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Renewable Energy Policy Analysis

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STATE OF MICHIGAN
RENEWABLE ENERGY POLICY ANALYSIS

December, 2021

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ABSTRACT

As market forces and policy interventions continue to facilitate a renewable energy transition, U.S. states are increasing their shares of renewable energy technologies. In recent years, Midwest states, such as Michigan – which have historically been intensely reliant on conventional energy sources – have become especially dynamic energy policy landscapes because of recent yet rapid transitions toward renewable energy.[1] In the unique case of Michigan, state-level policy has been a major driver for investments in renewable energy across the state. While Michigan has had some successes in implementing notable renewable energy policies and programs, Michigan's renewable energy landscape is hyper-sensitive to political outcomes in Lansing. Therefore, if Michigan is to achieve its long-term renewable energy goals, it must incorporate more stable and cohesive solutions that will promote renewable energy within the fabrics of Michigan's broader policy landscape.

While complex in its politics and energy policy landscape, Michigan is expected to see significant growth in renewable energy over the next few decades.[2] The rate of this growth, however, is dependent on many factors that exist within Michigan's borders. This paper discusses the current renewable energy policy landscape across Michigan and explores potential policy solutions at the state and local level that can help advance Michigan's long term energy goals.

In addition to government policy and politics, this paper also considers the role that policy interventions in areas such as taxation, siting authority, infrastructure investment, and the utilization of public lands as platforms to increase renewable energy deployment across Michigan. By considering a range of policy solutions in areas such as these, Michigan can hit its stride in delivering long term stability and demonstrate itself as a unique leader amongst U.S. states transitioning to renewable energy.

1 | STATE BACKGROUND

Known as the 'Great Lakes State,' Michigan is surrounded by one-fifth of the world's freshwater supply and 90% of the U.S.'s freshwater supply.[3, 4] Michigan is the 22nd largest state in the US by land area and 11th largest state by total area.[5] With a population of 10 million people and a total energy consumption of 289 million BTUs per capita, Michigan is among the top 10 states in the U.S. in both population and total energy consumption, though the state's total energy use is below the U.S. per capita average.[6] The majority of Michigan's electric capacity is coordinated by the Midcontinent Independent System Operator (MISO).[7] Michigan's lower peninsula is in MISO's Zone 7, while the upper peninsula (UP) is in MISO's Zone 2.[8] The south-western corner of Michigan is part of the PJM Interconnection electricity system.[9]

1.1 | MICHIGAN'S ELECTRICITY MIX

From 2001 to 2019, coal was Michigan's main source of electricity production, followed by nuclear, and natural gas, with wind, biomass, petroleum, and hydroelectric providing the remainder of the state's electricity production.[10] In 2020, Michigan saw a shift in electricity production when natural gas generated the largest amount of the state's electricity for the first time, supplying 33% of the state's net generation, surpassing coal with 27% of the state's net generation, which fell to third after nuclear power, supplying 29% of the state's net generation (Figure 1).[11]

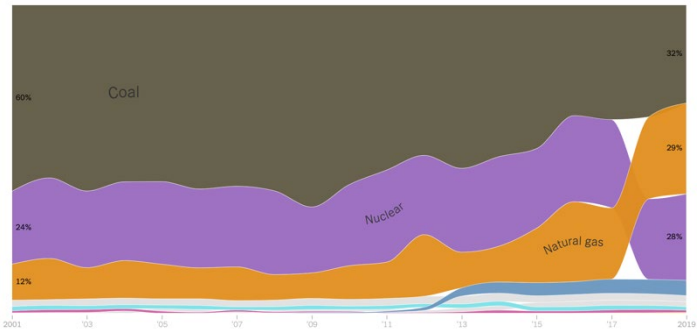

Figure 1. Michigan energy mix 2001-2019. [12]

In 2020, renewable energy generated 11% of Michigan's total in-state electricity net generation.[13] The majority of this generation came from wind, which supplied 60% of Michigan's renewable energy and 6% of the Michigan's total net generation.[14] Michigan ranks among the top 15 states in the country for electricity generated by wind.[15] While wind makes up the majority of Michigan's renewable energy, other sources such as biomass and hydroelectric dams also make up large portions of Michigan's renewable energy portfolio, with biomass accounting for 20% of the state's renewable energy generation and hydroelectric dams accounting for almost 2% of the state's renewable enrgy generation.[16] Although solar made up around 4% (.520 GWs) of Michigan's renewable energy generation in 2020, its share of the state's renewable energy mix is expected to grow to 1.801 GWs over the next five years.[17,18] According to 2019 data, Michigan had a total international import of electricity of a 6,047.749 GWh of electricity and a net interstate import of 0 GWh.[19] Michigan had a total international electricity export of 3,402.327 GWh and a net interstate export of 10,112.733 GWh of electricity.[20]

Michigan is home to 8 investor-owned utilities (IOUs), 9 rural electric cooperatives, and 41 municipal electric utilities (Figure 2).[21] The two largest utilities are Consumers Energy and DTE Energy, both of which provide electricity to 1.8 million and 2.2 million customers.[22,23] The Michigan Public Service Commission (MPSC) is responsible for electric regulation in the state and has regulatory oversight over 8 IOUs and 9 co-ops (Figure 2).[24]

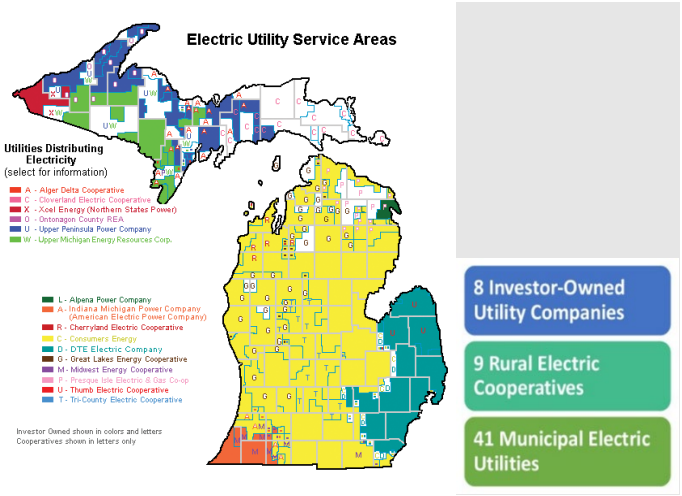

Figure 2: Michigan electric service area map[25]

In 2021, Consumers Energy announced it would retire all its coal-burning power plants by 2025 and DTE also announced a plan to close its coal-burning power plants by 2040.[26] Consumers Energy and DTE have both established goals of achieving net-zero carbon emissions by 2040 and 2050 respectively.[27, 28]

1.2 | RENEWABLE ENERGY POTENTIAL

Michigan has vast renewable energy resources, enough to generate several times the state's total electricity demand, which has averaged around 115,000 GWh/year recently.[29,30] The primary available resources in the state are wind (onshore and offshore) and solar. A 2014 study by the Union of Concerned Scientists (UCS), estimates that the state has the potential to generate 523,374 GWh/year from onshore wind at 100m, after accounting for competing land uses.[31] For reference, the state generated 6,759 GWh from wind in 2020.[32] Offshore wind potential generation is estimated at 1.7 million GWh annually, over 16 times the state's electricity demand.[33] Offshore wind resources remain untapped due to questions about feasibility. Solar potential for rooftop and urban utility-scale projects amounts to over 74,000 GWh/year; if rural area projects are included, the total technical solar generation potential is over 5.2 million GWh/year.[34] This is significantly more than Michigan's current solar generation of 325 GWh in

2020.[35] Michigan also has bioenergy resources, such as energy crops, agriculture and forest residues, wood wastes, and captured methane, that could generate 11,897 GWh/year.[36] Hydropower has the technical potential of 1,181 GWh/year with 133 MW of small-scale hydropower identified as potential development in a U.S. Department of Energy study after accounting for land use and environmental sensitivity.[37, 38] Should enhanced geothermal energy become more economically feasible in the future, Michigan has a technical potential of 457,850 GWh/year.[39]

The UCS believes that Michigan can affordably generate 32.5% of its electricity needs with renewable energy by 2030 while maintaining a reliable electricity system, mainly through a strengthening of the renewable energy standard and wind development.[40] Using NREL's Regional Energy Deployment System (ReEDS) model, the 2030 Case models a 1.5% increase in renewable energy requirements each year. This scenario results in significant economic benefits ($9.5 billion in new capital investments) with minimal consumer impacts (0.3% increase in electricity prices compared to the baseline), as well as reduced carbon emissions from a more diverse electricity supply.[41] Mark Jacobson laid out a 100% renewable energy system in 2050 for Michigan which is reliant on wind and solar alongside a reduction in end-use demand.[42] This system would create 242,000 jobs, cut annual energy costs by 62%, and eliminate 89 million tons of CO_2e/year. However, the system would cost nearly $300 billion to implement, as well as requiring 2% of the state's land.

Although there is significant wind and solar potential in Michigan, not all is accessible. Figures 3, 4, and 5 show the areas of the state with highest average wind speeds at 100 meters.[43] These areas are onshore in the thumb along Lake Huron, the center of the Lower Peninsula, areas of the UP along Lake Superior, and offshore in Lakes Huron and Superior.

