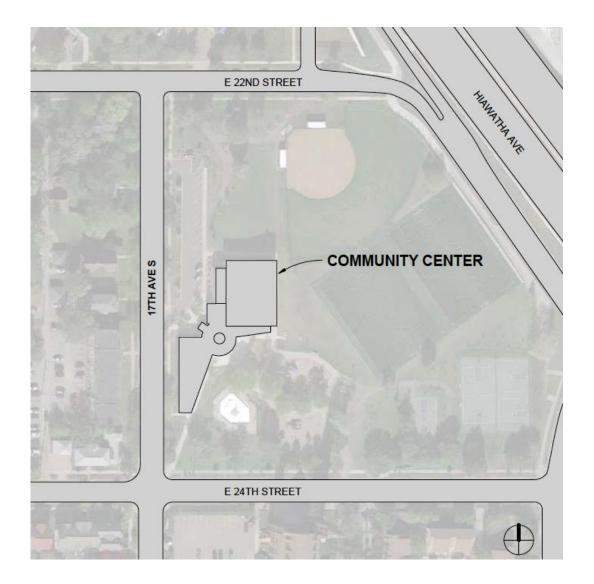




East Phillips – context







East Phillips – 3D view + highlights







The solar installation at East Phillips Park is located on the south facing wall of the gymnasium, on the Community Center. Here are some facts regarding the installation:

- 21 Made In Minnesota Solar PV Panels
- Size (kW): 6.510kw
- Estimated annual kWh production: 8,442kw
- Approximate percentage of annual energy at park supplied by solar: 6.8%
- Demographics:
 - 85% People of Color
 - 36% under the age of 18 years old
 - 44% earn less than \$35,000 annually

Webber Park – context







Webber Park – context



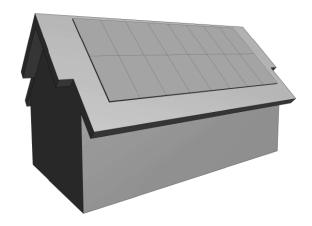




Webber Park – 3D view + highlights







The solar installation at Webber Park is located on the pool pump house. Here are some facts regarding the installation:

- 16 Made In Minnesota Solar PV Panels
- Size (kW): 4.6 kw
- Estimated annual kWh production: 5,472
- Approximate percentage of annual energy at pool supplied: 3.7%
- Demographics of residents:
 - 19% People of Color
 - 21% under the age of 18 years old
 - 52% earn less than \$35,000 annually

Nokomis Beach – context









Nokomis Beach – context



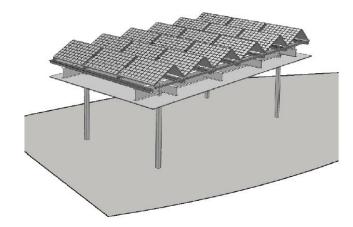




Nokomis Beach – 3D view + highlights







The solar installation is a shade structure at Lake Nokomis Beach. The masterplan for Lake Nokomis identified the need for additional shade at the beach area, so the structure is a fitting addition to the beach area.

Here are some facts regarding the installation:

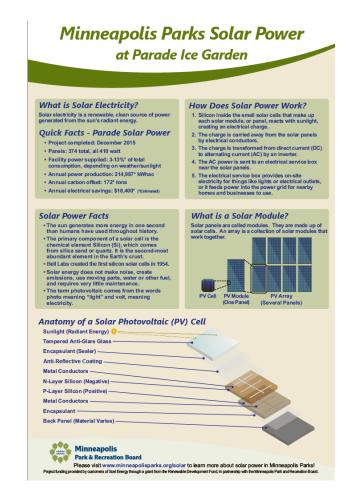
- 18 Made In Minnesota Solar PV Panels
- Size (kW): 7.380kw
- Estimated annual kWh production: 8,856kw
- Approximate percentage of annual energy at park supplied by solar: 15%
- Demographics: Regional Park

Education + Outreach





- "Solar in Minneapolis Parks" video
- Parade video kiosk
- Signage
- MPRB website



Thank you!









Minneapolis Parks and Recreation Board Solar Commercial Demonstration Project



Project funding provided by customers of Xcel Energy through a grant from the Renewable Development Fund.



