A MEGAWATT FOR MILWAUKEE

Project of: Environmental Collaboration Office ,
Department of Public Works, Milwaukee Public Library,
and Milwaukee Police Department

City of Milwaukee

eco ENVIRONMENTAL COLLABORATION OFFICE
ecoCITY of MILWAUKEE

Sustainability Goals

- The City's Sustainability Plan – ReFresh Milwaukee - calls on the City reduce energy use 20% by 2020 and increase reliance on renewable energy to 25% by 2025
- In June of 2017 the Common Council adopted a resolution expressing the City's support for the Paris Climate Accord

Better Buildings CHALLENGE U.S. DEPARTMENT OF ENERGY

COMPACT of MAYORS

COMPACT of MAYORS COMMITTED 2015

GLOBAL COVENANT of MAYORS for CLIMATE & ENERGY

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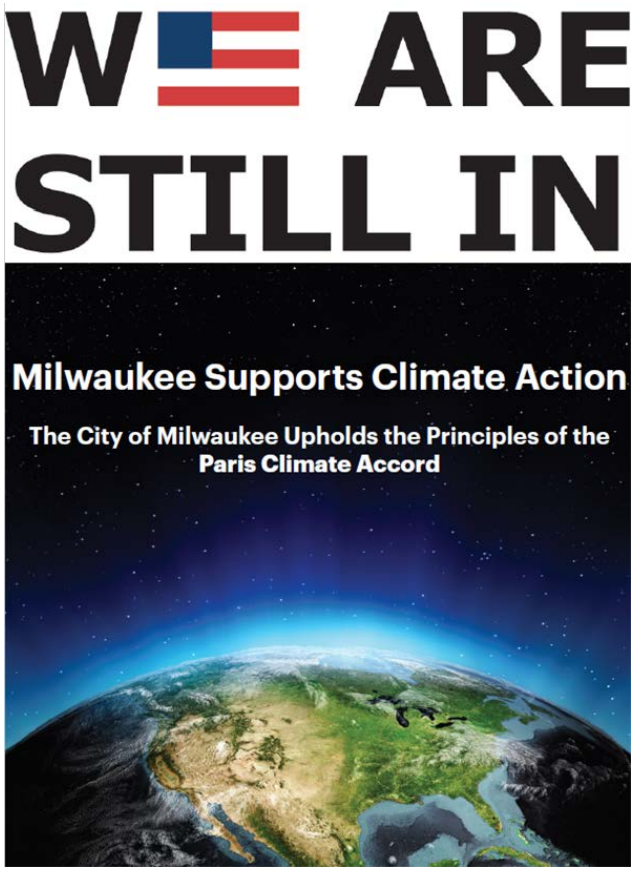
Sustainability Goals



Proposed Sites for Sola...

