



Report on the Implementation and Cost- Effectiveness of the P.A. 295 Renewable Energy Standard

February 15, 2019

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Contents

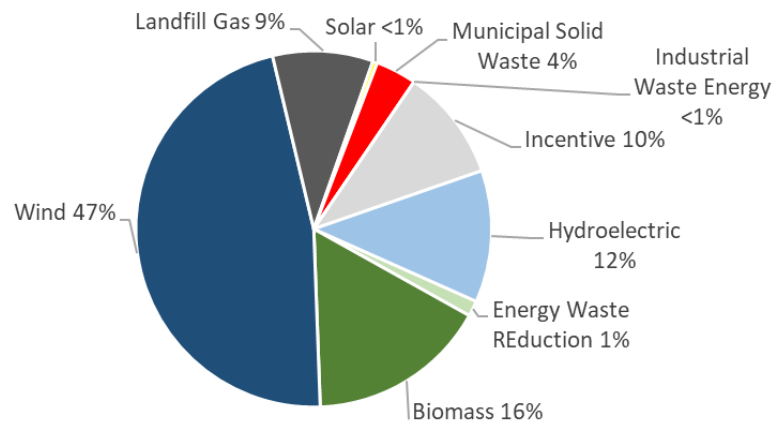
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Executive Summary

Pursuant to Public Act 295 of 2008, as amended by Public Act 342 of 2016 (Act), the Act directs the Michigan Public Service Commission (Commission) to prepare a report summarizing both the Commission's activities related to the Act and electric provider's annual reports. This ninth annual report is submitted to the standing committees of the Michigan Senate and House of Representatives with primary responsibility for energy and environmental issues.

For 2017 renewable energy standard compliance, electric providers were required to achieve the same number of renewable energy credits (RECs) needed to meet the 10% 2015 standard. The standard has an interim requirement of at least 12.5% for 2019 and 2020 and increases to at least 15% by the end of 2021. All of Michigan's electric providers subject to the standard in 2017 met the standard and retired a total of 10,218,115 energy credits. **Figure ES-1** shows the different renewable energy technology types used to generate the credits for compliance by all electric providers in 2017.

Figure ES-1: Compliance Energy Credit Breakdown
All Electric Providers – 2017 Compliance Energy Credits
10,218,115 Total Energy Credits



The number of energy credits generated or acquired during 2017 is equal to 11.3%¹ of retail sales.

The renewable energy standard led to the development of over 1,714 MW of new renewable energy projects. The weighted average price of renewable energy contracts is \$68.27 per MWh, which is considerably less than forecasted in the initial renewable energy plans.

¹ 2014 retail sales data used to calculate the percentage.

Introduction

Report Criteria

Public Act 342 of 2016 (PA 342) became effective on April 20, 2017, and amends Public Act 295 of 2008 (PA 295), increasing the renewable energy standard from 10% in 2015 to at least 12.5% in both 2019 and 2020 with a final requirement of at least 15% in 2021. PA 295, as amended by PA 342 of 2016, also includes a goal of meeting not less than 35% of the state's electric needs through a combination of energy waste reduction and renewable energy by 2025.

Section 51(5) (MCL 460.1051(5)) requires that by February 15, 2011, and each year thereafter, the Michigan Public Service Commission (MPSC or Commission) submit to the standing committees of the Michigan Senate and House of Representatives with primary responsibility for energy and environmental issues a report that does all of the following:

- a) Summarizes data collected under this section.
- b) Discusses the status of renewable energy and advanced cleaner energy in this state and the effect of the Renewable Energy Subpart and Energy Waste Reduction Subpart on electricity prices.
- c) For each of the different types of renewable energy sold at retail in this state, specifies the difference between the cost of the renewable energy and the cost of electricity generated from new conventional coal-fired electric generating facilities.
- d) Discusses how the Commission is ensuring that actions taken under this Act by electric providers serving customers in the same distribution territory do not create an unfair competitive advantage for any of those electric providers.
- e) Evaluates whether the Renewable Energy Subpart has been cost-effective.
- f) Provides a comparison of the cost effectiveness of the methods of an electric utility with one million or more retail customers in this state as of January 1, 2008, obtaining renewable energy credits from renewable energy systems owned by the electric provider and from contracts that do not require the transfer of ownership of the renewable energy system as described in the former Section 33.²

² The report no longer includes item Section 51 (5) (f) due to the repeal of Section 33 in PA 342 of 2016.

- g) Describes the impact of the Renewable Energy Subpart on employment in this state. The Commission shall consult with other appropriate agencies of the department of labor and economic growth in the development of this information.³
- h) Describes the effect of the 10% limit on using energy waste reduction credits or advanced cleaner energy credits to meet the renewable energy credit standards.⁴
- i) Makes any recommendations the Commission may have concerning amendments to the Renewable Energy Subpart, including changes in the 10% limits described in (h) or changes in the definition of renewable energy resource or renewable energy system to reflect environmentally preferable technology.

This ninth annual report provides information on the Commission's renewable energy activities related to the Act through calendar year 2018 and summarizes data from the electric provider annual reports through the 2017 calendar year.

Renewable Energy Plans and Commission Approval

Electric providers were required to meet a 10% renewable energy standard based on retail sales by the end of 2015. PA 342 requires electric providers to achieve the same number of renewable energy credits (RECs) needed to meet the 2015 standard for 2016, 2017 and 2018. PA 342 has an interim requirement of at least 12.5% for 2019 and 2020 and increases to at least 15% by the end of 2021.

The renewable energy standard is applicable to Michigan's investor-owned electric utilities, cooperative electric utilities, municipal electric utilities and alternative electric suppliers (AESs). The Act directed electric providers to file initial renewable energy plans (REPs) in 2009.⁵ The 74 initial REPs described how each electric provider intended to meet the renewable energy standard requirements. The Act also directed electric providers to file REPs biennially for Commission review. PA 342 directs the Commission to review each electric provider's REP within one year of

³ A State government reorganization took place in 2011 that moved employment-related agencies outside the newly-formed Department of Licensing and Regulatory Affairs (LARA). Consultation with the appropriate agencies is continuing.

⁴ Section 27 (8), the provision describing substituting advanced cleaner energy credits for renewable energy credits, was repealed by PA 342 of 2016.

⁵ There are currently 70 electric service providers, including 12 AESs serving customers in Michigan. Twelve AESs which are not serving customers are not included in this total.

the Act's effective date and no longer requires biennial REP filings. On August 23, 2017, the Commission established filing requirements for REPs consistent with the new Act.⁶

A listing of renewable energy case numbers and electric provider names can be found in **Appendix A**. Renewable energy credit requirements and renewable energy plan summaries are shown in **Appendix B**.

Renewable Energy Cost Reconciliation Cases and Commission Approval

Per Section 49(1) of PA 295, eight rate-regulated electric providers filed annual renewable energy cost reconciliation cases for 2017. Commission staff examined the pertinent revenues and expenses, determined the electric provider's compliance with its filed REP and assessed whether the provider met its compliance targets. Case numbers for each renewable energy cost reconciliation case for the reporting period can be found in **Appendix A**.⁷

Summary of Renewable Energy Data Collected

Electric providers are directed by Section 51(1) of PA 295 to file annual reports for each plan year beginning with 2009. The last electric provider annual reports will be filed during 2022 due to the PA 342 repeal of Section 51, effective January 1, 2023. Michigan electric provider annual reports for 2009 through 2017 are available on the Commission's website.⁸ A summary of data from annual reports is shown in **Appendix C**.

Renewable Energy Credit Requirements – 2017 Compliance

For 2017 renewable energy standard compliance, electric providers were required to comply using the same amount of renewable energy credits as in 2015.⁹ The number of renewable energy credits required for 2015 compliance varied by electric provider and was calculated by multiplying the applicable sales figure by the 10% compliance requirement. All¹⁰ of Michigan's electric

⁶ http://www.michigan.gov/documents/mpsc/U-18409_8-23-17_598908_7.pdf

⁷ http://www.michigan.gov/mpsc/0,4639,7-159-16393_53570-240178--,00.html

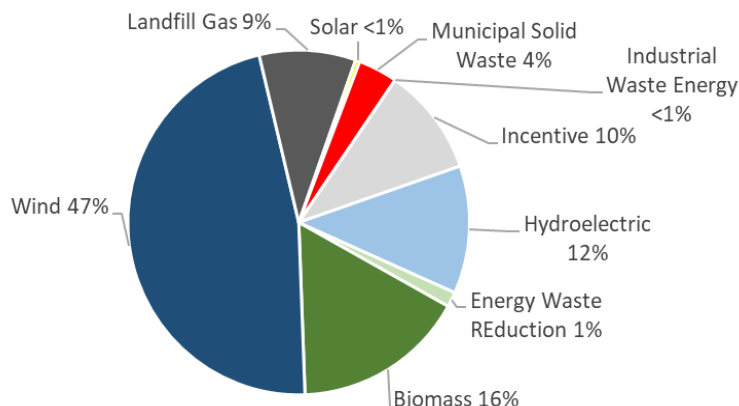
⁸ http://www.michigan.gov/mpsc/0,1607,7-159-16393_53570-240179--,00.html

⁹ Several AESs (Calpine Energy Services; U-16650, Constellation Energy Services, Inc.; U-16646 and Constellation NewEnergy Inc.; U-16642) applied to the Commission requesting to have their compliance requirements adjusted to 10% of the previous year's retail sales for each of the compliance years 2016, 2017 and 2018. The Commission approved the requests.

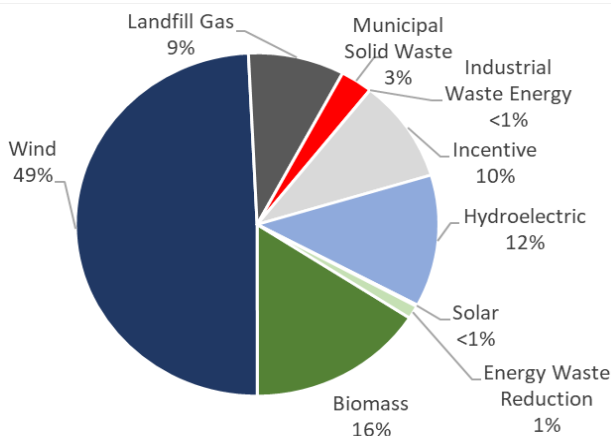
¹⁰ Sixty-eight out of seventy electric providers were subject to the 2017 renewable energy standard because MidAmerican Energy Services and Eligo Energy MI, LLC began serving customers in 2015 and 2017, respectively, and therefore did not have a 2017 compliance requirement. Constellation Energy Services, Inc (formerly Integrus) stopped serving customers in late fall 2018. They complied with the requirement in 2017.

providers subject to the standard in 2017 met the standard and retired¹¹ a total of 10,218,115 energy credits.¹² **Figure 1** shows the different renewable energy technology types used to generate the credits for compliance by all electric providers in 2016 and 2017 as well as separately for both Consumers Energy's and DTE Electric's 2017 compliance.

Figure 1: Compliance Energy Credit Breakdown
All Electric Providers – 2017 Compliance Energy Credits
10,218,115 Total Energy Credits



All Electric Providers – 2016 Compliance Energy Credits
10,313,552 Total Energy Credits



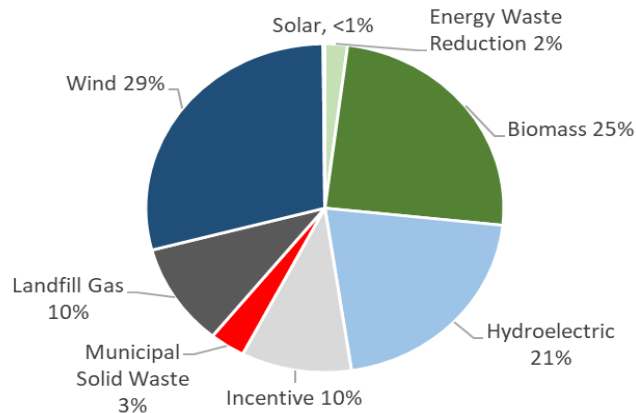
¹¹ Energy credits are "retired" when used for compliance.

¹² The term "energy credit" includes renewable energy credits, Michigan incentive renewable energy credits, advanced cleaner energy credits and energy waste reduction credits.

Figure 1: Compliance Energy Credit Breakdown (continued)

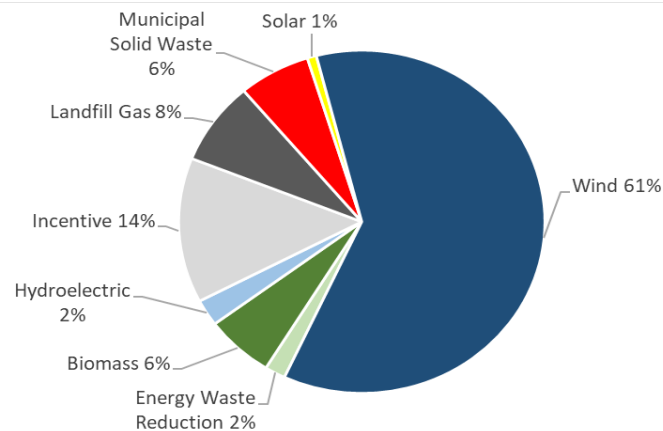
Consumers Energy - 2017 Compliance

3,318,873 Total Energy Credits



DTE Electric – 2017 Compliance

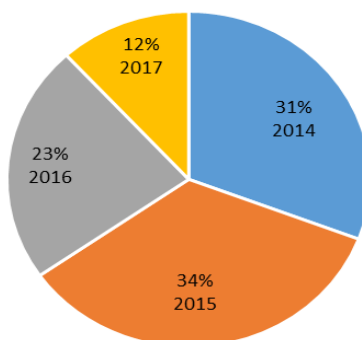
4,244,832 Total Energy Credits



Section 29 of the Act includes provisions for determining whether the location of a renewable energy system is eligible for Michigan’s renewable energy standard. Nearly ninety-five percent of the energy credits used for 2017 compliance were from renewable energy generated in Michigan. Indiana was the source for three percent, Wisconsin for two percent and a small amount of credits came from renewable energy generated in Iowa and Minnesota. Michigan’s multi-state utilities and electric providers with out-of-state wholesale suppliers are most likely to use energy credits from states other than Michigan.

