



# Michigan Solar Development Analysis

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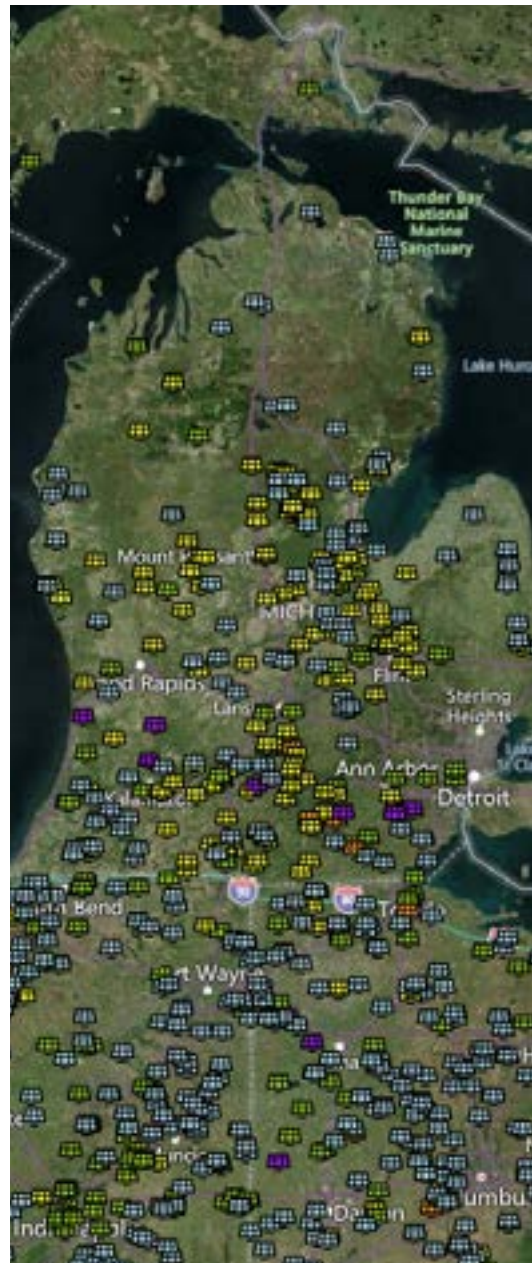
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# Michigan Solar Development ANALYSIS

The state of solar development in Michigan can be evaluated by key factors such as federal and local regulations, incentives, grid interconnection and integration. The current state of development activity in Michigan is growing and can be seen in this analysis summarizing all facets of solar energy project development.

We will break down the various federal and state incentives available to solar energy developers in Michigan and how to access them.

LandGate provides key data to the top developers and financiers in the country. To learn more about access to this platform, or to talk about how to apply the information below to your business, book time with a member of our dedicated energy markets team.



# Michigan Solar Energy ACTIVITY

Status	MI Solar Farm Count	MI Solar Farm Capacity (MWac)	MI Solar Farm Generation (MWh)
Operating	65	2,362	39,012
Under Construction	13	197	15,627 (est.)
Planned	100	912	176,900 (est.)
Queued Projects	117	15,291	203,775 (est.)
Site Control (Lease Options)	7	147	2,244 (est.)

\*est is the estimated peak total electricity generation that those solar farms will produce once operational

As of October 2023, Michigan has 65 solar farms already operating with a current capacity of 2362 MW<sup>1</sup> and a current electricity generation of 39,000 MWh. Michigan has a significant amount of operating solar farms compared to the other states in the US, and it has one the largest development of solar farms with 13 solar farms under construction of 197 MW capacity total, 100 planned solar farms with 912 MW capacity total, as well as 112 Utility-Scale Queued projects and 7 site control projects. Overall, if all planned and under construction farms go into operating status, Michigan will expand its capacity by 1,109 MW. That's a 47% growth in capacity for the state! In Michigan, the average solar farm size is 60.8 acres producing 8.5 MW of electricity under ideal conditions. So a solar farm in Michigan needs an average of 7.2 acres per MW of capacity.