Figure 3. Average land-based wind speed at 100 meters in Michigan.[39]

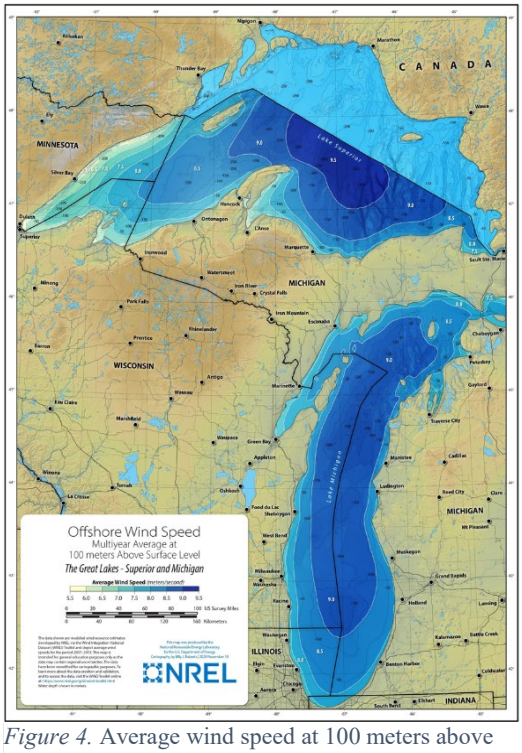

Figure 4. Average wind speed at 100 meters above Lakes Michigan and Superior.[39]

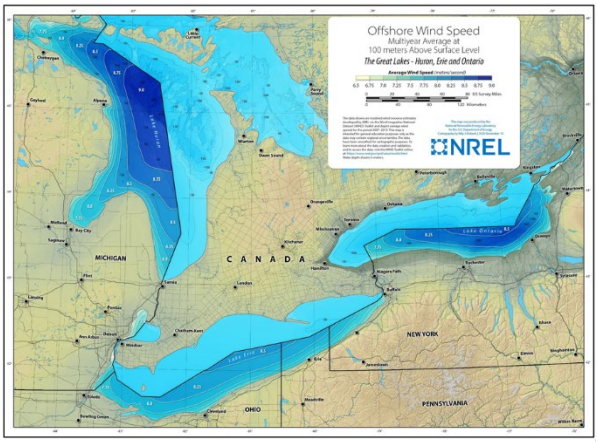

Figure 5. Average wind speed at 100 meters above Lakes Huron, Erie, and Ontario.[39]

Figure 6 categorizes the solar potential across the state based on Direct Normal Irradiance (DNI) values from NREL, with the thumb and center of the state once again representing the optimal areas.

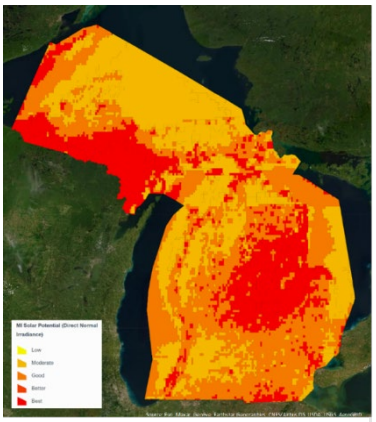

Figure 6. Solar potential around the state based on NREL DNI values.

Each of these resources is limited by various factors. One of the main factors is land cover (Figure 7). The areas of yellow in the map show the land covers that typically allow for utility-scale wind and solar development, while gray represents developed areas with potential for rooftop solar. The thumb and southern center of the state tend to have compatible land covers for development, which is convenient given those areas have the strongest potential. The heavily forested UP will make accessing the solar resources there difficult.

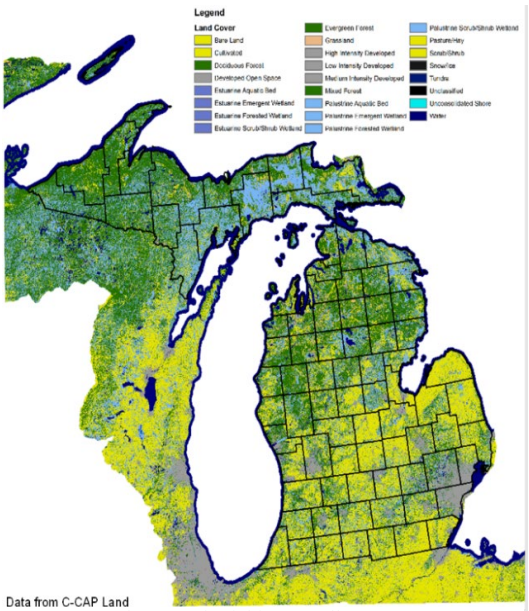

Figure 7. Land cover of Michigan. Yellow represents the most compatible land for wind and solar, such as bare land, cultivated, pasture, and shrub. Green are forested areas, blue is palustrine, and grey are developed.

1.3 | LOCAL NARRATIVES OF RENEWABLE ENERGY

Statewide and metropolitan news outlets tend to highlight the importance of renewable energy installations as necessary steps to reach state and national climate goals.[44] Supporters of renewable energy projects highlight economic impacts these developments will bring. This includes steady income to those who lease or sell their land, and an influx of jobs and tax revenue.[45]

Both statewide and local news outlets acknowledge pushback from many residents of localities where renewable energy developments are proposed to be sited, including potential property value loss, noise pollution, and impacts on migratory bat and bird populations. [46] Based on a qualitative study of resident's perceptions of wind turbines in two Michigan townships, 59 of 113 comments were negative in nature with regards to wind energy.[47] Land owners tended to be more supportive of onshore wind projects than neighbors who did not own land. [48]

Local opposition has had varying degrees of success combatting renewable energy development, sometimes even blocking it. In 2019, Renewable Energy Systems canceled plans for a 49-turbine wind project in L'Anse Township in Michigan's UP in the face of delays and opposition.[49] Additionally, Huron County in Michigan's thumb area, one of the state's top two wind resource areas, imposed a moratorium on wind farms in 2015, preempting drawn out local opposition.[50] This level of opposition is less common for solar development, however, a year-long solar development moratorium was established in 2021 by mid-Michigan Hazleton Township where Ranger Power was scouting for their next project.[51]

On the other hand, some Michigan communities are clamoring for RE development. Ann Arbor has plans to power its electric grid with 100% renewable energy by 2030.[52] Detroit set goals to increase local solar generation to .010 GW by 2029.[53] Highland Park is considering a solar ordinance to encourage solar development and beginning to partner with nonprofit Soulardarity who have pushed for solar in the community since 2011.[54] Traverse City has set goals for 40% renewable energy by 2025 and 100% by 2040.[55] Grand Rapids also has goals for 100% renewable energy sources for municipal energy use by 2025.[56]

Rooftop solar and net-metering are also contentious topics in Michigan. Electric utilities are only required to purchase 1% of their average in-state peak load from customer-generated power sent back to the grid. [57] However, there is currently a bipartisan bill in the works to lift this cap.[58] Although Michigan utilities have fought to keep this cap minimum requirement and keep it low, the debate sees much less opposition among local residents.[59] Utilities who now support an increase in the cap, but not an elimination, argue the cap is necessary because rooftop solar owners are compensated too generously while other customers are forced to subsidize the purchase of this electricity, particularly low-income ratepayers.[60]

1.5 | ECONOMIC, DEMOGRAPHIC, AND POLITICAL FACTORS

The majority of Michigan's population and industries are located in the state's Lower Peninsula.[61] About half the population lives in southeast Michigan, which is home to a majority of the state's industries and businesses.[62] While Michigan's heavily forested UP contains 29% of the state's land area, it contains 3% of Michigan's population.[63] According to the 2010 Census, Michigan was the only state in the country to see a drop in population over the previous decade, which was largely due to a decline in the state's automobile industry.[64] According to the 2020 US Census, however, Michigan saw modest population growth between 2010 and 2020, with the majority of growth concentrated in the west Michigan counties of Ottawa (+12.3%) and Kent (+9.2%), and in the southeast Michigan's counties of Washtenaw (+8%), Livingston (+7.1%) and Oakland (+6%).[65,66] The 2020 Census indicated population declines in other counties, mostly in the UP, including Luce (-19.5%) and Ontonagon (-14.2%) (see Figure 8).[67]

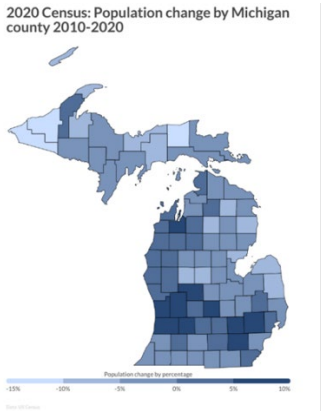

Figure 8. Michigan population trends from 2010-2020. [68]

Michigan is well-known for manufacturing automobiles, which accounted for 18.5% of the U.S.'s overall production in 2017.[69] Manufacturing accounts for 19.3% of Michigan's real GDP, followed by government (10.1%), and healthcare (8.7%).[70] Michigan is the second most agriculturally diverse state in the US and agriculture contributes $104.7 billion annually to the Michigan economy.[71] With relatively abundant land, 71.9% of it is privately owned and 28.1% is

publicly owned.[72] The majority of publicly owned land is located in Michigan's northern-Lower Peninsula and UP.[73]

Figure 9. Michigan counties with public land. [74]

Michigan is considered a 'swing state' that can be won by Democrats or Republicans. Republican strongholds include rural areas of Western and Northern Michigan and the UP, while Democratic strongholds include densely populated urban areas, especially Ann Arbor, Detroit, Flint, Lansing, and Grand Rapids.[75] With the exception of the 2016 presidential election, Michiganders have voted in support of the Democratic nominee for President since 1992.[76] In the 2020 presidential election, Joe Biden won Michigan over Donald Trump by 2.8% of the vote.[77]

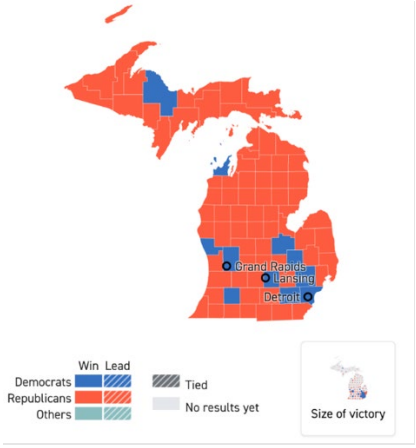

Figure 10. Michigan presidential election results (2020)[78]

Since 2018, Michigan has been governed by Gretchen Whitmer (D) who won Michigan's gubernatorial race against Bill Schuette (R) by 9.5% of the state vote.[79] During her campaign, Whitmer ran on a pro-renewable ener platform, saying "I support increased investment in the renewable energy sector of the economy…" and that, "…energy legislation should continue the progress of the state's transition to a clean energy economy."[80] Whitmer also embraced a goal of 100% renewable energy.[81] Schuette portrayed himself as a moderate on energy issues saying, "I would support a review of Michigan energy policy to provide a mix of nuclear, clean coal, natural gas, renewables and to encourage more [energy] choices…"[82]