Section 39 of the Act included a provision that allows energy credits to be “banked” up to 36 months; however, PA 342 extended the life of a REC representing energy generated during April 2017 and later to five years. **Figure 2** shows a breakdown of energy credits retired for compliance by vintage year of generation. The data shows that providers are utilizing the 36, now 60, month energy credit banking provision in the Act. Sixty-five percent of the energy credits used to comply in 2017 were from renewable energy generated in 2014 or 2015. Michigan Renewable Energy Certification System (MIRECS) data shows that, to date, approximately 6.1 million energy credits have expired without being used for compliance.

Figure 2: 2017 Compliance Energy Credits – Year of Generation



Status of Renewable Energy and Advanced Cleaner Energy

The number of energy credits generated or acquired during 2017 is equal to 11.3%¹³ of retail sales as shown in **Appendix C**. Michigan’s annual energy credit generation percentage is expected to continue increasing as new renewable energy projects are developed in future years. 162,230¹⁴ advanced cleaner energy credits (ACEC) were generated during 2017, which is less than previous years. This decrease may be due to the 2016 repeal of Section 27 that ended the ability to substitute ACECs for renewable energy credits after April 2017.

¹³ 2014 retail sales data used to calculate the percentage.

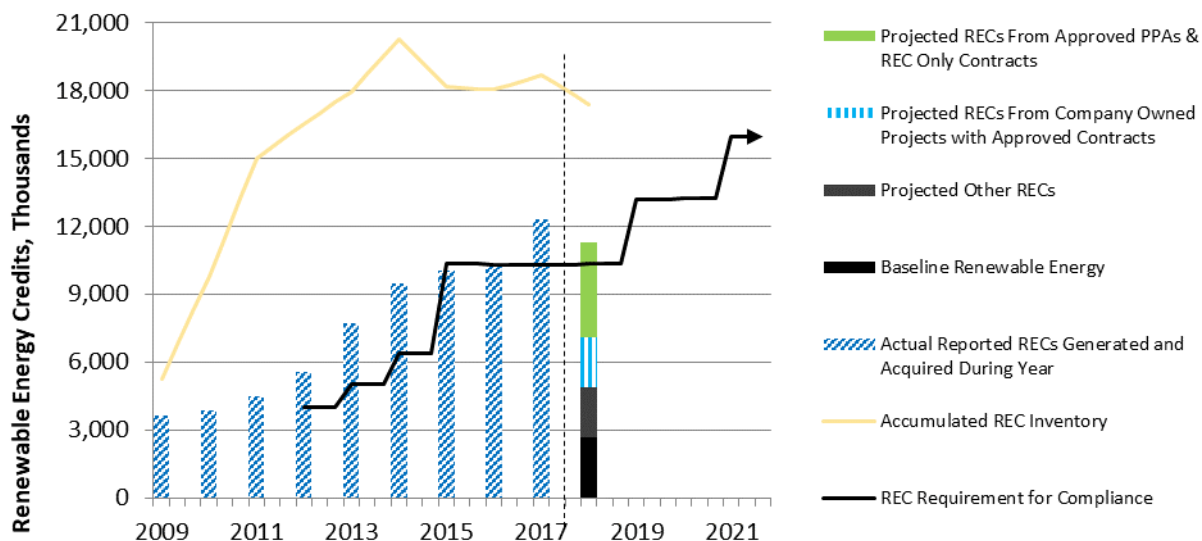
¹⁴ During 2017, advanced cleaner energy credits were generated by non-utility entities. With Appendix C showing a summary of annual reports from Michigan utilities currently serving customers, the number of ACEC shown as generated within Appendix C does not tie to this figure.

A projection of Michigan's energy credits for 2018 is shown in **Figure 3** along with the annual REC compliance requirement and accumulated RECs. In order to reflect only renewable energy generated or acquired in each year, accumulated RECs from previous years are not included in the yearly renewable energy totals but are shown separately by the line labeled "Accumulated REC Inventory." The projected renewable energy includes: i) baseline renewable energy (renewable energy that was operational prior to the passage of PA 295); ii) a projection of other RECs from non-rate regulated providers and contracts that do not require Commission approval under PA 295; iii) an estimate of RECs from PA 295 approved contracts for company-owned renewable energy projects; and iv) power purchase agreements (PPA) and REC-only contracts.

The accumulated REC inventory for 2017 reflects the deduction of energy credits that were retired for 2017 compliance, voluntary retirements, and 2014 energy credits that expired without being used.

Figure 3 incorporates Michigan's current renewable energy status and projects that providers are on track to comply with the standard in 2018. The decrease in RECs from actual 2017 and projected 2018 data includes the expiration of over two million 2014 vintage RECs from various REC banks.

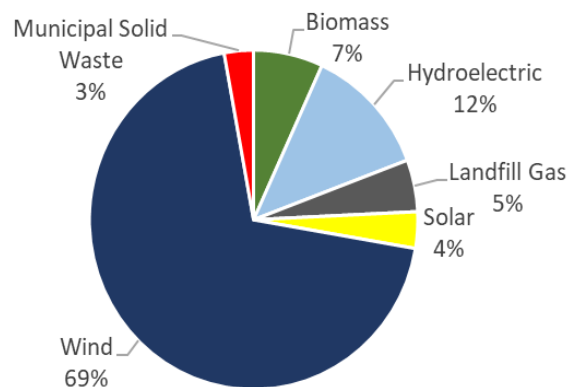
Figure 3: Michigan Renewable Energy Credit Projection



Source: Electric provider annual reports, PA 295 contracts, MIRECS and Commission staff projections.

Figure 4 provides the technology type and total nameplate capacity for the approximately 3,000 MW of renewable energy generators operating in Michigan as of the date of this report. Additional renewable energy generators exist within Michigan that are not used to meet the energy credit requirements of the renewable energy standard. These renewable generators may be used for green pricing programs or for compliance with another state's renewable energy standard. There are renewable energy generators currently under development and/or contracted for, which are not yet operational, that are not included within this figure. Further, renewable energy generators that are outside of Michigan are also not included within **Figure 4**.

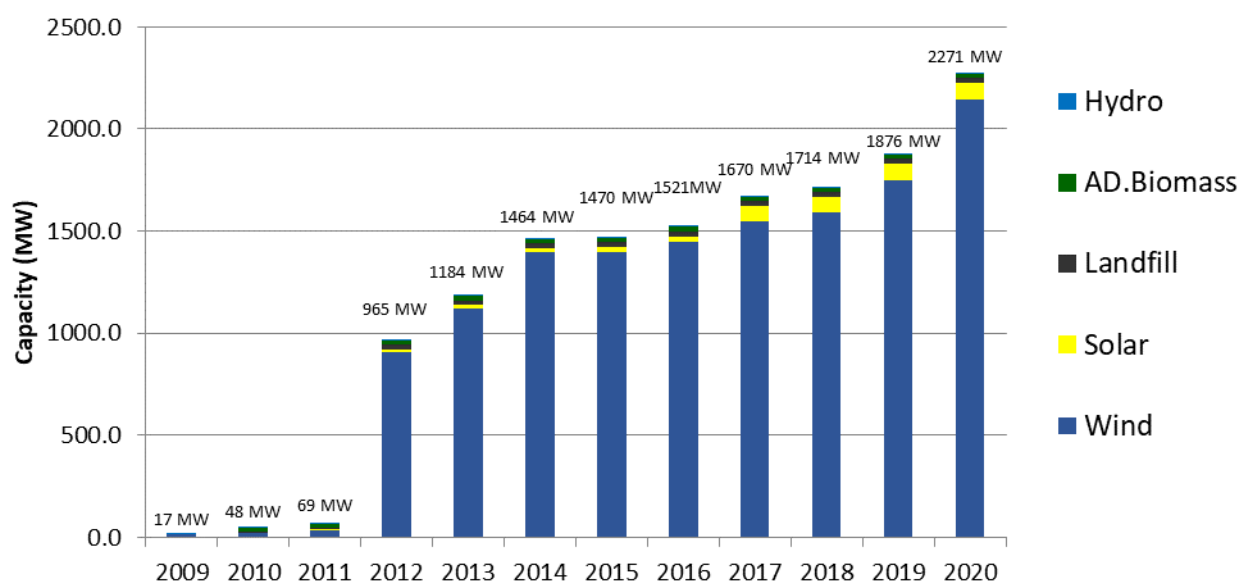
Figure 4: Renewable Energy Generators in Michigan, by Technology Type
Approximately 3,000 MW Nameplate Capacity



Source: MIRECS Project Registrations

As of January 2019, 68 renewable contracts and amendments have been approved by the Commission pursuant to PA 295. **Figure 5** shows the expected commercial operation dates for renewable energy projects through 2020 based on the contracts approved by the Commission.¹⁵ Renewable projects developed by non-rate-regulated electric providers, where contracts are not filed for approval with the MPSC, are not reflected in **Figure 5**.¹⁶

Figure 5: Cumulative Commission Approved PA 295 Renewable Energy Capacity by Commercial Operation Date



In 2017, DTE Electric completed what is currently the largest solar project in Michigan, a 48 MW company-owned solar project located in Lapeer County which was approved by the Commission in December 2015.

¹⁵ Assumes all of DTE Electric's 22 MW SolarCurrents program and Consumers Energy's 7 MW Experimental Advanced Renewable Program were commercially operational by the end of 2016.

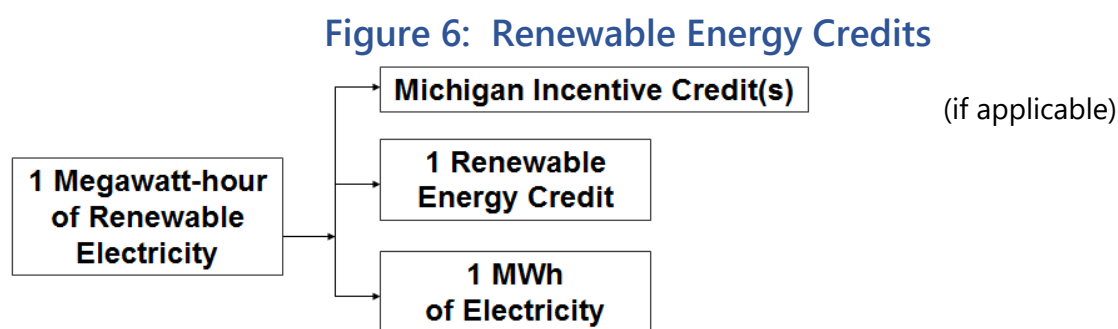
¹⁶ Nearly all AESs are purchasing unbundled renewable energy credits to meet the renewable energy credit portfolio requirements. The terms and conditions of these purchases are unknown.

Impact of Percentage Limits on the Use of Energy Waste Reduction Credits

As allowed by the Act, electric providers included banked energy credits and excess energy waste reduction credits within their renewable energy credit portfolio to achieve the 2017 compliance requirement. As provided under Section 28 of the Act, energy waste reduction credits may be substituted for renewable energy credits on a one to one ratio and shall not be used to meet more than 10% of the renewable energy credit standard. For the 2017 compliance requirement, two utilities substituted energy waste reduction credits after approval by the Commission. Consumers Energy and DTE Electric substituted 67,696 and 77,736 energy waste reduction credits respectively. This compares to 21,521 and 105,112 for the respective companies in their 2016 compliance portfolios.

Michigan Renewable Energy Certification System (MIRECS)

Compliance with the renewable energy standard is demonstrated through the use of energy credits. One renewable energy credit is created for each megawatt-hour (MWh) of renewable energy generated. Additionally, the Act provides for Michigan Incentive Renewable energy credits (IRECs) and the substitution of energy waste reduction credits¹⁷ and ACECs for RECs. However, due to the repeal of Section 27, ACECs are no longer substitutable for RECs after April 2017. RECs may be sold separately from energy as shown in **Figure 6**.



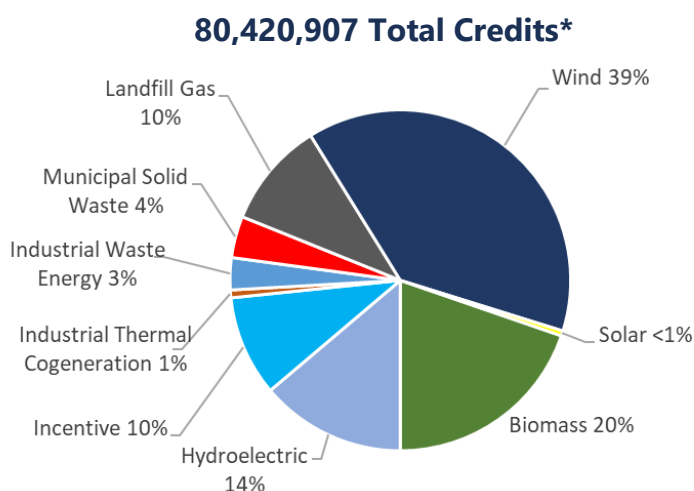
Section 41 of PA 295 directed the Commission to "establish a renewable energy credit certification and tracking program." On August 11, 2009, the Commission approved the contract between the Department of Energy, Labor and Economic Growth (now Licensing and Regulatory Affairs or

¹⁷ At this time, energy waste reduction credits are not transferable from one electric provider to another, meaning that they cannot be sold or otherwise traded.

LARA) and APX, Inc., that designates APX, Inc. as the State of Michigan Administrator of the renewable energy credit and tracking program.¹⁸ MIRECS was launched on October 30, 2009.¹⁹

As of January 18, 2019, a total of 80,420,907 energy credits have been created in MIRECS from 2009 through 2018. **Figure 7** shows the categorization of Michigan's energy credits by technology type. Annual breakouts of energy credits are available in **Appendix D**. Analysis of these breakouts show the significant growth of wind in Michigan's REC portfolio, from 7% in 2009 to approximately 50% or greater in each of the subsequent years. The 39% wind figure shown in **Figure 7** represents total non-energy waste reduction credits created over the 2009 through 2018 period. This data differs from **Figure 1** because all energy credits created in MIRECS since its inception are reflected, while **Figure 1** shows only energy credits used for 2017 compliance.

Figure 7: MIRECS 2009-2018 Vintage Energy Credits



*Energy waste reduction credits are not included in this number.

The number of generating units within MIRECS declined throughout 2018. As of January 2019, there were 302 registered projects (generators) in MIRECS. MIRECS has 144 account holders which include electric service providers, generator owners, and others.