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# Analyzing Utility-Scale Solar in Michigan

Utility-scale solar refers to solar farms often created and managed by utilities, independent power producers, or energy firms. These projects aim to produce electricity on a large scale and deliver it directly into the distribution grid. These solar farms generally have **more than 10 MW** in capacity. Contrarily, community-scale solar refers to smaller-scale solar power facilities, **under 10 MW**, that are primarily intended to serve local communities or particular user groups. Below is a breakdown of the different types of solar farms and their development statuses

Michigan is a state for solar development where the state is regulated by Pennsylvania-New Jersey-Maryland Interconnection (PJM) and MISO

## Projects Queued for Development in Michigan

ISO	Number of Solar Farms	Capacity (MWac)
MISO	86	13,537
PJM	26	1,754

A project in queue means that the project enters the interconnection queue of that region waiting for regulatory approval. During this period, the analysis of possible engineering and land factors is conducted to determine the feasibility of the project to be constructed and connected to the grid. The average amount of time it takes for a farm to go from queue to operational in Michigan is **47 months!** As per the projected in-service dates for the current projects in queue, Michigan will most likely add **15 GW** of Utility Scale farms by the end of 2025, which is a **42%** increase in operational capacity.

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## Projects Under Site Control in Michigan

Site Control is land under lease or under option to lease. Solar developers run an initial assessment of the suitability of parcels for solar farms. After they put the land under option, they need time to run their due diligence and submit the project to the queue. When the solar project is about to be approved by the queue, the solar developer exercises the solar farm option agreement to convert it to a solar farm lease agreement. These site control projects have not entered the interconnection queue yet. Currently there are 7 project leases with an estimated capacity of 147 MW. Land-Gate analyzes county tax & deed assessor records to find lease agreements already in place between developers and landowners. This unique dataset is continuously updated by a process that locates new lease documents within days of new agreements being filed with each county.

How do developers screen and run due diligence for those solar farm projects in site control?

### Factors to take into consideration:

- Electricity generation
- Electricity commodity prices (LMP, incentives, PPA)
- Capital costs
- Operating costs
- Timing
- Risks

Using the factors above and a standard solar panel size, the buildable acreage and a land coverage ratio (encompassing row spacing and maintenance spacing) we calculate the maximum number of panels that could fit on the parcel. This helps us estimate the capacity the project lease will add to the grid and calculates a Market Value of the solar project.

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LandGate's Solar PowerVal tool enables similar capabilities to evaluate land parcels for solar development and get an independent economic report for solar projects of all statuses. This tool allows developers and project financiers to fast-track the process of submitting a feasibility study to the queue for approval through independently produced Engineering & Economic analytics and Solar 8760 reports or evaluate projects and parcels for origination and M&A.

## **How is a utility-scale solar project submitted to the queue to connect to the Electric Grid?**

Typically, the queue submission process within an ISO or Utility area follows similar steps.

The solar developer needs to complete and submit an official interconnection request form provided by the ISO or utility, that captures essential project details and starts the interconnection process. Project specifications should include details like name, location (latitude and longitude), point of interconnection, capacity, expected energy production, environmental impact, technology layout-inverters, solar panels, system layout through a Feasibility study with an 8760 report to help initially assess the project's compatibility with the existing grid infrastructure. The Solar developer will also have

to pay an initial payment to secure a position in the interconnection queue and contribute towards the cost of initial studies and evaluations conducted by the ISO/Utility. Post the submission of the form, reports and payment, the project is now effectively in the queue.

After the project has entered the queue, Injection reliability study and system impact study is conducted. These studies determine the exact impact of the project on existing infrastructure and identifies any potential network updates required to reliably interconnect the solar project to the grid. Once the study is completed, the developer gets a complete picture of the financial cost of the solar farm with regards to the complete CAPEX and Budget. This helps the decision making process of whether to move forward with

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the development of the solar project or withdraw the application from the queue. If the project seems viable to move forward the developer signs an interconnection agreement with the ISO/Utility and essentially looks to produce Economic and Financial reports for Bankers and Investors to help facilitate the construction of the solar project.



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# Commercial, Community & Behind-the-Meter Solar Farms

## Projects under development in Michigan

Status	Solar Farm Count	Capacity (MWac)
Building	3	7
Planned	76	206

Michigan is a state where DTE Energy and Consumers Energy are the two largest utility suppliers that take up the majority of the market supply. Below is an analysis of community solar farms and other small-scale solar projects in the queue.

In the near future, Michigan plans to expand and introduce community shared solar to the state and provide opportunities for its citizens to invest into renewable energy projects but as of right now, Michigan allows utility suppliers to still allow the consumers to get access to solar energy but they cannot invest into owning a share in the community shared solar program..

