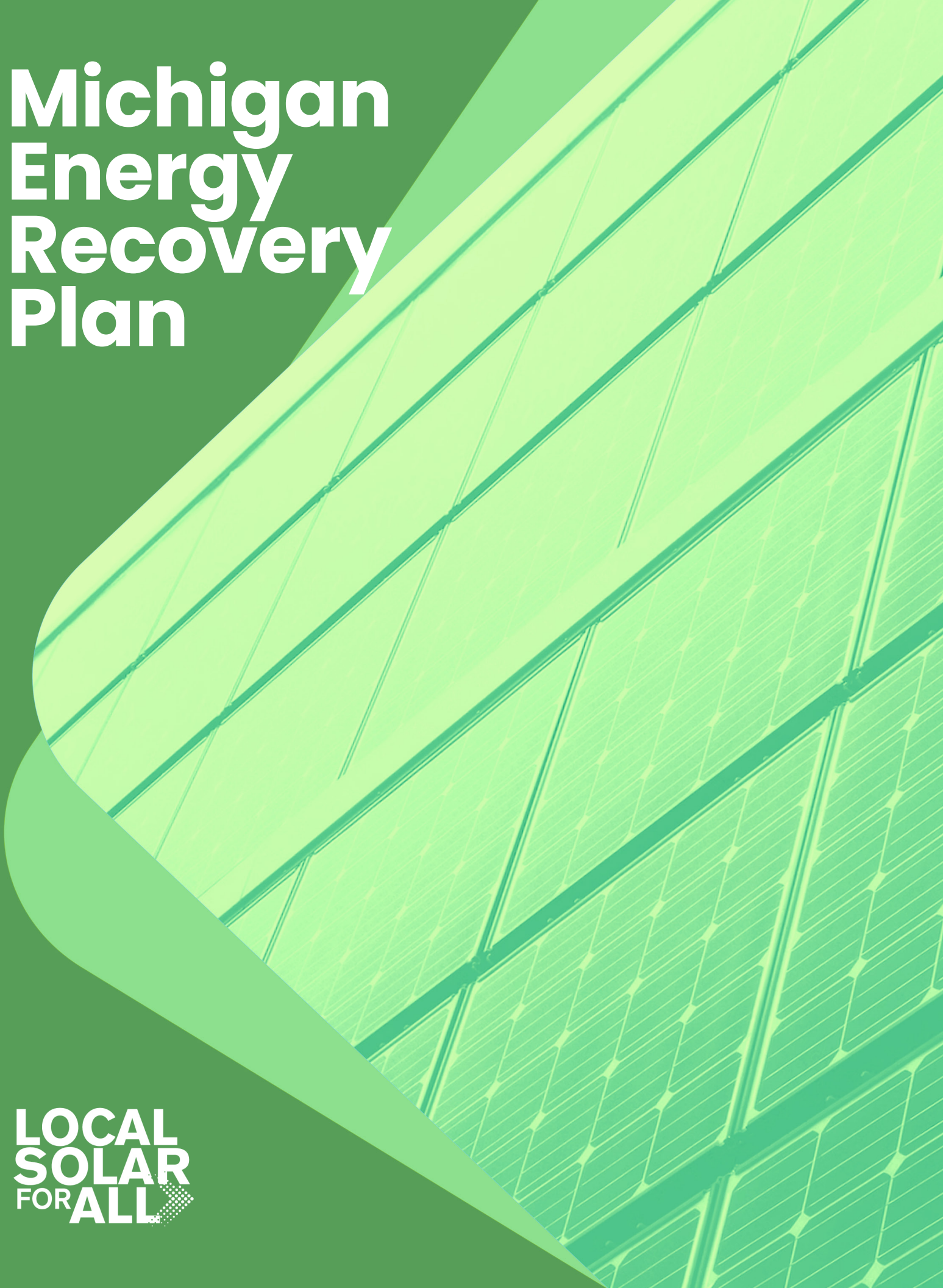
Michigan Energy Recovery Plan



LOCAL SOLAR FOR ALL

Michigan Energy Recovery Plan

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We would also like to thank the following for the generosity of their time, efforts, and resources to make this report a reality:

Coalition for Community Solar Access
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Executive Summary

Given the current state of the Michigan electric grid, it is past due time to re-think the current reliance on a centralized, fossil fuel-dependent grid system, particularly since Michigan electric affordability has steadily worsened. According to the federal government, Michigan retail electric prices for residential customers have risen over 23% since 2015. In a report released February 2023, Local Solar for All documented these risks and estimated the economic impact of Michigan's reliability problems to be as high as $4.9 billion between 2020 and 2021. And, as reported and analyzed by groups such as the Citizens Utility Board of Michigan, the grid's poor performance in those years were part of a longer trend–not outliers.

Local clean energy and smart building technologies can reduce the cost of operating the electric grid and providing quality electric service. Energy consumers can also be energy producers. If a home or a business becomes capable of changing how and when they need electricity from the grid, it opens up new possibilities for improving the grid. Community solar systems provide families and businesses who cannot install solar on their property direct energy bill savings. They can also help utilities run the grid better. It means that everyone's private investments in technologies such as internet-connected appliances, batteries, local solar, and even electric vehicles can contribute to improving the electric grid.