¹⁸ The initial contract between the State of Michigan and APX was extended for another 2 years in July 2014 and extended again until July 2017 in fourth quarter 2016. After an RFP process in 2017, a second contract between the State of Michigan and APX was entered into effective July 1, 2017 and expiring December 31, 2023.

¹⁹ MIRECS may be accessed at <http://www.mirecs.org>.

MIRECS is able to fully integrate with other tracking systems such as the Midwest Renewable Energy Tracking System (M-RETS), North American Renewables Registry (NAR) and, to a lesser extent, the North Carolina Renewable Energy Tracking System (NC-RETS) and PJM-Generation Attribute Tracking System (PJM-GATS) which allow energy credit imports from and exports to MIRECS. This integration allows both businesses and individual citizens to sell their product to a wider market. Generators registered with other tracking systems have, as of January 2019, registered 63 projects for the purpose of importing energy credits into MIRECS. Commission staff assists electric providers with the compliance process and will continue to hold training/information meetings.

Competition in Areas Served by Multiple Providers

AESs are also required to meet the REC requirement contained in the Act, but not the separate capacity requirement that was applicable to Consumers Energy and DTE Electric as part of the former Section 27. Almost all AESs have indicated in their renewable energy plans and annual reports that they will purchase RECs to meet the renewable energy credit portfolio requirements. Customer choice participation levels are at the maximum amount allowed by law and Consumers Energy and DTE Electric currently have customers waiting in the customer choice queue. Although there are no indications that the Act is creating an unfair competitive advantage between utilities and AESs, the two largest utilities and the all-requirements supplier for many of the cooperative utilities in Michigan have driven the expansion of renewable energy associated with complying with the statute.

Impact of the Renewable Energy Standard on Employment

One purpose of PA 295 is to “provide improved air quality and other benefits to energy consumers and citizens of this state.” The clean and renewable energy sector continues to contribute to employment opportunities in Michigan. Over the next several years, four additional utility scale wind farms are expected to become commercially operational in Michigan:

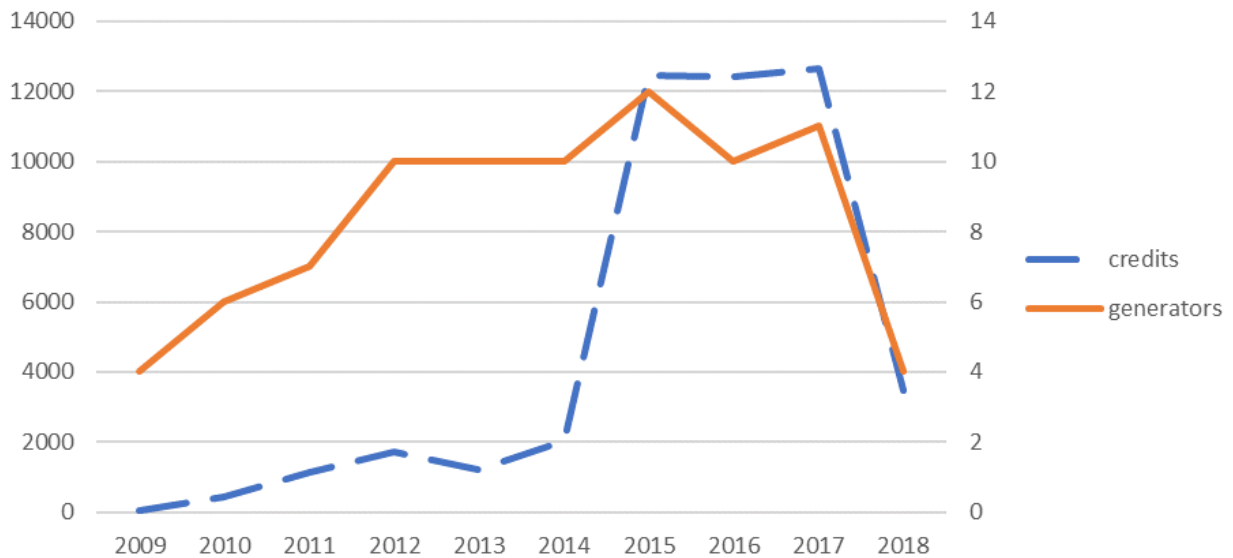
- Pine River Wind – 161.3 MW, Gratiot and Isabella Counties (2019)
- Cross Winds III – 76 MW, Tuscola County (2020)
- Gratiot Farms – 150 MW, Gratiot County (2020)
- Polaris Wind Park – 168 MW, Gratiot County (2020)

These projects will result in 555 MW of new, utility scale wind generation.

Section 39 of PA 295 provides for Michigan Incentive Renewable Energy Credits for renewable energy systems meeting certain criteria. For renewable energy systems constructed using a

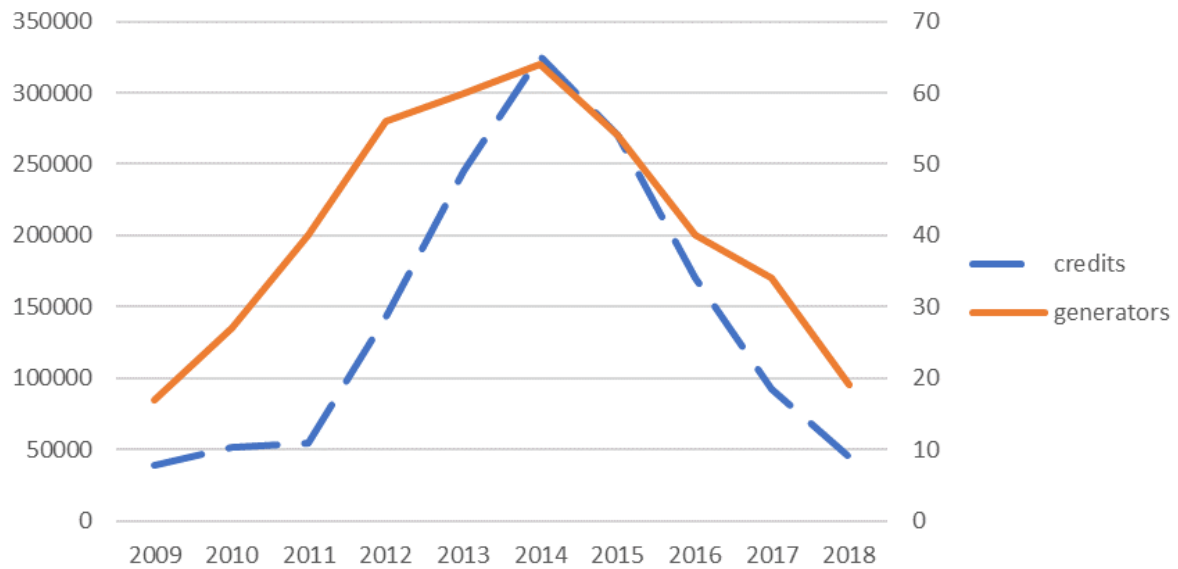
threshold level of Michigan labor, the amount of the incentive is one-tenth of a REC for each MWh generated during the first three years of commercial operation. The incentive for Michigan equipment is calculated in a similar manner. The Michigan specific incentive credits are shown in **Figures 8** and **9** below.²⁰

Figure 8: Michigan Equipment Incentive Credits 2009-2018



²⁰ Historical data within Figures 8 and 9 has been amended to accurately include aggregated projects and to reflect credits issued on a generator reporting delay of up to three years.

Figure 9: Michigan Labor Incentive Credits 2009-2018



Statewide, there has been significant investment in the renewable energy sector since the passage of PA 295 in 2008. Assuming an installed cost of \$2,000 per kW²¹ for new renewable energy projects, \$3.4 billion has been invested to bring approximately 1,714 MW²² of new renewable energy projects on-line through 2018 in Michigan. The \$3.4 billion includes both incremental cost of compliance and the portion of costs recovered as energy costs.

In September 2014, the Michigan Workforce Development Agency in partnership with the Bureau of Labor Market Information and Strategic Initiatives issued a 2014 Energy Cluster Workforce Updates report. The 2014 report is an update to the 2013 Cluster Workforce Analysis which tracked eight detailed industry sectors as a proxy for employment trends in the Renewable and

²¹ DTE Electric reported an installed cost of \$2,225 to \$2,438 per kW for its Echo Wind Park contract approval application filed on August 10, 2012.

²² Reflects the projects developed under Act 295 by MPSC rate-regulated electric providers. This number does not include 67.5 MW of wind generation attributable to contracts filed by Indiana Michigan Power Company as these projects are outside of Michigan or 1.05 MW of hydro and anaerobic bio-digestion projects that were commercially operational prior to PA 295.

Alternative Energy cluster. That analysis found the cluster grew from 6,775 jobs in 2005 to 8,200 jobs in 2013.²³ The 2014 Cluster Workforce Update found that overall, the Energy Cluster was expected to grow 7.1 percent between 2010 and 2020.²⁴ An additional update for the second quarter of 2018 showed 9,800 jobs among Michigan industries related to the Renewable and Alternative Energy cluster.²⁵

The Commission will continue to monitor data on the impact of the renewable energy standard on employment in Michigan.

The Cost of Renewable Energy Compared to the Cost of New Coal Energy

The Commission staff filed a letter in MPSC Case No. U-15800 to provide the required life cycle cost of electricity generated by a new conventional coal plant:

The Commission's temporary order implementing 2008 PA 295, Case Number U-15800, directed the staff to work with the providers to develop the required life cycle cost of electricity generated by a new conventional coal-fired facility in terms of a guidepost consisting of a levelized busbar rate, in \$/MWh, of an advanced-supercritical pulverized coal plant with a life cycle of 40 years. The Commission directed the staff to submit the number to the Commission by January 30, 2009. The staff has diligently worked with the providers to develop the guidepost rate and finds that the number is \$133 per MWh.²⁶

This guidepost rate was derived from data provided to Consumers Energy as a result of the Company's inquiry into building a new 830 MW coal fired power facility, and was adopted by all electric providers. The Commission continues to find that the \$133 per MWh guidepost is reasonable.

²³ The report's author provided additional information to MPSC staff showing job data for 2005 and 2013. Data presented in the report is for 2011 <http://milmi.org/Research/michigan-industry-cluster-workforce-reports>

²⁴ 2014 Cluster Workforce Updates – Energy <http://milmi.org/Research/cluster-workforce-updates-2014>

²⁵ The report's author provided additional information to MPSC staff showing job data for 2018.

²⁶ Excerpt from Commission staff January 30, 2009 Guidepost Rate Letter, <https://mi-psc.force.com/sfc/servlet.shepherd/version/download/068t0000000wNU3AAM>

By comparing the levelized cost of \$133 per MWh for a new conventional coal-fired power facility with the combined weighted average levelized contract prices in **Figure 10**, the cost of all renewable energy projects using multiple renewable energy technologies is less than the coal guidepost rate with the exception of 14 MW of total capacity.

**Figure 10: Weighted Average Levelized Renewable Energy Contract Prices
(2009 through the Present)**

Consumers Energy						
Technology	Wind	Digester	Biomass	Landfill	Hydro	Solar
Weighted Average	\$70.15	\$137.77	NA	\$106.21	\$121.31	\$160.00
DTE Electric						
Technology	Wind	Digester	Biomass	Landfill	Hydro	Solar
Weighted Average	\$62.31	NA	\$98.94	\$98.97	NA	\$113.52
Combined Weighted Average	\$65.89	\$137.02	\$98.94	\$104.05	\$121.31	\$121.27

While the Commission is required to make a determination about the cost effectiveness of the renewable energy standard as compared to the life-cycle cost of electricity of coal-fired generation, it should be noted that renewable energy wind resources are not equivalent on a capacity basis when compared to coal-fired or other base load generation. The differences in energy availability during peak loads can be significant. For example, regional transmission

organizations such as Midcontinent Independent System Operator (MISO) discounted the capacity value of wind resources to 15.7% and solar to 50% for the 2019 – 2020 planning year,²⁷ compared to an availability ranging as high, or higher than 80% for base load generation plants.²⁸ Comparing per unit energy costs of different generation types may not reflect the true value of the resource to the reliability of the electric system as a whole.

Cost-Effectiveness of the Renewable Energy Standard

Section 51(5)(e) of PA 295 requires an evaluation of the cost-effectiveness of the renewable energy standard. The actual cost of renewable energy contracts submitted to the Commission to date continues to show a downward pricing trend. Consumers Energy and DTE Electric have made substantial progress toward complying with the renewable energy standard. Consumers Energy has filed renewable energy contracts with the Commission totaling approximately 888 MW, and DTE Electric totaling approximately 1,320 MW, as shown in **Appendix E**.

Consumers Energy and DTE Electric have conducted 43 requests for proposals (RFPs) in total. During 2018, Consumers Energy and DTE Electric each conducted 2 RFPs. In total, Consumers Energy has conducted 20 RFPs and four requests for qualifications and DTE Electric has conducted 23 RFPs, two pre-qualification events, one solar solicitation of interest, a request for information, and an auction for 2009 and 2010 vintage RECs. In response to the majority of the companies' RFPs, Commission staff has reviewed competitive bidding activities through process audits. The purpose and design of the audits was to ensure that the companies followed the processes and procedures outlined in the Commission's December 4, 2008 Temporary Order in [MPSC Case No. U-15800, Attachment D](#)²⁹ and pursuant to the former Section 33 of PA 295. Details about each company's competitive bidding activities are shown in **Appendix F**.

Pursuant to the former Section 37 of the Act and now Section 28, renewable energy power purchase and REC-only agreements entered into by any electric provider whose rates are regulated by the Commission must be submitted to the Commission for approval. **Appendix E** lists all renewable energy contracts that have been approved by the MPSC under PA 295 to date.