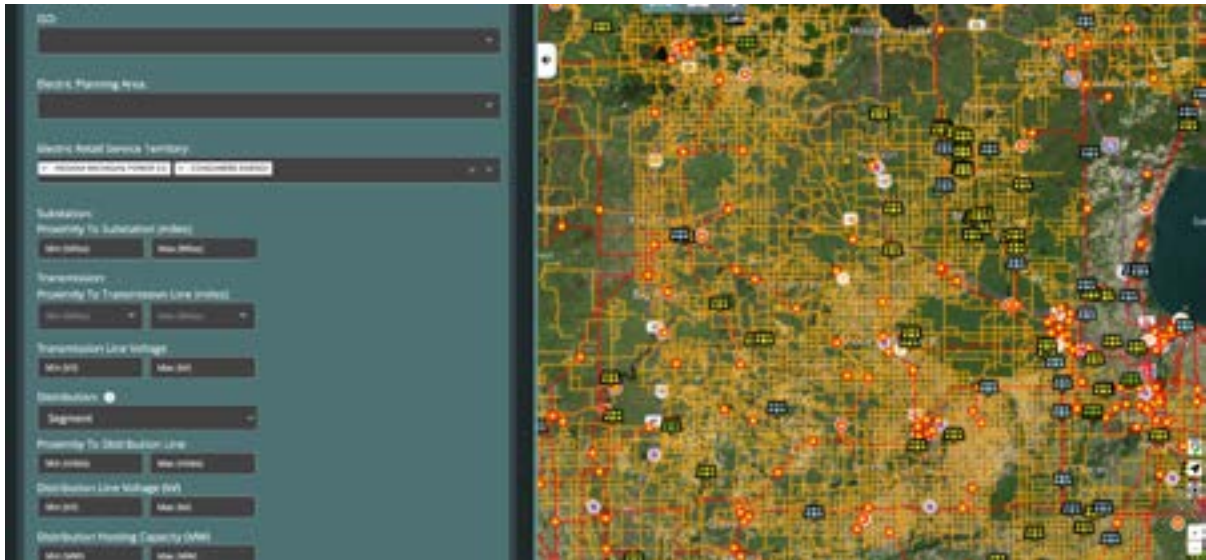
In late November of 2021, Consumers Energy reached the maximum allowable interconnections to the grid under their program. Under the 2008 law in Michigan, publicly held utilities were obligated to offer a metering program, which allowed them to interconnect distributed energy sources up to 1% of their average 5-year base energy load. This 1% was further divided into 0.5% for residential installations (net metering) up to 20 kW, 0.25% for commercial installations (modified net metering) up to 150 kW, and the remaining 0.25% for methane digesters up to 150 kW. Now that this cap has been reached, they are no longer required to accept additional interconnections to the grid. Consumers Energy raised the cap to 2%, and they implemented a new metering system for inflow

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and outflow, similar to what DTE adopted during their transition from net metering to distributed generation in November 2019. Instead of offering full retail credit for excess energy sent back to the grid (outflow), they will now credit the outflow at the power generation rate, which for most residential homes will be approximately 9.5 cents per kWh. While it's not explicitly stated if this program will work like DTE's, where outflow credits can only be applied against inflow power generation charges, it's promising that the outflow rate is higher than in many other areas in the state.

The reduction in the outflow rate and the increase in electricity prices make it essential to collaborate with an experienced solar company to ensure that your solar system is appropriately sized for optimal financial benefits. This change in outflow rates will likely lead more homeowners to consider adding battery storage to limit the amount of excess energy they send to the grid. The new energy laws replace net metering with a new distributed generation program but allows existing net metering program customers to maintain current program terms and conditions for 10 years from the date of enrollment in the program.

## How does a Community or Distributed Generation project connect to the electric grid?



These projects almost always connect to a three-phase distribution line. A distribution line is conceptually the same as a transmission line but moves electricity at a much lower voltage. A distribution line must be within one mile of your property (or preferably much less) to make interconnection cost-effective. Through LandGate's accessible distribution line data, developers and landowners can evaluate land parcels based on segments & feeders, proximity to existing distribution lines and distribution hosting capacity. Using these evaluations, developers can leverage LandGate's data to make informed decisions about the most cost effective locations for solar projects and streamline their project development process, leading to faster project approvals, minimizing interconnection costs, and maximizing energy generation.

