

COUNTY OF MILWAUKEE
Inter-Office Communication

Date: February 9, 2024

To: Supervisor Marcelia Nicholson, Chairwoman, Milwaukee County Board of Supervisors

From: Peter Nilles, Director of Facilities Planning and Development, Department of Administrative Services, Facilities Management Division

Subject: New Coggs Parking Lot Solar Photovoltaic System(s) Feasibility Study

File Type: Informational Report

REQUEST

As requested per File No. 23-1039, this Informational Report assesses the feasibility of installing solar photovoltaic system(s) at the new Marcia P. Coggs Health and Human Services Center parking lots for the generation of electricity.

POLICY

[File No. 21-389](#) commits Milwaukee County to achieving carbon-neutral county facilities and operations by 2050 and requests that the Sustainability Director develop and administer a strategic carbon neutrality plan.

BACKGROUND

As requested per File No. 23-1039, DAS-Facilities Management Division has prepared this preliminary analysis of parking lot solar photovoltaic system(s) at the new Marcia P. Coggs Health and Human Services Center being constructed at 1230 W. Cherry St. Milwaukee, Wisconsin 53205.

Property Design Requirements:

The following is building and parking lot parcel(s) design information developed by design consultant Engberg Anderson Architects, and sub-consultants TLC Engineering Solutions and K. Singh & Associates.

1. The new building will have a gross floor square footage of 60,072 square feet and is designed to be energy efficient. According to the building's ENERGY STAR® Statement of Energy Design Intent, it has earned an ENERGY STAR® Design Score of 88. According to the estimated design energy, the building will utilize 4,552.99 therms of natural gas and 671.12 MWh (megawatt hours) of grid electricity.

2. Included in the design for the new facility are plans for rooftop solar PV. It is estimated that roughly 3,800 square feet of roof space can support PV panels. This could generate 12 percent of the building's electrical energy needs, reducing the generation requirements for the parking lot canopy system to 632 MWh as described later in this report (see Analysis section, 1. Energy Generation).
3. Parking for the new facility includes three surface parking lots that, combined, have 161 parking spaces. Attachment 1 provides a site diagram outlining the location of the lots. As part of this project, the County will be improving the existing County surface parking lots located south of West Cherry Street between North 12th Street on the east and North 13th Street on the west. These two lots, comprising 70,980 square feet are planned to be a mix of public and employee parking. Milwaukee County is also working with the City of Milwaukee and the Housing Authority of the City of Milwaukee to acquire additional land for staff parking at 1515/1519 North 13th Street, comprising 11,275 square feet. All parking lots associated with this property will include safety features such as emergency blue light boxes, lighting fixtures and closed-circuit television.

Surface Parking Solar Photovoltaic (PV) Design Considerations:

1. As shown in Attachment 1, the two lots located south of West Cherry Street are being considered for canopy solar PV. These lots represent a large, widely open space that allows for adequate sun exposure. The lot located at 1515/1519 North 13th Street is not being considered for parking lot solar generation, due to its limited size and shading constraints.
2. The project design consultants recommend installing T-shaped canopies over double-depth stalls and cantilevered canopies over single-depth stalls. Canopies are also recommended to have center or rear column supports to avoid interference with vehicles. Solar PV panels should be oriented to a 7-degree slope toward south. Canopies should be constructed to 9-foot height on the low end of the canopy. Weather-prevention considerations including integrated gutter, wiring, and snow guards are also recommended.

ANALYSIS

Results Of Preliminary Analysis:

1. Energy Generation

To meet 100 percent of the building's electrical energy needs with a solar PV system, total output from the property's PV panels must be 721 MWh. An overdesign in generation amount is necessary to accommodate for potential electrical loss and shading. With rooftop panels planned to generate 12 percent of the total necessary output, parking lot panels need to generate roughly 632 MWh. To achieve this level of generation, a canopy system totaling 27,200 square feet of high efficiency panels

must be accommodated between the two parking lots- see Attachment 2. Based on this design, the PV system output would be 23 kWh per square foot.

We Energies allows for customers to generate and sell excess electrical energy back to the grid – known as ‘net metering.’ However, the design goal for this proposed project is to meet the building’s energy needs, not excess generation. Thus, this analysis does not explore net metering.

2. Benefits of Implementation

As established by File 21-389, Milwaukee County’s goal for county facilities and operations is to become carbon neutral by 2050. Investment in renewable energy generation can demonstrate Milwaukee County’s commitment to taking actionable steps in reducing emissions. Approximately 64 percent of the County’s 2022 operational emissions were due to building energy use¹. Targeted building energy use reduction as well as renewable energy implementation will be required for the County to achieve carbon neutral facilities operations.

On-site renewable energy generation also provides a hedge against future electric rate increases. We Energies’ electric rates have increased twice in the past two years, i.e., during 2023 and again in 2024. Between 2021 and 2023, blended average electric costs at the current Marcia P. Coggs Center increased from approximately \$0.89 to \$1.06 per square foot - a 19 percent increase.

