

## **Residential Solar Bulk-Purchase Program**

The U.S Department of Energy<sup>1</sup> defines community solar as any solar project or purchasing program within a demarcated geographical area in which the benefits of the solar project flow to multiple customers such as individuals, businesses, nonprofits and other groups.

For the City of Grand Rapids (GR), the scope of implementing such a solar program is curtailed by the current legislations of the state which does not allow the establishment of community solar except by investor- owned private utility companies.

## **Existing solar programs in the City**

**Lake Michigan Filtration Plant Solar Array (1 MW):** The City of Grand Rapids Lake Michigan Filtration Plant (LMFP) is partly powered by onsite renewable solar energy (Fongers 2022). The array generates 1.5 million kWh per year, which accounts for 10% of the LMFP's electricity consumption. With this onsite solar plant put into operation, it's expected to increase the City's renewable energy performance from 37.5% to 41%, which helps in the City's continuous progress towards 100% renewable energy for municipal operations by 2025. The 1 MW plant is owned and operated by CMS Consumers Energy.

**Rooftop solar at Bridge Street Market:** Michigan's first ever rooftop solar array and battery storage system operates in downtown Grand Rapids (Energy 2019). The project was undertaken by Consumers Energy in the Circuit West district. 1800 solar panels were installed atop the Bridge Street Market and adjoining buildings and accompanied with 500 kW battery storage. The panel can power 100 homes.

**Rooftop solar on Oak Industrial building:** Installed in 2012 on the roof of the Oak Industrial and Environmental Services Department office building. It was a 122 kW (DC) solar array that provides a proportion of the power for that facility (Office of Sustainability and Performance Management 2020).

## **Proposed mitigation activity**

A majority of the BIPOC communities live in rented homes – most are structurally old and unfit for immediate solarization. Discussions with the Health and Sustainable Building Policy Specialist at the OSPM confirms that approximately 60% of the housing inventory of GR was built before the 1960s. Most of this inventory is utilized as rental properties with little to no investment from landowners. As a result, such homes have –

- Weak roofing and insulation
- Older electrical fittings and appliances that consume high energy,

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<sup>1</sup> <https://www.energy.gov/eere/solar/community-solar-basics>

- Unsafe health & indoor environment due to lead pipes, soot on windows, etc.

In 2021, a research was conducted by Construction Coverage, a real estate firm on minority home ownership in US cities using American Community Survey (ACS) five-year estimates (2019). Cities were grouped into three categories: small cities (100,000 – 149,999 persons); medium cities (150,000 – 349,999 persons), and large cities (350,000 and above persons). Cities in each group were ranked on the basis of share of minority home ownership in their category. According to that study, Grand Rapids was ranked 84<sup>th</sup> among 107 medium cities.

### Household ownership in Grand Rapids by ethnicity

Minority population share	White only population share	White homeownership (%)	Minority home ownership (%)	Black ownership (%) among all black population	Hispanic ownership (%) among all Hispanic population	Asian, Native Hawaiian & Pacific Islanders (%) among all above race population
43.1	56.9	63.7	37.7	35.4	41.9	35.7

Source: American Community Survey, 5-year estimates (2019). Jones, Jonathan. "Cities with Highest (and Lowest) Minority Homeownership Rates", Construction Coverage (2021)

Given this context, piloting and implementing a specific residential solar program has limited scope. The proposed pathway is to educate, generate awareness and create engagement among residents who would utilize the E.H.Zero Initiative. This initiative is focused on creating solutions for equitable, healthy and zero carbon buildings.

The Equitable, Healthy & Zero (E.H.Zero) Carbon Buildings program was launched in 2022 by the City of Grand Rapids, U.S Green Building Council of West Michigan, and Urban Core Collective with the aim to transform the design and construction of buildings and homes, and operated so that Grand Rapids can support affordable housing, ensure clean healthy air and increase community resilience to negative impacts of climate change.

The program recognizes that BIPOC communities are disproportionately impacted by both indoor and outdoor environmental pollutants and are underrepresented in design, operation and maintenance of their residences. The initiative aims to realize policies and programs for residential and commercial buildings that have been co-created and supported by the community. Such policies/programs would benefit health outcomes while reducing the utility cost burden and carbon emissions. The initiative is in the process of implementing a pilot program to renovate five residential buildings (rented and owned) to make them energy efficient.

