Let Communities Choose

Clean Energy Sovereignty in Highland Park, Michigan

Union of Concerned Scientists

SOULARDARITY

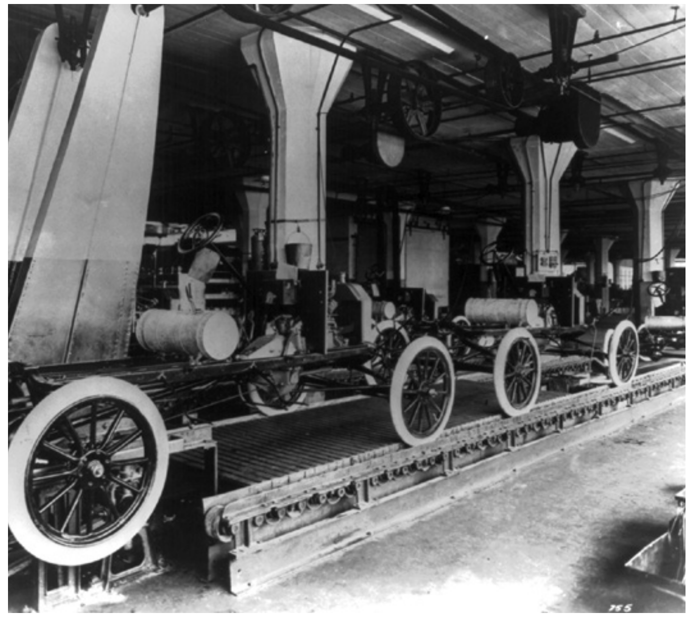
In the traditional model for electric utilities, we all use the power they supply and we pay the bills; the utilities do the rest. This model is not designed to engage the people and communities the utilities serve, nor does it provide quality service for all. Rather, it heightens the health, affordability, and climate crises that affect people already struggling with too many service outages, rising electricity rates, and downed power lines.

This is felt deeply in Highland Park, Michigan, where residents are asking fundamental questions. What if we envision a different model of supplying and consuming electricity? What if we empower communities to choose clean energy and generate electricity locally?

Increasingly, communities across the United States are doing just that. As the climate crisis accelerates, people of color and low-income working-class people, afflicted by historic systemic racism, are experiencing some of the worst effects of pollution and climate change. Fossil fuel generators that burn coal and methane gas are disproportionately sited in or near low-income and minority communities, contaminating the environment, posing health risks, and driving up carbon emissions (Grier, Mayor, and Zeuner 2019). That is a big reason why more and more neighborhoods and entire cities are demanding the development of clean energy that leads to safe, resilient, affordable, and community-driven systems. As interest in reimagining the energy system increases, communities are seeking the agency to choose locally generated electricity resources that benefit everyone and provide access to all (Schelly et al. 2020).

The Union of Concerned Scientists (UCS) and Soulardarity (a Highland Park–based nonprofit working to build a just and equitable energy system for all) set out to explore how Highland Park could envision a future of clean energy and move to a locally controlled, equitable, and just energy system—a community powered 100 percent by local, resilient, and affordable clean energy sources, owned by local people and businesses. *Let Communities Choose* explores a potential pathway to achieving the bright, resilient vision this city's residents have for their community. It considers the policy changes and the modifications to a traditional utility's incentives and ways of operating that are needed to achieve that vision and its emphasis on an equitable distribution of benefits.

Places like Highland Park are seeking energy sovereignty—the ability of communities and individuals to choose the forms, scales, and sources of the energy they use (Schelly et al. 2020). This should be a core building block as Michigan, other states, and the nation seek not only to decarbonize the provision of electricity and other services but also to address how those services reflect systemic racism.



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The world's first moving assembly line was at the Ford Motor Company's Highland Park Plant. More than a century later, Highland Park can once again be a home for innovation by owning and generating the energy used by its residents and businesses.

Achieving Self-Determination in Highland Park

In Highland Park, a 2.97 square mile city in Southeast Michigan, today's roughly 10,000 residents represent about one-fifth of its peak population of 53,000 (City of Highland Park, n.d.). The city has been ground zero for the fossil fuel model of community development. In addition to Henry Ford's creation of the world's first moving assembly line in 1913 (Detroit Historical Society, n.d.), the city and its immediate vicinity have been home to the country's first mile of concrete highway (1909) and first depressed urban expressway (1942) (MDOT 2015).

Today, innovative, dedicated local leaders in this community are fighting for just and equitable development in the face of numerous systemic crises. According to University of Michigan researchers, Highland Park is in the 92nd percentile for environmental injustice in Michigan, with among the highest levels of health vulnerability based on hazardous air pollution, poverty, and other social and environmental determinants (Zeuner, Grier, and Mayor 2019).

Income is extremely low, with 46.5 percent of the population living at or below the poverty level. Median household income is $18,474; 63 percent of residents are renters; and the median value of owner-occupied housing units is $45,700 (US Census Bureau 2019). Highland Parkers struggle with the impacts of aging and divested housing stock, food insecurity,

Cover Photo: Nick Hagen

burdensome housing costs, and a lack of Internet access (less than 50 percent of households have broadband connection).

Highland Parkers also suffer from extreme "energy poverty." The average Michigan household that has the median income of Highland Park spends 18 to 33 percent of income on energy; 6 percent or less is considered to be an affordable energy burden (Fisher Sheehan & Colton, n.d.). In part, this deficit is driven by consistent and aggressive increases in residential electric rates from DTE Energy, the local utility, while rates for industrial and other large energy users have risen much more slowly (Matheny 2019). Some Highland Parkers also experience very poor energy reliability: some households reported multiple full days of outages this past year, including during heat waves, winter storms, and pandemic conditions (House 2021).

Despite the historic forces stacked against them, Highland Parkers have organized for transformative and forward-thinking changes, and they are claiming a seat at the table in state and federal policy conversations on various important topics such as lead and copper rules, utility regulation, and community development. In 2011, when DTE Energy repossessed and removed two-thirds of the city's streetlights, residents responded by forming Soulardarity, a nonprofit organization that has since installed 17 community-owned, solar-powered streetlights and has become a strong advocate for energy democracy. At the same time, two Highland Parkers launched sustainable development projects, Avalon Village and Parker Village, that advance community-centered sustainable development visions anchored by clean energy (Avalon Village, n.d.; Parker Village, n.d.). In 2019, Soulardarity released *The Blueprint for Energy Democracy*, a plan to make Highland Park a global model for sustainability and self-determination (Soulardarity 2019).