Part of ECO's 1 MW for Milwaukee Project

3 views

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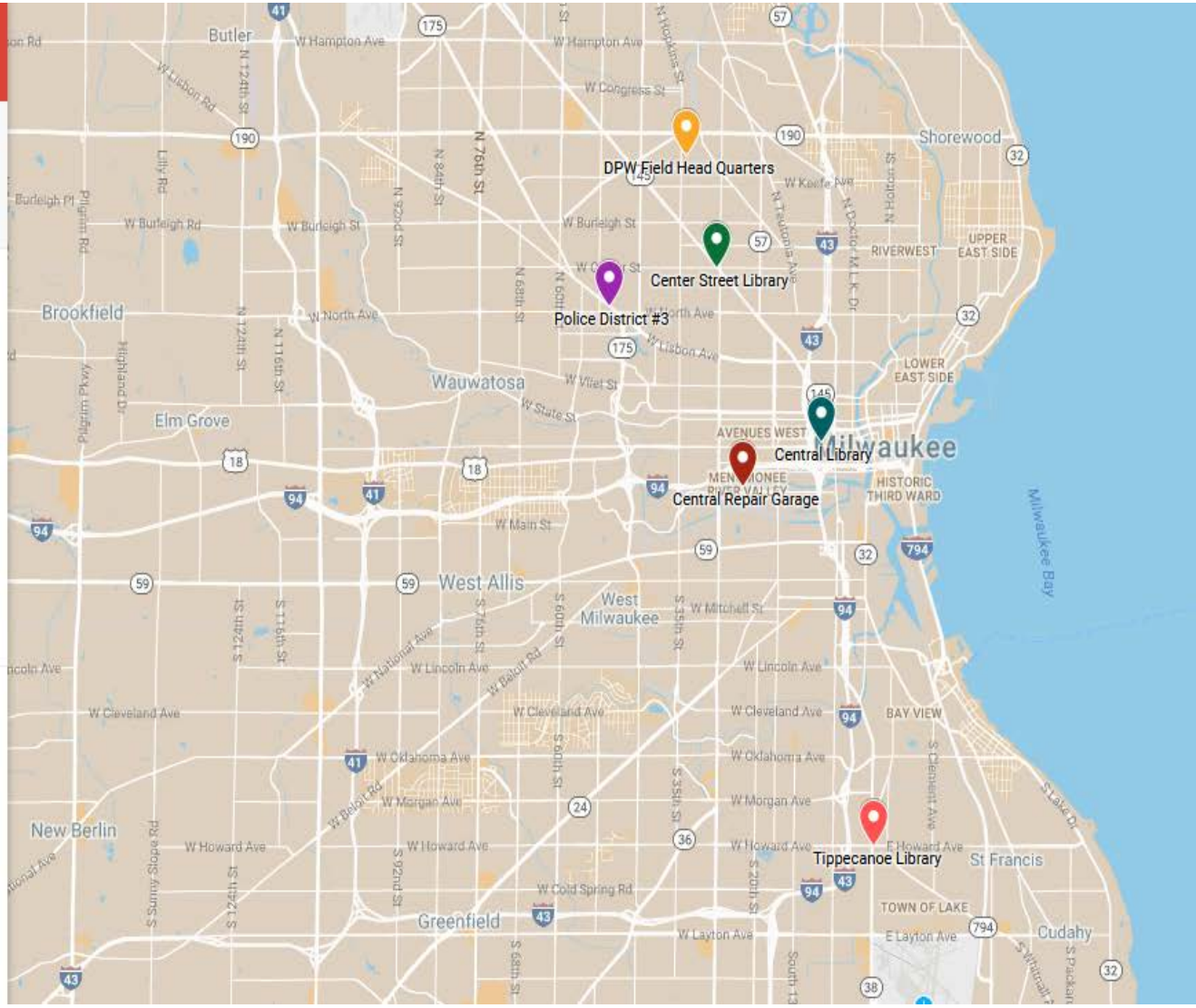
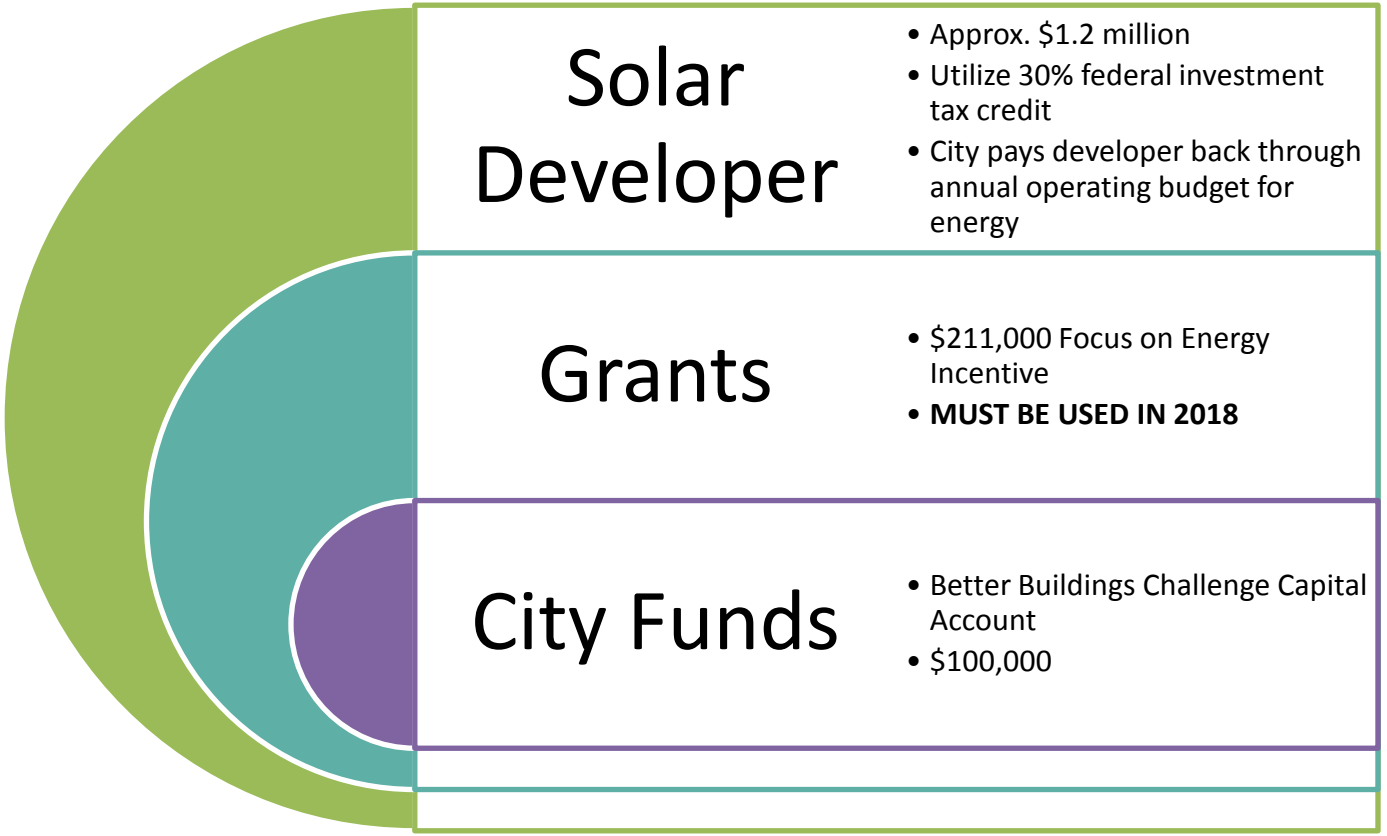
Proposed Solar Sites.xlsx