The state's congressional delegation is also split, with one party typically holding a narrow majority. As of February 2022, Michigan's congressional delegation is a 7-7 split of Democrats and Republicans in the U.S. House, and Michigan's two U.S. Senators are both Democrats.[83]

As of February 2022, Michigan's legislature is currently controlled by Republicans holding 55 out of 110 seats in the Michigan House of Representatives and 22 out of 38 seats in the Michigan Senate.[84, 85] Republicans typically control both chambers of the state legislature and current redistricting efforts in the state are expected to favor Republicans.[86] Michigan House Energy Committee Chair, Joe Bellino (R) holds a 47% lifetime scorecard with the Michigan League of Conservation Voters (MLCV) and a mixed voting record when it comes to energy legislation.[87] Bellino is a proponent of Enbridge's contentious Line 5 pipeline and has recently received criticism from both sides of the political spectrum and Michigan's clean energy industry for refusing to hold a vote on legislation to lift the minimum required purchase of rooftop solar in Michigan.[88, 89, 90]

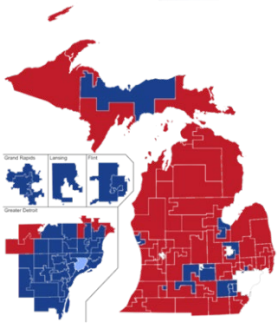

Figure 11. Composition of Michigan State House (2019). [91]

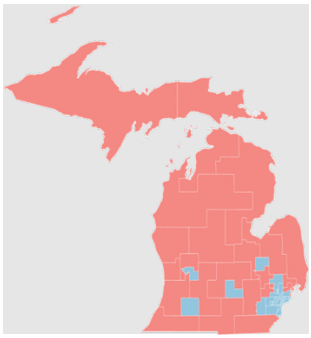

Figure 12. Composition of the Michigan Senate (2019). [92]

The Chair of the Michigan Senate, Dan Lauwers (R) holds a 32% lifetime scorecard with MLCV and a mixed voting record on energy legislation.[93] Lauwers is a proponent for energy availability and reliability and supported a 2019 review of Michigan's energy infrastructure.[94] In 2020, Lauwers also received backlash from both sides of the political isle and Michigan's clean energy industry for failing to take up legislation to lift the minimum required purchase of rooftop solar in Michigan.[95]

2 | POLICY OVERVIEW

2.1 | CLIMATE POLICY

2.1.1 | RENEWABLE PORTFOLIO STANDARD (RPS)

In 2008, the Michigan Legislature enacted the Clean and Renewable Energy and Energy Waste Reduction Act, PA 295 (2008), which required IOUs, municipal utilities, cooperative utilities and retail suppliers to reach the goal of renewable energy, energy efficiency and demand

reduction by 10% in 2015.[96] This act also required certain electric service providers to establish and recover costs for renewable energy programs, establish energy waste reduction programs and create a wind energy resource zone board.[97] Michigan's two largest power providers, DTE and Consumers Energy, had an additional renewable energy capacity requirement of 500 and 600 MW by 2015, respectively.[98]

In 2015, Senator John Proos introduced the "Clean, Renewable, and Efficient Energy Act" SB 438 (2015) with an aim to amend the PA 295 (2008), which was later approved by Republican Governor Rick Snyder as PA 342 (2016).[99] This act raised the RPS by 12.5% and 15% by 2019 and 2021 respectively.[100] To continue the reduction of carbon emissions, this act also includes the goal of meeting 28% of the state's electricity needs through energy waste reduction and renewable energy by 2025.[101]

Despite these successive legislative actions to increase the RPS, there have also been failed attempts – both through ballot initiatives and within the legislature. One such example is the 2018 "NextGen America" campaign funded by billionaire Tom Steyer. [102] The purpose of the campaign was to push a ballot initiative that would require utilities to get 30% of their energy from renewable energy sources by 2030.[103] As a result of pushback from the utilities, a compromise was struck with the organizers of the campaign for the utilities to voluntarily commit to getting 25% of their energy from RPS by 2030 and another 25% from reductions in energy use, and the ballot initiative failed in 2018 as it did not get enough signatures. [104] As a result, the issue was not put before voters.[105]

In 2020, Democrats in the State House and Senate introduced bills intended to increase the RPS to 100% by 2050; however, these bills faced resistance from the Republicans.[106] One of the bills, HB 5420, was subsequently reintroduced in 2020 by Democrat Yousef Rabhi and has

twenty-nine co-sponsors, as compared to one co-sponsor when it was initially introduced in 2018.[107] Even though the goal of 100% is aggressive, the Michigan Environmental Council (MEC) strongly supports the 100% requirement. In an interview, Charlotte Jameson, MEC's program director for legislative affairs, drinking water, and energy, emphasized the need to reach carbon neutrality by 2050 and cited the power sector as low hanging fruit. [108]

2.1.2 | IMPACT ON RENEWABLE ENERGY DEPLOYMENT

The RPS has helped increase the deployment of renewables in Michigan. Most of Michigan's electric service providers were able to meet the RPS and retired a total of 12,812,152 RECs in 2019. Wind energy has been the most used source to fulfill the supply of renewable energy.[109] Since the adoption of RPS policy, Michigan has seen a decline in the cost of deploying renewable energy technologies, which has impacted the cost of electricity and the projects themselves in a positive way.[110] The average cost of all new renewable electricity facilities used to meet the standard is $78.39 per megawatt-hour (MWh), which is less than utilities' forecasts.[111]

In addition to the reduced cost of renewable technologies, Michigan's RPS is also driving investment and economic benefits in the local communities. Renewable energy projects including wind, solar, and energy storage have invested $5 billion into Michigan's economy and produced another $35.2 million in land-lease payments to property owners.[112] These investments not only support the construction and installation of renewable energy but also provide jobs, create tax revenues, and provide land-lease payments to rural landowners.

2.1.3 | EXECUTIVE ACTION

In 2019, Governor Gretchen Whitmer signed EO 2019-06 that created the Department of Great Lakes, Environment and Energy (EGLE), which is responsible for energy and climate

related issues. [113] This department reorganized government agencies to put energy and environmental functions within the same department. [114] EGLE is critical in promoting lead-by-example sustainability initiatives within state agencies, coordinating the cabinet-wide Climate and Sustainability workgroup, and refining agency-wide approach for the climate efforts and energy efficiency.[115] This executive order was followed by the announcement of Michigan joining the United States Climate Alliance, a bipartisan coalition of governors from 25 states working towards the goals of Paris Agreement despite the withdrawal of the U.S. federal government from the agreement.[116] As a result, Michigan committed to achieve at least 26-28% carbon emission reduction by 2025.[117] Recently, Gov. Whitmer signed ED 2020-10 that set the goal of 100% economic decarbonization in Michigan by 2050.[118]

Furthermore, ED 2020-10 tasked EGLE to develop a plan to achieve the goal of 100% economic decarbonization in Michigan by 2050.[119] As a result, EGLE has awarded $412,000 to Lawrence Technological University and University of Michigan – Economic Growth Institute to develop the clean energy asset roadmap.[120] Gov. Whitmer has also launched two initiatives to advance Michigan's electric vehicle (EV) infrastructure and workforce landscape: The Lake Michigan EV Circuit and The Michigan Revolution for Electrification of Vehicles Academy/Academies (MiREV).[121]

Gov. Whitmer was not the first governor to address renewable energy policy through executive action. Gov. Jennifer Granholm, the first woman elected as a governor of Michigan and current Secretary of the US Department of Energy, pushed for clean energy reforms during her terms as well.[122] One such example is the Midwestern Greenhouse Gas Reduction Accord (MGGRA), which was signed on November 15, 2007.[123] This regional agreement was signed by six governors of states in the US Midwest (members of the Midwestern Governors Association –

MGA) and the premier of one Canadian province with an aim to reduce greenhouse gas emissions through a cap-and-trade program.[124] In 2010, MGGRA presented guidelines to MGA which were supposed to be implemented in 2012, however, the accord has been inactive since then.[125] In light of a "blue wave" of Midwest governors taking office in 2018, Dr. Barry Rabe at the University of Michigan emphasized the importance of Midwestern governors committing to accelerate the energy transition in terms of renewable energy resources that do not necessarily adhere to state boundaries.[126]

2.2 | TAXATION OF RENEWABLES

2.2.1 | WIND TAX POLICY

Utility-scale wind farms in Michigan are classified as personal property per Section 211.8 of the General Property Tax Act.[127] The first tax table for wind systems was created in 2007 by the Michigan State Tax Commission (STC). [128] The initial depreciation table was ad valorem, taxing the turbine at 5% depreciation annually over the first 15 years, then constant at 30% for the next 15 years.[129] The table was then amended in 2011 to start at 80% and decline to 30% in seventh year.[130] Due to the loss of potential tax income caused by this change, several counties formed the Michigan Renewable Energy Collaborative (MREC) to challenge what was viewed as "an arbitrary and costly change" in tax collections.[131] In 2014, the table was again amended to the current structure, shown in Figure 13.

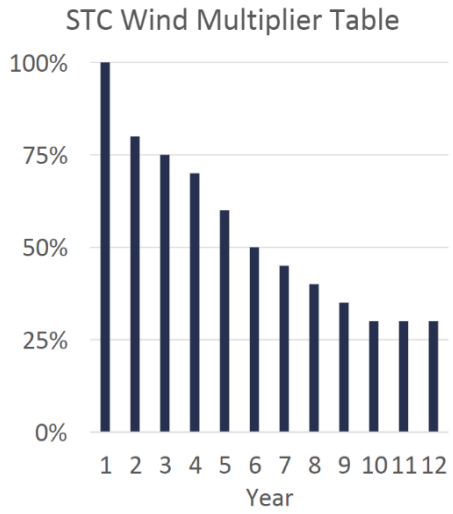

Figure 13. Current wind energy tax multiplier as amended in 2014.