MPRB Project at a Glance

Project Objectives

- Increase the penetration of solar energy in Minnesota
- Promote Minnesota-based solar technology companies
- Demonstrate the effectiveness of alternative solar designs
- Provide an increased knowledge of solar in Minnesota

Selection

- Visibility
- Variety of designs to meet site challenges
- Opportunity for public education

Outcomes

- Benefits
- Lessons Learned
- Usefulness



Key Project Features

Visibility

23 million annual park patrons

Array visible from major highway and downtown Minneapolis

Array used as shade structure at popular beach

Wall mount blends into building site lines

Design Variations

Solar awning

Solar canopy

Ballasted roof mount (flat roof)

Fixed roof mount (pitched roof)

Public Education

Onsite signage

Video Campaign

Regional and community outreach

Media outreach

Outcomes



Benefits

- Environmental
- Economic
- Social Equity

Lessons Learned

- Site selection
- Public outreach
- Conventional technology

Usefulness

- Exposure to the possibilities and benefits of solar
- Promotion of Minnesota based businesses
- Cleaner and more breathable air.
- Sustainability



Parade Ice Garden





Webber Natural Swimming Pool





East Phillips Park Cultural and Community Center





Rev. Dr. Martin Luther King, Jr. Recreation Center





Lake Nokomis Main Beach







Connecticut Green Bank Delivering Results for Connecticut



- Investment mobilized nearly \$1.3 billion of investment into
 Connecticut's clean energy economy so far, using a 8:1 leverage ratio
- Energy Burden reduced the energy burden on over 30,000 households and businesses, , including "beyond parity" for LMI solar
- Jobs created over an estimated 16,000 total job-years 6,200 direct and 9,700 indirect and induced*
- Clean Energy deployed more than 285 MW of clean renewable energy helping to reduce over 4.6 million tons of greenhouse gas emissions that cause climate change

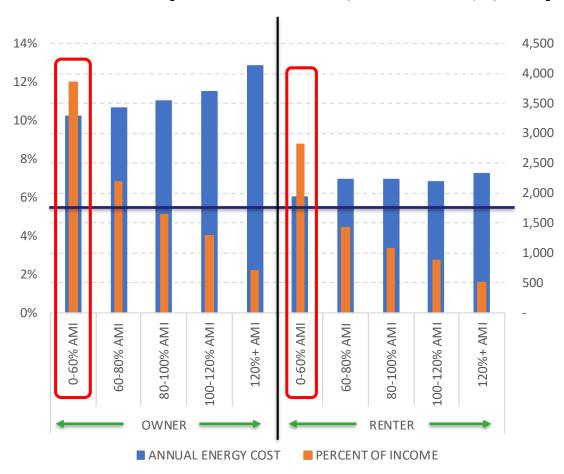
Private investment drives economic growth

Creates jobs, lowers energy costs, and generates tax revenues

Reducing Energy Burdens For Those That Need It Most

CONNECTICUT GREEN BANK

ENERGY BURDEN [AVG. EXPENDITURES/AVG. INCOME, \$/YEAR]



To have meaningful impact on energy burdens we must provide <u>comprehensive solutions</u> that combine <u>solar + EE</u>

Energy costs are amongst the highest in the country and a significant portion of household expenses

More than <u>half</u> our low income residents suffer a <u>high energy cost</u> <u>burden</u> (>10% of income)

AMI Bands	Avg. Household Income – MF
0-60%	\$20,000
60-80%	\$48,000
80-100%	\$65,000
100-120%	\$77,000
120%+	\$131,000

CT Low-to-Moderate Income Market: By the Numbers

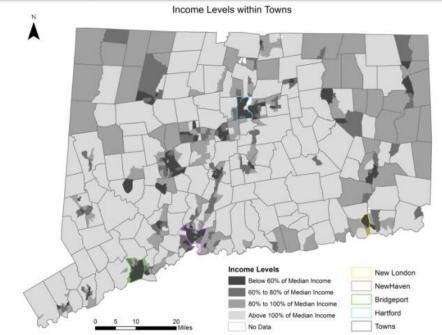


Income Level by AMI Band	# of Census Tracts	Tract Households	% of Households	Tract Owner Occupied Households	% OO HHs in AMI Band	Tract Renter Occupied Households	% Rental HHs in AMI Band	Average Median Household Income
<60%	167	232,021	17%	67,273	29%	164,748	71%	\$35,054
60%-80%	110	194,858	14%	103,963	53%	90,895	47%	\$55,135
80%-100%	128	225,955	17%	149,072	66%	76,883	34%	\$69,958
100%-120%	144	253,815	19%	193,581	76%	60,234	24%	\$81,930
>120%	274	448,028	33%	386,334	86%	61,694	14%	\$118,744
Grand Total	823	1,354,677	100%	900,223	66%	454,454	34%	\$78,658