Consumers Energy/Creative Commons (Flickr)

An artist rendering of the community solar project at Grand Valley State University in Michigan. Building larger-scale projects like these in the community can benefit Highland Park's move toward energy sovereignty.

[***Soulardarity's vision is for Highland Park to be powered 100 percent by local, resilient, and affordable clean energy resources that are owned by people in the community.***]

Toward an Energy Sovereignty Vision

Soulardarity's vision for Highland Park is a community powered 100 percent by local, resilient, and affordable clean energy resources that are owned by people and businesses in the community. UCS and Soulardarity started their analysis of how to make this possible with an assumption that Highland Park's residential and commercial sectors have a total average annual electricity demand of approximately 86,200 megawatt-hours (MWh) (Buchanan et al. 2017). What collection of resources could meet that level of demand, with a particular focus on the capacity and economics of rooftop solar? This analysis focused on the electricity sector and identified key resource categories to serve Soulardarity's vision of energy sovereignty.

- **Energy efficiency:** The foundation of the vision is energy efficiency, which reduces the amount of electricity consumed while lowering energy bills and improving the comfort, health, and longevity of homes and businesses.
- **Rooftop solar:** Hosting solar panels on the roofs of homes and other buildings can reduce both customers' electricity bills and the amount of land needed for electricity generation. Rooftop solar makes more space available for urban agriculture, recreation, and other community and economic purposes. It can also be paired with energy storage batteries to further help customers save money on their bills and to assist during power outages and periods of peak power demand (see box, p. 4).
- **Community solar facilities:** Larger yet still local solar installations enable subscribing customers to receive credit on their electricity bills for the electricity produced. This model is particularly advantageous for residents or businesses unable to pursue rooftop solar, either because they are renters or because their roofs cannot accommodate solar.

- **Other distributed solar resources:** Throughout a community, customer-owned solar can be installed in innovative ways and locations that take up little land. For example, solar carports can include charging hook-ups for electric vehicles, solar canopies can be installed over driveways, patios, or other outdoor areas, and solar trees in various shapes and sizes can be located on business grounds or in parks or other public spaces.
- **Community water and energy resource centers (CWERCs):** CWERCs are small-scale treatment facilities (1 million to 5 million gallons daily) that accept waste-water from sewer pipes and food waste from food processors and local businesses, converting it to electricity, reclaimed water, and thermal energy (CRWA 2015). CWERCs turn organics into methane through anaerobic digestion, which can be used to generate electricity and heat.

Energy Storage Batteries Can Add to Utility Bill Savings and Resilience Benefits

While the UCS-Soulardarity analysis focuses on saving and generating electricity, energy storage batteries are an important part of Soulardarity's vision for energy sovereignty. Batteries do not generate power themselves, but when paired with solar they can store electricity to be used at other times or during power outages. Batteries can also help shift solar generation to meet periods of peak demand, and they can assist customers in shifting their electricity consumption to periods of less stress on the electric grid. Front-of-meter storage installations—batteries installed as part of the electric grid or in combination with community solar sites and other renewable energy facilities—are growing dramatically in the United States (ESA 2020). Although our results from the HOMER modeling did not show behind-the-meter battery storage to be cost-effective for the single-family home scenario we tested, the economics of solar-plus-storage were better for commercial buildings we analyzed.

Nevertheless, residential battery storage is gaining traction in Michigan as battery costs continue to decline. Electricity consumers and installers are finding ways to pair batteries with solar in projects that are cost effective even under utilities' current programs (Perkins 2021). Additional incentive programs at the state or federal level—an example is Massachusetts' ConnectedSolutions program (Mass Save, n.d.)—and improved time-of-day rate offerings can further increase the attractiveness for behind-the-meter storage, enable customers to save more money on their energy bills, and bolster the resiliency of the overall system. Such programs would also help protect those who are especially vulnerable during power outages, such as seniors, low-income families, and anyone who relies on medical equipment or refrigerated medicine.

Rooftop Solar Analysis

Our analysis used the Hybrid Optimization of Multiple Energy Resources (HOMER) software model to examine Highland Park's potential for rooftop solar under current policies and programs maintained in Michigan and by DTE. The analysis included nine types of buildings.

Residential single-family homes are the most prevalent structures in Highland Park. Using census data, we estimated the number of occupied single-family homes in Highland Park. We then assumed that about 60 percent of these homes are currently solar-viable based on aggregated overhead imagery (Google Project Sunroof 2018) and input from our project team about the structural conditions of houses. The eight other structure types examined were midrise apartment, medium-size office, stand-alone retail, supermarket, warehouse, primary school, and full-service and quick-service restaurant buildings.

We then developed a reference scenario, selecting the largest solar configurations from the HOMER outputs based on rooftop size and the requirements in DTE's distributed generation program (Table 1).[1] In general, we found that single-family homes and certain other building types are limited in the amount of solar they can install because of the utility's restriction tying the size of a solar installation to a customer's annual usage and an overall limit of 150 kilowatts (kW). Also, payback periods are relatively long due in part to DTE's compensation mechanism for customer-generated solar power and the absence of other state solar incentives.

We found that installing solar in the amounts in our reference scenario (Table 1) would produce 11,343 MWh per year. This would meet about 13 percent of Highland Park's energy needs.

For additional detail on the methodology, see the technical appendix at www.ucsusa.org/resources/let-communities-choose-clean-energy.