If Michigan were to commit to a path to 100% clean energy, local solar and batteries could be part of a cost-effective plan. The national solar advocacy non-profit, Vote Solar, conducted a Michigan study in 2022 that examined this exact scenario. They analyzed how building a decentralized grid as part of a statewide 2050 decarbonization strategy would impact the grid and the economy. In their analysis, the benefits for Michiganders could accrue to as much as $30 billion over the life of the decarbonization plan, which would equal $773 for person annually. In the near term, the state's electric grid could operate at far lower cost, saving Michigan consumers nearly $15 billion from 2024-2035.

Michigan public policy creates barriers to achieving this future, or any scenario where energy consumers have the choice to adopt their own local clean energy solutions. Modest reforms, such as those listed below, could unlock these grid improvements, increase resiliency in the face of extreme weather, and lead to direct energy savings for all energy consumers.

1. **Empower Michigan energy consumers** by creating a statewide community solar program and repealing policies that pre-empt individual energy choices like the cap on customer-sited distributed generation (DG).
2. **Encourage clean back-up power options** by creating a battery storage program to increase access and leverage grid benefits.
3. **Ensure true clean energy access for low-income households** by creating targeted incentives and financing programs.
4. Direct the Michigan Public Service Commission to **create new reliability programs** that include non-utility local solar and batteries to improve the electric grid.

KEY TERMS

KILOWATT	A unit of measurement for the power of a machine, either a machine that generates electricity such as a solar energy system or a machine that consumes electricity, such as a motor.
ROOFTOP SOLAR	Small-scale solar projects that are installed on the roofs of homes and businesses. These systems are increasingly connected to battery storage, which can keep a home powered during a grid outage.
COMMUNITY SOLAR	Small-scale solar installations typically built on landfills, former industrial sites, or private parcels of farmland. People can sign up as subscribers, and in turn, receive credits on their electric bills based on their share of the project's generation. It broadens access to solar energy to families and businesses who rent and are unable to install solar on their property.
DISTRIBUTED ENERGY RESOURCE (DER)	Small-scale technologies, such as solar, battery storage, and internet-connected appliances, that can respond to the needs of the electric grid. In critical moments, these responses can help a utility avoid higher cost actions or even avert rolling blackouts in more extreme cases.
ELECTRIC GRID	The entire system that generates and transmits electricity to all electricity consumers. There are two major pieces of the electric grid, the bulk power system and the electric grid.
BULK POWER SYSTEM	Large power plants and the high-voltage transmission lines that bring that power from those plants to population centers, often over great distances. Transmission lines run across fields and non-populated areas due to the sheer amount of electricity they constantly transmit.
DISTRIBUTION GRID	The part of the grid that serves neighborhoods, business campuses, and industrial facilities. The distribution grid is often operated and maintained by the local electric utility. It takes electricity from the bulk power system and carries it to the end consumer. In a state with multiple utilities, there are actually multiple distribution grids.

Introduction

The purpose of an electric grid is to serve all the families and businesses in an area who need electricity—and everyone needs electricity. If that grid cannot perform that function affordably or reliably, that electric grid needs to be improved with the people who need it in mind.

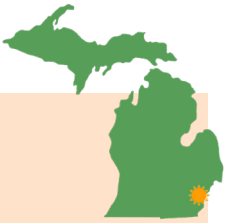
A century ago, the top-down centralized electric grid approach was the only practical approach to reliable and resilient grid architecture—large fossil-fueled power plants were cutting edge. But, the practice of locating large power plants away from major population centers created a structural risk to individual consumers' electric service. By the end of the 1970's, the inherent vulnerability of our domestic energy infrastructure, and the improved performance and cost of a rising cohort of right-sized energy resources that could be deployed almost anywhere, combined to point to a more economic path to domestic energy security.[1] Today, those structural weaknesses are more readily apparent as we rely increasingly on electricity as our only source of energy. Extreme weather consistently stymies an electric grid that utilizes far-away power plants. Maintaining a 20th century grid strategy that utilizes only large fossil fuel power plants in less than ideal locations is becoming unaffordable and increasingly unsustainable in the clean energy transition.

By the early 2000's, decentralized grid technologies and approaches were maturing to the point that a new philosophy for the electric grid could be articulated thoughtfully and with vision. Joining with Amory Lovins and others, co-author Karl R. Rábago co-wrote "Small Is Profitable," documenting the more than 200 distinct engineering, economic, operational, and financial benefits of adding a decentralized approach to the architecture for electricity infrastructure.[2] It diagnosed the structural weaknesses of the centralized electric grid, and foresaw the problems now endemic in electric service quality.

In the years since these seminal treatises were published, the economics and performance of right-sized electrical resources have only improved. Further improvements appear all but certain. But there is no need to wait for further technological advancements. The electric grid of today is straining under the pressure of its advanced age and new circumstances. The time has never been better to put into practice a re-design of "brittle power" towards a system that includes local, resilient electricity. As we transition to a 100% clean energy future, it is not enough to change out large fossil fuel plants for large renewable energy generators, although that is necessary. Small-scale clean energy and battery storage that is right-sized and local can enhance the effectiveness of large-scale renewable systems and improve electric service for millions of people.

Given the current state of the Michigan electric grid, it is past due time to re-think the reliance on a centralized, fossil fuel-dependent grid system. This report will outline two of the main energy issues in Michigan, affordability and reliability, then discuss how decentralizing the grid with resources like local solar and storage can benefit energy consumers directly and whole communities as well. We will illustrate the benefits of a 2035 vision where Michigan successfully implements a decarbonization plan with local clean energy and energy storage resources. Then, we propose an energy recovery plan to achieve that vision.