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# Michigan LMP Data

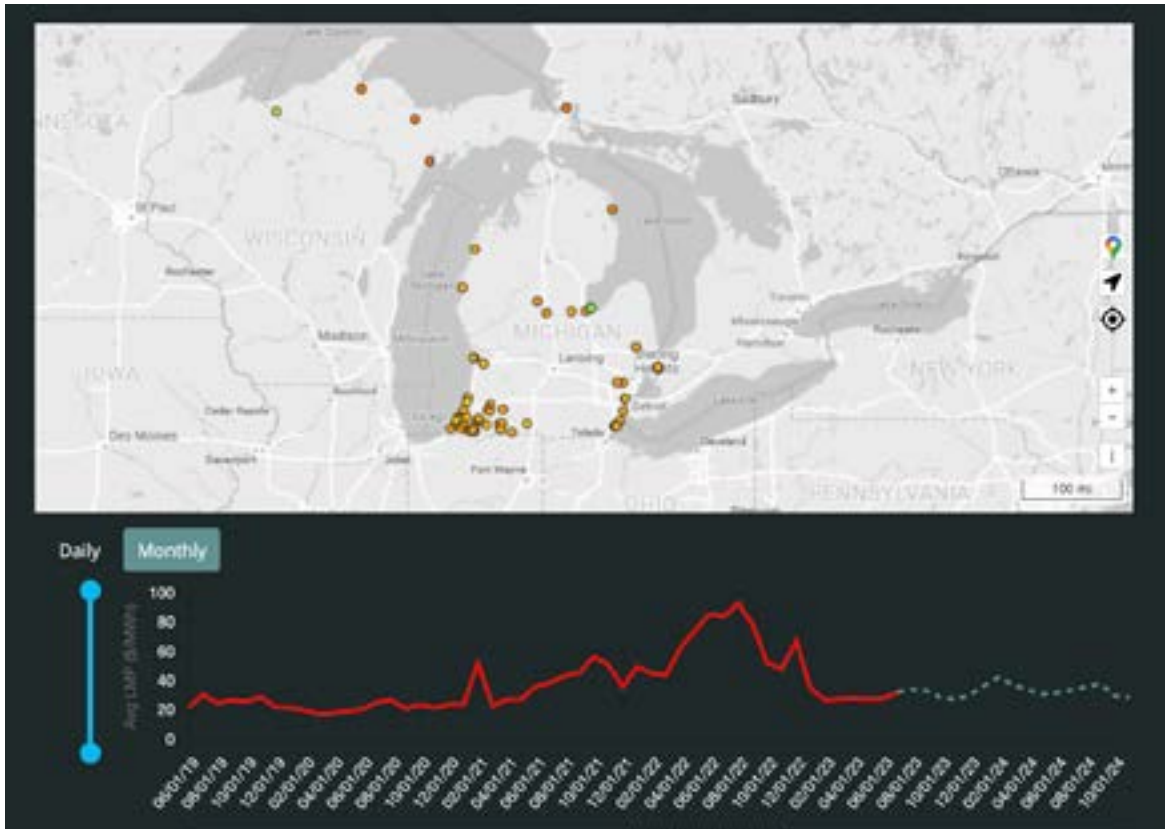
**LMP (Locational Marginal Price) is a pricing mechanism used in wholesale/merchant energy markets to determine the cost of electricity at specific locations (node) within the grid.** LMP considers a number of variables, including the cost of generating power, transmission constraints, grid congestion, losses, and load at certain nodes or locations within the electrical grid. The prices at which electricity is bought and sold in the market in real time or on an hourly basis are reflected in its calculation, which is done through market procedures.

**Michigan saw the average LMP price increase by 81.3% in the past 3 years with an average price of \$43.40/MWh in 2023.** This price is expected to decrease by 30.9% in 2024. Consumer electricity purchase cost has increased for the past few years in Michigan. The current commercial electricity rate is 16.07 ¢/kWh which is a 12.77% increase compared to the commercial electricity rate of 14.25 ¢/kWh in 2020.

Lower LMP prices correspond to lower electricity costs, which could potentially impact the financial variables of solar installations. However, lower LMP prices can improve the value proposition of community solar projects. These projects seem more economically appealing as they offer participants greater savings on their power bills. Lower LMP areas can, thus, increase community solar adoption as residents collectively seek to reduce electricity costs. This complements Michigan's current move towards providing citizens better access to clean energy through bills aimed at introducing community solar projects.

In addition, Lower LMP locations could have less expensive land acquisition, less expensive development, and possibly less complicated regulations. This can be useful for developers as they can take advantage of these cost savings to make their projects more financially attractive. Lower LMP prices may also offer unique opportunities for solar developers to enter markets that may have been overlooked due to higher competition in areas with higher LMP prices. In this manner, developers can strategically expand their portfolios into regions with lower LMP, diversifying their projects and potentially reducing risk by avoiding over-saturated markets.