Next we created a policy scenario to test how improved solar policies could increase the potential for rooftop solar in Highland Park. The scenario has four components:

- **Eliminating size restrictions on distributed generation:** Assuming that the owners of homes and other buildings could utilize more of their rooftop space for solar generation, we selected larger solar systems from the HOMER outputs for building categories including single-family homes, supermarkets, warehouses, and primary schools. We also assumed that energy-efficiency retrofit programs would make additional single-family homes solar-viable, so that 80 percent of homes become available to host rooftop solar, rather than 60 percent in the reference scenario.
- **Improving the compensation mechanism for solar production:** In 2016, Michigan changed its energy laws to no longer require utilities to offer full retail-rate net metering. Until that change was implemented, every kilowatt-hour (kWh) a customer's solar installation exported to the grid earned them a 1 kWh credit on their bills. Restoring full retail-rate net metering would significantly shorten payback periods for solar investments by single-family households compared with the period under DTE's current compensation mechanism. The effect of restoring full retail-rate net metering could also be achieved by creating a fair and reasonable value-of-solar calculation; Minnesota uses such an approach (MnSEIA, n.d.).

[Improved compensation for rooftop solar production would significantly shorten payback periods for investments by single-family homeowners.]

- **Adding a supplemental revenue stream for customer solar production:** Many states further compensate utility customers for solar generation. One form this can take is using a renewable portfolio standard (RPS) that recognizes the environmental attributes of solar and other clean energy resources. Michigan's RPS, established in 2008, is 15 percent by 2021; compliance is achieved through utilities' retiring what are known as renewable energy credits (RECs). One REC represents 1 MWh of renewable energy. As a proxy for additional solar compensation, our modeling assumes that Michigan updates and expands its RPS to include a distributed solar carve-out, as Illinois and several other state RPS programs have done; this could help create a viable solar

TABLE 1. The Reference Scenario: Rooftop Solar under Current Policies

Building Type	Assumed Number of Structures	Solar Capacity per Structure	Per-Building Annual Production	Initial Investment (with Investment Tax Credit)	Annual Bill Savings (2021$)	Payback Period
Single-Family Home	1,428	4.3 kW	5,586 kWh	$8,304	$640	15 years
Midrise Apartment	5	49.5 kW	62,862 kWh	$67,609	$9,707	7 years
Medium Office	5	86.3 kW	109,642 kWh	$117,922	$8,322	16 years
Stand-Alone Retail	10	86.9 kW	110,468 kWh	$118,811	$7,451	19 years
Full-Service Restaurant	10	17.9 kW	22,802 kWh	$24,524	$1,371	21 years
Quick-Service Restaurant	10	10.9 kW	13,798 kWh	$14,840	$890	20 years
Supermarket	2	112.7 kW	143,234 kWh	$154,051	$12,513	14 years
Warehouse	3	147.4 kW	187,377 kWh	$201,528	$11,147	22 years
Primary School	1	145.6 kW	185,041 kWh	$199,015	$14,669	16 years

The reference scenario provides a basis for comparing policy options in the UCS-Soulardarity analysis with current conditions. The modeling assumes that the federal investment tax credit (ITC) is applied to the investment cost. In addition, the kilowatt size for the single-family home is relatively small due to DTE's program limiting solar size to the customer's average annual usage.

Note: We assumed solar investments would be made in 2023, corresponding to a 22 percent federal investment tax credit. For more information, please see the technical appendix at www.ucsusa.org/resources/let-communities-choose-clean-energy.

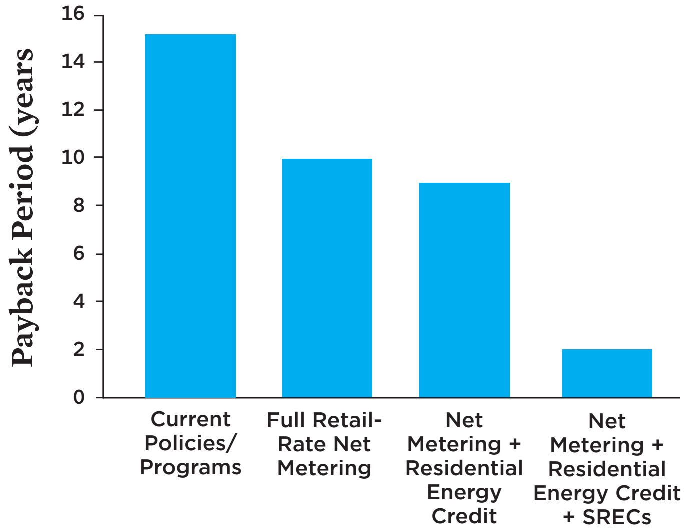
SOURCE: UCS CALCULATIONS BASED ON DATA FROM HOMER GRID.

REC (SREC) market for customers installing solar. Our policy scenario assumes that Highland Park solar owners could sell SRECs valued in the $42 to $67 range depending on the system size (equating to $0.042–$0.067 per kWh), payable upfront or shortly thereafter for 15 years of production, based on the Illinois program (Illinois Power Agency 2020).

- **Adding a Michigan Residential Energy Credit:** State tax policy can incentivize rooftop solar. For example, the Massachusetts Department of Revenue regulations (Mass. Regs. Code tit. 830, § 62.6.1) offers a credit against state personal income taxes equal to 15 percent of the net expenditure for renewable energy resources (including batteries) or $1,000, whichever is less. Our policy scenario assumes that new solar customers in the single-family-home category would receive a $1,000 state tax credit or a cash grant if the customer has no tax liability.

This suite of policies could significantly reduce the payback period for installing a 4.3 kW solar system (Figure 1). With all four policy changes, the contribution of rooftop solar in our analysis increases from supplying about 13 percent of Highland Park's electricity needs to supplying nearly 30 percent of the 86,200 MWh target. Further, both the payback

FIGURE 1. Better Energy Policies Can Make Rooftop Solar More Affordable for Highland Park Homeowners



Current state policies and DTE utility programs results in a long payback period (15 years) for a sample homeowner installing solar. Improving compensation for investments in solar significantly reduces that payback period.

SOURCE: UCS CALCULATION BASED ON DATA FROM HOMER GRID.

Spotlight Solar

Solar trees, like this one in Madison, Wisconsin, allow for distributed solar generation in open areas such as parks while preserving the land underneath for other uses.