- Central Repair Garage
- DPW Field Head Quarters
- Central Library
- Police District #3
- Center Street Library
- Tippecanoe Library



Co-Owned System Financing



- The solar developer/third party participant (TPP) investor will utilize federal tax benefits in a manner acceptable to the City of Milwaukee, We Energies and Wisconsin Focus on Energy.

- City of Milwaukee's financing strategy's goal is to provide positive cash flow to the City over the entire term of the financing, except for the buyout year.

General Assumptions

Solar electric systems designed, specified and installed to:

- To maximize cost effective solar electric power production
- To minimize maintenance and repair needs over the systems' first 30 years
- Use solar electric modules that have a 25-year production guarantee
- Use inverters that have at a minimum, a 10-year warranty

General Assumptions

- Buildings will make monthly payments to the solar developer/third party participant (TPP) investor from their utility budget
- Projects should be cash flow positive
- City has option to purchase PV systems beginning after 7 years at the fair market value

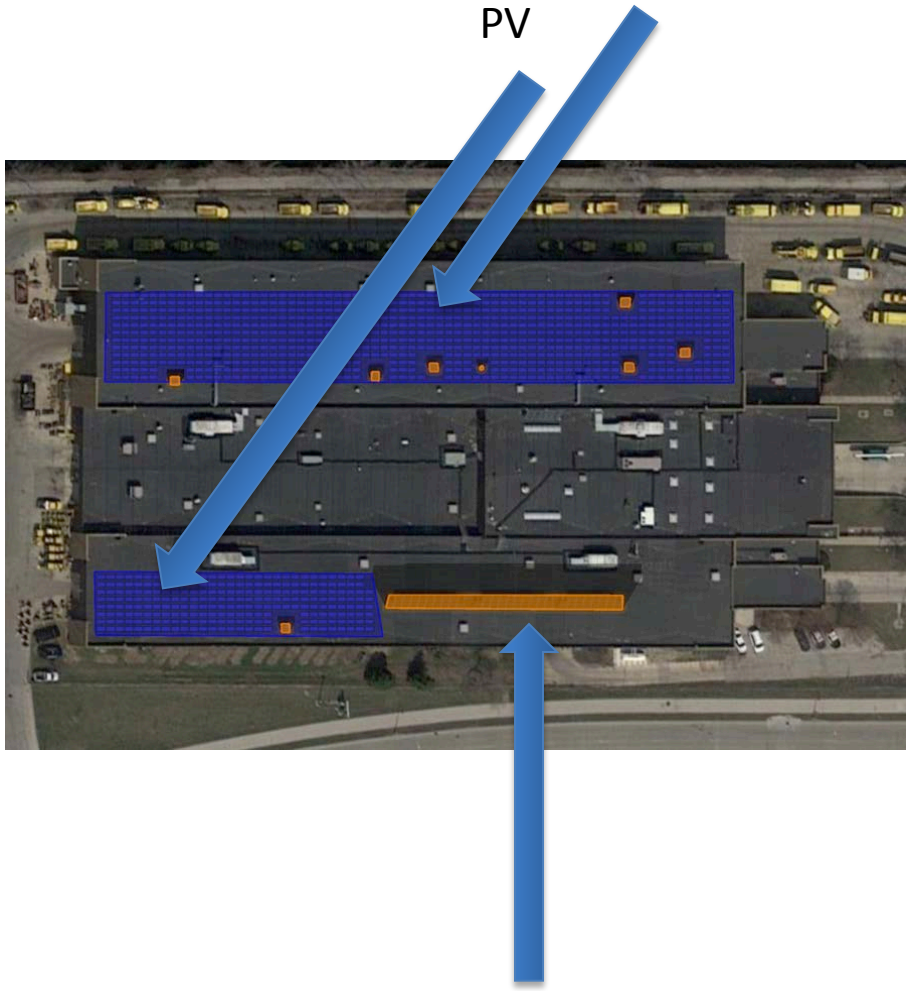
General Assumptions

- The selected bidder will train City staff at each site and provide a manual for operating and maintaining the PV systems for when the City takes ownership.

- The selected bidder shall specify, install, operate, and maintain the PV systems to minimize the operating costs after the City takes ownership. This may include purchasing long-term warranties, extra components, or other practices.