MREC commissioned Appraisal Economic Inc. who created a data-driven, conservative multiplier table, which many local assessors use, resulting in 1,109 tax appeal cases from utilities and developers since 2012.[132] In June 2021, the STC ruled in favor of utilities, potentially costing local governments millions of dollars in past and future revenue, as they may be responsible to repay past overpayments.[133] This decision, regarding Huron County and DTE, has recently been appealed.[134]

This uncertainty in tax responsibilities has likely led to some hindrance of development, as developers tend to favor certainty regarding taxes.[135] However, the net generation of wind energy in Michigan has steadily increased since 2007 when the first multiplier table was introduced (Figure 14), which reflects that both sides are still interested in wind development regardless of the jumbled tax situation.[136] Development has likely been affected more by NIMBYism than tax uncertainty.

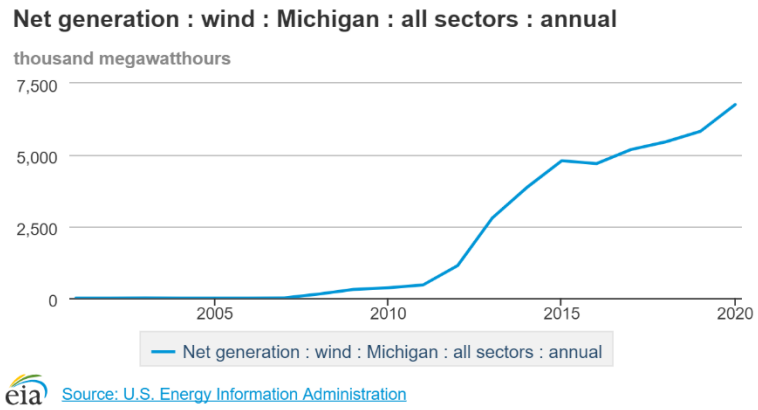

Figure 14. Net generation of wind energy in Michigan since 2000.[9]

The decision of the tax commission to side with utilities will likely agitate local governments that may suddenly be responsible for millions of dollars, but given that the decision will undergo an appeal, the final outcome will not be decided for years. Some counties may have available funds to provide the tax refunds, while others may have to draw money from other programs and areas. Should Huron County be forced to pay back tax revenues, services that rely on wind energy taxes, including Thumb Area Transit, Huron Intermediate School District, the Huron County Road Commission, the senior citizen's millage, and the veteran's millage, would all be affected.[137] Tax refunds are not certain as the lawsuits could be settled outside of court as well.

Because of the litigation situation, MREC is pushing for the issue to be resolved in the state legislature, which could be one way to help settle the litigation.[138] Two bills, introduced in April 2021 and September 2021 in the State Senate (SB 441) and House (HB 5326) by State Sen. Kevin Daley (R) and State Rep. Pat Outman (R) respectively, would set a standard depreciation table across the state.[139] The structure mirrors the original 2007 STC table, but with the 30% after 15 years applying until the turbine is removed rather than just the next 15 years.[140] Created with the help of MREC, this structure is likely appealing to local governments as it will increase local property tax revenues.

2.2.2 | SOLAR TAX POLICY

Small-scale alternative energy systems, such as residential solar, valued at less than $80,000 can receive property tax exemptions through three 2019 bills: HB 4465, HB 4069, and SB 47, ultimately combined into PA 116 (2019). The systems must meet certain conditions, including generating all or some of the property's energy use and generating less than 150 kW.[141] The exemptions have wide support for fixing the confusing patchwork of local tax structures for rooftop solar and removing a potential disincentive to install rooftop solar.[142]

Utility-scale solar energy in Michigan lacks a tax table such as that seen with wind energy. It has been taxed ad valorem, based on installation location tax rates, resulting in wildly varying taxes per MW per year.[143] In the past year, there have been several legislative actions regarding solar. A payment-in-lieu-of-taxes (PILOT) program was proposed and passed the legislature in the fall of 2020 as SB 1105/1106 (2020).[144] However, local governments wrote Gov. Whitmer claiming that the program ran counter to local control and lacks protections.[145] In December 2020, Whitmer vetoed the bills due to concerns of local governments being left out while instructing the STC to review the current treatment.[146] In the summer of 2021, the STC provided new guidance on solar energy that would increase ad valorem, but also complicate the predictability.[147] A new bill regarding solar taxation is also expected to be introduced soon, but there are no details available on its contents as of October 2021.

2.3 | SITING AUTHORITY

In Michigan, land use and siting permits for RE facilities are granted by local governments (cities, counties, and townships) and their respective zoning ordinances.[148] In the event that permits for renewable energy projects are granted by a state body, such projects remain subject to local authority.[149] Townships may choose to assume siting and regulatory

authority for renewable energy systems, but if a township has not assumed authority, the county in which the township is located may assume authority.[150]

Renewable energy facilities are subject to local land use controls; therefore, developers must acquire zoning or permits from the local government in which a proposed project is located.[151] If neither a township nor a county has assumed zoning authority for a renewable energy facility, a land use permit is not required.[152] Residents of jurisdictions within which renewable energy systems are proposed can provide public comments regarding their developments through local zoning hearings.[153]

Michigan's structure for siting authority is a product of the Michigan Zoning Enabling Act (MZEA), PA 110 (2006), which uniformly grants siting and permitting authorities to local governments by repealing the Township Zoning Act, the City and Village Zoning Act, and the County Zoning Act (Figure 15).[154] The MZEA was signed by Gov. Granholm on April 7, 2006 and went into effect July 1, 2006.[155] Though the MZEA was amended in 2008, the amendment, PA 12 (2008) only included minor changes and had no impact on Michigan renewable energy siting and permitting authority.[156] There have been no other changes to MZEA since and there are no known initiatives to make further amendments to MZEA.

While there are no known initiatives to amend MZEA, in October 2021, the Michigan Council of Climate Solutions: Energy Production, Transmission, Distribution, and Storage Workgroup developed five recommendations to be included in Gov. Whitmer's MI Healthy Climate Plan.[157] One of these recommendations is to "facilitate siting of necessary energy infrastructure" by adopting "state policies and programs that will facilitate siting of necessary renewable generation, storage, and transmission sufficient to achieve a clean energy transition of the electric power sector."[158] As of this writing, November 2021, this proposal remains solely a

recommendation for the Michigan Climate Council's consideration and the Council may adopt, reject, or modify any recommendations proposed by workgroups. That said, the recommendation may ultimately have implications for renewable energy siting in the future.

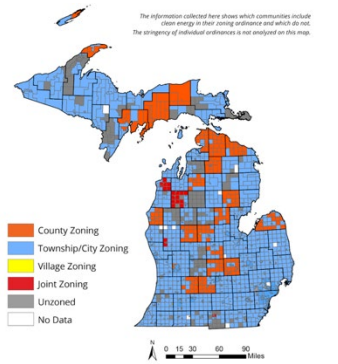

Figure 15. Zoning Jurisdiction in the State of Michigan. [159]

In addition to authorizing local governments the power to create zoning ordinances that regulate land use, the MZEA also requires that jurisdictions create a Zoning Board of Appeals (ZBA), which may establish rules to govern its zoning procedures. [160] Ruling decisions of ZBAs are final, meaning that the losing party seeking a land use permit has no further recourse at the municipal level.[161] However, a losing party can still challenge a ZBA decision by appealing to a local Circuit Court.[162]

According to the Michigan Zoning Database, "of the 1,856 jurisdictions in the state, around half have already given consideration to clean energy (wind energy, solar energy, or electric vehicle infrastructure) in their zoning ordinances, and that number continues to grow" (see Figures 16 and 17).[163]

Jurisdiction Zoning Authority Totals

Jurisdiction	Total	County Zoning	City Zoning	Township Zoning	Village Zoning	Joint Zoning	Unzoned	No Data
Township	1241	210	0	875	0	20	126	10
City	280	1	277	0	0	1	0	1
Village	252	5	0	4	203	1	26	13
Total	1773	216	277	879	203	22	152	24

Figure 16. Michigan Jurisdiction Zoning Authorities. [164]

Consideration of Renewable Energy in Zoning Ordinances						
Jurisdiction	Total	Utility Wind	Small-Scale Wind	Utility Solar	Small-Scale Solar	Electric Vehicles
Township	1241	680	757	361	380	14
City	280	82	120	39	95	20
Village	252	48	66	23	37	2
Total	1773	810	943	423	512	36

Figure 17. Michigan Jurisdiction's Consideration of Renewable Energy in Zoning Ordinances. [165]

Since Michigan authorizes its local governments to oversee their own permitting and siting practices, there is a lack of uniformity in ordinances concerning renewable energy facilities.[166] Without standard and uniform siting and permitting practices across local governments, this can result in a lack of confidence amongst renewable energy developers, as well as more potential roadblocks and inefficiencies that can hinder the procurement of renewable energy.[167] As shown in Figure 17, for example, roughly half of Michigan jurisdictions have considered wind energy in their zoning ordinances, and roughly one-third of jurisdictions have considered solar.[168]

2.3.1 | WIND ENERGY SITING AND PERMITTING

In Michigan, the siting and land use permitting for wind energy development falls under the jurisdiction of local governments through their respective zoning authorities.[169] Subsequently, communities across Michigan have developed local ordinances regulating wind energy, with some variations in standards, restrictions, and requirements.[170] While Michigan state agencies do not have authority in issuing permits for wind energy systems, there have been efforts to develop wind siting guidelines dating as far back as 2002.[171] In 2008, the Michigan Department of Labor and Economic Growth, in partnership with the Michigan Wind Working Group, developed a sample zoning resource, which included recommended zoning language for local government's wind siting considerations.[172,173] Since its inception, the sample zoning ordinance has periodically been revised with, according to the sample zoning resource, "the

intent of striking a balance between the need for clean, renewable energy and the necessity to protect the public health, safety, and welfare [of communities in Michigan]."[174]