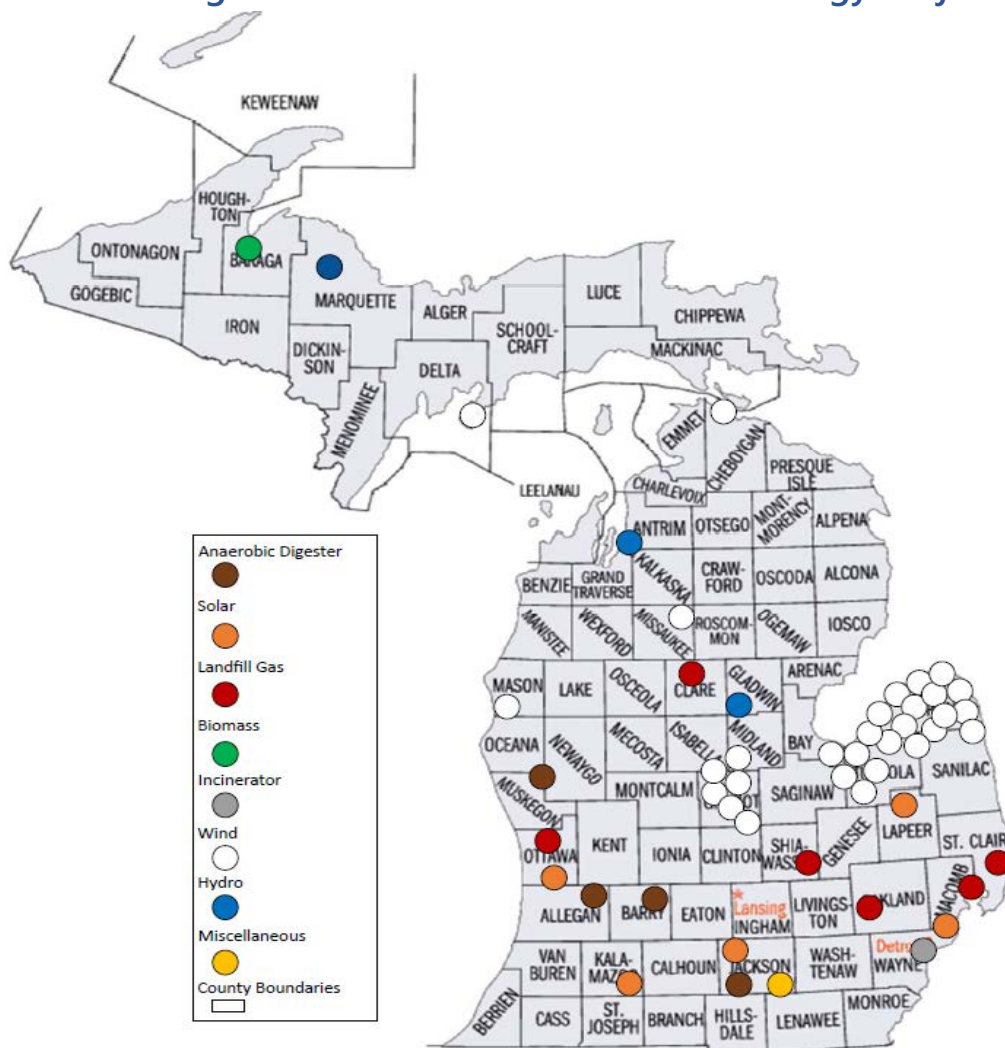
²⁷ www.misoenergy.org

²⁸ The availability on-peak for base load generators is unit-specific. Older units may have capacity values significantly lower than 80%; however, newer units, especially newer nuclear units may have capacity values on-peak above 90%.

²⁹ <https://mi-psc.force.com/s/filing/a00t0000005pa5iAAA/u158000002>

There has been significant renewable energy development as a result of PA 295. **Figure 11** shows the location of PA 295 renewable energy projects. Wind energy has been the primary source of new renewable energy in Michigan. At the end of 2018, including wind projects developed shortly before Act 295 and wind projects developed by non-rate regulated electric providers and under the PA 295 contract approval and cost recovery mechanisms, there were 1,925 MW (total includes 127 MW of utility scale projects that began operating prior to the Act) of utility scale wind projects in operation in Michigan as indicated in **Appendix G**. Four wind farms with 555 MW of new wind capacity are expected to begin operating in the next several years.

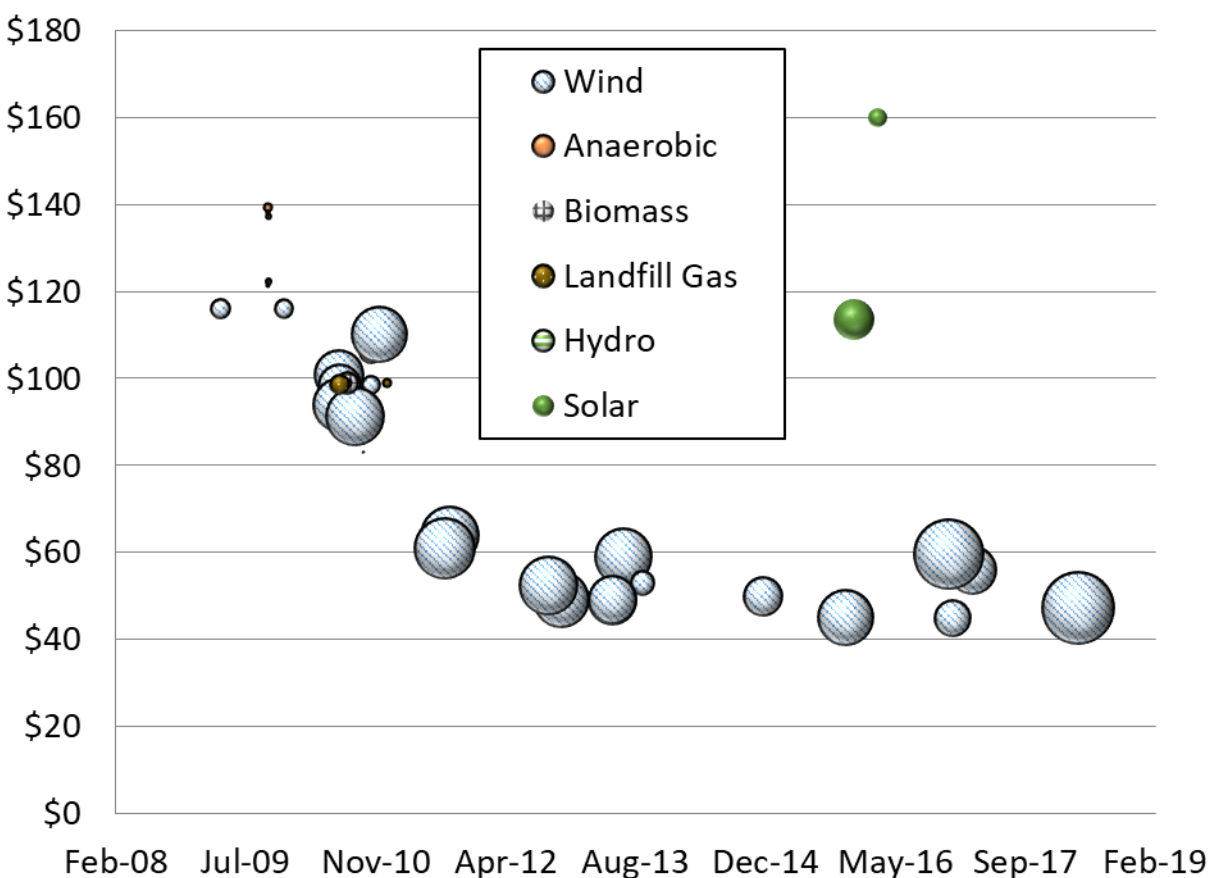
Figure 11: Locations of Renewable Energy Projects



Multiple Anaerobic Digester projects participating in Consumers Energy's Experimental Advanced Renewable Program are represented by a brown symbol at Jackson. Multiple Solar projects participating in Consumers Energy's Experimental Advanced Renewable Program are represented by a solar symbol placed at Jackson. Multiple Solar projects participating in DTE's SolarCurrents Program are represented by a solar symbol placed at Detroit. Alpena Power Company purchasing "bulk of RECs" from Consumers Energy represented by a yellow symbol placed at Jackson. DTE purchasing misc. RECs from UPPCo represented by a blue symbol placed at UPPCo's headquarters. Map shows renewable energy projects based on PA 295 contracts filed at the Michigan Public Service Commission.

The most recent wind contracts approved by the Commission have levelized costs in the \$46 - \$59 per MWh range, approximately half of the levelized cost of the first renewable energy contracts approved in 2009 and 2010. Weighting the levelized costs of all contracts by the generation in MWh results in an average cost of \$68.27 per MWh. With the exception of 14 MW of capacity, all renewable energy contract prices are lower than the \$133 per MWh coal guidepost rate. **Figure 12** shows the decline in levelized costs of contracts over time. The \$68.27 per MWh cost of the renewable energy under the standard is substantially lower than the cost of a new coal-fired plant and demonstrates that the renewable energy standard has been cost effective.

Figure 12: Levelized Cost of MPSC Approved Contracts (\$ per MWh)



*Circle size denotes project capacity size.

The MWh contract prices shown in **Appendix E** are levelized cost calculations and reflect the prices over the contract term for all power purchase agreements or, in the case of a company-owned project, the depreciable composite life.³⁰ The levelized cost value is used to compare multiple contracts with varying terms and conditions. Of the 74 contracts and amendments from five electric providers approved by the Commission to date, all but four have been from Consumers Energy or DTE Electric and 20 have been unsolicited. With the exception of several early contracts for small renewable energy projects and several of Michigan's first utility scale solar projects, the contract prices have been much lower than expected and have continued to decline.

Effect of the Renewable Energy Subpart on Electricity Prices

PA 295 provides for the recovery of costs associated with complying with the renewable energy standard. As described in the 2013 [report](#) on renewable energy released as part of the *Readying Michigan to Make Good Energy Decisions* information gathering process:

Act 295 renewable energy costs are recovered in two ways: the energy and capacity portion of the renewable energy is recovered pursuant to Sections 47 and 49 of the Act through the Power Supply Cost Recovery (PSCR) mechanism utilizing a transfer price schedule while the remaining or incremental portion of the renewable generation costs is recovered through a surcharge. The incremental cost of compliance represents the cost of renewable energy above and beyond the costs defined by transfer price schedules and recovered through the PSCR process. PSCR recovery is generally reserved for power purchase agreement recovery, fuel purchases and some Environmental Protection Agency regulation compliance costs. Sections 47 and 49 of the Act expanded the use of the PSCR mechanism to include the projected capacity, energy, and maintenance and operation costs, which is now called the transfer price. Transfer price schedules are representative of what a Michigan electric provider would pay had it obtained the energy and capacity (the non-renewable market price component) through a new long term power purchase agreement for traditional fossil fuel electric generation. To best determine the value of the non-renewable component of Act 295 compliant generation, Commission staff determined, for purposes of developing a uniform Transfer Price Schedule, that the

³⁰ MPSC staff performed audits of the companies' levelized cost calculations starting in the early part of 2011. Additionally, through RFP process audits, staff reviewed actual costs of contracts obtained through most of the companies' competitive solicitations. Staff reviewed the actual costs of all contracts listed in **Appendix E**.

levelized cost of a new natural gas combined cycle (NGCC) plant would likely be analogous to the market price mentioned above.³¹

For 2017, the average annual transfer price for DTE Electric was \$66.30 per MWh and the average annual transfer price for Consumers Energy was \$79.19 per MWh. The Act allows providers to recover the incremental costs of compliance with the renewable energy standard requirements (i.e., the incremental cost above the transfer price threshold) through a renewable energy surcharge on customer bills. Commission approval of the renewable energy surcharge is only required for rate-regulated electric providers. Section 45 of the Act limits the retail rate impact (surcharge amount) of the renewable energy standard to the following:

- (a) \$3.00 per month per residential customer meter.
- (b) \$16.58 per month per commercial secondary customer meter.
- (c) \$187.50 per month per commercial primary or industrial customer meter.

At the end of 2017 only two rate-regulated providers, Indiana Michigan Power Company and Upper Michigan Energy Resources Corporation – WEPCO Rate Zone,³² continued collecting renewable energy surcharges on customer bills. Additionally, there are seven non-rate-regulated electric providers with revenue recovery mechanisms. Surcharge details can be found in **Appendix B**. It is important to understand that for utilities that have renewable energy compliance costs lower than the transfer price (and therefore, no surcharge), the **actual** costs of renewable energy contracts and utility generation used to comply with the RPS are recovered through the power supply cost recovery charge, not the transfer price itself.

Spending on renewable energy has had an impact on electric rates, but should be considered in context of other factors that affect rates. Several factors, including load loss, fuel costs, environmental investment, and base system investment, have contributed to electric rate increases since 2008.³³ There are also benefits attributable to an increase in renewable energy generation sources. Wind and solar generation have zero fuel costs and the integration of zero fuel-cost generation into the regional market can result in lower locational marginal prices in the energy market. And, as noted in previous sections, the cost of energy generated by renewable sources continues to decline and is cheaper than new coal-fired generation.

³¹ For more detailed information on the staff Transfer Price Schedule: <http://efile.mpsc.state.mi.us/efile/docs/15800/0042.pdf>

³² Effective January 1, 2017, customers of Wisconsin Electric Power Company and Wisconsin Public Service Corporation are served by a new stand-alone utility, Upper Michigan Energy Resources Corporation (UMERC).

³³ http://michigan.gov/documents/energy/Additional_Areas_final_440032_7.pdf, Figures 6 and 7, pp. 24-25.

Conclusion

All electric providers achieved the renewable energy standard for 2017. The combined efforts of the electric providers, renewable energy project developers, communities hosting renewable energy projects, renewable energy advocates and many others have contributed to the effective implementation of Michigan's renewable energy standard. The renewable energy standard has led to the development of over 1,714 MW of new renewable energy projects. The weighted average price of renewable energy contracts is \$68.27 per MWh, which is considerably less than forecasted in the initial renewable energy plans.