Using the existing E.H.Zero pilot program, the implementation agenda for bulk solar is to include solarization solutions as one of the activities in the program for the participating households. The objective will be to provide knowledge solutions about solar such that they can participate in a bulk solar purchase program in the future. The steps involved to reach energy efficiency are –

**Step 1:** weatherization (to make the household structurally efficient through repairs and improved insulation)

**Step 2:** electrification (switching to energy efficient appliances including heating, cooking to reduce indoor air pollution)

**Step 3:** solarization (installing ground mounted/roof-mounted solar to achieve energy efficiency; decarbonization)

The model will work on generating and aggregating interest of the participating households to create a bulk demand for home improvements. Bulk programs create a win-win situation by reducing the cost of energy audits and home improvements through group discounts. There are three stakeholders whose participation is required to implement this program.

### **Participating Stakeholders**

**Resident Ambassador** - This program requires a first-mover household who will initially demonstrate the use of residential solar. This household becomes the *Resident Ambassador* to spread information and engagement within the group. They will facilitate and moderate group meetings to share information on home improvements, the negative impacts of indoor air pollution, and the process of adopting solar. In the pilot phase, one household among the five can be considered for this role, specifically belonging to the BIPOC community.

**Contractor** - the agency/agencies who will provide energy audits, cost estimate for home improvements, and specific information to each of the participating households on their housing condition and the extent of renovation required. The contractors will actively participate in the group meetings to explain the process and the time involved.

**Financial Institution** - Based on the experience of the Solarize program at Ann Arbor, it is recommended that a financial institution should be involved in this program. The financial partner is not any traditional financial institution rather a green bank which invests in home improvements and energy efficiency and provides customized financial support. The suggested entity for this role is Michigan Saves.

The organization was created in 2010 as a result of \$6.5 million grant by the State Public Service Commission to allocate funds for creating an energy efficiency lending program<sup>2</sup>. Over a period of time, it has created a \$60 million lending facility. The repayment is flexible since Michigan Saves is impartial to whether the loan is repaid through lender billing, utility bill, or any other method.

Based on the success of the community bulk buying program at Ann Arbor, this program could include Michigan Saves as the financial partner for Grand Rapids as well. Michigan Saves was founded in 2009 by the Michigan Public Service Commission grant (Balaskovitz 2017). Participants of the program are required to be owners of the property and once they find the installer they want to work with, they apply for the loan which is supported by different lenders all over the state.

Through Michigan Saves, households can match with a contractor to get an estimate on qualifying energy improvements that include – roofing, insulation, remediation, replacing air conditioning, heating, windows, bathroom fittings, etc. The qualified contractors will complete an analysis of your home to determine the areas of improvement required to become energy efficient.

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<sup>2</sup> [https://energy.gov/sites/prod/files/2014/01/f6/michigan\\_saves\\_program\\_description.pdf](https://energy.gov/sites/prod/files/2014/01/f6/michigan_saves_program_description.pdf)

**Office of Sustainability** - The other important participant in this program is the organizer (Great Lakes Renewable Energy Association (GLREA), 3-5). This should be the Office of Sustainability and Performance Management (OSPM) as they can oversee the implementation of selection of qualifying homes, source of funds, and the engagement and advocacy for this program. OSPM could work on three specific agendas -

- Providing information on the qualifying criteria and eligible home improvements under the program
- Encouraging and persuading households to share a nominal proportion of the cost of the improvements so that they are actively invested in the program
- Showcasing E.H.Zero as the one point solution for residences regarding energy efficiency through a concierge of services that includes financing, weatherization, electrification, and solarization

**Nonprofits/Neighborhood Associations** – Members of organizations like Seeds of Promise, along with neighborhood associations can conduct trainings for communities on home weatherization, electrification and solarization programs. The qualified members can then conduct home assessments as a payment-based service provided by the associations for their community.

A specific example would be the GreenStar Homes Program provided by Green Home Institute (Roberts 2018). This is a holistic certification program that is used for renovations, home additions, constructions/electrification or solarization. In order to receive the certification, homes are required to make efforts in home improvements based on a checklist. A GreenHome Inspector (GHI) audits the home before and after the improvements and submits the checklist for approval. This program can be trained by the local associations, and through a training of trainer (ToT), the GHI can be appointed from the local community to conduct the audits for the households. The GHI could be paid out by Green Home Institute.

### Cost estimate for solar panels

The cost of solar panels depends on many factors, including your location, the size and configuration of your system, local labor and permitting costs, and more. Power generated by one solar panel is the amount of direct sunlight an area gets, on average, per day multiplied by the wattage of the panel (Thumbwind Staff 2021).