In 2017, Michigan State University (MSU) Extension revised this sample zoning ordinance with updated recommendations to address topics such as noise, shadow flicker, and zoning language.[175] The sample zoning ordinance was last updated in October 2020 and included additional information regarding new technological advances around wind energy and new research on wind energy regulation from communities in Michigan, other U.S. states, Canada, and Europe.[176] While the sample zoning ordinance offers a range of resources for local governments to consider when amending or developing wind energy ordinances, the sample zoning ordinance does not prescribe a specific set of zoning requirements. The sample zoning ordinance notes that because of Michigan's land use patterns, average parcel sizes, various dwelling densities amongst communities, major transmission lines, natural features, and community's unique grid-like road networks, "making a one-size-fits-all recommendation [is] impractical."[177]

As referenced in Figure 17, out of the 1,773 jurisdictions researched by Michigan EGLE and Graham Sustainability Institute, 810 jurisdictions have considered utility-scale wind, and 943 have considered small-scale wind.[178]

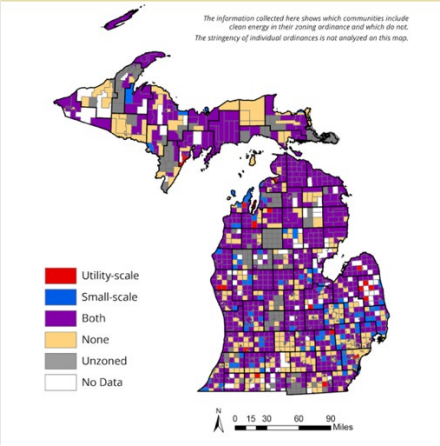

Figure 18. Wind energy zoning in the State of Michigan. [179]

2.3.2 | SOLAR ENERGY SITING AND PERMITTING

Like wind development, siting and permitting authority for solar development also resides at the local level and their respective zoning ordinances.[180] As referenced in Figure 17, of the 1,773 jurisdictions researched by Michigan EGLE and Graham Sustainability Institute, 425 jurisdictions have considered utility-scale solar, and 512 have considered small-scale solar.[181]

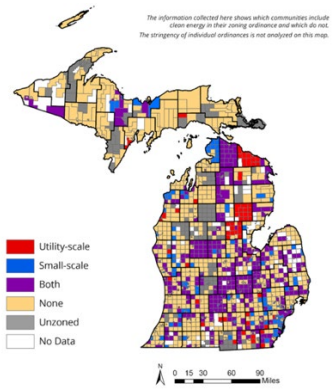

Figure 19. Solar Energy Zoning in the State of Michigan. [182]

Currently, there is no analogous effort for a state-sanctioned solar zoning resource. However, in October 2021, MSU Extension, in partnership with MSU School of Planning, Design and Construction, and the University of Michigan Graham Suitability Institute, released a sample solar zoning guide for local governments.[183] This new resource, which illustrates how various scales and configurations of solar energy systems fit into general landscape patterns for rural, suburban, and urban areas, is intended "to help Michigan communities meet the challenge

of becoming solar-ready by offering best practice guidance for addressing solar energy systems within their planning policies and zoning regulations."[184, 185] The sample zoning guide presents the current context for solar in Michigan and provides principles for how various sized and scaled solar energy systems may fit within various land-use patterns across the state (e.g. farmland, brownfields/grayfields, and historic/culturally significant sites), as well as sample language for community's zoning ordinances.[186]

2.4 | INFRASTRUCTURE INVESTMENT

Michigan is part of the Midcontinent Independent System Operator (MISO). [187] The organization is responsible for operating the power grid of 15 states, providing an open-access transmission service and monitoring the high-voltage transmission system.[188] The transmission network in Michigan is aging and most of the state faces serious congestion (see Figure 20).[189]

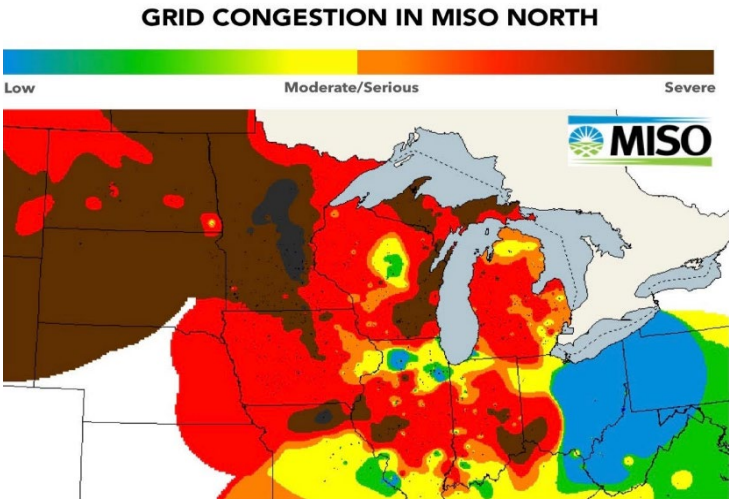

Figure 20. Grid congestion in the MISO region.[21]

This congestion creates problems for the development of new renewable energy projects, as transmission lines struggle to move power from the locations of high resources to other areas of the state. Renewable energy developers claim that transmission constraints are among the largest barriers to renewable energy development.[190] Investment into the network today will be

vital for meeting future clean energy goals, as projects take time to develop and implement and remain in place for decades.

The majority of transmission lines in Michigan are owned and operated by three companies.[191] ITC Michigan owns the majority of the network in the Lower Peninsula, with AEP Transmission owning the southwest corner of the state.[192] The Upper Peninsula network is owned by ATC.[193] As a result of this ownership of the transmission network, these companies are the key players in infrastructure investment. In MISO's Transmission Expansion Plan 2020 (MTEP20), the operator recommended approval of 515 projects valued at $4 billion of investment.[194] In Michigan, there were 83 projects valued at $436 million (Figure 21).[195]

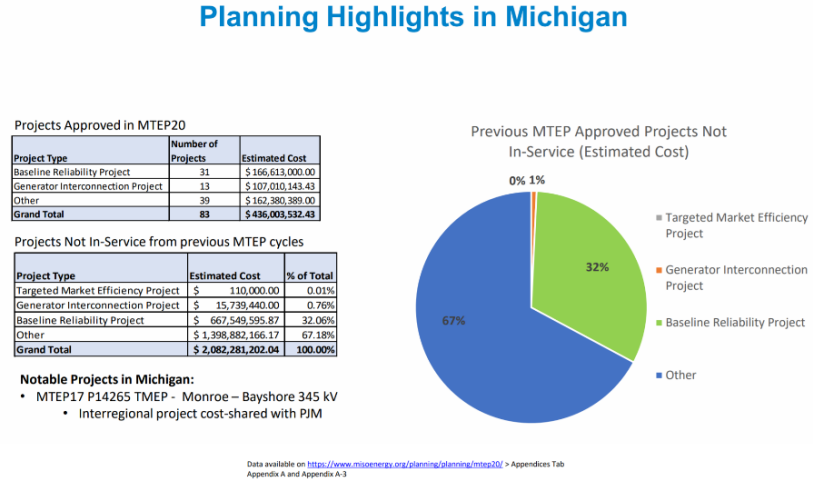

Figure 21. Breakdown of projects located in Michigan that were recommended in MTEP20.[25]

Each transmission operator has projects listed on its respective website. AEP Transmission shows 10 projects, mainly revolving around replacing, updating, and rebuilding transmission lines.[196] ATC shows one current project, which is replacing the Straits of Mackinac cables that connect the Lower and Upper Peninsulas.[197] ITC Michigan shows 40 projects, including line rebuilds and upgrades, new lines, and new substations.[198] These projects tie into Consumers Energy's and DTE's five-year $7 billion plans, which are heavily weighted toward

replacing equipment nearing the end of its life.[199] When planning these projects, PA 30 (1995) grants siting authority to the MPSC, from whom developers must obtain a Certificate of Public Convenience and Necessity, when the lines are over 5 miles and carry electricity at 345 kV.[200] This varies from the siting authority of wind and solar generation, which resides at the local level. Eminent domain may be used when siting transmission lines, and a certificate is conclusive and binding in those cases.[201] One-time payments are made to the landowners when constructing transmission lines. The lines are subject to property taxes as well which contributes to the local economy.[202]

One of the major projects ITC has conducted in recent years is the Thumb Loop, shown in Figure 22.[203] This $510 million, 345 kV line runs through the thumb of Michigan's Lower Peninsula, connecting Tuscola, Huron, Sanilac, and St. Clair counties.[204] Michigan's Clean, Renewable and Efficient Energy Act, PA 295 (2008), created the Wind Energy Resource Zone Board to study and identify regions with the highest wind potential.[205]

Figure 22. Path of the Thumb Loop constructed by ITC Transmission.[32]

The Thumb Loop was a result of this study, identifying the region as the highest wind potential in the state, a result of the high wind speeds in the area and compatible land use, as discussed in Section 1.2.[206] Following the results of the study, ITC applied to the MPSC for

expedited siting approval in 2010, which was granted in 2011.[207] The project was constructed in phases and electrified in 2015.[208] The 140 miles of line and four substations are capable of supporting 5,000 MW of energy, enough to carry the region's 4,236 MW of maximum potential identified in the study.[209] The loop is currently supporting around 1,600 MW of energy, with many more projects approved to provide energy to the line.[210] However, projects in the region have also been stifled by local opposition, as well as limited by a Huron County moratorium on wind farms.[211, 212] Much of the state's renewable energy potential, as discussed in Section 1.2, is in conservative counties in the middle of the state and Thumb region which likely contributes to the local opposition seen in these areas. The high capacity of the line is designed to allow for certainty of transmission support for renewable energy developers when planning projects in the Thumb region. The project was funded by ratepayers across MISO's 13 states; the average residential customer was estimated to see an additional cost on their annual bill of $1.10 per year.[213] The ITC estimates the project contributed $366 million to the Michigan economy.[214]