SUCCESS STORY



HURON OPHTHALMOLOGY • YPSILANTI

ROOFTOP SOLAR SYSTEM INSTALLED IN 2021

Huron Ophthalmology was founded 50 years ago by Dr Jerome Epstein. Their full service eye care facility has physicians trained in treating glaucoma, cataracts, and injured corneas. They also offer complete eye exams, eye glasses, contact lenses, and various types of eye surgeries. In 2009, they moved into a building in the St. Joseph Mercy Health System campus in Ypsilanti, which is all-electric and boasts a geothermal heating and cooling system among other sustainable features.

In 2020, Huron Ophthalmology decided to add to their building's many environmentally-friendly features by adopting solar, but sustainability was not the only reason for the move. The 166-kilowatt rooftop solar system is able to offset over 90 percent of the energy the building had needed from their utility. This is the equivalent of powering over 20 single-family homes. It allowed the practice to both lower their carbon footprint and hedge against continuing energy inflation. Annual savings are over $20,000/year and increasing each year as utility rates continue to go up.

The system was installed by local company Homeland Solar, which has its office in nearby Ann Arbor. Homeland Solar has been in the solar design and installation business for over 14 years, offering solar to single-family homes and multi-family buildings as well as to commercial, agricultural, non-profit, and municipal energy consumers. Among their customers are the Zingerman's Mail Order, Food Gatherers, Huron Valley Tennis Club, many houses of worship, Green Things Farms, and Washtenaw Dairy.

Great Lakes, Poor Electric Service

Michigan electric affordability has steadily worsened over the past decade. According to data from the U.S. Energy Information Administration, Michigan retail electric prices for residential customers (*i.e.*, single-family homeowners and apartment renters) have been rising at a startling rate for over a decade, increasing over 23% since 2015. Figure 1 and Table A illustrate the affordability issue with the current Michigan electric grid.

Figure 1: Michigan Retail Electric Rates 2012-2022

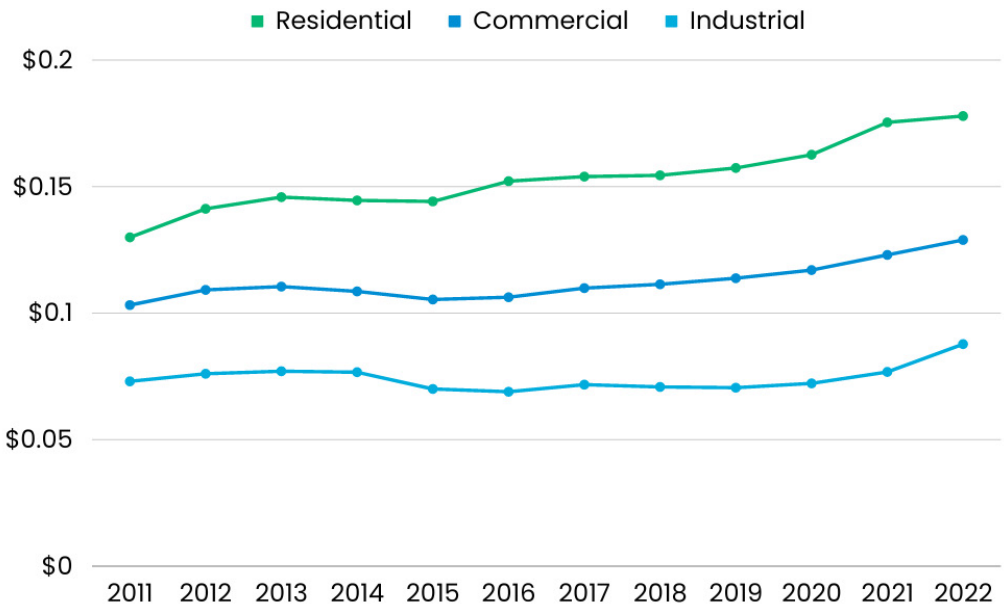


Table A: Percent Increase in MI Retail Electric Rates, 2015-22		
Residential	**Industrial**	**Commercial**
23.37%	22.27%	25.21%

Michigan's unreliable electric grid has been the subject of public outcry and discourse in 2023, in part due to winter storms in February. Hundreds of thousands of people were without power for multiple days.[3] Some people had no power for a week or more.[4] However, outage issues are long-running and unaddressed across the state. For far too long, power outages have been a way of life in the Upper Peninsula–a situation which is becoming more common statewide. These issues are well documented through the various reports from the Citizens Utility Board (CUB) of Michigan and utility reliability data published by the U.S. Energy Information Administration. By multiple metrics, Michigan ranked as one of the bottom-10 states for electric grid reliability in 2021.

Reliance on a centralized electric grid has exposed the risks inherent in this design. Local Solar for All documented these risks and estimated the economic impact of Michigan's reliability problems in a report released in February 2023, as summarized in Table B. The economic impact of power outages in Michigan in just two years–2020 and 2021–were estimated to be as high as $4.9 billion. And, as reported and analyzed by groups such as CUB of Michigan, the grid's poor performance in 2020 and 2021 were part of a longer trend–not outliers. As the data shows, this is only one part of the problem.