CT Green Bank Definitions

Low Income = 80% AMI or lower, 40% are homeowners

Moderate income – 81%-100% AMI, 66% homeowners



Low-to-Moderate Income Strategy



Tiered Incentive + Investment



- Residential Solar Investment Program
- Low-to-Moderate Income Performance Based Incentive for Third Party Owners
- Launched in 2015
- Nearly 3x market rate incentive
- Income screen of 100% AMI or lower
- 2 Contractors approved to access
- Enhanced consumer protection



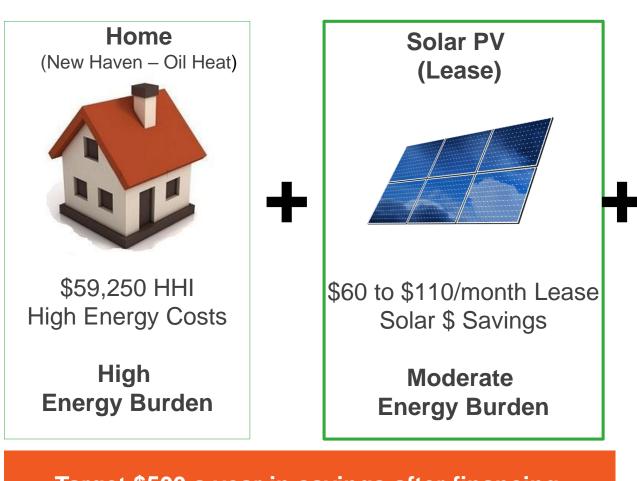
- 2015 LMI Solar Financing RFQ helped create a \$45MM+ Fund
- \$8.5MM CGB investment
- Product offering combines nonescalating solar lease with energy efficiency services
- Utility weatherization programs (HES or HES-IE) leveraged
- Alternative underwrite
- Community partnerships

Solar For All with PosiGen



Lease & ESA for Single Family LMI Market

PosiGen Co-investment: \$8.5 million in Green Bank capital leveraged to create a \$45 million fund



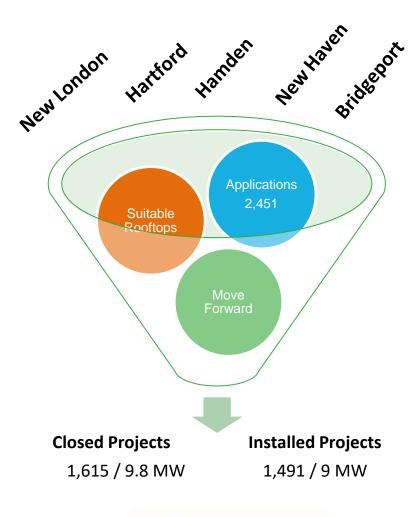
Energy Efficiency (ESA) \$10/month ESA **Energy Savings** <<Additional Savings>> Solar + EE \$ savings Reasonable **Energy Burden**

Target \$500 a year in savings after financing.

Solar for All Campaigns



Community-based marketing drives adoption





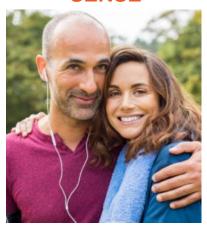




Customer Segmentation A targeted approach to customer acquisition



DOLLARS & SENSE



"Judy & Dante"



SEEKING STABILITY



Total Customer Count: 61,434

SURVIVING NOT THRIVING



"Emma"



Total Customer Count: 18.186

Top home improvement measures likely to be adopted by these customer segments:

- Windows
 - Hot water heaters

- Heating & cooling
- Insulation

Solar for All with PosiGen

Solar for All Campaign Progress

- √ 1,600+ contracts since 2015, ~10 MW of solar PV
- √ ~2/3 of contracts are LMI (getting the LMI tiered incentive)
- √ 75% of projects in census tracts <80% AMI
 </p>