# Michigan LMP Scorecard



<b>Merchant Energy Pricing:</b> <b>Market: MISO &amp; PJM</b> <b>Hub: Michigan.Hub</b>	
Number of price nodes active:	<b>61</b>
Average LMP price as of 07/01/23:	<b>\$43.30.MWh</b>
Average retail price as of 07/01/23 (how much a community solar farm or behind the meter electricity generation sales electricity for + consumer purchase cost)	<b>16.07¢/kWh</b> Current commercial electricity rate <b>14.25¢/kWh</b> Rate in January 2020, +12.77% incr.
Percentage change in average LMP in the past 3 years	<b>+81.30%</b>
Forecasted percentage change in average LMP Price for 2024:	<b>-30.90%</b>

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## Average LMP Prices: Historical & Forecasts

Year	Avg LMP Price (\$/MWh)
2018	\$38.71
2019	\$26.50
2020	\$21.64
2021	\$38.52
2022	\$64.68
2023	\$29.94
2024 (est.)	\$34.44
2025 (est.)	\$39.15
2026 (est.)	\$44.65

Based on the LMP and ISOs data in Michigan, the 2024 average LMP is estimated to be \$34.44/MWh, increasing by 15% compared to 2023.

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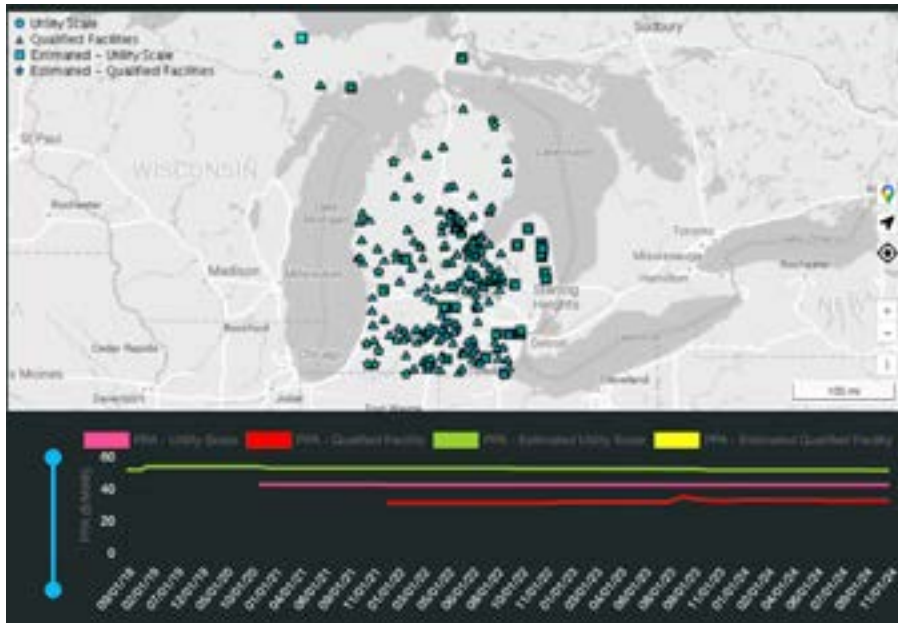
# Michigan PPA Data

Utility-scale solar can be integrated into the grid and electricity can be sold at a predetermined price thanks to PPAs (Power Purchase Agreements) with utilities or power purchasers. Even if they are unable to put solar panels on their own homes, PPAs for community-scale solar projects allow local participants to profit from solar energy generation. The time and amount of power sales are governed by the PPA's terms, which guarantees a steady market for the solar installation.

The average Utility-Scale PPA price in Michigan is \$52.48/MWh. This price has decreased by 2.83% in the past 3 years. A lower PPA price means that the cost of power from the particular project is now more competitive when compared to other energy sources. It implies that a solar or wind farm, for example, has become more cost-effective and is now able to offer electricity at a cheaper cost, making it a more alluring option for

consumers. Electricity consumers may benefit from cheaper electricity prices as a result of a drop in PPA prices. This can lower consumers' overall energy expenses and have a positive effect on their electricity bills, whether they are residential, commercial, or industrial customers.