Doubling down on the centralized grid is an expensive and risky proposition. In 2021, DTE Energy proposed a 5-year, $7 billion grid modernization plan, while Consumers Energy proposed their own 5-year, $5.4 billion grid modernization plan. While the Michigan Public Service Commission (MPSC) has not approved either of these plans in full, projects such as these tend to be funded by utility customers through increased bill charges. It would be a daunting task for Michigan energy consumers to fund over $12 billion in new projects on top of the higher rates they have already been paying. These proposals would not fundamentally change how the electric grid serves Michigan energy consumers, nor would it create new alternatives for them whenever this centralized grid has an outage.

Table B: Est. Economic Impact of Michigan 2020-21 Reliability Performance, Using 2020 Census Data

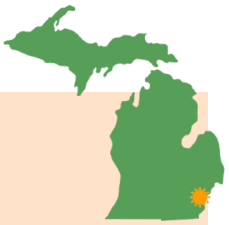
Sector	Customer Count	Total Cost		
		2020	2021	2020-21
Residential	3,976,729	$56,279,976	$109,855,711	
Small C& I	198,572	$788,179,430	$2,039,971,193	
Medium/Large C&I	22,488	$583,745,719	$1,338,087,725	
Total	**4,197,789**	**$1,428,205,125**	**$3,487,914,629**	**$4,916,119,754**

Of course, utilities often have a different perspective. One of the more perverse aspects of traditional utility rates and rate setting is that utility profits increase every time that the utility spends more on capital projects, including when they spend more than they need to.

Fortunately, new and smarter consumer energy technologies are now available and increasingly affordable. These range from home energy management systems to rooftop solar, batteries, and electric vehicles. Local solar solutions such as residential rooftop solar or community solar can immediately lower individuals' energy bills. Solar paired with batteries can keep a home's lights on or prevent a factory from ceasing manufacturing if there is a power outage. If communities adopt these technologies as a mainstream solution, they can revolutionize how the electric grid works, and improve its performance for all of us.

The American Council for an Energy-Efficient Economy (ACEEE), known for more than 40 years of non-partisan information and research on energy efficiency opportunities and technologies, explains that an electric grid that relies on these technologies and local clean energy generation can take advantage of their inherent resilience and reliability benefits.[5] This strategy involves building a more decentralized electric grid because this grid strategy involves installing small-scale electric generators that are spread out across the grid, often near the people and businesses they serve. These local clean energy generators are commonly referred to as distributed energy resources (DERs) for this reason. If electric generators like DERs are located closer to the people who will use them, that is a more resilient system because there is less reliance on large, expensive, and vulnerable power lines. This lowers costs for consumers and provides reliability and resilience to the grid.

SUCCESS STORY



CHRISTOPHER TAYLOR'S HOUSE • ANN ARBOR

SOLAR & BATTERY STORAGE SYSTEM INSTALLED IN 2022

Christopher Taylor is a resident of Ann Arbor. He has lived in his current house, with his family, in the Burns Park neighborhood since 2021. In April 2022, as part of a personal commitment to reduce their carbon footprint, the Taylor family installed a rooftop solar system coupled with battery storage on their property.

The system, which is 7.8-kilowatts in size, is able to offset their home's annual electric load. Nearly one year after adopting solar, Mr. Taylor and his family have saved about $1,800 in energy costs, according to the local company that installed the system, Oak Electric.

In the recent February 2023 winter storm, Ann Arbor suffered from long-duration power outages, like much of southeastern Michigan. Mr. Taylor and his family were without power from the grid but were able to keep the lights and heat on by relying on their solar panels and battery. They were able to do this for over five days.

Mr. Taylor has served as the Mayor of Ann Arbor since 2014, and is currently in his third term.

Oak Electric is based in Waterford. They are an electrical and mechanical contractor, with their associated business Oak Heating, Cooling & Plumbing. They have been serving homes and businesses across southeast Michigan for more than 40 years, and hold electrical, mechanical, plumbing, and builders professional licenses.

Community Benefits from a Decentralized Grid

The Michigan success stories included in this report begin to illustrate how a decentralized electric grid can improve quality of life for communities – but these stories only scratch the surface of what is possible. If families and businesses build rooftop solar and battery storage, or have the opportunity to subscribe to a community solar system, not only will they benefit directly with lower energy costs and back-up power, but that will create inherent benefits for the entire community. And, going a step further, when privately-owned clean energy generators are built at scale, it means improving everybody's electric grid using mostly private capital instead of only surcharges on the utility bill. Let's look at how individuals and communities can benefit from a decentralized grid.

FOR FAMILIES

When a family is able to put solar on their roof, they typically can lower their electric bills as soon as the solar starts generating electricity. Financing makes it easier to adopt solar by removing upfront costs. Not all families can install rooftop solar for themselves, such as if they rent an apartment or live in a condominium. In those instances, they can subscribe to a community solar system, like Burcham Park in East Lansing. By doing so, they could experience a similar reduction in their energy costs.

By installing on-site solar with a battery storage device, families can benefit more than just from lower energy costs. Battery storage enhances rooftop solar. The battery can be charged by the solar energy and used when the family needs it. That could be at night, to power their house for more hours. Or, that battery can be used as back-up power when there is a power outage. As we saw from Christopher Taylor's experience, he was able to rely on his solar and battery storage system during the February 2023 winter storm. His battery kept re-charging during the day from his rooftop solar system.

FOR BUSINESSES

A business that adopts some kind of local solar can achieve similar energy savings as families, but it can go one step further. Large businesses, like manufacturing plants, are charged for the energy they use, and the amount of power that they demand. These demand charges can be the most expensive part of their electric bills. But, a large enough on-site solar and storage system would enable that manufacturer to lower the amount of power that they demand, which could dramatically lower their demand charges.