TABLE 2. Impact of the Policy Scenario on Payback Periods and Upfront Investments

Building Type	Assumed Number of Structures	Solar Capacity per Structure	Annual Production per Structure	Initial Investment per Structure with All Monetary Incentives Included	Adjusted Payback Period
Single-Family Home	1,904	8.3 kW	10,908 kWh	$4,213	3 years
Midrise Apartment	5	49.5 kW	62,862 kWh	$56,662	3 years
Medium Office	5	86.3 kW	109,462 kWh	$98,859	4 years
Stand-Alone Retail	10	86.9 kW	110,468 kWh	$99,573	4 years
Full-Service Restaurant	10	17.9 kW	22,755 kWh	$20,050	4 years
Quick-Service Restaurant	10	10.9 kW	13,856 kWh	$12,210	4 years
Supermarket	2	225.4 kW	286,468 kWh	$271,552	8 years
Warehouse	3	245.7 kW	312,295 kWh	$296,033	10 years
Primary School	1	388.2 kW	493,443 kWh	$467,749	9 years

Installing increased solar in these amounts under our policy scenario would produce 25,105 MWh per year, about 30 percent of Highland Park's energy needs. For the single-family home category, we assumed the customer could roughly double the size of their installed system from the reference scenario without being constrained by utility program requirements. For additional detail on how we applied the different policy elements to the different building types, please refer to the technical appendix.

SOURCE: UCS CALCULATION BASED ON DATA FROM HOMER GRID.

periods and the needed upfront investments shrink substantially (Table 2).

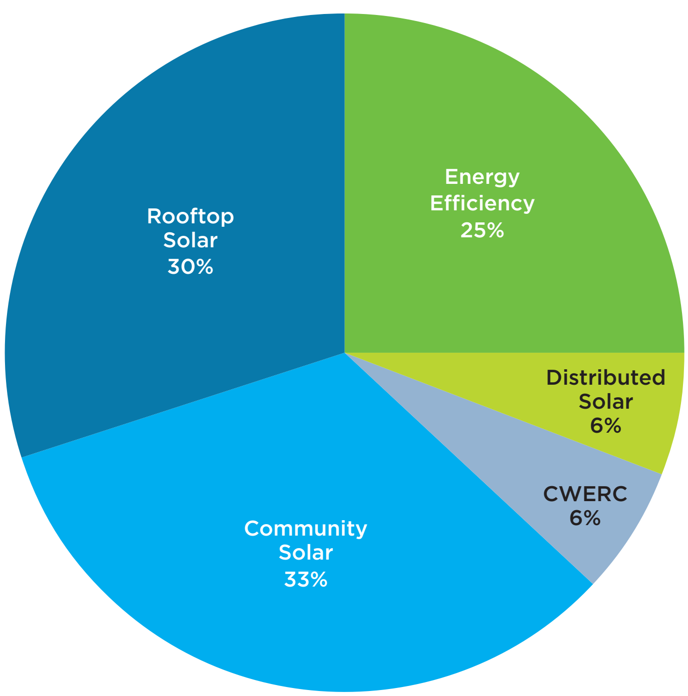
Bringing In Additional Clean Energy Components

Rooftop solar can meet a substantial portion of Highland Park's energy needs. Energy efficiency, community solar facilities, distributed solar installations, and a community water and energy resource center could help the community achieve a vision of 100 percent locally generated clean energy. Putting together all these components, Highland Park could be powered by local, resilient, and affordable clean energy resources that are owned by people and businesses in the community (Figure 2).

ENERGY EFFICIENCY

According to a study prepared for DTE's service territory, there is an achievable energy efficiency potential of about 20 percent in electricity savings in the residential and commercial sectors by 2035 (GDS Associates, Inc. 2016). This achievable potential accounts for market and adoption barriers and assumes that not all cost-effective efficiency measures will be realized. Overcoming additional barriers could yield additional savings: the study for DTE found up to 49 percent

FIGURE 2. Components of a 100 Percent Clean Energy Vision for Highland Park



energy savings for the residential sector and 36 percent for the commercial sector. Our analysis assumes that more aggressive policies and funding levels could achieve 2 percent savings per year; as a result, energy efficiency could contribute a total of 25 percent of Highland Park's energy needs by 2035.

Expanding achievable potential with respect to efficiency is important as transportation and buildings convert from fossil fuels to electrification. Moreover, efficiency can be less expensive than certain solar applications and requires no additional land use.

One advanced way to increase efficiency is a deep energy retrofit, which can include homes and other structures undergoing roof replacement and receiving improved roof insulation (Cluett and Amann 2014). Projects like these could help make more single-family homes "solar ready" by addressing subpar roof conditions or other structural concerns. Additionally, home retrofits can make many homes healthier from the perspective of indoor air quality, such as by reducing asthma triggers (Cassidy 2021).

COMMUNITY SOLAR FACILITIES

Despite the significant potential of efficiency and rooftop solar, achieving 100 percent clean energy locally in Highland Park will likely require at least some larger solar installations in the community. A key aspect of community solar is that the utility does not need to own such facilities; nonprofits, municipal governments, and other entities can own them. Additionally, customers can subscribe to a project and receive credits on their bills through "virtual" net metering based on the output from the community solar arrays. However, Michigan does not require utilities to make virtual net metering available, and DTE does not offer it.

TABLE 3. Illustrative Sites for Highland Park Community Solar Facilities

Site	Capacity	Acres	Annual Output
Former Ford Highland Park plant	10 MW	50	14,210 MWh
Former Ecoworks site	4 MW	20	5,684 MWh
Land between Johnson Controls and Coca-Cola	4 MW	20	5,684 MWh
Land north of Nandi's Knowledge Café	2 MW	10	2,842 MWh

Repurposing these four currently unoccupied parcels of land could yield about one-third of the 86,200 MWh target for Highland Park.

SOURCE: UCS CALCULATION BASED ON DATA FROM S&P MARKET INTELLIGENCE AND DAFT LOGIC.

[Overcoming barriers and achieving additional energy efficiency saves customers money and can make more homes solar-ready.]

In considering Highland Park's transition to clean energy, we looked at real-world solar installations to get a sense of the land area required for such facilities and the production output they provide. Our analysis illustrates the impact of transforming four Highland Park parcels of currently vacant land, with a total land area of 100 acres, into solar facilities (Table 3).[2] Together, these parcels could host 20 MW of community-owned solar and achieve about one-third of the 86,200 MWh target for Highland Park. Please refer to the technical appendix for overhead imagery of these locations.