Energy Efficiency Progress

- √ 99.9 % of households get Direct Install EE measures, 19,500 MMBTUs saved
- √ 69% of households also undertake "deeper"
 energy efficiency projects through \$10 ESA
 payment/month for 20 years







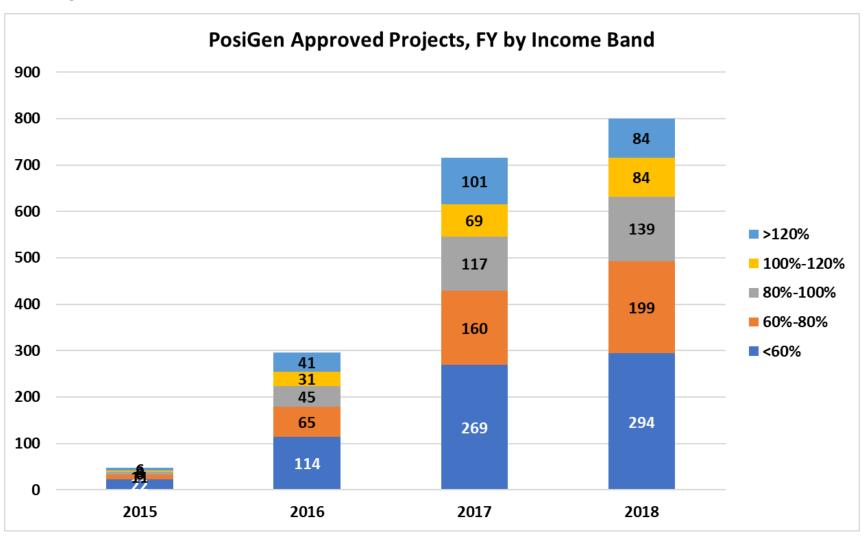




PosiGen Progress

CONNECTICUT GREEN BANK

Projects to date



Moving the Needle on Inclusive Prosperity



Solar Penetration by Census Tract Median Income 2012-2017



Year Project Approved

Solar penetration in census tracts earning <100% of area median income grew from 17% in 2012 to 48% in 2017

Mobilizing Investment for All



"Beyond Parity"

AMI Band	# of Solar PV Projects	# Owner Occupied HH (1-4 Units)	% of Total Owner Occupied HH (1-4 Units)	% Projects in AMI Band
<60%	2,179	60,769	7.1%	8.1%
60-80%	3,347	99,220	11.6%	12.5%
80-100%	5,152	165,331	19.3%	19.2%
100-120%	6,070	187,463	21.8%	22.6%
>120%	10,077	345,311	40.2%	37.6%
Total	26,826	858,094	100%	100%

Pope Francis

[&]quot;There can be no renewal of our relationship with nature without a renewal of humanity itself. There can be no ecology without an adequate anthropology."



More Info:

www.ctgreenbank.com

Contact us:

Kerry O'Neill Vice President, Residential Programs Kerry.Oneill@ctgreenbank.com (860) 257-2884

The Power of Clean Energy Financing to Scale Inclusive Prosperity

August 2, 2018

Clean Energy States Alliance



MAKE POWER, SAVE POWER



About PosiGen | Our Story



FAST FACTS

Founded in New Orleans after Hurricane Katrina with a mission to deliver the benefits of solar energy and energy efficiency to low-to-moderate income families nationwide in a scalable and sustainable manner.

Approves Homeowners based on home ownership + utility usage history, NOT on FICO score, enabling a population that has historically been ignored by the solar community, and underserved or poorly served by most energy efficiency programs, to access the benefits of clean energy.