The process to implement the provisions in the new renewable energy standard as set forth in PA 342 of 2016 is continuing. The Commission intends to build on the successful activities already in place to guide Michigan's path to the 15% renewable energy standard in 2021 and achieving the combined goal of meeting Michigan's electric needs through a combination of 35% energy waste reduction and renewable energy by 2025. Status of the combined goal may be found within the Annual Report on the Implementation of PA 295 2017 Utility Energy Waste Reduction Programs.³⁴

³⁴ https://www.michigan.gov/mpsc/0,4639,7-159-52495_53472_53476-292333--,00.html

Appendices

Appendix A - Renewable Energy Case Numbers and Electric Providers

	COMPANY	Initial RE Plan Case #	Most Recent Plan Case #	2016 Reconciliation Case #	2017 Reconciliation Case #
IOUs					
1	Alpena Power Company	U-15804	U-18230	U-18240	U-20170
2	Consumers Energy Company	U-15805	U-18231	U-18241	U-20171
3	DTE Electric Company	U-15806	U-18232	U-18242	U-20172
4	Indiana Michigan Power Company	U-15808	U-18233	U-18243	U-20173
5	Northern States Power Company-Wisconsin	U-15809	U-18234	U-18244	U-20174
6	Upper Peninsula Power Company	U-15810	U-18235	U-18245	U-20175
7	Upper Michigan Energy Resources Corporation		U-18236		U-20176
	Wisconsin Public Service Corporation	U-15811		U-18246	
8	Wisconsin Electric Power Company	U-15812	U-18237	U-18247	U-20177
Cooperatives - Member Regulated				Not Required	
9	Alger Delta Cooperative Electric Association	U-15813	U-16589		
10	Bayfield Electric Cooperative	U-15814	U-16590		
11	Cherryland Electric Cooperative	U-15815	U-16591		
12	Cloverland Electric Cooperative/Edison Sault	U-15816	U-17799		
13	Great Lakes Energy Cooperative (2012)	U-15817	U-16593		
14	Midwest Energy Cooperative	U-15818	U-16594		
15	Ontonagon Co. Rural Electrification Assoc. (2012)	U-15819	U-16595		
16	Presque Isle Electric and Gas Co-op (2012)	U-15820	U-16596		
17	Thumb Electric Cooperative	U-15821	U-16598		
18	Tri-County Electric Cooperative	U-15822	U-17801		
Municipals				Not Required	
19	Village of Baraga	U-15848	U-16599		
20	City of Bay City	U-15849	U-16600		
21	City of Charlevoix	U-15850	U-16601		
22	Chelsea Department of Electric and Water	U-15851	U-16602		
23	Village of Clinton	U-15852	U-16603		
24	Coldwater Board of Public Utilities	U-15853	U-16604		
25	Croswell Municipal Light & Power Department	U-15854	U-16605		
26	City of Crystal Falls	U-15855	U-16606		
27	Daggett Electric Department	U-15856	U-16607		
28	City of Dowagiac	U-15858	U-16609		
29	City of Eaton Rapids	U-15859	U-16610		
30	City of Escanaba	U-15860	U-16611		
31	City of Gladstone	U-15861	U-16612		
32	Grand Haven Board of Light and Power	U-15862	U-16613		
33	City of Harbor Springs	U-15863	U-16614		
34	City of Hart Hydro	U-15864	U-16615		
35	Hillsdale Board of Public Utilities	U-15865	U-16616		
36	Holland Board of Public Works	U-15866	U-16617		
37	Village of L'Anse	U-15867	U-16618		
38	Lansing Board of Water & Light	U-15868	U-16619		
39	Lowell Light and Power	U-15869	U-16620		
40	Marquette Board of Light and Power	U-15870	U-16621		
41	Marshall Electric Department	U-15871	U-16622		
42	Negaunee Department of Public Works	U-15872	U-16623		
43	Newberry Water and Light Board	U-15873	U-16624		
44	Niles Utility Department	U-15874	U-16625		
45	City of Norway	U-15875	U-16626		
46	City of Paw Paw	U-15876	U-16627		
47	City of Petoskey	U-15877	U-16628		
48	City of Portland	U-15878	U-16629		
49	City of Sebewaing	U-15879	U-16630		
50	City of South Haven	U-15880	U-16631		
51	City of St. Louis	U-15881	U-16632		
52	City of Stephenson	U-15882	U-16633		
53	City of Sturgis	U-15883	U-16634		
54	Traverse City Light & Power	U-15884	U-16635		
55	Union City Electric Department	U-15885	U-16636		
56	City of Wakefield	U-15886	U-16637		
57	Wyandotte Department of Municipal Service	U-15887	U-16638		
58	Zeeland Board of Public Works	U-15888	U-16639		

Appendix A - Renewable Energy Case Numbers and Electric Providers

	COMPANY	Initial RE Plan Case #	Most Recent Plan Case #	2016 Reconciliation Case #	2017 Reconciliation Case #
Alternative Electric Suppliers (AES) Serving Customers				Not Required	
59	Calpine Energy Solutions f/k/a Noble Americas Energy Solutions LLC	U-15843	U-16650		
60	CMS ERM Michigan LLC	U-15826	U-16640		
61	Constellation Energy Services, Inc (formally Integrys)	U-15833	U-16646		
62	Constellation NewEnergy Inc	U-15829	U-16642		
63	Direct Energy Business LLC	U-15845	U-16643		
64	Eligo Energy MI, LLC	U-17885	U-17885		
65	FirstEnergy Solutions Corp	U-15832	U-16644		
66	Just Energy Inc f/k/a Commerce Energy	U-15828	U-16641		
67	MidAmerican Energy Services	U-17934	U-17934		
68	Spartan Renewable Energy Inc	U-15844	U-16651		
69	U.P. Power Marketing LLC	U-16586	U-16652		
70	Wolverine Power Marketing Cooperative Inc	U-15847	U-16653		
Alternative Electric Suppliers (AES) Not Serving Customers				Not Required	
71	AEP Energy, Inc	U-15825	U-15825		
72	Dillon Power, LLC	U-17769	U-17769		
73	Direct Energy Services LLC	U-15830	U-15830		
74	EDF Energy Services	U-18037	U-18037		
75	Energy Int'l Power Marketing d/b/a PowerOne	U-15831	U-15831		
76	Energy Services Providers, Inc. d/b/a Michigan Gas & Electric	U-17010	U-17010		
77	Interstate Gas Supply, Inc d/b/a IGS Energy	U-17338	U-17338		
78	Liberty Power Delaware	U-15834	U-15834		
79	Libery Power Holdings LLC	U-15835	U-15835		
80	Nordic Energy Services, LLC	U-18066	U-18066		
81	Plymouth Rock Energy LLC	U-17549	U-17549		
82	Texas Retail Energy, LLC	U-17168	U-17168		
Alternative Electric Suppliers (AES) Licenses Rescinded				Not Required	
	Dynegy Energy Services (East), LLC (Formally Duke Energy	License Rescinded 05/2016			
	Energy.me Midwest, LLC d/b/a energy.me	License Rescinded 04/2016			
	Glacial Energy of Illinois	License Rescinded 02/2016			
	Lakeshore Energy Services, LLC d/b/a CenterPoint Energy Service Retail	License Rescinded 05/2016			
	MidAmerican Energy Company	License Rescinded 08/2016			
	Premier Energy Marketing LLC	License Rescinded 2/26/2018			
	Santanna	License Rescinded 03/2016			
	Term Power & Gas, LLC d/b/a ENCOA	License Rescinded 11/2014			

Appendix B - Renewable Energy Credit Requirements and Renewable Energy Plan Summary

Company	Initial Plan	2017 Plan Docket	2017 REC Requirement	2017 Excess RECs Retired	2017 EWR Credit Substitutions	Met the 2017 Standard	Current Residential Surcharge \$/Month
Rate Regulated Utilities							
Alpena Power	U-15804	U-18230	33,993			Yes	0.00
Consumers Energy	U-15805	U-18231	3,318,873		67,696	Yes	0.00
DTE Electric	U-15806	U-18232	4,244,832		77,736	Yes	0.00
Indiana Michigan	U-15808	U-18233	282,839			Yes	3.00
NSP-Wisc (Xcel)	U-15809	U-18234	14,118			Yes	0.00
Upper Michigan Energy Resource Corporation							
UMERC - WPSC Rate Zone	U-15811	U-18236	27,750			Yes	0.00
UMERC - WEPCO Rate Zone	U-15812	U-18236	38,400			Yes	1.20
Upper Peninsula Power	U-15810	U-18235	83,861			Yes	0.00
Wisc. Elec Co Mines	U-15812	U-18237	122,800			Yes	0.00

Member Regulated Cooperatives							
Alger Delta Coop Elec	U-15813	U-16589	6,969			Yes	0.00
Bayfield Elec. Coop	U-15814	U-16590	17			Yes	0.00
Cherryland Elec Coop	U-15815	U-16591	38,353			Yes	0.00
Cloverland Electric Coop	U-15816	U-17799	80,961	8		Yes	0.00
Great Lakes Energy Coop	U-15817	U-16593	139,943			Yes	0.00
Midwest Energy Coop	U-15818	U-16594	59,206			Yes	0.00
Ontonagon Co. Rural Elec.	U-15819	U-16595	2,540			Yes	0.00
Presque Isle Elec & Coop	U-15820	U-16596	23,866			Yes	0.00
Tri-County Elec. Coop	U-15822	U-16598	33,432			Yes	0.00
Thumb Elec. Coop	U-15821	U-17801	16,565	395		Yes	0.00

Alternative Electric Suppliers							
Calpine Energy Solutions, LLC f/k/a Noble Americas Energy Solutions	U-15843	U-16650				Yes	
CMS ERM Michigan	U-15826	U-16640				Yes	
Constellation Energy Services, Inc (Formally Integrys)	U-15833	U-16646				Yes	
Constellation NewEnergy	U-15829	U-16642				Yes	
Eligo Energy MI, LLC		U-17885					
Direct Energy Business	U-15845	U-16643				Yes	
First Energy Solutions	U-15832	U-16644				Yes	
Just Energy Inc f/k/a Commerce Energy	U-15828	U-16641				Yes	

Appendix B - Renewable Energy Credit Requirements and Renewable Energy Plan Summary

Company	Initial Plan	2017 Plan Docket	2017 REC Requirement	2017 Excess RECs Retired	2017 EWR Credit Substitutions	Met the 2017 Standard	Current Residential Surcharge \$/Month
MidAmerican Energy Services		U-17934					
Spartan Renewable Energy	U-15844	U-16651				Yes	
U.P. Power Marketing	U-15846	U-16652				Yes	
Wolverine Power Marketing Cooperative	U-15847	U-16653				Yes	
Aggregated Totals***			910,723	11,311			

Appendix B - Renewable Energy Credit Requirements and Renewable Energy Plan Summary

Company	Initial Plan	2017 Plan Docket	2017 REC Requirement	2017 Excess RECs Retired	2017 EWR Credit Substitutions	Met the 2017 Standard	Current Residential Surcharge \$/Month
Municipal Utilities							
Village of Baraga	U-15848	U-16599	1,880			Yes	0.00
City of Bay City	U-15849	U-16600	31,664			Yes	0.00
City of Charlevoix	U-15850	U-16601	5,966			Yes	0.00
Chelsea Dept. of Electric & Water	U-15851	U-16602	9,888			Yes	0.00
Village of Clinton	U-15852	U-16603	2,340			Yes	0.00
Coldwater Board of Public Utilities	U-15853	U-16604	34,792			Yes	0.00
Croswell Municipal Light & Power Dept.	U-15854	U-16605	3,877	55		Yes	0.11
City of Crystal Falls	U-15855	U-16606	1,634			Yes	0.00
Daggett Electric Department	U-15856	U-16607	135			Yes	0.00
City of Dowagiac	U-15858	U-16609	6,506			Yes	0.00
City of Eaton Rapids	U-15859	U-16610	9,385			Yes	0.57
City of Escanaba	U-15860	U-16611	14,167			Yes	0.00
City of Gladstone	U-15861	U-16612	3,240			Yes	0.00
Grand Haven Board of Light & Power	U-15862	U-16613	28,481			Yes	0.00
City of Harbor Springs	U-15863	U-16614	3,772			Yes	0.48
City of Hart	U-15864	U-16615	4,505			Yes	0.63
Hillsdale Board of Public Utilities	U-15865	U-16616	11,899			Yes	0.00
Holland Board of Public Works	U-15866	U-16617	104,100			Yes	0.00
Village of L'anse	U-15867	U-16618	1,195			Yes	0.00
Lansing Board of Water & Light	U-15868	U-16619	214,461			Yes	0.75
Lowell Light & Power	U-15869	U-16620	7,001			Yes	3.00
Marquette Board of Light & Power	U-15870	U-16621	30,609			Yes	0.00
Marshall Electric Department	U-15871	U-16622	10,523			Yes	0.00
Negaunee Dept. of Public Works	U-15872	U-16623	2,269			Yes	0.00
Newberry Water and Light Board	U-15873	U-16624	1,785	3,186		Yes	0.00
Niles Utilities Department	U-15874	U-16625	13,102			Yes	0.00
City of Norway	U-15875	U-16626	2,866			Yes	0.00
Village of Paw Paw	U-15876	U-16627	4,083			Yes	0.00
City of Petoskey	U-15877	U-16628	10,585			Yes	0.00
City of Portland	U-15878	U-16629	3,540			Yes	0.00
City of Sebewaing	U-15879	U-16630	4,249			Yes	0.19
City of South Haven	U-15880	U-16631	13,496			Yes	0.00
City of St. Louis	U-15881	U-16632	3,999			Yes	0.00
City of Stephenson	U-15882	U-16633	612	2		Yes	0.00
City of Sturgis	U-15883	U-16634	22,356			Yes	0.00

Appendix B - Renewable Energy Credit Requirements and Renewable Energy Plan Summary

Company	Initial Plan	2017 Plan Docket	2017 REC Requirement	2017 Excess RECs Retired	2017 EWR Credit Substitutions	Met the 2017 Standard	Current Residential Surcharge \$/Month
Traverse City Light & Power	U-15884	U-16635	32,297			Yes	0.00
Union City Electric Department	U-15885	U-16636	1,589			Yes	0.00
City of Wakefield	U-15886	U-16637	1,313			Yes	0.00
Wyandotte Dept. of Muncipal Service	U-15887	U-16638	29,216			Yes	0.00
Zeeland Board of Public Works	U-15888	U-16639	33,740			Yes	0.00
***Total			10,203,158	14,957	145,432		
Credits retired for 2017			10,218,115				