DISTRIBUTED SOLAR INSTALLATIONS

Various types of non-rooftop, distributed solar could be installed throughout Highland Park, including creative applications such as solar carports, solar canopies, and solar trees. To produce about 6 percent of Highland Park's energy needs, we assumed the installation of 50 four-spot solar carports, 50 solar canopies, 100 solar trees, and an additional 3.25 MW of undefined distributed solar.

The 3.25 MW of undefined distributed solar is equivalent to installing one additional large community solar facility; spreading this solar capacity throughout the community would minimize additional usage of land parcels for power generation. The amount of undefined solar could be reduced through identifying additional rooftops available to host solar and by building the community solar installations with single- or dual-axis trackers to increase their output.

COMMUNITY WATER AND ENERGY RESOURCE CENTER

Despite their quirky name, CWERCs can help address a serious challenge in urban communities: wastewater treatment. In addition to producing reusable water, a CWERC captures methane that it can provide directly to nearby buildings for heating. In addition, the methane can be

2018 MLive Media Group

A solar carport sits above electric vehicle charging stations in a parking lot in Ann Arbor, Michigan. Carports and solar canopies can be installed on already developed land parcels, providing shade while also generating clean electricity.

combusted at the facility to generate electricity (CRWA, n.d.). CWERCs are chemically balanced, renewable, and carbon-neutral assuming no methane leaks from the system.

The town of Littleton, Massachusetts, with a population similar to that of Highland Park, is working on developing a CWERC to collect wastewater and divert food waste from landfills, and then treat it in an enclosed facility (Chawaga 2017). A CWERC sized to treat 3 million gallons of wastewater per day can generate 5,300 MWh of electricity per year (CRWA 2015). This would equate to about 6 percent of the 86,200 MWh target for Highland Park.

Recommendations for Michigan Policymakers and Utilities

To move toward making an energy sovereignty vision a reality, and to ensure that the transition is fair and equitable and does not repeat past mistakes and injustices, state policymakers should promote programs that target investment in traditionally underserved areas. These communities are often predominantly populated by people of color who have endured disproportionate health impacts from air pollution and other inequities associated with the energy system. We recommend that the Michigan legislature, the Michigan Public Service Commission, and the state's utilities pursue policies that empower communities to choose and achieve a clean energy vision, and to do so through a lens of equity and justice.

- **Eliminate the ability of utilities to cap distributed generation or restrict the size of customer-owned resources:** Michigan does not require utilities to compensate their customers for distributed generation once the total amount of that generation in the utility service territory exceeds 1 percent of the utility's peak load. This needs to change if Highland Park and other communities are to achieve clean energy sovereignty. Cities and towns should be able to utilize the full feasible area of rooftops and the existing built environment for a clean energy transition. DTE and current state law should remove restrictions on the size of customer-owned distributed generation.
- **Require utilities to meet higher levels of energy efficiency and address barriers to adoption:** Utilities can reach higher levels of cost-effective energy efficiency than they currently pursue. Additionally, customers should be rewarded for investing in energy efficiency through lower electricity bills, not be punished with regressive rate increases for conserving electricity usage.
- **Require utilities to offer virtual net metering to facilitate community solar:** Many states require virtual net metering, recognizing the value that customer-supported

Ifalola-James Jones

With the right policies in place, Highland Park can transition from its industrial past to a community powered by local clean energy resources.

solar provides and the role community solar plays in enabling more equitable and direct access to the benefits of clean energy. Renters and property owners who cannot install solar themselves should be able to participate in community solar and receive the financial savings it can provide.

- **Improve the compensation mechanisms for customer-owned solar:** Michigan should either restore full retail-rate net metering or conduct a thorough value-of-solar study toward fully compensating solar generation for its contributions to the electric grid. For example, although Minnesota does not require full retail-rate net metering, it offers a value-of-solar compensation rate to compensate community solar subscribers for the benefits the projects provide to the grid, including avoided transmission and distribution system upgrade costs (MnSEIA, n.d.). By recognizing the environmental and other valuable attributes of distributed solar, improved compensation increases its economic attractiveness for customers. Also, improved compensation can be paired with additional revenue streams, grants, and tax credits to recognize the multifaceted value that distributed solar provides.[3]

- **Make lower-cost financing and other investment programs more accessible to lower-income households and communities:** Approaches to more inclusive financing include requiring utilities to offer "pay as you save" or other on-bill financing programs that utilize flexible underwriting methods and protect vulnerable households from the risks of taking on direct debt for energy-related upgrades. With on-bill financing, a utility or a third-party energy services company offers programs that fund efficiency or solar installations; the customers pay back the cost over time through utility bills while still saving money overall. The financing can be at a lower interest rate than commercial lenders provide and also offered to customers with poor credit. Also, financing and other programs should include measures to ensure that projects are cost effective for customers, as well as requiring clear disclosures and resources for technical assistance and education.

Improving access to lower-cost financing and other investment programs is needed to ensure lower-income households can benefit from local clean energy.

Another option is to expand Michigan Saves, the state's nonprofit green bank, and encourage it to place more emphasis on underserved communities like Highland Park. For every dollar of public funds invested, the bank draws about $30 from private investors, and it can secure very favorable rates for its loans (Perkins 2020). Currently, however, Michigan Saves is limited by a lack of robust public funding and is still striving to be more accessible to lower-income people.

- **Create state benchmarks to ensure that clean energy development benefits communities like Highland Park:** Through a 2020 executive order by Governor Gretchen Whitmer, Michigan has set a goal of reaching economy-wide carbon neutrality by 2050 (Gignac 2020). Pathways to achieving that goal should include expansion of the state's renewable portfolio standard, with a target for reaching 100 percent clean energy. Michigan should also include carve-outs and specific goals for emerging technologies, as in Illinois's distributed generation program, and for serving underserved communities, as in the Illinois Solar for All program (Illinois Power Agency 2020).