# Michigan PPA Scorecard



Average PPA price 2023:	<b>\$52.48/MWh</b>
Average PPA price change in the last 3 years	<b>-2.83%</b>
Largest PPA buyers:	<b>Ford</b>

## Average PPA Prices:

Year	Price (\$/MWh)
2020	\$54.01
2021	\$42.87
2022	\$42.53
2023	\$52.48



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# Federal & Michigan State Tax Incentives for Solar Developers

There are several federal and state incentives available for solar development in Michigan, intended to encourage the use of solar energy by making solar power more affordable for businesses and organizations that install solar systems. These incentives can improve the financial viability of solar projects since they lower the initial costs and increase the return on investment. Solar project incentives aid in the switch to clean, renewable energy sources, which lower greenhouse gas emissions and slow climate change. Incentives aid in increasing the deployment of solar projects by making solar energy more financially appealing, replacing fossil fuel-based power and lowering the environmental effects related to traditional energy sources.

Michigan offers mainly the Federal Solar Tax Credit (ITC) as the primary incentive program for solar energy. You can combine this with the property tax exemption offered as well.

<b>MI Solar Development Incentive</b>	<b>Type</b>	<b>About</b>
Federal Solar Tax Credit (ITC)	Federal	Developers can claim 30% of the installation cost as a credit on their federal income taxes.
The Michigan Renewable Energy Credit Program	State	This is an inexpensive and easy way for the people of Michigan to support renewable energy in the Great Lakes State. When you take part, your monthly energy use is matched with renewable energy credits from wind or solar energy generated right here in Michigan
Renewable Portfolio Standard (RPS)	State	The Michigan Power Agency sets targets for the RPS which is the percentage of energy that utilities must derive from renewable sources. Under the RPS the Michigan Power Agency manages RECs (Renewable Energy Credits)

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## **Federal Solar Tax Credit, also known as the Investment Solar Tax Credit (ITC)**

Federal Solar Tax Credit (ITC) is 30% until 2032 which can be claimed in Michigan as well. Developers of community-scale and utility-scale solar projects are eligible for the Federal Solar Tax Credit as long as the solar energy systems they install meet the requirements. The tax credit percentage for community-scale solar and utility-scale solar projects is also 30% of the total project Cost. This means that developers can claim 30% of the installation cost as a credit on their federal income taxes.

## **RPS Goal**

Michigan's Renewable Energy Standard (RPS) mandates a gradual increase in the state's retail supply portfolio from 10% in 2015 to 15% by 2021. This applies to all retail electric providers. After 2021, investor-owned utilities will continue to use renewable energy credits (RECs) to reach the 15% target, while others can voluntarily retire

RECs for the same goal.

The 15% Renewable REC Portfolio is measured in RECs, with each REC equal to one megawatt-hour of renewable energy from sources like wind, solar, biomass, and hydroelectric power. The RPS offers "incentive credits" for specific renewable energy characteristics and allows the limited use of energy waste reduction credits instead of RECs.

Michigan's utilities have met these targets primarily using wind power, resulting in a limited market for Solar Renewable Energy Certificates (SRECs) in the state. However, homeowners may consider selling SRECs in Ohio.

While Michigan lacks a strong SREC market due to the absence of a solar carve-out, solar owners can participate in Ohio and Pennsylvania's SREC markets.

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## Solar Renewable Energy Certificates

Michigan does not currently have a viable SREC market as there is no solar carve-out. However, solar owners in Michigan are eligible to participate in the OH & PA Tier-I SREC markets. The goal for the future is 35% by 2025 (including energy efficiency and demand reduction).

## The Michigan Renewable Energy Credit Program

The Michigan Renewable Energy Credit Program: With this program, you have the option to align your energy consumption with renewable energy sources. It involves a modest additional cost on your monthly bill, amounting to just \$0.014 per kWh or \$1.40 per 100 kWh block.

Through this program, Consumers Energy collaborates with local wind and solar facilities in Michigan to secure the renewable energy credits corresponding to your subscription. These credits are

“retired” annually, signifying that they are exclusively associated with your energy use.

This initiative is available to all customers, both residential and business, who have not received a shut-off notice in the last 9 months. The program offers the convenience of automatic yearly re-enrollment.



With such a wealth of new data on the state of Solar Development in Michigan, we imagine you might have questions about how to apply these trends, data, and tools to your own solar development efforts in Texas. Our dedicated energy markets team can help walk you through how to access and interpret this information in a way that is relevant to your business needs. Scan the code to the right to schedule time with our team to talk one on one.



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