In 2019, Gov. Whitmer launched MI Power Grid, aimed at maximizing the benefits of the transition to clean, distributed energy resources for Michigan residents and businesses.[215] The initiative will gather information into a central location, reach out to stakeholders to integrate clean technologies and optimize investments in Michigan's grid, and ensure the transition is reliable and affordable.[216] While the MI Power Grid initiative's final report detailing its achievements isn't expected until October 2022, in October 2021, as part of MI Power Grid, ITC released a host capacity analysis of its transmission network, a study requested by the MPSC with the goal of helping map where new sources of electricity generation could locate most affordably.[217] The study identifies the lines in several regions of the Lower Peninsula that can

support the addition of renewable energy, as well as providing a resource to direct infrastructure investment.[218]

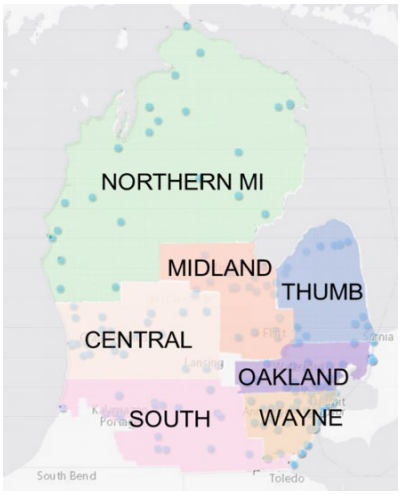

Figure 23. Regions examined in ITC hosting capacity analysis.[46]

The South, Central, and Wayne regions (seen in Figure 23) are key regions identified in the study that can support an affordable expansion of renewable energy, likely a result of population centers creating overbuilt infrastructure.[219] These regions also have relatively high resource potential and compatible land use, as seen in Section 1.2. These factors combine to create the optimal locations for the expansion of renewable energy. These areas also tend to be the more liberal areas of the state (see Figure 10) and thus more likely to be accepting of increased renewable energy deployment. As siting for generation assets occurs at the local level, the state lacks the ability to increase generation assets in these capacity-ready areas. Instead, local governments will have to approve the projects that may want the easy access to the grid these regions can provide, potentially increasing the negative effects local resistance can have which could force projects to be developed and connect in areas where expensive grid upgrades would be needed.

2.5 | RENEWABLE ENERGY ON PUBLIC LANDS

Public lands have the potential to play a major role in supporting the development of renewable energy. In Michigan, 28.1% of land is publicly owned, though it is not yet being utilized for renewable energy development.[220] However, since Gov. Whitmer's pledge to make Michigan carbon-neutral by 2050, the state is reconsidering its use of public lands, including the possibility of utilizing public lands to house renewable energy facilities.[221]

In response to Gov. Whitmer's carbon neutrality goal and her commitment to power all state facilities with renewable energy by 2025, in July 2021, the Michigan Department of Natural Resources (DNR) released its Public Land Strategy (PLS) for 2021-2027, which was developed over the course of 18 months through a collaborative process between public and private stakeholders.[222,223] The latest PLS outlines that "the sustainable management of Michigan's natural resource assets will play a significant role as the world continues to mitigate climate change and shift toward renewable energy sources."[224]

In its PLS, the DNR outlines the strategy of "assess[ing] the potential for locating utility-scale solar energy on DNR-managed public lands that have been degraded by past industrial use."[225] To achieve this, the PLS identifies developing a "comprehensive inventory of DNR-managed public lands that contain brownfields, postindustrial sites, or are otherwise degraded, marginal lands and market them for potential renewable energy development," in which identified lands will be measured by their total renewable energy production capacity.[226]

While the state and DNR have identified and are strategizing the use of public lands as sites of renewable energy between 2021-2027, the PLS awaits implementation following the consideration and approval of the Michigan Legislature.[227] The PLS, HB 5388 (2021) introduced by Rep. Gary Howell and six other lawmakers, was introduced before the Michigan House of

Representatives on October 2021 and is on its second reading in the Committee on Natural Resources and Outdoor Recreation, as of November 2021.[228] Although initiatives to utilize public lands are still getting off the ground in Michigan, actions and proposals such as these may be setting the stage for the state to support more renewable energy deployment across its assets.

The utilization of public lands for the development of renewable energy facilities, however, was not included in any of the Council on Climate Solutions Workgroup recommendations that have so far provided their recommendations to EGLE and Gov. Whitmer (including the Energy Production, Transmission, Distribution, and Storage Workgroup).[229] As of this writing, the Council on Climate Solutions awaits the recommendations of the Natural Working Lands and Forest Products Workgroup.[230]

While the state navigates the potential for renewable energy on public lands, it has in the meantime developed creative public-private initiatives to develop renewable energy on other public asset lands, such as former mining sites in Dickinson and Crawford Counties that were acquired by the state through tax reversion.[231,232] Other initiatives were also included a June 2019 decision to permit farmland enrolled in Michigan's Farmland and Open Space Preservation program, PA 116 (2019), to house commercial solar projects.[233] While these are not examples of the state utilizing its public lands for siting renewable energy facilities, creative initiatives such as these are worth noting to highlight how the state is utilizing its land assets to support renewable energy.

2.6 | THE MICHIGAN PUBLIC SERVICE COMMISSION (MPSC)

The MPSC is the branch of state government responsible for regulating natural gas, electricity, and telecommunications industries.[234,235] The MPSC holds the power and jurisdiction to regulate public utilities' spending and earning, requiring approval to implement proposed

changes to rates, fees, charges, refunds, services, operations, etc.[236] The three-member board has regulatory oversight over eight IOUs and nine co-ops, as discussed in Section 1.1.[237, 238] Commissioners are appointed by the governor, with staggered 6-year terms and no more than two members representing the same political party. [239] The MPSC has a stated mission "to serve the public by ensuring safe, reliable, and accessible energy and telecommunications services at reasonable rates" and vision to "be a best-in-class commission by: making well-informed decisions at every level of the organization, meaningfully engaging the public, [and] enabling innovation for the future."[240]

2.6.1 | INTEGRATED RESOURCE PLANNING (IRP)

PA 342 (2016) instituted the integrated resource planning (IRP) process for regulated energy providers to "examine options to meet long-term electricity needs considering reliability, cost, performance, environmental impact, and other considerations" which the MPSC would oversee.[241] In 2017, the MPSC set modeling parameters and assumptions for IRPs, which regulated utilities were required to submit to the MPSC for review and approval, and every five years thereafter. [242]

The MPSC issued final orders on utilities' initial IRPs in 2020. [243] The MPSC's 2020 annual report highlights a common theme of continued transition from coal-fired electric generation to renewable energy and energy waste reduction across IRPs. [244] They suggest the drivers of this transition include "aging infrastructure, environmental regulations, economics, customer demand for cleaner energy, and voluntary utility company carbon reduction goals." [245] Through the IRP process, the MPSC predicts significant growth in renewable energy and energy waste reduction - up to 35% of Michigan's generation mix by 2025 (see Figure 24).[246]

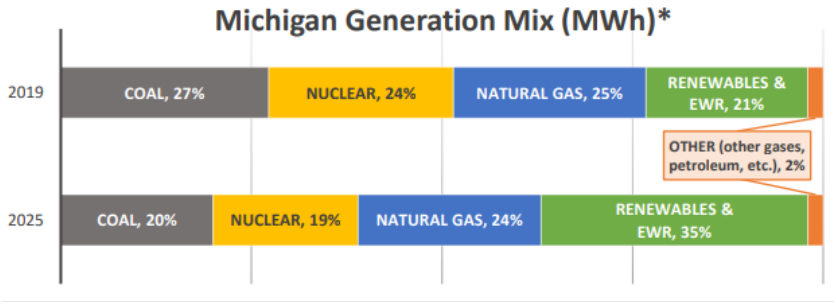

Figure 24. Michigan Energy Generation Mix per IRPs[247]

This policy appears to support renewable energy deployment by encouraging utilities to make market-based decisions by forcing energy providers to justify investments in fossil fuels as well as account for the costs and benefits of renewable energy and waste reduction programs.[248] Renewable energy advocates believe the IRP process pushes utilities to bolder clean energy targets than they would plan for on their own, although there is still room for improvement.[249] Advocacy groups widely criticized initial IRP plans, particularly that of DTE, which was ultimately ordered change requirements by the MPSC. [250]

The MPSC also sees room for improvement in the fledgling IRP process. In response to Gov. Whitmer's ED 2020-10, which sets a goal for 28% reduction in economy wide carbon emissions compared to 2005 historical levels, as discussed in Section 2.1.3, MPSC staff released a report detailing two options for integrating this goal into the IRP process.[251] As part of the MI Power Grid initiative, outlined in Section 2.6.5, the MPSC will begin a stakeholder engagement process for updating IRP guidelines and parameters in December 2021, including integrating statewide emissions reduction goals.[252]

2.6.2 | RENEWABLE ENERGY PLAN CASES

Michigan's 2008 Clean, Renewable and Efficient Energy Act, PA 295, established a 10% RPS, as discussed in Section 2.1.1.[253] It also required regulated utilities to develop renewable energy plans and file biennially to the MPSC for review. [254] These plans describe how each electric provider will meet the renewable energy standard requirements.[255] For electric providers

whose rates are regulated by the MPSC, the MPSC conducts a contested case hearing following the administrative procedures act of 1969, PA 306 (1969), and approves or rejects the plan.[256] For all other electric providers, the MSPC provides an opportunity for public comment and approves or rejects the plan.[257]

PA 342 (2016) amended PA 295 (2008), increasing the RPS from 10% in 2015 to 15% in 2021, and no longer requiring biennial renewable energy plan filings.[258, 259] In 2017, the MPSC established new filing requirements for renewable energy plans in Case No. U-18409. [260,261] In the same case, the MPSC agreed with points brought by the NRDC that "eventually, a provider's IRP will serve as the broad planning tool that encompasses not only renewable energy but also demand response, EWR and other demand and supply-side resources. Accordingly, the Commission expects that in the future, once IRP proceedings are completed, the filing requirements will include a description of how the REP correlates with the approved IRP."[262]

2.6.3 | GREEN PRICING PROGRAMS

Section 460.1061 of PA 295 (2008), as amended by PA 342 (2016), requires electric providers to offer customers the option to participate in voluntary green pricing programs.[263] In these programs, customers may specify the amount of their electricity use that will be provided by renewable energy and are responsible for any additional cost (or savings) realized by the electric provider as a result of participation in the program. [264] Utilities regulated by the MPSC must file their voluntary green pricing programs for review and approval by the MPSC every two years.[265] However, municipal utilities, cooperative utilities, and alternative electric suppliers are not required to go through this approval process.[266] There have not been major changes to this policy since enacted in 2016 and there are no proposed changes at of the time of this writing.