3. Estimated System Cost

The project design consultants requested informal cost projections for the proposed PV system from three Milwaukee-area solar vendors, based on conceptual plans, and received responses from two vendors. The vendors’ conceptual cost projections ranged from \$2.2 to \$3.3 million, including design, equipment and installation. Both vendors had minor differences in design size, type of materials and panel efficiency. Although the scope varies slightly between vendors, all include full canopy design, including foundations, support structures and PV panel installations. Costs for additional features such as under-panel lighting fixtures and installation are not included in the vendor estimates. Final costs would be established through the Milwaukee County public works bidding process. Milwaukee County staff will continue to explore opportunities to add value and optimize the design of the proposed solar PV systems, such as adding battery storage to account for non-daylight electrical demands or providing movable panels that follow the sun and increase energy output.

4. Incentives

Focus on Energy offers rebates of up to \$50,000 for commercial solar PV installations in Wisconsin. To receive this rebate, Milwaukee County would need to complete the online reservation application to reserve rebate funds. Following

¹ Office of Sustainability emissions inventory for 2022 Milwaukee County operations. Accessed 2/9/24 from <https://milwaukeecounty.legistar.com/View.ashx?M=F&ID=12306023&GUID=60414C19-949F-44D1-A4F5-9E0794625537>.

completion of the system installation, Milwaukee County would complete the rebate application to receive a check.

With the federal Inflation Reduction Act (IRA) of 2022, tax-exempt and governmental entities including Milwaukee County are now eligible to receive tax credits for clean energy investments. These '[Elective Pay](#)' tax credits can offset the costs of solar PV installations by as much as 30 percent. However, Milwaukee County must first determine whether and how county departments may apply for the tax credits.

5. Payback Period

Using the estimated cost range of \$2.2 to \$3.3 million, the projected payback for the proposed high efficiency system is 25 to 38 years. However, with the inclusion of a 30 percent Elective Pay tax credit and \$50,000 incentive from Focus on Energy, a payback of 17 to 26 years could be achieved. The below table shows payback calculations before any incentives and tax credits.

Option	System Capacity (kW)	System Cost	Annual Electricity Production (\$)	Payback Period (years)
Vendor/System #1	537	\$2,200,000	\$88,300	25
Vendor/System #2	530	\$3,300,000	\$87,100	38

Analysis calculations courtesy of TLC Engineering
Annual Electricity Production based on a cost of \$0.14052 per kWh
The industry standard for most solar panels' lifespans is 25 to 30 years.

SUMMARY

1. Installation of solar photovoltaic electrical power generation and connection to the new Cogs facility is technically feasible and achievable.
2. Sufficient parking lot area exists to install a solar PV parking lot canopy system capable of meeting 100% of the facility's electrical energy requirements.
3. The initial project economics are not overly attractive. The costs of this system will range from \$2.2 to \$3.3M, and the simple payback on the installation will range from 25 to 38 years. Financial incentives may be available to reduce both the cost and payback period.
4. Milwaukee County staff will continue to evaluate system options that will deliver the best value for the County.
5. Installation of this renewable energy system aligns with and supports the County's policy and goal to achieve net zero emissions by 2050.

ALIGNMENT TO STRATEGIC PLAN

The new Marcia P. Coggs Health and Human Services Center is located in a Milwaukee neighborhood that the federal government is targeting for climate and clean infrastructure investments². Solar energy generation reduces carbon emissions and operating costs, helping to ensure fiscal sustainability and aligning with Milwaukee County's strategy to 'Invest in Equity.'

FISCAL EFFECT

The report is informational only and there is no fiscal impact.

VIRTUAL/HYBRID MEETING INVITES

Stuart Carron, Director of Facilities Management – Department of Administrative Services – Facilities Management Division

Sean Hayes, Director of Architecture, Engineering & Environmental Services – Department of Administrative Services – Facilities Management Division

Peter Nilles, Director of Facilities Planning and Development – Department of Administrative Services – Facilities Management Division

Gordie Bennett, Sustainability Director – Department of Administrative Services – Facilities Management Division

Grant Helle, Energy Program Manager – Department of Administrative Services – Facilities Management Division

PREPARED BY:

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APPROVED BY:

Stuart Carron, Director, Department of Administrative Services, Facilities Management Division

ATTACHMENTS:

1. New Coggs Parking Site Plan
2. Excerpt from New Coggs Parking Budget Narrative Report

² Under the White House's Justice40 Initiative, Milwaukee's King Park neighborhood is designated as a 'disadvantaged community' that is marginalized and overburdened by pollution and underinvestment. See <https://www.energy.gov/justice/justice40-initiative>.

CC: Kelly Bablitch, Chief of Staff, Milwaukee County Board of Supervisors
Janelle M. Jensen, Legislative Services Division Manager, Office of the County Clerk
Shakita LaGrant-McClain, Director, Department of Health and Human Services
David Muhammad, Deputy Director, Department of Health and Human Services
Steve Delgado, Director of Operations and Maintenance, Department of Administrative Services, Facilities Management Division