Services Homeowners in Louisiana, Connecticut, New York, New Jersey and Florida – **73%** in low to moderate income neighborhoods

POSIGEN BY THE NUMBERS



12,000+ Families Installed



72 Megawatts Total installed megawatts



170 PosiGen Employees working to help families make power + save power

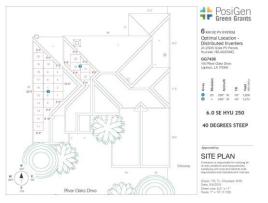


Operational Efficiency | Focus on Standardization



The "Southwest" of Solar











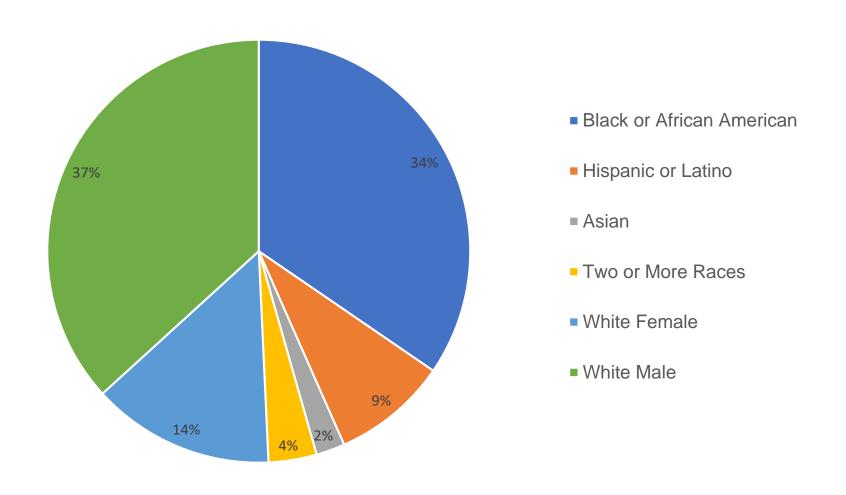




Standard design, kits, tools and training lead to safe, high quality, low cost installs and happy customers.

PosiGen Employees

Diversity at Work



PosiGen Employees: Diversity at Work



MAKE POWER, SAVE POWER



Mychau Truong, Assistant
Operations Manager, Louisiana
I worked in the hospitality industry
for 5 years prior to PosiGen. I started
as front desk clerk and moved to
Sales Manager, working towards a
Director of Sales role. My great
friend convinced me to join PosiGen in 2013. I began working on
the sales team and have now work
as Assistant Operations Manager.
My future plans include advancing
to Operations Manager.

2013 - Outside sales (and my own telemarketer),
and Concierge
2014 - Operations Analyst, PV Pipeline Management
2016 - Assistant Operations Manager

Greatest Accomplishments
Made minimum sales (20) 7 months out of
11 & Won a cruise trip November 2013
with 30 sales for Nov
Keeping ~300 customers up to date with
install progress
Implemented new tracking process and

2014 - Advanced to a Lead QC Technician

2015 - Received BPI Certification

procedure for Operations

Susan Young, Renewable Energy Specialist, Connecticut

My first bill after installation was \$26.35, much lower compared to the normal \$200. I was so amazed that I immediately contacted the utility company because I thought they may have made an error, only to be reassured that my solar system was generating almost all

the energy needed to power my home.

I felt compelled to tell others about this great cost saving, renewable energy opportunity. So I called PosiGen and asked for a job. I have been with PosiGen as a customer and an employee for nearly two years.

PosiGen is a terrific company that

developed an innovative way to make solar affordable for everyone. Being the parent of two boys (one in college), the savings are simply fantastic.





Glynn Woodall, Operations Supervisor, Louisiana

I began my career in solar with another company as an installer in 2012. I was ready for a new opportunity and joined PosiGen in 2013.

I began as a Level 2 QC Technician and have worked my way up to Operations Supervisor. I aim to

work as Operations Manager and PosiGen's Licensed Electrician. What I like most about PosiGen is the people I work with. The team members that I work with know what needs to happen to help the company succeed. We work hard every day to make sure that happens. **2013** - Level 2 QC Technician

t PosiGen is

n. The team

with know

n to help the

e work hard

t PosiGen is

2016 - Advanced to Operations Supervisor,
received NABCEP Certification, and
began designing solar energy systems

2017 - Begin managing inventory for both
LA and CT markets





Solar for All – Local Support for Local Partners

LOCAL GOVERNMENTS:

- City of Bridgeport
- City of New London
- City of New Haven
- City of Hartford
- City of Hamden

NON-PROFITS:

- Operation Fuel primary emergency fuel assistance in CT
- Habitat for Humanity of Hartford
- Neighborhood Housing Services of New Haven
- New Haven Clean Energy Task Force

SMALL BUSINESS PARTNERS:

- CMC Energy Efficiency Services
- Uplands Construction Energy Efficiency Services