This policy appears to encourage and facilitate the deployment of renewable energy in Michigan.[267] However, early iterations of voluntary green pricing programs in Michigan received criticism from renewable energy advocates. [268] For example, Consumers Energy's 2017 proposed program that limited options to wind, and set prices above market rates. [269] In June of 2021, the MPSC formally ruled on a case brought by the City of Ann Arbor that contested DTE's voluntary green pricing program, MIGreenPower, set prices too high.[270] The settlement included changes to MIGreenPower to lower program costs for and simplify enrollment options.[271] Despite these challenges, voluntary green pricing programs are expected to expand in the coming years as demand grows from residential, commercial, and industrial consumers.[272]

2.6.4 | PUBLIC UTILITY REGULATORY POLICIES ACT (PURPA) AVOIDED COST REVIEW

In 1978, PURPA was enacted at the federal level "in response to an energy crisis to encourage competition, conservation, reliability and efficiency in generating and delivering electricity."[273] In each state, it is implemented by public utility commissions for regulated electric utilities such as the MPSC in Michigan.[274]

As required by Section 6v of PA 342 (2016), the MPSC issued its second report on the implementation of PURPA in 2020, defining a class of electric generating facilities known as qualifying facilities (QFs), independent power producers smaller than 20MW that produce from largely renewable energy sources, from which utilities are required to purchase power.[275] The compensation rate varies by utility, and is based on the "avoided cost," how much it would cost a utility to generate the power itself or purchase from another source. [276] PA 342 (2016) requires the MSPC to determine this avoided cost rate and review it at least every five years. [277] An

MPSC review process is set out in PA 342 (2016), and several utilities have been instructed to include a PURPA review in their biennial IRP filing.[278]

MPSC PURPA rulings have been dubbed a mixed bag by renewable energy advocates in Michigan.[279] They suggest that utilities are dragging their feet on approving QFs, and utilities suggest that PURPA projects are overwhelming their pipeline, forcing them to pay more for renewable energy they do not need at higher rates than they would pay in the market.[280] A 2019 MPSC settlement directed Consumers Energy to triple their purchase of interconnected solar capacity through PURPA, ending a years long disagreement but leaving uncertainty for future opportunities. [281]

While PURPA avoided cost rates can be valuable for existing developments whose contracts have expired and have acted as a stable source of income for renewable energy development in the past, they are now significantly lower than rates through PPA negotiated contracts. [282] When paired with favorable policies and lower cost of renewable energy, PURPA avoided cost rates are no longer a major driver of renewable energy development in Michigan. [283]

2.6.5 | MI POWER GRID INITIATIVE

As discussed in Section 2.4, in 2019, the MPSC launched the MI Power Grid initiative, a multi-year stakeholder initiative focused on maximizing "the benefits of the transition to clean, distributed energy resources for Michigan residents and businesses." [284] Each of the MPSC's commissioners leads one of the three workgroups of MI Power Grid; (1) customer engagement, (2) integrating emerging technologies, and (3) optimizing grid investments in performance.[285] See Appendix A for a detailed overview of the MI Power Grid initiative areas of emphasis and work groups.[286]

Each workgroup is formed and led by MPSC staff to facilitate discussion and educational sessions for stakeholders including utilities, energy technology companies, customers, consumer advocates, state agencies, and more.[287] The outcomes of this initiative will be seen in new clean energy programs and rates, changes to energy infrastructure planning, and updated customer service and reliability regulations.[288]

Parts of the MI Power Grid initiative will support renewable energy deployment in Michigan. For example, ITC Michigan recently published a study, at the request of the MPSC, outlining where there is capacity for interconnection with high-voltage transmission lines for new sources of power generation.[289] The MPSC has since directed regulated electric utilities to file similar maps in their distribution plans in Case U-20147. [290] This initiative has also created structure for new energy programs and technology pilots.[291] Through Case U-2064, the MPSC developed definitions, defined objectives, and created a streamlined review processes for pilot programs in Michigan, and developed a pilot directory to improve transparency to stakeholders and ratepayers.[292] The MPSC released its latest MI Power Grid status report in September 2021, will kick off the third and final phase in early 2022, and expects to release the final overview of actions for MI Power Grid in Q3 of 2022.[293]

2.6.6 | DISTRIBUTED GENERATION PROGRAM IMPLEMENTATION

Distributed generation programs in Michigan are overseen by the MPSC.[294] Under Section 173 of PA 342 (2016), these programs follow an inflow/outflow tariff mechanism and utilities can limit participation to 1% of their average in-state peak load for the preceding five years.[295] Half of the 1% limit is allocated to residential-sized systems under 20 kW, and the other half for projects larger than 20 kW.[296]

Prior to 2016, under PA 295 (2008), Michigan had a net metering policy where customers received a credit at the full retail rate from electricity delivered to the grid during the billing month. [297] However, as part of PA 342 (2016), the MPSC was directed to conduct a distributed generation study and develop an equitable cost of service based distributed generation tariff to replace Michigan's net metering program by April 2018.[298] In July of 2017, the MPSC issued an order to continue net metering as the interim distributed generation program until new program tariffs are approved in rate cases with each utility. [299]

MPSC staff convened a Distributed Generation Workgroup seven times to gather input on how to calculate cost of service for distributed generation and the proposed inflow/outflow tariff.[300] This process culminated in publishing the Report on the MPSC Staff Study to Develop a Cost of Service-Based Distributed Generation Program Tariff in 2018. [301] This report proposed an inflow/outflow tariff mechanism, where distributed generation customers pay for all inflow electricity delivered by the utility according to their regular cost of service and outflow electricity receives a credit at a lower rate than the inflow rate.[302] In Case U-18383, the MPSC adopted inflow/outflow tariff that regulated electric utilities are expected to submit in any rate case filed after June 1, 2018. [303] Additionally, this order permits utilities to file their own distributed generation tariff for approval. [304]

According to the MPSC's 2020 Distributed Generation Report, Consumers Energy, DTE Electric Company, Indiana Michigan Power Company, and Upper Peninsula Power Company have Commission-approved inflow/outflow tariffs for distributed generation. [305] Alpena Power Company and Northern States Power Company both had rate cases in progress for their proposed distributed generation inflow/outflow tariffs. [306] Two Michigan utilities voluntarily agreed to

increase their participation cap above the required 1%, Consumers Energy to 2% and Upper Peninsula Power Company to 3%.[307]

Advocates for RE broadly agree that both the move away from net metering and the 1% minimum required purchase policies hinder the deployment of distributed generation projects in Michigan.[308] Despite these limitations set out in 2016, the number of distributed generation program customers continues to grow with 10,553 customers as of 2020 a significant increase from 11 in 2006 (see Figure 25).[309]

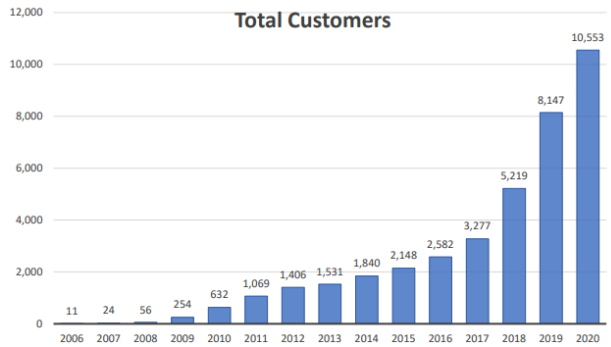

Figure 15. Michigan Distributed Generation Program Customers [310]

There are two proposals that would significantly change Michigan's policy is related to distributed generation. The first is HB 4236 (2021), which would amend Section 173 of PA 295 (2008), as amended by PA 342 (2016). [311] It would remove all caps for distributed generation and stipulates that an electric provider cannot restrict the number of participants in a distributed generation program.[312] This bill was sponsored by Gregory Markkanen (R), Vice Chair of the Michigan House Energy Committee and is backed by environmental groups and other stakeholders.[313] Michigan's largest energy providers, Consumers Energy and DTE, both oppose this bill stating that it would have negative consequences for their electric customers. [314]

The second is HB 4716 (2021), which would amend PA 295 (2008), as amended by PA 342 (2016), to define and provide for the establishment of community solar facilities.[315] This bill was introduced by Michele Hoitenga (R) and Rachel Hood (D) to "strengthen our energy grid

and boost our economy – without raising taxes… This plan saves will businesses and Michigan residents money while creating jobs and more customer choice" according to Hoitenga.[316] It will also make solar energy more accessible to ratepayers who face barriers to installing rooftop solar, including financial barriers, roof limitations or lack of property ownership.[317]

3 | CONCLUDING ANALYSIS

Over the past two decades, Michigan has implemented progressive policies across the state to meet aggressive climate goals. The legislature has passed bills setting emissions reduction targets including energy efficiency and demand reduction. This has been instrumental in encouraging the state's investor-owned utilities, municipal utilities, and cooperative utilities to reach the targets and help with the process of renewable energy transition. The RPS has supported deployment of solar and wind energy across the state with an evident decrease in the cost of renewable energy technologies which has been beneficial for the new incoming projects. Even though the RPS has been met as of 2020, an increase in the standard could help achieve the goal of net zero.