Appendix C - ELECTRIC PROVIDER RENEWABLE ENERGY ANNUAL REPORT SUMMARY

2017 Reporting Year

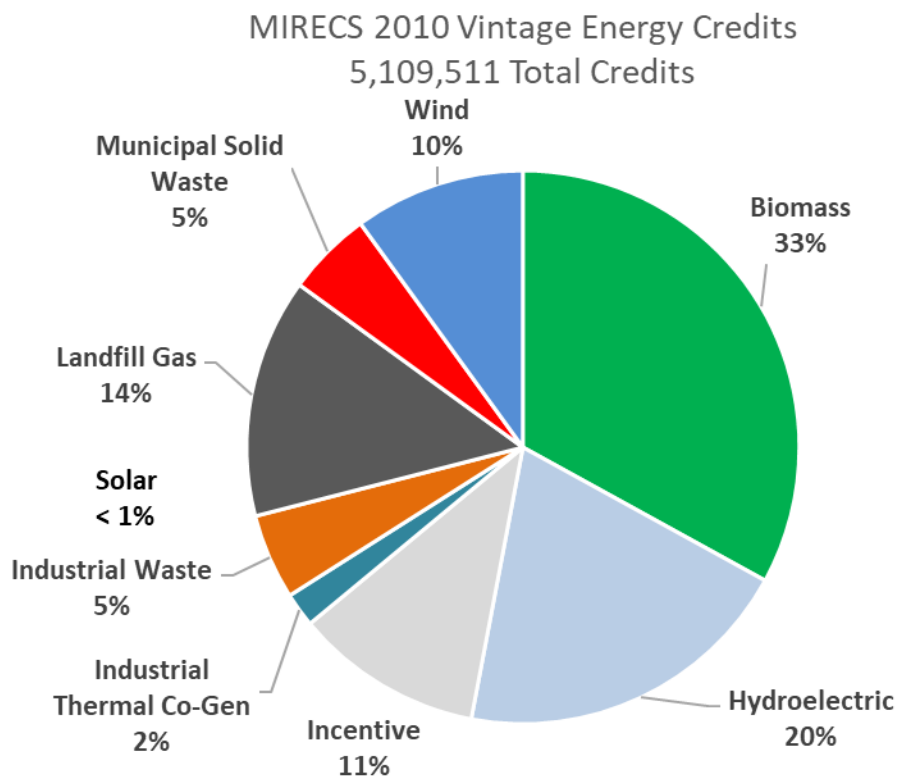
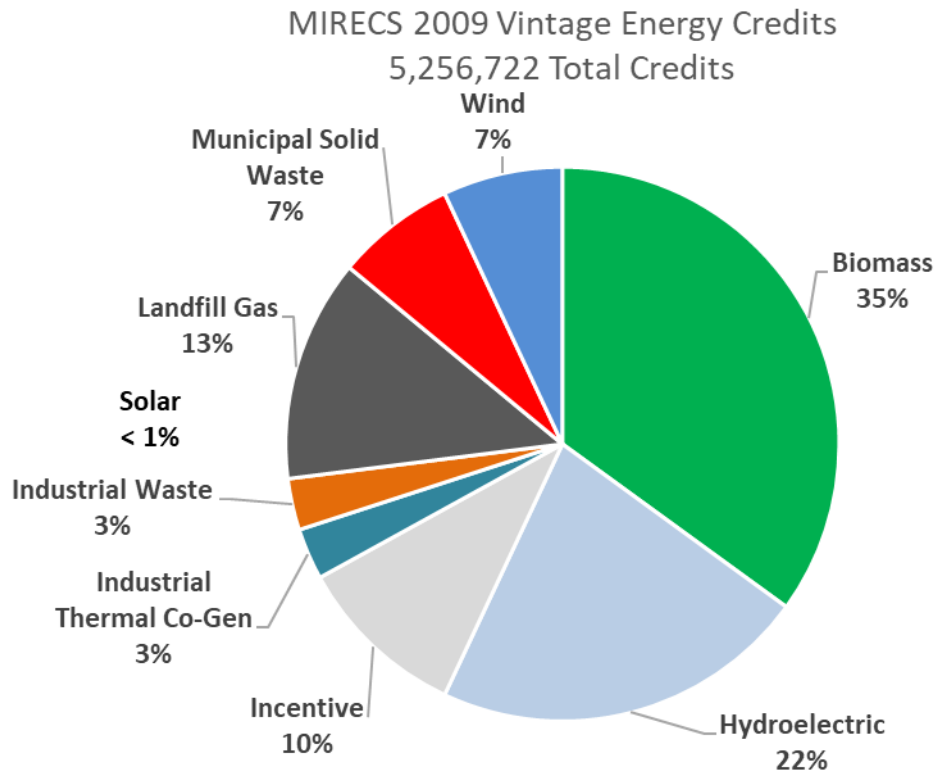
Company Name	2017 Generated or Acquired (RECs)	2017 Generated or Acquired (ACECs)	Energy Credits Sold in 2016 (RECs)	2009-2016 Reported Incremental Cost of Compliance (\$)	2017 Reported Incremental Cost of Compliance (\$)	Remaining Anticipated Incremental Cost of Compliance (\$)	Total Plan Period Anticipated Incremental Cost of Compliance (Prior Years plus Anticipated) (\$)
Investor Owned Utilities:							
Alpena Power Company	33,993	0	0	2,992,085	16,483	634,700	3,643,268
Consumers Energy Company	3,156,818	0	32,454	143,068,171	26,500,000	65,400,000	234,968,171
Detroit Edison Company	4,299,062	0	6755	326,009,634	33,091,115	111,086,888	470,187,637
Indiana Michigan Power Company	303,687	0	59,867	4,568,002	3,961,262	28,660,668	37,189,932
Northern States Power Company	38,401	0	0	0	0	0	0
Upper Peninsula Power Company	1,650,688	0	23,525	0	0	0	0
Upper Michigan Energy Resource Corporation	62,625	0	0	0	919,747	660,168	1,579,915
Wisconsin Electric Power Co	93,163	0	0	5,206,174	2,892,179	1,685,765	9,784,118
	9,638,437	0	122,601	481,844,066	67,380,786	208,128,189	757,353,041
Member Regulated Electric Cooperatives:							
Alger Delta Cooperative Electric Association	6,989	0	0	0	0	0	0
Bayfield Electric Cooperative	0	0	0	204	51	0	255
Cherryland Electric Cooperative	66,042	0	0	0	0	0	0
Cloverland Electric Cooperative	419,304	0	16528	0	0	0	0
Great Lakes Energy Cooperative	241,824	0	0	0	0	0	0
Homeworks Tri-County Electric Cooperative	57,879	0	0	0	0	0	0
Midwest Energy Cooperative	103,357	0	0	0	0	0	0
Ontonagon County Rural Electrification Association	0	0	0	0	0	0	0
Presque Isle Electric and Gas Co-op	40,724	0	0	0	0	0	0
Thumb Electric Cooperative	16,960	0	16,960	0	0	0	0
	953,079	0	33,488	204	51	0	255
Municipally-Owned Electric Utilities:							
City of Bay City	38,877	0	0	1,288,143	3,048,568	0	4,336,711
City of Charlevoix	5,012	0	0	289,349	458,691	0	748,040
City of Crystal Falls	9,923	0	0	0	0	0	0
City of Dowagiac	6,506	0	0	7,146	0	0	7,146
City of Eaton Rapids	9,385	0	0	502,942	286,193	0	789,135
City of Escanaba	42,000	0	0	38,765	8,805	381,844	429,414
City of Gladstone	3,240	0	0	0	0	0	0
City of Harbor Springs	5,014	0	0	21,190	0	0	21,190
City of Hart Hydro	2,509	0	0	10,595	0	0	10,595
City of Norway	39,997	0	62,136	0	0	0	0
City of Petoskey	10,029	0	0	366,148	654,077	0	1,020,225
City of Portland	3,310	0	0	68,465	143,111	0	211,576
City of Sebewaing	4,249	0	0	21,961	4,911	109,570	136,442
City of South Haven	13,580	0	0	7,719	0	0	7,719
City of St. Louis	23,332	0	0	75,093	181,288	0	256,381
City of Stephenson	611	0	0	0	0	0	0
City of Sturgis	28,713	0	0	12,051	0	0	12,051
City of Wakefield	2,103	0	0	0	0	0	0
Chelsea Dept of Electric & Water	3,009	0	0	396,999	292,103	0	689,102
Coldwater Board of Public Utilities*	57,002	0	0	3,411	0	0	3,411
Croswell Municipal Light & Power Dept	60,934	0	0	9,458	4,481	70,902	84,841
Daggett Electric Dept	147	0	0	1,905	0	0	1,905
Grand Haven Board of Light & Power	26,616	0	0	804,545	2,247,406	0	3,051,951
Hillsdale Board of Public Utilities*	57,002	0	0	1,473	0	0	1,473
Holland Board of Public Works	68,388	0	0	6,352,628	0	0	6,352,628
Lansing Board of Water & Light	152,755	0	0	11,209,053	10,095,363	10,444,911	31,749,327
Lowell Light & Power	7,020	0	0	1,070,642	671,064	2,458,382	4,200,088
Marquette Board of Light & Power	40,651	0	0	42,175	0	0	42,175
Marshall Electric Dept*	57,002	0	0	7,186	0	0	7,186
Negaunee Dept of Public Works	2,269	0	0	0	0	0	0
Newberry Water & Light Board	0	0	0	2,173,289	0	0	2,173,289
Niles Utility Dept	13,102	0	0	7,529	0	0	7,529
Traverse City Light & Power	31,515	0	0	0	0	0	0
Union City Electric Dept*	57,002	0	0	506	0	0	506
Village of Baraga	1,880	0	0	0	0	0	0
Village of Clinton*	57,002	0	0	269	0	0	269
Village of L'Anse	1,195	0	0	0	0	0	0
Village of Paw Paw	4,177	0	0	2,505	0	0	2,505
Wyandotte Dept of Municipal Service	29,216	0	0	466,467	1,228,429	0	1,694,896
Zeeland Board of Public Works	11,011	0	0	11,332	1,635,626	0	1,646,958
	759,277	0	62,136	25,270,939	20,960,116	13,465,609	59,696,664
Combined Annual Report*							
Alternative Electric Suppliers (AES):							
Calpine Energy Solutions, LLC f/k/a Noble Americas Energy Solutions LLC							
CMS ERM Michigan LLC							
Constellation Energy Services, Inc (formally Integrys)							
Constellation NewEnergy Inc							
Direct Energy Business LLC							
Eligo Energy MI, LLC							
FirstEnergy Solutions Corp							
Just Energy Solutions Inc. (Formerly Commerce)							
MidAmerican Energy Services							
Spartan Renewable Energy Inc							
UP Power Marketing LLC							
Wolverine Power Marketing Cooperative Inc							
	940,540	1,200	405,023	2,007,256	766,500	600,000	3,373,756
*Totals:	12,291,333	1,200	623,248	509,122,465	89,107,452	222,193,798	820,423,715

Michigan Retail Sales (MWh): 103,362,287

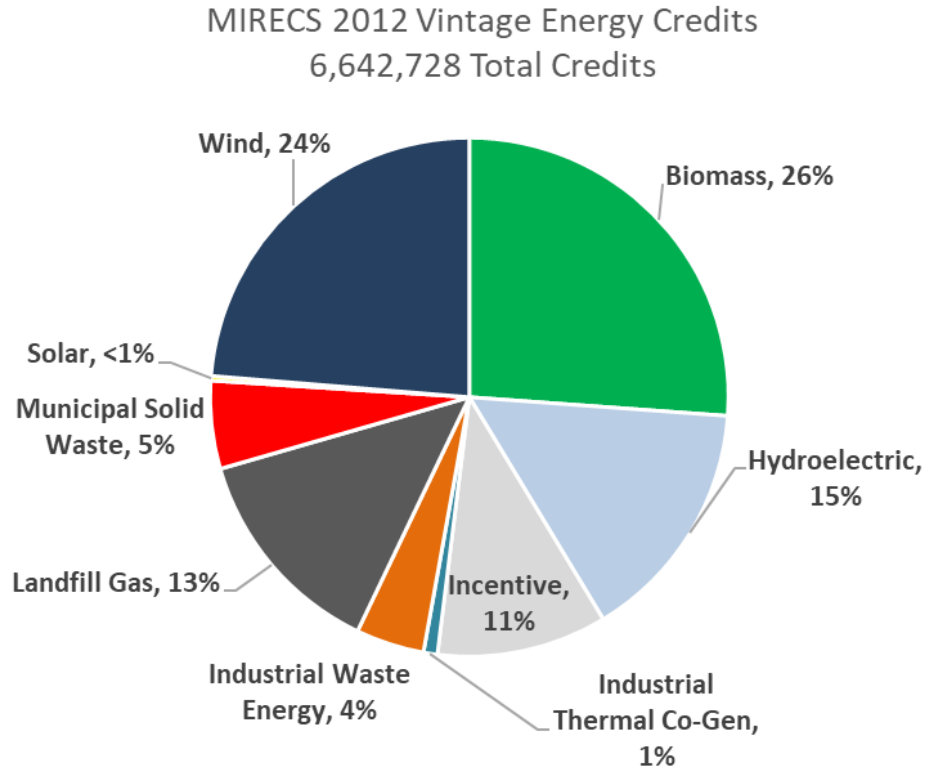
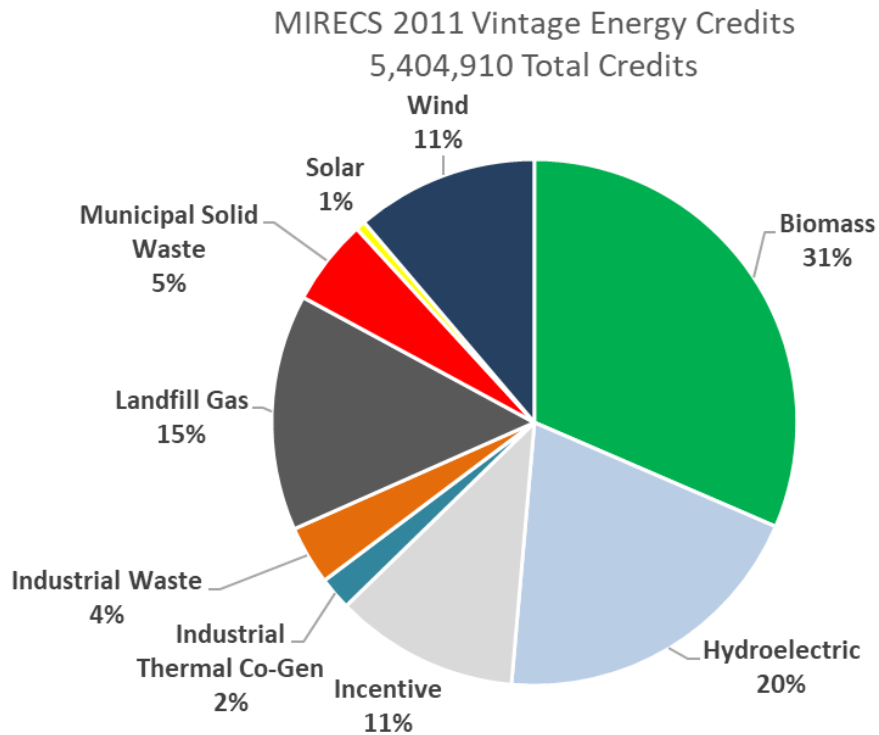
(Based on 2014 Retail Sales Total)