A business that adopts solar and battery storage can also benefit. Industrial sites may not need to rely on fossil fuel generators anymore for back-up power by switching to batteries. They could build solar on a parking lot, like Michigan State University did, or on their facilities' roofs and connect them to battery storage systems that are ready to turn on when the grid goes down. That way, a power outage doesn't automatically interrupt production and send employees home. The benefits extend beyond the business and the electric grid to the local economy.

Businesses that cannot install solar and batteries on their property can still enjoy the benefits of community solar. If a business rents in a strip mall, or does not have the roof or ground space to install solar, they can subscribe to a nearby community solar system and receive the credit for their share of the solar energy.

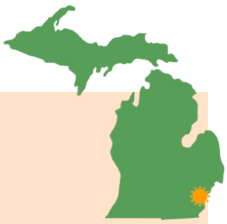
FOR ENTIRE COMMUNITIES & THEIR ELECTRIC GRID

Solar and storage do not have to only benefit individual energy consumers like families and businesses. In fact, when adopted at scale, distributed solar and storage can improve the electric grid on ordinary days. There does not need to be a power outage. Local clean energy and smart building technologies can reduce the cost of operating the electric grid and providing quality electric service. Local solar and storage reduces the strain on the electric grid, especially in critical moments, to help large scale clean energy systems perform optimally. This is valuable with today's grid that still relies on fossil fuels but also the grid of the future that runs on 100% clean energy.

DERs like distributed solar and storage systems can prevent higher electricity costs. They naturally produce the most electricity in the middle of the day, when there is typically the highest demand for electricity. Following the core economic principles of supply and demand, if demand for electricity goes down then so does the price for electricity. If this keeps happening, then that can translate to consistently lower retail electric prices for people who have and who do not have solar on their homes.

DERs can be most valuable on days of extreme heat or cold. On a sweltering summer day, when everyone is blasting their air conditioning, there is a spike in electricity demand that the electric utility may or may not be able to supply. Blackouts during heat waves are becoming more common, and disproportionately impacting low-income communities.[6] Utilities do not have to rely on rationing electricity during heat waves when DERs help power those homes and offices locally. On-site solar energy can be consumed directly by families. Batteries can be directed to discharge their stored energy to the grid. This reduces stress on the grid, since power lines can only transmit so much electricity at any one time.

SUCCESS STORY



BRIDGING COMMUNITIES • DETROIT

ROOFTOP SOLAR ARRAY INSTALLED IN 2021

Bridging Communities is a Detroit-based non-profit grassroots organization. Their mission is to improve the quality of life for families and individuals of all ages in Claytown, Michigan-Martin, Midwest, and the surrounding communities. They believe the health of communities is tied to the quality of life for the elders who live in them. According to their website, Bridging Communities began their work in Southwest Detroit as Ecumenical Project S.A.V.E. (Seek and Visit the Elderly) in 1980. Today, they offer various eldercare services, competitive mini-grants for individuals and organizations local to the area, and they advocate for more affordable housing for seniors.

In June 2021, Bridging Communities added a new tool to improve their ability to help people in their surrounding communities. They installed rooftop solar at their Detroit offices to lower their electric bills. This was done in particular to reduce their own operational overhead costs and focus their budget more on their programs. Their 20-kilowatt solar array is able to off-set more than 80% of their annual electricity bill.

Ryter Cooperative Industries (RCI) installed the solar array for Bridging Communities. Ryter is located in Highland Park. They were formed in 2015 after their founder, Ali Dirul, participated in a college project to create a home with a net-zero carbon footprint. Ali wanted to apply the lessons from that project to his community, and RCI was born. RCI provides solar and storage installation services, feasibility studies, and expert services for non-profits, businesses, and communities. Their various projects include providing solar to Avalon Village STEM Lab, and developing the first climate resiliency hub for the City of Detroit, the New Lenox Center Resilience Hub, set to open in 2023.

This new reality means that energy consumers can also be energy producers. If a home or a business becomes capable of changing how and when they need electricity from the grid, it opens up new possibilities for improving the grid. It means that everyone's private investments in technologies such as internet-connected appliances, batteries, local solar, and even electric vehicles can contribute to improving the electric grid. Utilities can ask local energy consumers and producers to send the grid extra energy, instead of buying more expensive electricity from an aging, expensive fossil fuel generator. Energy management software can automate this arrangement, based on the preferences of families and businesses, who in turn can be compensated for how much they improve the electric grid. Software can even aggregate groups of separate systems for the benefit of the grid, making this effort even more efficient.