- **Support efforts to allow conversion of the federal solar Investment Tax Credit (ITC) to a cash grant for lower-income households and businesses, governmental entities, and nonprofits:** This action alone would make a significant difference, reducing the debt incurred and shortening payback periods for investments in solar. It would also enable all households and other electricity consumers to benefit from public spending on solar development.[4] And it would reduce the phenomenon of nonprofits and households with little to no tax liability being forced to have third parties own the solar installations or involve a tax-equity investor in order to realize the ITC benefit (Brown and Sherlock 2011).

- **Expand the ability of communities to choose alternative electricity suppliers and empower community ownership of electric power systems:** A major constraint on the pace of customer solar adoption is a utility profit model that often conflicts with customers' interest in distributed generation and expanding energy efficiency. Enabling communities to pursue options for their electricity supply, and even consider owning utility service themselves, would better position places like Highland Park to transition to clean energy sovereignty. At the very least, the existence of these options would place competitive pressure on utilities to transform their business models to better meet community demands. One example of what state policymakers could do is enacting legislation to allow communities to aggregate customers to receive electricity supply from alternative providers. Another example is providing technical support and grant funds for communities exploring municipalization of utility services to achieve equitable climate and energy goals.

Recommendations for Highland Park Policymakers

Local leaders in Highland Park have a critical role in motivating state and federal action. As a historic driver of technological innovation, the city that was home to Henry Ford's first Model T moving assembly line can set the stage for more transformative policies. While most policies with respect to the electricity system are set at the federal, state, and utility levels, Highland Park can take important and necessary steps to move toward clean energy sovereignty.

- **Enact a solar ordinance:** To encourage solar development and improve protections for energy consumers, Highland Park should enact an ordinance that thoroughly addresses siting, code enforcement, and approval processes for solar installations at all scales. The city can also support and partner with local organizations that are already working to aggregate homeowners' buying power in bulk solarization efforts that reduce costs.

- **Set local clean energy benchmarks:** Highland Park should establish clean energy benchmarks, working toward a goal of 100 percent clean energy and including a timeline with interim targets. Numerous other cities and towns have developed or are developing such plans; toolkits, guidance, and other resources are available to help the city do this (RMI 2019).


Nick Hagen

At a solar training at Parker Village in May 2021, Highland Park residents learn about how rooftop solar projects connect to a home's electricity meter.

- **Offer city-sponsored on-bill financing and create municipally owned solar projects:** Through water bills, the Highland Park Water Department could offer on-bill financing for home improvements such as solar and efficiency. The on-bill model would work exactly like similar electric utility programs. Highland Park could also develop city-owned community solar projects to which residents can subscribe through the water billing system.

- **Develop solar and energy efficiency businesses:** Highland Park should seize the opportunity to foster home-grown businesses that circulate wealth locally. The city should create incentives and benefits for solar businesses in and near the city that hire Highland Park residents at high labor standards. To serve a clean energy transformation, numerous types of firms will be needed for installation, project management, construction, finance, and customer service and support.

- **Establish a local revolving loan fund:** Highland Park should establish a revolving fund for encouraging energy improvements to buildings, homes, and businesses. Such a fund could be managed in partnership with state and local financing institutions or programs such as the Clean Energy Credit Union, Michigan Saves, and the Highland Park–based Polar Bear Sustainable Energy Cooperative.

- **Set standards for developers to provide sustainable community benefits:** Highland Park should create standards for developers to construct energy-efficient buildings that maximize solar. By enacting a community benefits ordinance or similar local policies and outlining the process and standards developers must use to secure approval for projects, the city can prioritize developers that demonstrate commitments to renewable energy, affordability, efficient construction, and other community benefits such as firms that hire locally or are minority- or woman-owned.

- **Create a sustainability commission:** As recommended by the local residents' group Citizens For A Sustainable Highland Park, the city should establish a sustainability commission with representatives of the city administration, the city council, and the broader community to create alignment on the strategic goals necessary for a clean energy transformation (CFSHP 2019). Pursuing a goal of 100 percent energy sovereignty is a complex endeavor; the community should leverage the talented, networked, and energetic Highland Parkers who can assist in the pursuit of that goal.

- **Conduct research into establishing a community choice aggregation program or forming a municipal utility:** While both these strategies would likely require enabling state or federal actions, the city would be well-served to have fiscal and operation plans developed should policies turn toward greater community choice and local control of energy systems. For example, were Highland Park to directly own electricity generation and distribution, it would have significantly more autonomy to advance a clean energy transformation through local decisions on such crucial elements as rate structures, billing policies, and investment plans.

A Call for Community Energy Empowerment: Invest in Communities

Achieving energy sovereignty in Highland Park undoubtedly requires significant investment. However, a full consideration of costs must take into account the significant benefits a clean energy transformation will bring—not only in the form of lower electricity bills and improved reliability but in the health and well-being of the community. Instead of an electricity system that extracts community wealth and adversely impacts community health, those resources would be invested locally to benefit the bill-paying customers.

With respect to bill savings specifically, a 2021 report by the Institute for Local Self-Reliance (ILSR) reported that a campaign to install rooftop solar and community solar facilities to serve the equivalent of 30 million US homes over the next five years would produce $69 billion in total electricity bill savings over that time and $30 billion in ongoing annual savings (Kienbaum and Farrell 2021). The ILSR found that $2.56 billion of those five-year savings would occur in Michigan from 4,900 MW of new solar installations in the state—with $310 million in savings from 600 MW of new solar in the congressional district that includes Highland Park (MI-13). Additionally, prior ILSR research showed that solar at any scale makes economic sense (Farrell 2019). Whether it is on a residential rooftop or a vacant lot, solar can generate savings for the people using it.

The technologies considered in this analysis pay for themselves over time, yet upfront capital is needed to purchase equipment and pay installers. The keys to funding efficiency upgrades, rooftop solar, and other local sources of energy are lower-cost, inclusive financing and robust

> [***We must place a high priority on giving the people most affected by energy decisions a central role in shaping those decisions.***]

investment programs targeted to benefit communities like Highland Park. Thus, a foundational piece of Michigan's vision to decarbonize and create a more equitable electricity system should include strategic planning to boost local renewable energy development and empower communities like Highland Park to choose their local clean energy future with the support of utilities and state and regional entities. Michigan can achieve this by removing barriers to distributed solar generation, increasing investments in energy efficiency, and ensuring that communities have equitable access to financing options to invest in their neighborhoods.