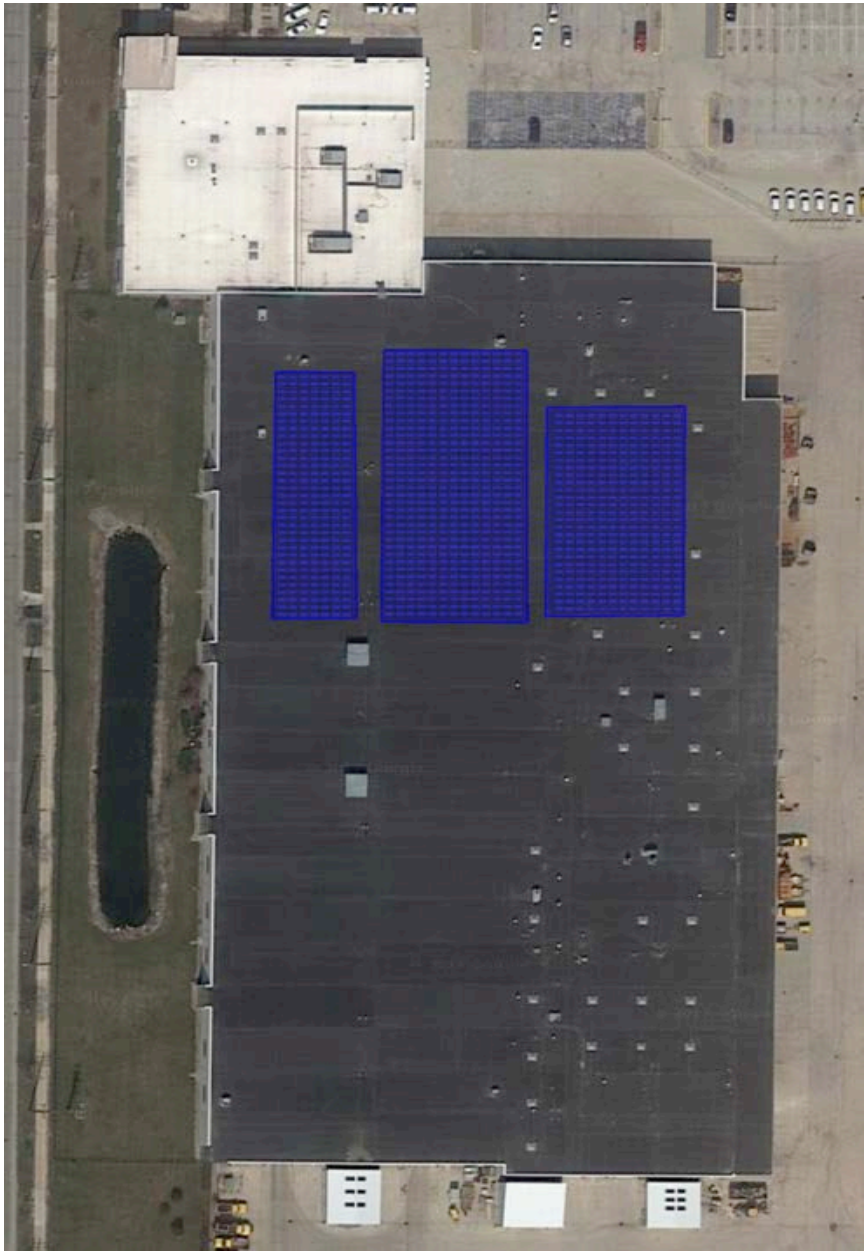
Central Repair Garage
2142 W Canal St.

System size	280 kW ac or ~340 kW dc Note: Site has a 20 kW dc PV system and solar thermal system)
Net-metered system	Yes
Rate Schedule	CP1
System location	Roof mounted on newer roof areas using ballasted racks
Roof material	Rubber membrane
Roof ages	Northern area: replaced in 2011 Central area: replaced in 2007 Southern area: replaced in 2007
Roof structural	Able to support PV system loads
Electrical service	480 volts
Electric meter location	Southeast corner of building near W. Canal St.
Electric room location	Center of the building