A decentralized electric grid supports two-way flow of electricity, supports clean energy generators throughout a community, and creates a more secure grid system to keep the lights on for everyone. Mountain Power Solutions, a clean energy business in Colorado that is also a thought leader in the industry, dives into how this electric grid model increases community energy security and reduces the need to fund expensive utility-led electric construction projects.[7] Large scale clean energy systems, like solar and wind farms, can be better integrated into the electric grid. This puts energy consumers in a position to contribute to a better run electric grid, receive higher quality electric service, and support the transition to 100% clean energy.
The National Renewable Energy Laboratory (NREL) has considered the evolution of the grid and developed a vision for the future energy grid made up of "Autonomous Energy Grids."[8] These are next generation versions of the distributed solar and storage technologies commonly available today. AEGs will manage a growing base of intelligent energy devices, variable renewable energy, and advanced controls. NREL explains:

> *The AEG effort envisions a self-driving power system—a very "aware" network of technologies and distributed controls that work together to efficiently match bi-directional energy supply to energy demand. This is a hard pivot from today's system, in which centralized control is used to manage one-way electricity flows to consumers along power lines that spoke out from central generators.*
>
> *Instead, AEG grids are composed within one another, like a fractalized group of microgrids. Sections, or "cells" of AEG use pervasive communication and controllability to continually pursue their best operating conditions, which adjust to the temperament of customer demand, available generation, and pricing.*

Already, electric distribution utilities like Holy Cross Energy, an electric distribution cooperative serving Glenwood Springs, Colorado, are partnering with customers to encourage investment in a more decentralized and resilient grid as part of their business and service model, and to generate wholesale power savings for all the cooperative's members.[9] The combined benefits of wholesale power savings, increased reliability and resilience, and the stimulation of local businesses all combine to provide a snapshot of a future in which everyone gets the level and quality of electric service they need at a price they can afford.

SUCCESS STORY

EAST LANSING COMMUNITY SOLAR PARK • EAST LANSING

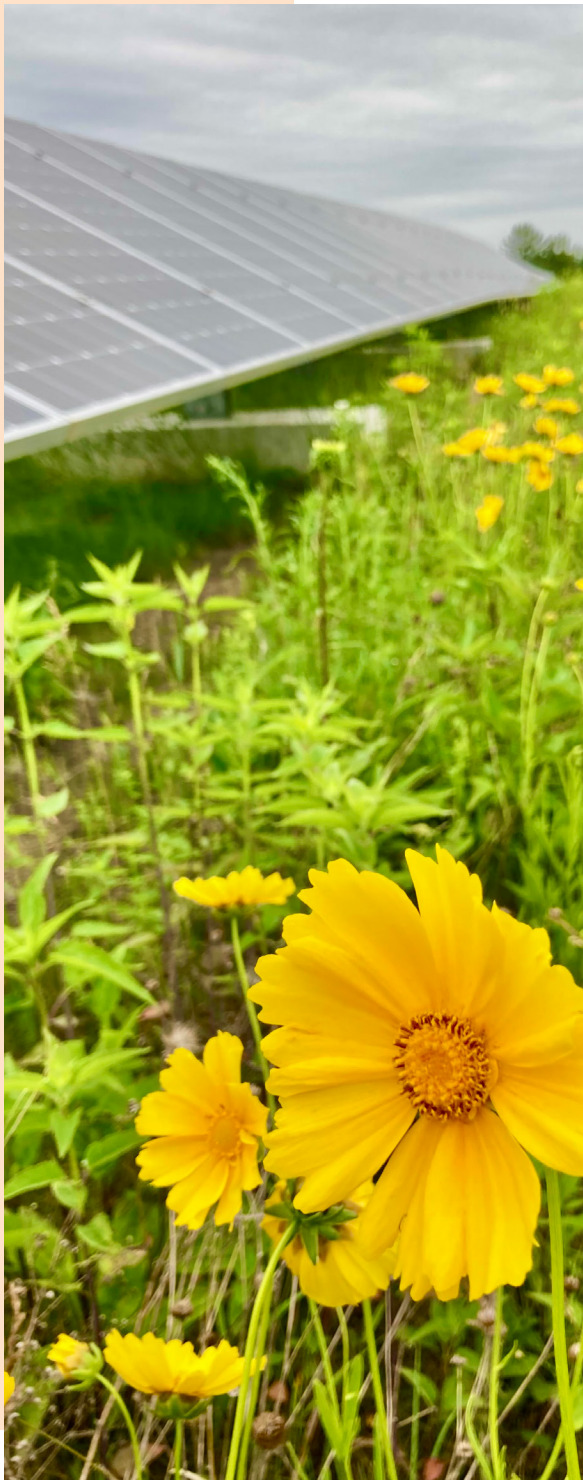
SOLAR SYSTEM ON LANDFILL INSTALLED IN 2019

The Lansing Board of Water & Light (BWL), Michigan Energy Options (MEO) and the City of East Lansing began a process in 2015 to expand how area families and businesses can benefit from renewable energy. MEO led the process of creating a community solar park by aligning stakeholders, gaining public engagement, and securing the solar developer Pivot Energy, a national leader in community solar. This was especially challenging because Michigan does not have a statewide community solar program. This project was made possible by broad stakeholder support in Lansing and East Lansing, and with the backing of BWL.

In January 2019, a 345-kilowatt community solar park began operation on the retired landfill at Burcham Park. Unlike other types of local solar installations, the "East Lansing Community Solar Park" does not serve only one energy consumer. There are multiple "subscribers" who entered individual leases to receive a portion of the solar array's electric generation. With that arrangement, they can receive credits on their electric bill from BWL for a share in the larger East Lansing Community Solar Park. Doing so enables them to lower their electric bills. There were approximately 150 residential and commercial subscribers to the project, including the City of East Lansing, and the Capital Area Transit Association, as well as local households, businesses and churches across Lansing and East Lansing.

The East Lansing Community Solar Park has also included habitat restoration. MEO worked with environmental engineers, state and local agencies, and a wildflower company to transform the capped landfill into a native habitat of pollinating flowers and grasses, which provide habitat and food for birds and insects. Additionally, the site has been modified so any stormwater run-off would be kept onsite and in natural catch basins. A local sculpture artist, Jim Cunningham, added a sun-inspired sculpture to the park, which also has educational signage about community solar and the restored meadow.