Political leadership, particularly in the Governor's office, has long played an important role in fostering renewable energy development in Michigan. Since the introduction of its RPS in 2008, Michigan saw significant investments and growth in renewable energy generation, which was instrumental in achieving Michigan's initial RPS goal and for its ability to generate about 11% of its total in-state electricity from renewable energy in 2020.[318] Under the leadership of Gov. Whitmer, Michigan makes great strides in increasing its share of renewable energy, and this growth is expected to continue as a result of enacting programs and policies such as MI Power Grid and the MI Healthy Climate Plan. Like its RPS, long term initiatives such as these will play an important role in ensuring Michigan continues to invest in renewable energy.

However, because Michigan is a 'purple' state, to which political power can be controlled by either political party, the extent of growth for Michigan's renewable energy landscape may be threatened by changes in politics. It is for this reason that to continue fostering growth of renewable energy in Michigan, the state must find long term and sustainable solutions that are not only rooted in the result of political outcomes in the Governor's office, but by also creating a policy landscape that brings systemic, creative, and grassroots-oriented solutions to Michigan energy landscape.

Property tax policy related to both wind and solar in Michigan is unsteady. Taxed as personal property, the tax table for utility-scale wind has been in a state of flux since its first introduction in 2007, with several iterations leading to the current version. Many local assessors are not using the current version as it is unfavorable to local government property tax revenue, leading to a plethora of lawsuits. Despite uncertainty in tax responsibilities resulting from the tax variation, wind development has steadily increased in the state. Recently introduced legislation would aim to set a state-wide tax table similar to the original 2007 table. This table, developed with MREC, likely appeals to local governments as it will likely increase local tax revenues.

A newer technology being deployed at the utility-scale, solar is in a similarly unstable tax policy position as wind. It has been taxed ad valorem at local rates, resulting in varying annual taxes. A PILOT program for solar was introduced in 2020 but was struck down by Gov. Whitmer due to concerns about local governments being left out of the planning and payments to localities that would be well below normal. Property taxes for utility-scale solar are currently based on interim guidelines from the STC with new legislation expected to be proposed soon.

The tax policy situations for these technologies are neither helping nor harming development in the state. Local revenue from these projects is very important in the high

resource, typically rural areas of the state where the majority of projects are developed. The uncertainty in tax responsibility may cause slight hesitation for developers, but both sides usually want to develop the renewable energy projects. NIMBYism is likely providing much more of a roadblock to development than uncertain tax policies. Solidifying the tax policy, however, is an opportunity for improving the state's ability to develop renewable energy.

Similar to the variety in local tax policy for solar projects, because Michigan has hyper-local siting authority, there is a lack of uniformity amongst local government's renewable energy siting ordinances. Consequently, this can have implications for the efficient development of renewable energy facilities in Michigan communities. While there are pros and cons to whether a state or local government holds siting authority for renewable energy, the State of Michigan – with the help of other non-governmental stakeholders – has strategically been able to provide at least some potential guidance to local governments to considered in their planning ordinances with the use of sample zoning guides. While sample zoning guides are made general and not community specific and their legitimacy may be questioned by some, the creation of state-sponsored and/or state-wide sample zoning guides are useful for Michigan communities to consider renewable energy in the planning ordinances. Sample zoning ordinances should also be updated on a regular basis to include updated information on best practices and how to site other forms of energy technologies, such as energy storage or electric vehicle infrastructure.

Unlike siting for generation, transmission siting is at the state level by the MPSC as it transcends localities. The transmission system in Michigan is privately-owned, aging, and facing congestion. These transmission constraints are among the largest barriers to renewable energy development. Improvement projects within and investment into the system are mainly done by the transmission operators. Siting for these projects falls to the MPSC, rather than localities as is

the case for generation projects. As part of the MI Power Grid initiative, ITC conducted a host capacity analysis, finding the southern and central regions of the state have the greatest capacity for affordable renewable energy expansion and development. The regions identified in the study have strong resource potential as well as compatible land use for renewable energy development and projects. The South, Central, and Wayne regions (see Figure 23) contain the major population centers in the state, likely resulting in overbuilt infrastructure capable of supporting renewable energy expansion. These areas tend to be more liberal (see Figure 10), increasing both the chance of public acceptance of new renewable energy projects and the odds of siting approval by local governments, to whom the responsibility falls for approving renewable energy projects.

In the past year, Michigan has become an active player in its own energy market by siting renewable energy on public lands. With long term renewable energy and carbon reduction goals, increasing its deployment of renewable energy on public lands will help Michigan achieve its energy and carbon neutrality goals. By siting renewable energy on its own lands, this will likely provide a path of least resistance for the development of renewable energy, making it a strategic effort the state of Michigan should continue. Because renewable energy facilities typically have long lifespans, the state's ability to procure renewable energy on its own lands will also help achieve long term results for the state's energy transition. However, because Michigan politics have implications for renewable energy growth, the success of Michigan's energy transition cannot be overly reliant on political outcomes. Therefore, the state must help bring communities along in the benefits of a renewable energy transition by working collaboratively with local stakeholders in efforts to foster renewable energy.

As the primary regulator of utilities in Michigan, the MPSC has been instrumental in rulemaking and enforcement of policies impacting renewable energy deployment in the state. Since the MPSC is made up of three commissioners appointed by the governor, at the time of this writing two Democrats and one Independent, it is no surprise that in recent years, its work has largely supported renewable energy policy. In addition to the political affiliation of the commissioners, much of the MPSC's work is dictated by executive directives coming from the governor's office. This includes developing guidance for and approving the development of IRPs and renewable energy plans that have pushed utilities in the direction of integrating renewable energy projects into their long-term planning. The MPSC has overseen the rollout of green pricing programs which are widely seen to spur new renewable energy development in the state, and the PURPA avoided cost review which is not expected to have significant impacts on renewable energy development going forward. Additionally, the MPSC is making strides forward to support renewable energy development through the MI Power Grid initiative, which will wrap up in late 2022.

The MPSC's work related to distributed generation is highly criticized by renewable energy advocates. While much of recent legislation and rulemaking by the MPSC has supported expanded renewable energy deployment, the change from net metering to an inflow/outflow tariff for distributed generation is seen as a big setback. While this seems out of place compared to other recent MPSC initiatives, it aligns with the politically purple nature of the state of Michigan. In order to pass many progressive renewable energy policies in the major 2016 energy bill, one of the concessions was moving away from net metering for distributed generation. This is no surprise as at the time it was passed, there was a Republican governor and Republican led legislature. The MPSC was required to develop inflow/outflow tariff guidelines by this

legislation, even if they generally lean towards supporting renewable energy development or net metering.

Michigan's purple nature is a dictating factor in its renewable energy policy. It is not particularly cohesive, with some aspects controlled by the state, like the RPS, and some left to localities, like siting. Some aspects, like property taxes, are controlled at different levels depending on the policy. Some aspects within a level are controlled by different parties as well, depending on which party holds the legislature and the governorship. The state's policy is likely not going to be cohesive given that control of the state's government tends to flip party control multiple times per decade. This complexity can make it difficult for policies to work in tandem to promote renewable energy, rather mostly working in parallel. This middle ground of control does provide an opportunity to learn what policies work on both sides, rather than just one if all control fell to one level of government. The purple nature of the state can also help determine what policies may work in a more conservative state. A state that values its natural resources intensely, Michigan's renewable resource potential and policies, while complex, position it well to develop strong renewable energy in the coming years and be an example for purple states nationwide.

APPENDIX A | MPSC MI POWER GRID INITIATIVE OVERVIEW[319,320]

CUSTOMER ENGAGEMENT	INTEGRATING EMERGING TECHNOLOGIES	OPTIMIZING GRID INVESTMENTS AND PERFORMANCE
Commissioner Tremaine Phillips	Commissioner Katherine Peretick	Chair Dan Scripps
Focuses on providing Michigan residents and businesses with the demand-side technologies, programs, and price signals that will allow customers to be more active and effective participants in the state's transition to increased clean and distributed energy resources	Seeks to ensure timely and fair grid access and appropriate information exchange to support customer-oriented solutions and reliable system operations	Aimed at integrating transmission, distribution, and resource planning to increase transparency and optimize solutions, as well as the enhancement of tools, financial incentives, and regulatory approaches to adapt to technology change and customer preferences
WORKGROUPS		
1. **Customer Education and Participation:** Focus on educating customers and facilitating participation in new demand-side technologies, energy efficiency programs, demand response offerings, time-based pricing and other related programs. 2. **Innovative Rate Offering:** Ensure that customers can make informed choices about available rate options including time-based pricing, distributed generation rates, and voluntary green pricing tariffs. 3. **Demand Response**: Increase demand response participation, improve performance and communications, and review and update emergency operations procedures. 4. **Energy Programs and Technology Pilots**: Develop objective criteria to utilize when evaluating proposed utility pilot projects and identify potential areas for additional pilot program proposals.	1. **Interconnection Standards and Worker Safety**: Establish updated interconnection rules that provide a standardized process and schedule to ensure that all interconnections are completed safely and in a timely manner. 2. **Data Access and Privacy**: Determine how to make distribution system information available to customers to make informed decisions about where to interconnect distributed generation and also monitor customer data access and privacy issues for potential recommendations and updates when necessary. 3. **Competitive Procurement:** Continue to monitor current utility competitive solicitation processes utilized to secure new generation resources and identify best practices to develop procedures and rules applicable to regulated utilities. 4. **New Technologies and Business Models**: Analyze the capabilities and market access for newer technologies such as electric vehicles and storage to develop recommendations to capture potential benefits in pilots and other state initiatives, as well as cases before the Commission.	1. **Financial Incentives/Disincentives:** Work with stakeholders to analyze and evaluate appropriate incentive/disincentive methodologies such as performance-based ratemaking, power purchase agreement incentive options and shared savings mechanisms to ensure that utility investments benefit their customers. 2. **Grid Security and Reliability Metrics:** Work with stakeholders to update both the Service Quality and Reliability Rules and the Technical Standards for Electric Service to ensure utilities meet certain levels of performance and to enhance customer service and the physical and cyber security of utility infrastructure. 3. **Advanced Planning Processes:** Workgroups will be held to discuss the value of electric generation diversity, the value of resilience, updates to future IRP requirements, and how to coordinate better alignment of electric transmission, distribution and generation planning efforts.

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