We must place a high priority on giving the people most affected by energy decisions a central role in shaping those decisions. Our recommendations for policies and regulatory changes would enable Highland Park and other communities to choose their own paths to clean energy. Highland Park has led transformative change reaching the global scale before. It's time to do it again.

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ACKNOWLEDGMENTS

This report was made possible by the generous support of the Bezos Earth Fund, the John D. and Catherine T. MacArthur Foundation, the Heising-Simons Foundation, the Joyce Foundation, and UCS members.

The authors thank their project team members, Paula Garcia and Camilo Esquivia-Zapata with the Union of Concerned Scientists and Gracie Wooten and Juan Shannon with Soulardarity, for their essential contributions to this work. Additional thanks go to past and present members of Soulardarity for laying the foundation for this effort. The authors also thank the following people for their insightful review of the report: Bridget Vial of the Michigan Environmental Justice Coalition, Seth Mullendore of the Clean Energy Futures Group, Rob Rafson of Charthouse Energy, Will Kenworthy of Vote Solar, and Bob Zimmerman formerly of the Charles River Watershed Association. Additionally, the authors are grateful to their colleagues for their thoughtful input, advice, feedback, and support, especially John Rogers, Jessica Collingsworth, Megan Rising, Jeff Deyette, and Sital Sathia. Special thanks go to Bryan Wadsworth, Marc S. Miller, Heather Tuttle, Cynthia DeRocco, David Gerratt, and Michelle Rama-Poccia for their roles in the report's editing and production, and to Lisa Nurnberger and Jiayu Liang for communications support.

Organizational affiliations are listed for identification purposes only. The opinions expressed herein do not necessarily reflect those of the individuals who reviewed the work or the organizations that funded it. The Union of Concerned Scientists and Soulardarity bear sole responsibility for the report's contents.

ENDNOTES

1 The UCS-Soulardarity analysis considered only solar installations of the fixed variety. However, solar tracking systems, which are available for ground-mounted and other freestanding installations, can adjust panel orientation along a single or dual axis to maximize output. For example, installing the community solar facilities considered in this analysis with single-axis tracking would potentially increase output by as much as 25 to 35 percent (Marsh 2021).

2 Given the total land area in Highland Park of about 1,901 acres (2.97 square miles), 100 acres for community solar accounts for 5.26 percent.

3 Exemptions from state property taxes are another important component of ensuring that solar installations are cost effective. Michigan exempts solar systems from increasing owners' property taxes, but this exemption is limited to systems of 150 kW or less. Much larger systems should also qualify for property-tax exemptions. For example, Minnesota does not tax solar installations up to 1,000 kW.

4 As an example of a way to address a lack of tax equity, Section 1603 of the American Recovery and Reinvestment Act of 2009 provided cash grants in lieu of tax credits to support renewable energy projects (Brown and Sherlock 2011).

REFERENCES

Avalon Village. n.d. "The Avalon Village." Accessed July 26, 2021. http://theavalonvillage.org

Brown, Phillip, and Molly F. Sherlock. 2011. *ARRA Section 1603 Grants in Lieu of Tax Credits for Renewable Energy: Overview, Analysis, and Policy Options.* Washington, DC: Congressional Research Service. https://crsreports.congress.gov/product/pdf/R/R41635

Buchanan, Caillin, Tyler Fitch, Benny Jeong, and Anna Lenhart. 2017. *Get Free—Understanding the Potential for Community Solar Power in Highland Park*. Ann Arbor, MI: Graham Sustainability Institute. http://graham.umich.edu/media/files/dow/Dow-Masters-2017-Get-Free.pdf

Cassidy, Julie. 2021. Empowering Families Through Affordable Energy. Lansing, MI: Michigan League for Public Policy. https://mlpp.org/wp-content/uploads/2021/07/empowering-families-through-affordable-energy-final.pdf

CFSHP (Citizens For A Sustainable Highland Park). 2019. Proposed ordinance to create a Highland Park Sustainability Commission. Accessed August 9, 2021. http://tinyurl.com/sustainHP

Chawaga, Peter. 2017. "Bringing Communities Together for Wastewater Recovery." *Water Online*, June 22, 2017. https://www.wateronline.com/doc/bringing-communities-together-for-wastewater-recovery-0001

City of Highland Park. n.d. "Community Profile." Accessed July 19, 2021. https://highlandparkmi.gov/Community/Community-Profile.aspx

Cluett, Rachel, and Jennifer Amann. 2014. *Residential Deep Energy Retrofits*. Washington, DC: American Council for an Energy-Efficient Economy. https://www.aceee.org/sites/default/files/publications/researchreports/a1401.pdf

CRWA (Charles River Watershed Association). 2015. *Annual Report FY2015: Charles River Watershed Association.* https://www.crwa.org/uploads/1/2/6/7/126781580/annual_report_fy15_web.pdf

CRWA (Charles River Watershed Association). n.d. "How a Community Water and Energy Resource Center Works." Accessed August 9, 2021. https://www.crwa.org/uploads/1/2/6/7/126781580/cwercs_faq.pdf

Detroit Historical Society. n.d. "Encyclopedia of Detroit: Ford Highland Park Plant." Accessed August 6, 2021. https://detroithistorical.org/learn/encyclopedia-of-detroit/ford-highland-park-plant

ESA (Energy Storage Association). 2020. "US Energy Storage Market Shatters Records in Q3 2020." Press release, Dec. 2, 2020. https://energystorage.org/us-energy-storage-market-shatters-records-in-q3-2020

Farrell, John. 2019. *Is Bigger Best in Renewable Energy?* Minneapolis, MN; Portland, ME; and Washington, DC: Institute for Local Self-Reliance. 2019 re-release. https://ilsr.org/wp-content/uploads/2016/09/ILSRIsBiggerBestFinalSeptember.pdf

Fisher Sheehan & Colton. n.d. "Home Energy Affordability Gap." Accessed July 19, 2021. http://homeenergyaffordability.com/index.html