Michigan Estimated Renewable Energy %: 11.3%

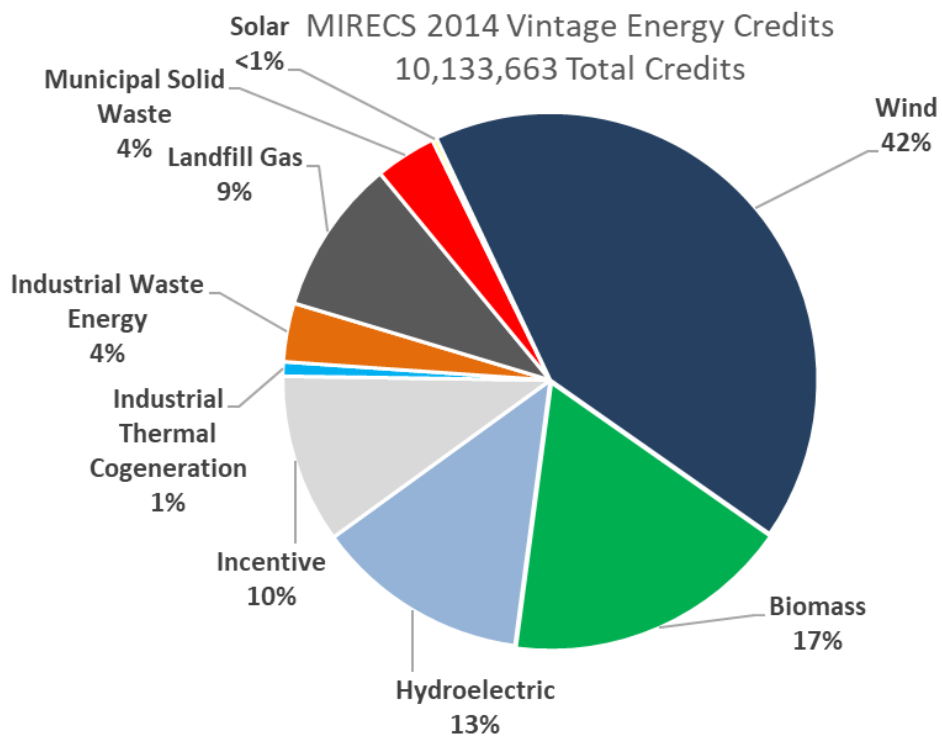
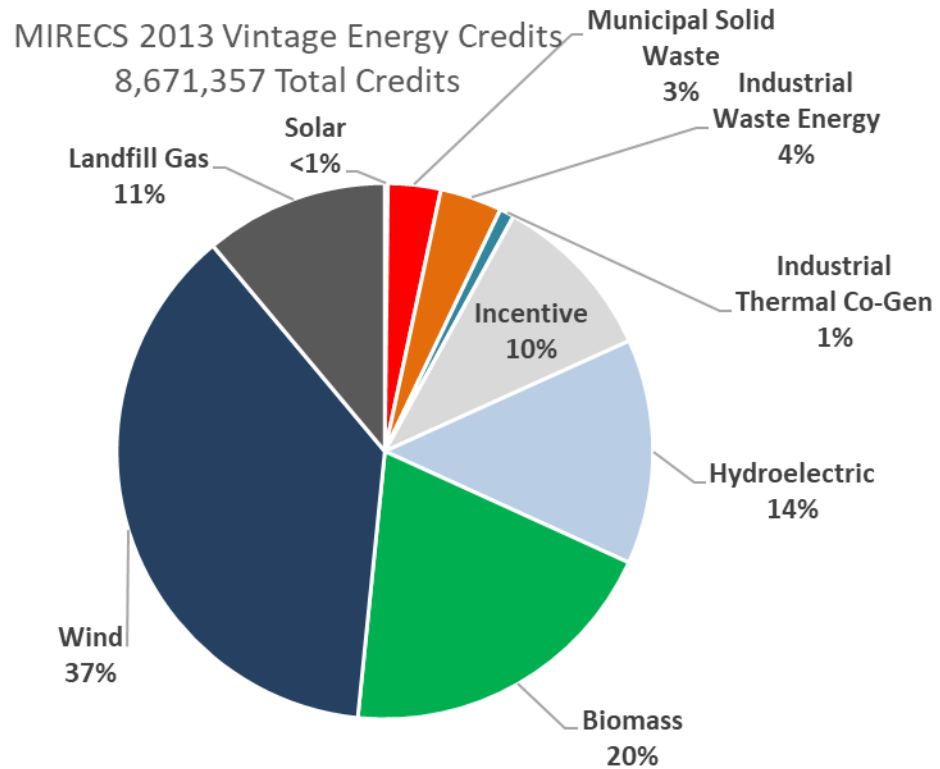
Appendix D – MIRECS Energy Credit Summary



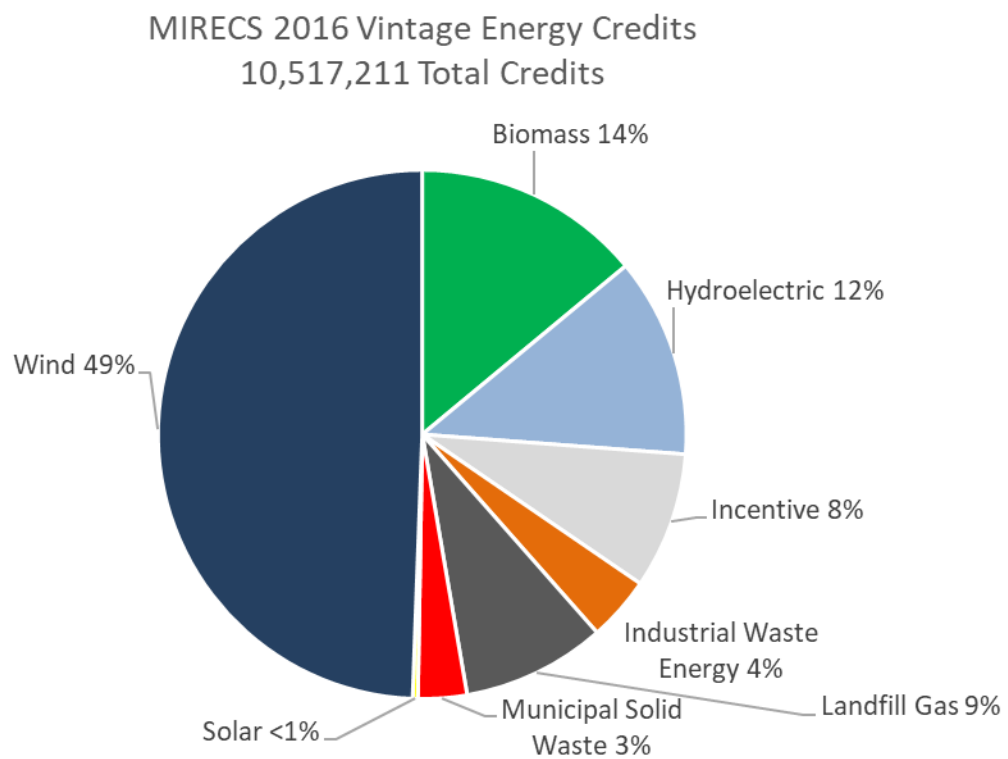
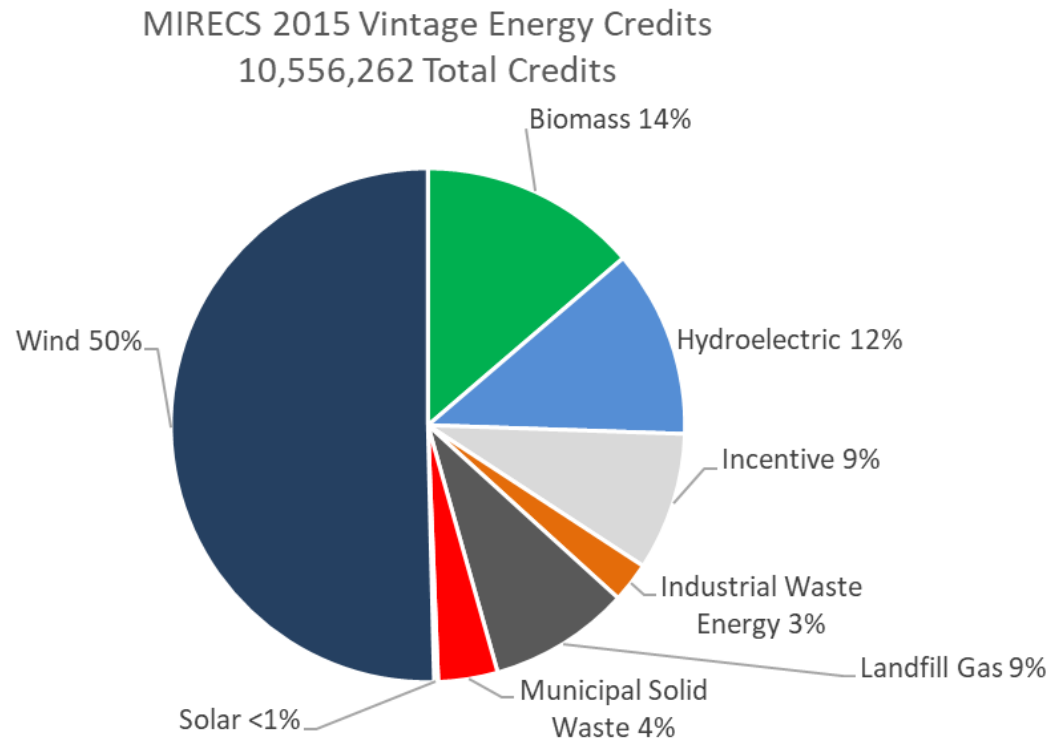
Appendix D – MIRECS Energy Credit Summary