The system won "Project of the Year in 2019" from the Michigan Energy Innovation Business Council, the state's largest clean energy trade association. MEO is a local non-profit organization dedicated to helping Michigan communities become more sustainable. MEO also helped create a community solar park in Marquette. Pivot Energy is a national solar provider that develops, finances, builds, and manages solar energy and energy storage projects.



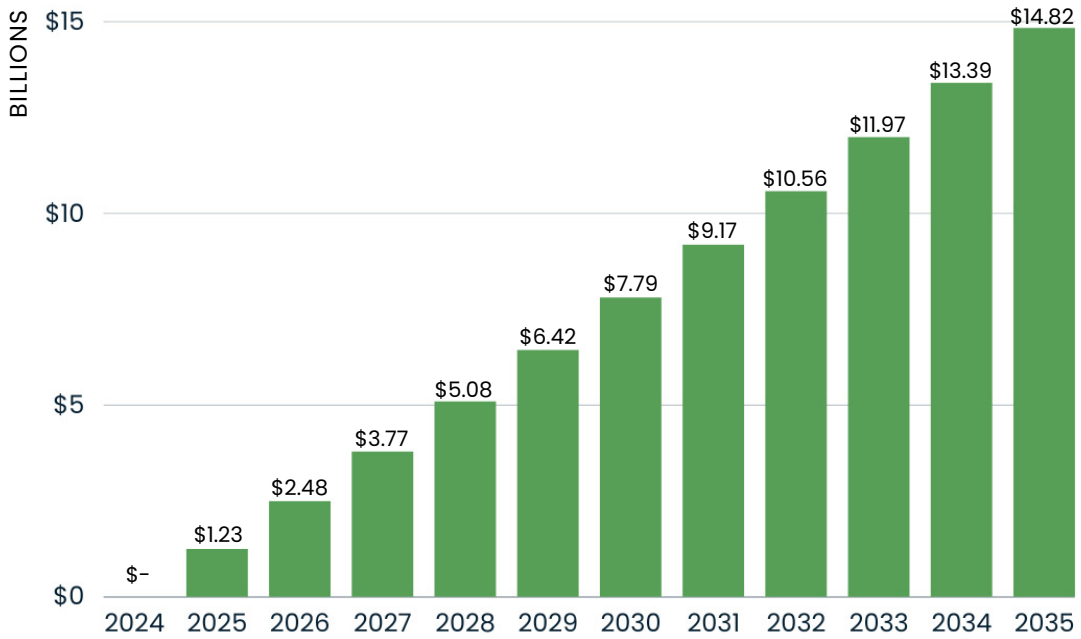
A 2035 Vision for Michigan

If Michigan adopted a decentralized grid, what would that look like? How would the quality of electric service improve, and what would it cost Michiganders? How would this impact the Michigan economy? The national solar advocacy non-profit, Vote Solar, conducted a Michigan study in 2022 with the firm Vibrant Clean Energy (VCE) to answer a very similar question. They analyzed how building a decentralized grid as part of a statewide 2050 decarbonization strategy would impact the grid and the economy. In their analysis, the benefits for Michiganders could accrue to be as much as $30 billion over the life of the decarbonization plan, which would equal $773 for person annually.

Here, we look at a nearer time horizon, one that current energy policies actively contemplate. The Biden Administration has set a national goal of a carbon-free electricity sector by 2035,[10] and various new or newly extended federal programs are funded through the early 2030s. By deploying and optimizing DERs throughout Michigan as part of a transition to 100% clean energy, the state's electric grid could operate at a much lower cost, saving consumers nearly $15 billion from 2024-2035.[11] This assumes implementing a 100% clean energy electric grid by 2050, deploying thousands of megawatts of large-scale clean energy, but still relying heavily on the deployment of distributed solar and battery storage in the process.

Compared to building a centralized clean electric grid, the analysis shows that relying on distributed solar, storage and DERs is the lower cost scenario, compared to a clean energy centralized grid approach. The savings comes from lower costs to supply and deliver electricity for all Michigan energy consumers. Figure 2 compares the "Business as Usual" scenario, which follows the filed Integrated Resource Plans (IRPs) by Michigan utilities against the modeled optimized DER deployment and usage scenario put forth by Vote Solar/VCE. It illustrates that a decentralized Michigan electric grid can operate at a lower cost compared to the way the grid operates today.

Figure 2: Cumulative Michigan Electric System Savings from Optimized DER Scenario versus Utility IRPs



The modeling posits that in their optimized DER scenario, 2,980 MW of distributed solar and 1,932 MW of distributed battery storage would be built beyond a "business as usual" scenario. Notably, this "business as usual" scenario already reflects adopted policies and plans, such as utility IRPs, that include some renewables. Coupled with other methods of decarbonizing the electric grid, it projects that Michigan energy consumers can be responsible for a less expensive electric grid.

The billions in savings from grid operation do not take into account the direct energy savings that families and businesses could realize when adopting solar and battery storage. It also does not include the avoided costs of an unreliable Michigan electric grid, which Local Solar for All has already estimated to measure in the billions of dollars per year. As described, a decentralized electric grid can improve resiliency and electric service reliability.