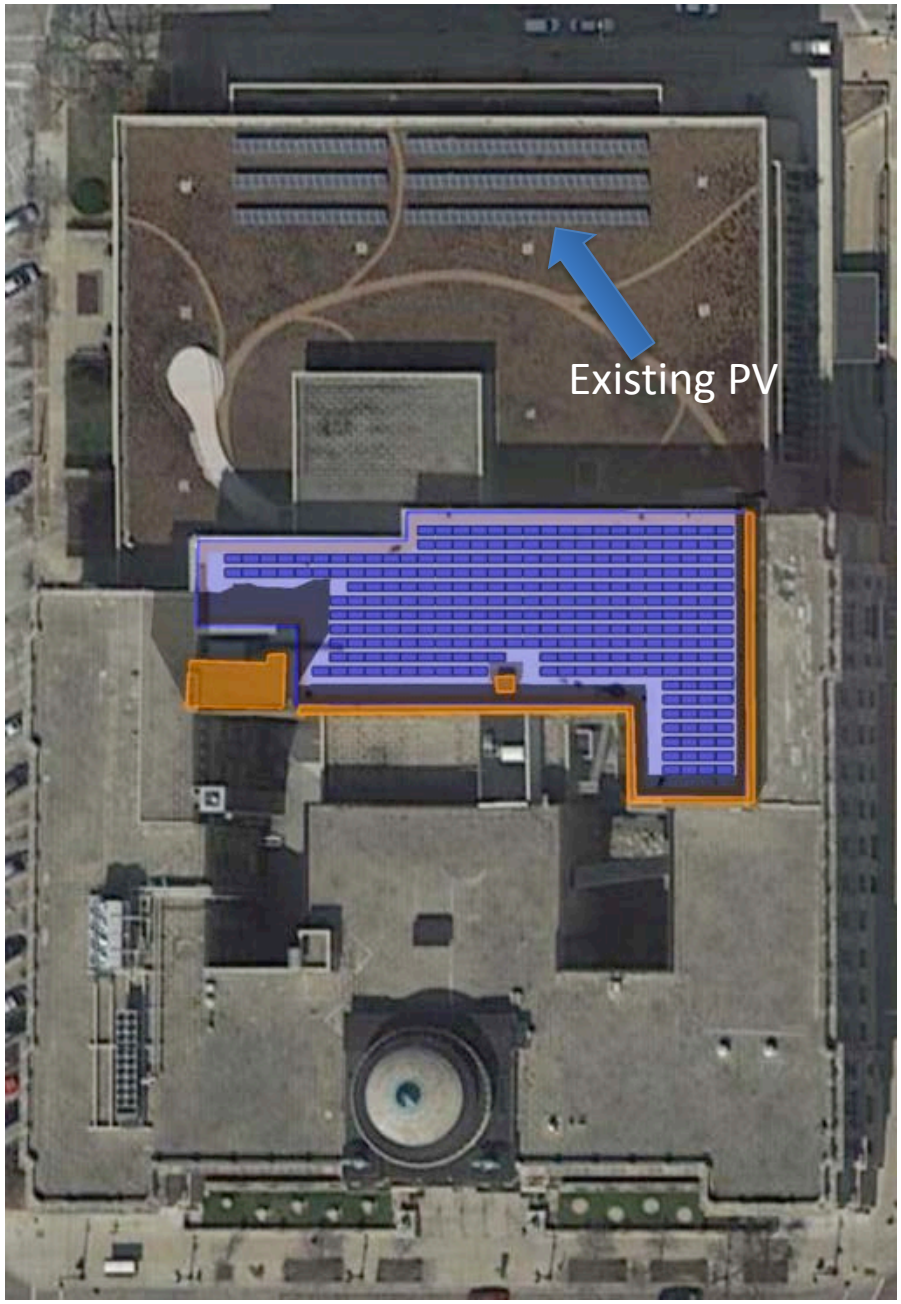
Department of Public Works Field Headquarters 3850 N 35th St.

System size	300 kW ac or ~360 kW dc
Net-metered system	Yes
Rate Schedule	CG3
System location	Roof mounted using ballasted racks
Roof material	Rubber membrane
Roof age	Installed 2006
Roof structural	Able to support PV system loads
Electrical service	480 volts
Electric meter location	West of where the white and black roof areas meet



Central Library
814 W Wisconsin Ave.

System size	~115 kW dc (as much as possible)
System location	White roof area, as shown
Net-metered system	Yes
Rate Schedule	CP1
Racking	Ballasted racks
Roof material	PVC membrane with insulation
Roof age	Installed 2015
Roof structural	Able to support PV system loads
Electrical service	480 volts



Police District 3
2333 North 49th St.

System size	~150 kW dc (as much as possible)
System location	Curved metal roof
Net-metered system	Yes
Rate Schedule	CP1
Racking	flush-mounted
Roof material	Metal
Roof expected life	40 to 50 years
Roof structural	Able to support PV system loads
Electrical service	480 volts