PosiGen Customers | LMI, not Sub-Prime



PosiGen's fixed, all-inclusive lease is financially and environmentally superior to loans for lower income consumers:

Lower income homeowners:



Cannot qualify for market rate loans due to insufficient income, credit score, and/or DTI ratios



If they can qualify, are more likely to be **subject to predatory interest rates**, **fees and terms** relative to higher income/credit score consumers



If they can qualify, cannot fully monetize the 30% federal solar tax credit due to insufficient taxable income



Are extremely **reluctant to take on additional debt**, particularly for their most valuable asset – their home

PosiGen Customers | LMI, not Sub-Prime



Lower income homeowners, cont'd:



Need fixed monthly expense predictability due to severe income limitations



Benefit both financially and from lack of need to manage systems due to lease inclusion of all insurance, monitoring, maintenance, repairs and inverter replacement



Reinvest all of their savings on energy costs into the local community, with an economic multiplier of \$3.90 for every \$1 saved in the Southeastern U.S., and a multiplier of \$5.40 per \$1 saved nationally.

OUR CUSTOMERS

Lower Income, Not Sub-Prime

- Homeowners' average credit score is **55 points higher** than that of non-homeowners (*Experian Study*)
- LMI mortgages outperform sub-prime mortgages of much more affluent households (UNC Study)
- The default risk of LMI residential loans is **three times lower** than sub-prime loans made to similar borrowers (UNC Study)
- The PosiGen transaction is viewed as a utility replacement rather than a standard installment agreement, and our consistent delivery of real savings to the consumer has kept our **default rate under 0.5%**



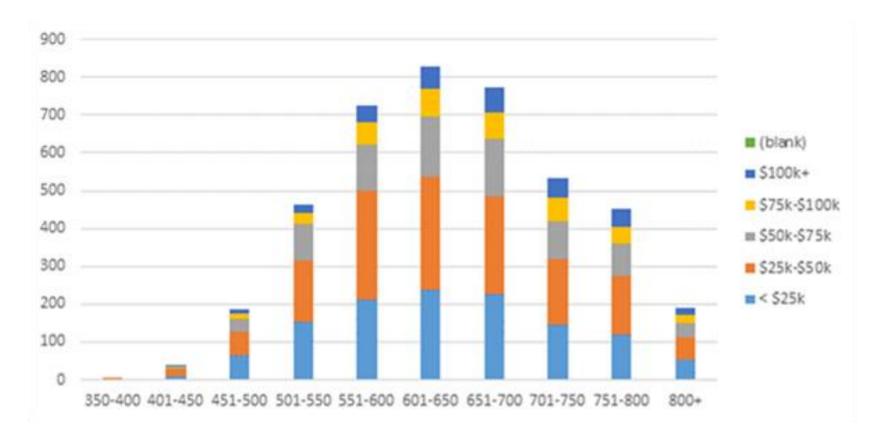




PosiGen Customers: Income to FICO Score



- Focused on serving low to moderate income homeowners, which is 50%+ of the 16.6 million single family, solar eligible homes
- Almost 3/4s of PosiGen installs are located in census tracts with an Area Median Family Income (AMI) at or below 120%
- Disconnect between income and credit score that should disrupt traditional financed clean energy offerings over time



Our Customers – Stronger with Clean Energy

"Between the energy [efficiency upgrade] and the solar panels, in my first month alone I have saved close to \$300 on my energy bill! Thank you, thank you, thank you!"

Michelle A. – Connecticut Customer

"We had solar panels installed on our home a few months ago. We could not have been happier with the entire process. From the initial visit to completion of the project we were kept informed of everything that was happening. I wish we would have done this sooner."

Pat and Shelly S. - Connecticut Customers

"[PosiGen's energy efficiency installers] were very professional and informative. They did a great job with all of the improvements that they made on the inside and on the outside of my house. I would highly recommend their services to anyone in need of an energy assessment!"

Robert R. - Connecticut Customer

"[PosiGen] was very professional, friendly and patient with my MANY questions. I am looking forward to a long & electrifying relationship with PosiGen! (pun is very much intended) A guarantee of savings + no credit check + great prices = NO BRAINER."

Carmen L. - Connecticut Customer



MAKE POWER, SAVE POWER





Thank you for attending our webinar

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