The Vote Solar/VCE analysis shows what is possible if all Michigan energy consumers had the opportunity to adopt DERs such as rooftop solar, community solar, and battery storage. Today, there are statutory limits on how much distributed solar can be installed. Unless a utility voluntarily allows more customers to participate, distributed solar is limited to less than 1% of a Michigan investor-owned utility's average annual peak load. Several utilities have increased that cap as part of broader case settlements, and multiple electric co-operatives and municipal utilities offer programs in their small territories. Notably, Consumers Energy reached a settlement agreement in 2023 where they agreed to increase their cap to 4% as part of a broader deal that included a rate increase.[12] DTE Electric has not agreed to increase their DG cap, which remains at statutory levels. The bulk of Michigan electric load, population, and solar installations are in Consumers' Energy and DTE Energy territory meaning that policy actions that accelerate a broad ramp-up in solar and storage adoption will need to impact those territories at a scale that has not been experienced in Michigan.

Table C: 2021 Solar and Storage Deployment as Percentage of 2035 Model Targets

Technology Type	2021	2035	Percent of 2035 Goal Realized
Solar Capacity	124.75 MW	2,980 MW	4.1%
Battery Storage Capacity	12.94 MW	1,980 MW	0.7%

The MPSC released a 2022 report touting the significant growth of distributed solar in Michigan with comparatively miniscule figures. Total installed distributed solar in Michigan by the end of 2021 was 124.75 MW, which represented a 37% growth year over year. MPSC data also showed that a total of 12.9 MW of distributed battery storage was installed by the end of 2021. Compared to the 2035 levels posited by the Vote Solar/VCE study, there is a long way to go. Statutory limits cap the allowed amount of distributed energy at less than 200 MW. Even with some voluntary utility actions that have raised their caps, such as settlement agreements in regulatory proceedings, state policies do not allow mainstream adoption of distributed solar and storage.

Michigan will need to reform its energy policies to unlock the economic potential of local clean energy, the financial relief energy consumers can directly benefit from by going solar, and the resiliency improvements by adopting battery storage for the next time the grid has an outage. Without it, Michiganders could be on the hook for billions of dollars in avoidable energy costs.

SUCCESS STORY

MICHIGAN STATE UNIVERSITY • EAST LANSING

SOLAR PARKING CANOPIES INSTALLED IN 2017

Michigan State University (MSU) is one of the nation's leading research institutions, and one of the many sources of pride for the State of Michigan. It is located in East Lansing and home to over 50,000 students. In 2009, MSU adopted an Energy Transition Plan that would eventually transition the entire campus to 100% renewable energy.

One significant step towards meeting the plan target was the construction and contracting for solar parking canopies installed on the East Lansing campus. A solar parking canopy is constructed over a parking lot, allowing the land to have a dual use. The parking lots continue to be used as a normal lot, but above them solar panels rest on a steel structure. These sets of solar canopies were installed over five different parking lots, covering about 5,000 individual parking spaces. The structures help keep cars shaded and cool during the summer months, shield them from snow in the winter, and be a source of security lighting at night.

The solar arrays across the five campus lots total 10.8-megawatts in total capacity, and generate anywhere from 5-8% of MSU's annual electricity needs. MSU does not own these systems but instead contracts for the electricity. They are projected to save $10 million in electricity bill savings over the life of the contract.

"The array is performing exactly as promised, delivering enough electricity to completely power more than 1,800 average American households," said Dr. Wolfgang Bauer in 2018, University Distinguished Professor at MSU in the Department of Physics and Astronomy who assisted on the project.

The solar canopies were possible through a partnership between Indiana-based Inovateus Solar and Alterra Power, headquartered in Vancouver, British Columbia. Inovateus Solar is based in South Bend, Indiana. They were founded in 2008 and grew from a small Midwest solar company to a national solar developer and construction company. The MSU solar canopy project is not their only experience in Michigan. They have also installed projects for Ford Motor Company, Blue Cross Blue Shield of Michigan, and the Metea Court Senior Apartments in Buchanan.

Michigan Energy Recovery Plan

This four-point plan can bridge the gap between Michigan's current energy policies and the 2035 vision. It can lower energy costs for all Michiganders, improve reliability, and create a new way to improve the electric grid.

1 Empower Michigan energy consumers

- All Michigan families and businesses need the ability to access electricity beyond what their utility provides them. Removing obstacles to access, such as the distributed generation cap, is a first step.
- A statewide community solar program would provide access to those individuals without the ability to install solar on their roof.
- The restoration of customer-friendly net billing mechanisms would ensure that energy consumers who adopt clean energy for themselves will be able to earn the benefits of those investments.
  those investments.

2 Encourage clean back-up power options

- Create a battery storage incentive program, to make clean back-up power less expensive for families and businesses and speed up adoption.
- Establish statewide battery deployment goals to encourage residential and commercial adoption.

3 Ensure true clean energy access for low-income households

- Create low-income solar and storage programs that are focused on the neighborhoods that need the most grid improvements, and so that low-and-moderate income households can have the same access to clean energy technologies as any other family.
- Leverage federal clean energy programs that are designed to increase equitable clean energy access.

4 Create grid reliability programs that include distributed solar and storage

- Direct the Michigan Public Service Commission to create a program that enables distributed solar and battery storage owners to lower grid costs in peak demand periods.
- Direct the MPSC to recognize a suite of grid services that can optimize distributed solar, storage and DER technologies to help the utilities lower the cost of maintaining and operating the electric grid while fairly compensating owners of those technologies for those services.

Endnotes & References

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