Example of a flush mount on a curved, metal roof

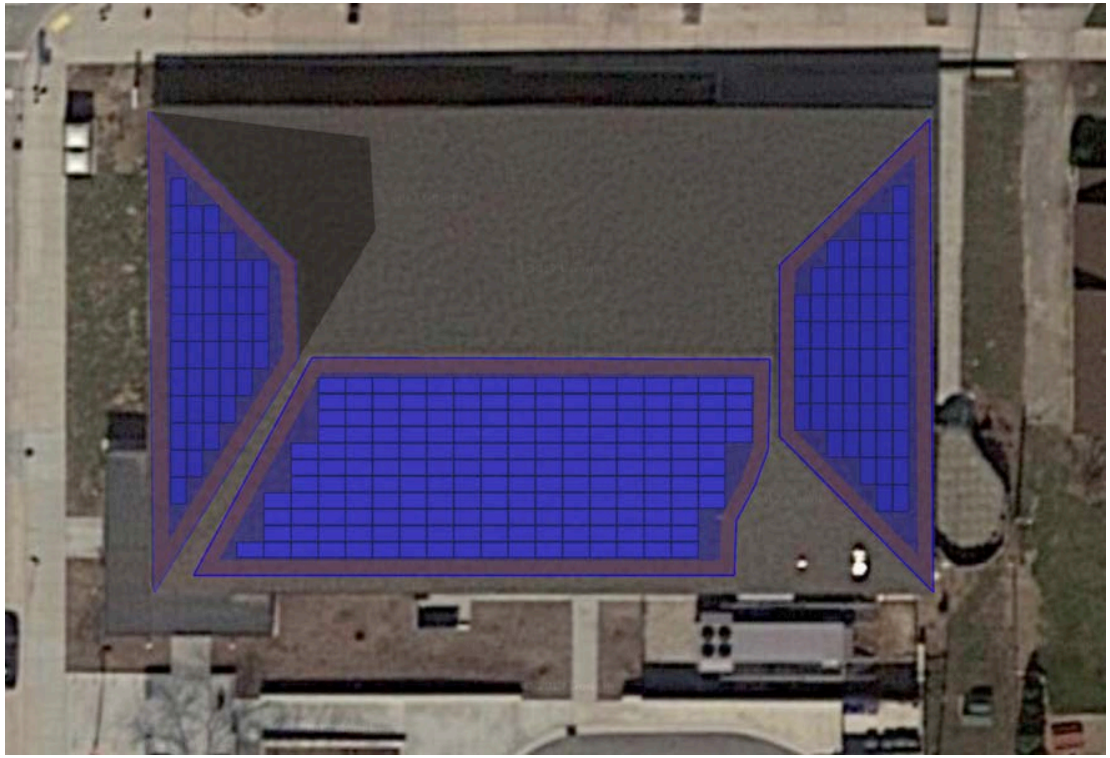
Center Street Library
2727 W Fond du Lac Ave.

Notes:

- The Center Street Library's roof looks open and unobstructed.. except for a few trees and bump outs on the roof.
- The roof was replaced in 2015. It must be white (or reflective metal). So the roof will be cooler and there will be more reflected light, which is good for solar generation.
- Proposed system size: 42 kW
- Rate Class: Cg2 - Fg2
- Solar kiosk included

Tippecanoe Library
3912 S Howell Ave

System size	~ 65 kW dc
System location	South (preferred), east and west roof areas
Net-metered system	Yes
Rate Schedule	CG2
Racking	Flush-mounted
Roof material	Shingle
Roof replaced	2015
Roof structural	Able to support PV system loads
Electric meter location	Assume near the HVAC unit (SE side of building)
Solar Kiosk	Yes



Example of solar kiosk (in the lobby of MPM)

Codes and Standards

- Installation must meet or exceed all relevant building and electrical **codes of the City Milwaukee**, and the State of Wisconsin.
- Modules and racking must comply with **wind uplift requirements** per the American Society of Civil Engineers Standard for Minimum Design Loads for Buildings and Other Structures, and must be able to withstand design **wind speeds of at least 100 mph** (3-second gusts).
- System installation must conform to Occupational Health and Safety Administration (**OSHA**) directives.
- Rooftop system components should adhere **to Uniform Building Code (UBC) fire code regulations**.
- The selected bidder shall obtain all necessary permits.

Next Steps

- **Council approval for accepting Focus on Energy funds**
- **Finalizing and distribute RFP**
- **Reviewing RFP responses and select solar developer/financing partner**
- **Contract negotiation**
- **Council approval of contract**
- **Schedule installs**

HOME GR/OWN

Milwaukee SHINES

Me2

BETTER BUILDINGS CHALLENGE

WATER CENTRIC CITY

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City of Milwaukee

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