Factors for cost estimation	Figures
Average amount of sunlight/day in Michigan	4.1 hours
Wattage of one solar panel	250 W – 400 W
Energy produces by one panel	1kW – 1.6 kW
Cost of one panel	\$3.12 <sup>3</sup>
Cost of power produced	\$3,120 - \$4,992

Source: Energysage.com, 2022. “Solar Panel Cost in Michigan”

<sup>3</sup> <https://www.energysage.com/local-data/solar-panel-cost/mi/>

## Challenges to Residential Solar

There are three issues that can arise in such community development programs. These are in the form lack of awareness on the extent of structural weakness of their housing, financial constraints to undertake improvements (specifically for renter households), and policy bottleneck.

The partners of E.H.Zero who will be selected to conduct evaluations and provide home certification, and the panel of contractors with Michigan Saves can ensure that the program provides complete information to the participating households.

The financial liability on participating households can be calibrated through a modified Pay as You Go (PAYG) model. The PAYG is a business model that has emerged to address the energy needs through renewable energy solutions for low income households. Typically, the PAYG model relies on use of mobile technologies, declining cost of electricity supply technology, and integration with the energy service provider (IRENA 2020). For the participating households in GR, the PAYG model can be integrated into the program by linkage with Michigan Saves. The households pay off their share of liability as per the extent of use from the installations.

There are specific policy challenges that impede the initiative and adoption of this program. They are detailed below.

**House Bill 4125** - The proposed bill would impose the requirement of an occupational license system to supervise electrical job operations for renewable energy sources. The bill stipulates a certain number of hours of training that would add to the cost of installation and ultimately the cost will be passed on to consumers (Skorup 2021). The bill has been passed in both the houses and as of June 2021 was with the Senate Committee on Regulatory Reform as of June 2021.

**Clean and Renewable Energy and Energy Waste Reduction Act (2008)** - the Act capped distributed energy supply to the grid at 1% of each utility's peak load average over the last five years. This implied that for the given highest amount of energy a utility company was supplying to meet the demand of a customer, once the customer installs solar, no more than 1 percent of the total energy consumer can come from customer generated clean energy.

When the law was enacted in 2008, this ceiling wasn't a concern because there were very few solar systems in Michigan. Since then solar has become popular for both residential, business, and in the agricultural sector. With the rise in electricity rates over the years, customers wanted to take ownership of their energy by having the ability to generate their own electricity.

In 2016 the state Legislature modified the 2008 law and replaced the procedure through which distributed solar owners sold surplus energy to the grid by replacing the old Net-Metering program with a new Distributed Generation (DG) Energy program (Freeman 2021).

Under the DG program the credit is calculated based on the cost of service the utilities incur to provide energy to solar owners. When this tariff is determined, the credit that solar owners receive for selling electricity back to the grid is significantly less. Under Net-Metering it was the same as the retail rate, about 16 cents/ kWh, but under the DG program, it dropped down to around 8 cents/ kWh. The data from a [2018 Michigan Public Service Commission report](#) stated

that DTE paid rooftop solar users 3.9 cents/kWH while the true value of that energy was estimated to be 13.8 cents/kWH by the National Renewable Energy Laboratory (Moore 2021).

Once this pilot program becomes self-sustainable, the City government could work towards generate advocacy to support the legislation House Bill 4236<sup>4</sup> in the state legislature. House Bill 4236 has been proposed to eliminate the current 1% cap on distributed energy in the state's investor-owned utility territories.

**Federal Tax Credits** - The federal residential solar energy credit is a tax credit available for property owners who can claim credit on their federal income taxes for a percentage of the cost of the installed solar system. The current extension period lapses in 2024. The current tax credit is 26 % (2020 - 2022) and going forward it will reduce to 22 % in 2023. Systems installed before December 31, 2019 were eligible for a 30% tax credit (Office of the Energy Efficiency and Renewable Energy 2021). This implies that households interested in solar will have a lower time horizon to claim those credits unless the system is renewed beyond 2024.

Given the policy bottlenecks, the proposed residential solar program could serve lead to home improvements among BIPOC households, energy efficiency behaviour, zero carbon emission from residential buildings and ultimately an advocacy space to for an community solar in Grand Rapids.

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<sup>4</sup>[http://www.legislature.mi.gov/\(S\(bbsjfxswcplh3un2wgrskolr\)\)/mileg.aspx?page=GetObject&objectname=2021-HB-4236](http://www.legislature.mi.gov/(S(bbsjfxswcplh3un2wgrskolr))/mileg.aspx?page=GetObject&objectname=2021-HB-4236)

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