GDS Associates, Inc. 2016. *DTE ENERGY Electric Energy Efficiency Potential Study.* https://www.michigan.gov/documents/mpsc/DTE_2016_Electric_ee_potential_study_w_appendices_REV_B_554359_7.pdf

Gignac, James. 2020. "Michigan Governor Whitmer's Big Step Forward on Climate Leadership." *The Equation* (blog). September 24. https://blog.ucsusa.org/james-gignac/michigan-governor-whitmers-big-step-forward-on-climate-leadership

Google Project Sunroof. 2018. "Estimated Rooftop Solar Potential of Highland Park, MI." https://sunroof.withgoogle.com/data-explorer/place/ChIJyQUcWerNJIgR913c7LWM_zs/#?overlay=flux

Grier, Laura, Delia Mayor, and Brett Zeuner. 2019. *Assessing the State of Environmental Justice in Michigan*." Master's thesis. Ann Arbor, MI: University of Michigan School for Environment and Sustainability. https://seas.umich.edu/sites/all/files/AssessingtheStateofEnvironmentalJusticeinMichigan_344.pdf

House, Kelly. 2021. "Michigan Is No Texas, But It Has Grid Reliability Issues of Its Own." *Bridge Michigan*, February 23, 2021. https://www.bridgemi.com/michigan-environment-watch/michigan-no-texas-it-has-grid-reliability-issues-its-own

Illinois Power Agency. 2020. *Long-Term Renewable Resources Procurement Plan*. https://illinoisshines.com/wp-content/uploads/2020/04/Revised-LTRRPP-updated-from-ICC-Order-20-April-2020-1.pdf

Kienbaum, Katie, and John Farrell. 2021. *The National Impact of 30 Million Solar Homes: A Vision for an Equitable Economic Recovery Built on Climate Protection and Energy Democracy.* Minneapolis, MN; Portland, ME; and Washington, DC: Institute for Local Self-Reliance. https://ilsr.org/wp-content/uploads/2021/07/30MSH-Report-Final-WebRes.pdf

Marsh, Jacob. 2021. "Solar Trackers: Everything You Need to Know." Energysage. https://news.energysage.com/solar-trackers-everything-need-know

Mass Save. n.d. "Use Your Battery Storage Device to Make the Grid More Sustainable." Accessed July 21, 2021. https://www.masssave.com/saving/residential-rebates/connectedsolutions-batteries

Matheny, Keith. 2019. "DTE Energy Rate Hikes Among Biggest in Country—As Reliability Still Lags." *Detroit Free Press*, August 5, 2019. https://www.freep.com/story/news/local/michigan/2019/08/05/dte-energy-electric-rate-hikes/1900782001

MDOT (Michigan Department of Transportation). 2015. "National Firsts." Accessed July 28, 2021. https://www.michigan.gov/mdot/0,4616,7-151-9623_11154-129682--,00.html

MnSEIA (Minnesota Solar Energy Industries Association). n.d. "Value of Solar." Accessed July 19, 2021. https://www.mnseia.org/value-solar

Parker Village. n.d. "About Us." Accessed July 27, 2021. http://www.parkervillagehp.com

Perkins, Tom. 2020. "Could a Michigan Green Bank Offer a Blueprint for Biden's Green Recovery?" *Energy News Network*, December 9, 2020. https://energynews.us/2020/12/09/could-michigan-green-bank-offer-a-blueprint-for-bidens-green-recovery

Perkins, Tom. 2021. "Michigan Solar Ruling Could Expand the Role of Residential Energy Storage." *Energy News Network*, January 19, 2021. https://energynews.us/2021/01/19/michigan-solar-ruling-could-expand-the-role-of-residential-energy-storage

RMI. 2019. "More Than 100 American Cities Charge Toward a Renewable Future." Press release, February 26. https://rmi.org/press-release/more-than-100-american-cities-charge-toward-a-renewable-future

Schelly, Chelsea, Douglas Bessette, Kathleen Brosemer, Valoree Gagnon, Kristin L. Arola, Andrew Fiss, Joshua M. Pearce, and Kathleen E. Halvorsen. 2020. "Energy Policy for Energy Sovereignty: Can Policy Tools Enhance Energy Sovereignty?" *Solar Energy* 205 (15): 109–12. https://doi.org/10.1016/j.solener.2020.05.056

Soulardarity. 2019. *The Blueprint for Energy Democracy*. https://www.soulardarity.com/bfed

US Census Bureau. 2019. *American Community Survey 5-Year Estimates*. Retrieved from *Census Reporter Profile page for Highland Park,* MI. http://censusreporter.org/profiles/16000US2638180-highland-park-mi

Zeuner, Brett, Laura Grier, and Delia Mayor. 2019. "Screening Tool for Environmental Justice in Michigan." Ann Arbor, MI: University of Michigan School for Environment and Sustainability. https://www.arcgis.com/apps/webappviewer/index.html?id=dc4f0647dda34959963488d3f519fd24

Let Communities Choose

Clean Energy Sovereignty in Highland Park, Michigan

> ***We should envision a different model of supplying and consuming electricity that empowers communities to choose clean energy and generate electricity locally.***

In Highland Park, Michigan, the energy education and advocacy organization Soulardarity has a vision of energy sovereignty: a community powered by resilient, affordable clean energy resources, owned by Highland Park residents and businesses. To that end, an analysis by the Union of Concerned Scientists and Soulardarity shows how solar power, energy efficiency, and other local resources can meet 100 percent of the community's electricity demand. Changes in public policies can make the vision not only possible but affordable for the community of Highland Park—and for others across the United States. Empowering local communities to choose clean energy can and should play a key role in overall decarbonization efforts in Highland Park, in Michigan, and across the nation.

www.ucsusa.org/resources/let-communities-choose-clean-energy

Union of Concerned Scientists

SOULARDARITY

The Union of Concerned Scientists puts rigorous, independent science to work to solve our planet's most pressing problems. Joining with people across the country, we combine technical analysis and effective advocacy to create innovative, practical solutions for a healthy, safe, and sustainable future.

Soulardarity is building a brighter future in Highland Park with education, organizing, and people-powered clean energy. Soulardarity is working to install solar-powered streetlights, help people save money on energy bills, and collaborate with its neighboring communities to build a just and equitable energy system for all.

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