Appendix D – MIRECS Energy Credit Summary

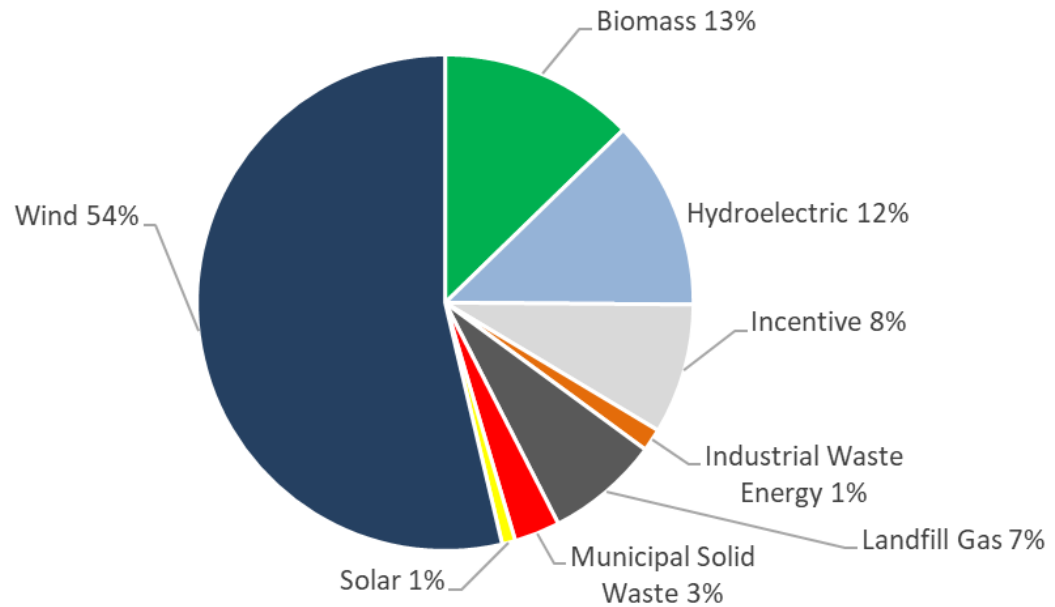


Appendix D – MIRECS Energy Credit Summary

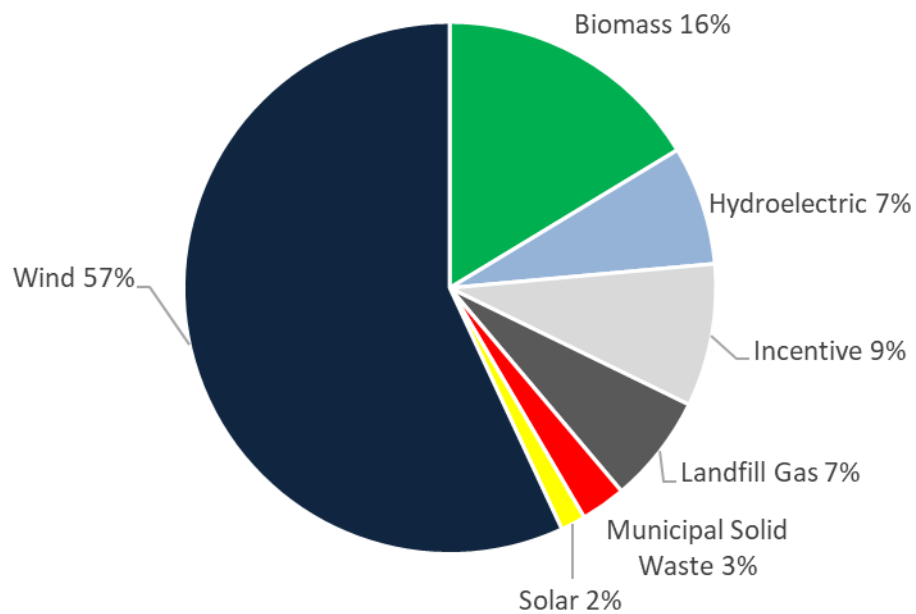


Appendix D – MIRECS Energy Credit Summary

MIRECS 2017 Vintage Energy Credits
11,004,994 Total Credits



MIRECS 2018 Vintage Energy Credits
7,123,549* Total Credits



*Not all data has been reported for 2018

Appendix E- Contract Summary

Consumers Energy : Contracts							
Seller	Quantity	Cost*	Term	Renewable Energy Type	Request for Proposal	Commission Approval	Commercial Operation Date
Trade Wind Energy	150 MW	\$46/MWh	Company Owned "Gratiot Farms"	Wind	7/1/2017		12/1/2020
General Electric White Construction, Inc.	75.9 MW	\$46/MWh	Company Owned "Cross Winds III"	Wind	12/1/2016	3/10/2017	12/31/2019
General Electric Company	44 MW	\$45/MWh	Company Owned "Cross Winds II"	Wind	10/2/2012	12/20/2016	12/31/2017
Suniva, Inc.	Solar Modules up to 10 MW	\$160.00/MWh	Company Owned "Solar Gardens"	Solar	7/31/2015	3/29/2016	Starting with 4/18/2016
SMA Solar Technology America, LLC	String Inverters				8/7/2015		
J. Ranck Electric, Inc.	Electrical Installation				8/24/2015		
Mounting Systems Inc.	Panel Racking				8/7/2015		
Experimental Advanced Renewable Program Phases 26-35	2,161.5 kW	\$0.199-\$0.243	Up to 15 years	Solar	Unsolicited	2/11/2016	Varies
Geronimo Huron Wind, LLC (Apple Blossom)	100 MW	Less than \$45	Up to 15 years	Wind	Unsolicited	11/19/2015	2017
Experimental Advanced Renewable Program Anaerobic Digester	2.6 MW	\$86/MWh or \$76.39/MWh-106.39/MWh	20 years	Anaerobic	Unsolicited	4/23/2015	Varies
Experimental Advanced Renewable Program Phases 16-21	1425.1 kW	\$0.199-\$0.243	Up to 15 Years	Solar	Unsolicited	4/23/2015	Varies
Experimental Advanced Renewable Program Phases 10-15	1193.7 kW	Non-Residential \$0.199-0.209 Residential \$0.243-0.249	Up to 15 Years	Solar	Unsolicited	5/2/2014	Varies
Barton Malow Company General Electric Company	Construction 62 1.7-100 1.7 MW	\$59.00/MWh	Company Owned "Cross Winds"	Wind	4/25/2013	9/10/2013	12/31/2014
ABB Transformers	2- 34.5KV to 345KV transformers				10/2/2012	6/28/2013	
Blissfield Wind (Beebe Wind)	Unchanged				2/27/2013	9/10/2013	
Heritage Garden Wind Farm I	20 MW	Unchanged	20 Years	Wind	Amendment	1/26/2012	12/31/2012
Heritage Stoney Corners Wind Farm II	Unchanged	Unchanged	20 Years	Wind	Amendment	1/26/2012	1/1/2012
Heritage Stoney Corners Wind Farm I (Phase 3)	8.35 MW	\$106.20 MWh	20 Years	Wind	Result of Amendments	1/26/2012	1/1/2012
Experimental Advanced Renewable Program	987.7 KW	Commercial \$0.375/KWh Residential \$0.525/KWh	12 Years	Solar	Unsolicited	5/10/2011	Varies
Vestas-American Wind Technology White Construction, Inc. U-15805 edocket files # 251-256	56 V100 1.8 MW Turbines Installation and construction	\$110.00/MWh	Company Owned "Lake Winds"	Wind	1/15/2010	12/2/2010	12/31/2012
GE Prolec Transformers, Inc.	2-125 KV transformers				7/23/2010		
Heritage Garden Wind Farm I	28.6 MW				7/27/2009		
Heritage Stoney Corners Wind Farm II	12.3 MW	\$106.20 MWh	20 Years	Wind	Unsolicited	11/19/2010	1/1/2012
		\$98.50 MWh	20 Years	Wind	Unsolicited	11/19/2010	1/1/2012

Appendix E- Contract Summary

[illegible]

Appendix E- Contract Summary

DTE Electric Company : Contracts							
Seller	Quantity	Cost*	Term	Renewable Energy Type	Request for Proposal	Commission Approval	Commercial Operation Date
Polaris Wind Park	168 MW	\$47.18***	Company Owned "Polaris "	Wind	6/19/2017	4/12/2018	2/28/2020
Pine River Wind Energy, LLC	161.3 MW	\$59.67***	Company Owned "Pine River"	Wind	5/20/2016	12/20/2016	12/31/2018
Innovatus (DTE Solar)	Up to 50 MW	\$113.52/MWh***	Company Owned	Solar	6/24/2015	12/11/2015	10/31/2016
General Electric Company	1.7MW-100 model turbines up to 50 MW	\$47/MIWh - \$53/MWh	Company Owned "Pinnebog Wind"	Wind	2/17/2014	12/11/2014	12/31/2015
Aristeo Construction Company	Installation and construction				6/20/2014		
Rudolf Libbe, Inc	750 kW	\$3,741/kW	Company Owned	Solar	9/28/2012	7/8/2014	Apr-15
Inovateus Solar, LLC. (SolarCurrents)	504 kW						
Big Turtle Wind Farm, LLC	20 MW	\$53/MWh	20 Years	Wind	Unsolicited	9/24/2013	Expected 2014
Pheasant Run Wind, LLC	74.8 MW	Up to \$49.25/MWh	20 Years	Wind	Unsolicited	5/17/2013	12/31/2014
Pheasant Run Wind II, LLC	74.8 MW	Up to \$49.25/MWh	Company Owned "Brookfield"	Wind	Unsolicited	5/17/2013	12/31/2014
SolarCurrents Phase II	0.5 MW Non-Residential	\$0.13/W \$0.02/kWh	Through 8/31/2029	Solar	Unsolicited	11/16/2012	Varies
	1.5 MW Residential	\$0.20/W \$0.03/kWh					
Tuscola Wind II, LLC	100 MW	\$49.25/MWh***	20 Years	Wind	5/3/2012	10/31/2012	12/31/2013
General Electric Company	1.6MW-100 model turbines up to 110 MW	\$52.50/MWh	Company Owned "Echo Wind"	Wind	10/12/2011	9/11/2012	12/31/2013
Barton Malow Company	Installation and construction				4/17/2012		
Michigan Waste Energy, Inc.	Up to 65,000 RECs/Year	\$7.00/REC	13 Years	Incinerator	Unsolicited	12/6/2011	1991
Nova Consultants, Inc.	Solar EPC	Up to \$48 Million	Company Owned	Solar	2/28/2011	11/10/2011	12/31/2015
McNaughton-McKay Electric Company	Supply up to 12 MW of Modules	Up to \$24 Million			3/24/2011		
Inovateus Solar, LLC (SolarCurrents)	Supply up to 12MW						
General Electric Company	Up to 69 1.6MW-100 Turbines	\$61-\$64/MWh	Company Owned "Thumb Wind" McKinley, Minden, Sigel	Wind	3/9/2011	9/13/2011	12/31/2012
Barton Malow Company	Installation and construction				5/6/2011		
Tuscola Bay Wind, LLC	120 MW	Up to \$60.90/MWh	20 Years	Wind	11/18/2010	8/25/2011	10/31/2012
L'Anse Warden Electric Company	110,374 RECs	\$11.98 (Average of 4 REC/ACEC Contracts)	Amendment Acquiring Vintage RECs	Biomass	8/18/2009	8/25/2011	7/1/2010
Gratiot County Wind	12.8 MW additional	Unchanged from original contract	Company Owned	Wind	Amendment	5/10/2011	12/31/2012
Nova Consultants (SolarCurrents)	Unchanged from original contract	Unchanged from original contract	Company Owned	Solar	Extension	12/21/2010	12/31/2011
Blue Water Renewables - Smiths Creek Landfill	3.2 MW	\$99.00/MWh	20 Years	Landfill	Unsolicited	1/20/2011	12/31/2011
Gratiot County Wind	110.4 MW	\$91.43/MWh	20 Years	Wind	8/18/2009	9/14/2010	5/1/2012
	89.6 MW Company Owned	Up to \$94.43/MWh	Company Owned				3/31/2012

Appendix E- Contract Summary

DTE Electric Company : Contracts							
Seller	Quantity	Cost*	Term	Renewable Energy Type	Request for Proposal	Commission Approval	Commercial Operation Date
WM Renewable Energy - Eagle Valley Landfill	3.2 MW	Combined average price of \$98.94/MWh	20 years	Landfill	8/18/2009	8/10/2010	6/1/2011
L'Anse Warden Electric Company	17 MW		20 years	Biomass	8/18/2009	8/10/2010	7/1/2010
Boyce Hydro**	Firm 210,000 RECs w/additional 112,000 RECs dependent on generation	\$7.75/ REC	7 Years	Hydro	12/23/2009	4/27/2010	3/16/2010
Nova Consultants (SolarCurrents)	Up to 3 MW	Up to \$18 Million	Company Owned	Solar	11/23/2009	3/2/2010	12/31/2010
Heritage Sustainable Energy Stoney Corners Wind Farm	12.2 MW	Unchanged from original contract	20 Years	Wind	Unsolicited	12/1/2009	1/1/2011
UPPCO**	Firm 500,000 RECs	Combined average price of \$12.46/REC	7 Years	Hydro	12/23/2009	12/1/2009	10/1/2009
Sterling Planet**	Firm 2,500,000 RECs		10 Years	MISC	12/23/2009	12/1/2009	10/1/2009
Heritage Sustainable Energy Stoney Corners Wind Farm	14 MW	\$116.00/MWh	20 Years	Wind	Unsolicited	4/30/2009	12/21/2009
Totals: 1320 MW							
* Per MWh prices represent levelized costs.							
** Pre-existing projects prior to 2008 PA 295 - The commercial operation date would refer to the effective date of the contract.							
***Staff calculated levelized cost							

Appendix E- Contract Summary

Alpena Power Company : Contracts							
Seller	Quantity	Cost	Term	Renewable Energy Type	Request for Proposal	Commission Approval	Commercial Operation Date
Consumers Energy	"Bulk of RECs needed to meet the RPS"	Consumers Energy Company's Average Cost of RECs	20 Years	MISC	Unsolicited	9/15/2009	8/4/2009
AEP/Indiana Michigan : Contracts							
Seller	Quantity	Cost	Term	Renewable Energy Type	Request for Proposal	Commission Approval	Commercial Operation Date
Fowler Ridge Wind Farm II	50 MW (7.5MW for MI)	Redacted	20 Years	Wind	Unsolicited	9/15/2009	2/15/2010
Wildcat I Wind Farm, LLC	100 MW (60MW for MI)	Redacted	20 years	Wind	Competitive Solicitation	8/25/2011	12/31/2012
Wisconsin Electric Power Company (Upper Michigan Energy Resources Corporation) : Contracts							
Seller	Quantity	Cost	Term	Renewable Energy Type	Request for Proposal	Commission Approval	Commercial Operation Date
Cadillac Renewable Energy, LLC	REC-Only Redacted	Redacted	Redacted	Biomass	Competitive Solicitation	1/23/2014	Redacted

Appendix F - Requests for Proposal (RFP) Summary

Consumers Energy : Request for Proposals/Requests for Information/Pre-Qualifications					
Issue Date	Type	Description	Requested Capacity	Company Owned	Applicable Technology*
6/8/2018	RFP	Requested Proposals for a Power Purchase Agreement or the Installation of a Utility Owned Solar Farm	100 MW	Optional	Solar
6/8/2018	RFP	Requested Proposals for the installation of a Utility Owned Wind Farm	400 MW	Yes	Wind
6/5/2017	RFP	Requested Proposals for the Installation of a Utility Owned Solar Farm (Energy Storage Optional)	100 MW	Yes	Solar
6/5/2017	RFP	Requested Proposals for the Installation of a Utility Owned Wind Farm (Energy Storage Optional)	100 to 450 MW	Yes	Wind
6/3/2016	RFP	Requested Proposals for the Installation of a Utility Owned Solar Farm	50 MW	Yes	Solar
6/3/2016	RFP	Requested Proposals for the Installation of a Utility Owned Wind Farm	50 to 200 MW	Yes	Wind
12/1/2016	RFP	Requested bids for the Installation of a Utility Owned Wind Farm (Cross Winds II and III)	Up to 150 MW	Yes	Wind
10/2/2012	RFP	Request for Qualifications for 150 MWs of Utility Owned Wind Turbines	Up to 150 MW	Yes	Wind
8/7/2015	RFP	Request for Proposal for Solar String Inverters	Up to 10 MW	Yes	Solar
7/31/2015	RFP	Request for Proposal for Solar Modules			
8/7/2015	RFP	Request for Proposal for Solar Park Racking			
8/24/2015	RFP	Request for Proposal for Solar Park Construction			
	RFQ	Request for Qualifications for Solar Park Construction			
4/25/2013	RFP	Requested bids for the Installation of a Utility Owned Wind Farm (Cross Winds)	105 MW by	Yes	Wind
2/27/2013	RFP	Requested Substation Transformer Bids for Utility Owned Wind Farm (Cross Winds)			
10/2/2012	RFP	Requested bids for Utility Owned Wind Turbines (Cross Winds)			
May-12	RFQ	Request for Qualifications for 105 MWs of Utility Owned Wind Turbines	N/A	Yes	Wind
7/23/2010	RFP	Requested bids for the Installation of a Utility Owned Wind Farm	100 MW by 2012	Yes	Wind
1/15/2010	RFP	Requested bids for Utility Owned Wind Turbines			
7/27/2009	RFP	Requested Substation Transformer Bids for Utility Owned Wind Farm			
2/19/2010	RFQ	Request for Qualifications for the Installation of a 100 MW Utility Owned Wind Farm	N/A	Yes	Wind
7/14/2010	RFQ	Request for Qualifications for 100 MWs of Utility Owned Wind Turbines	N/A	Yes	Wind
5/7/2009	RFP	Requested CEREC**	100 MW by 2012 / 150 MW by 2014	No	All
1/29/2009	RFP	Requested CEREC**	17.4 MW	No	All

* All=Any Renewable Energy Resource defined by 2008 PA 295; REC=Renewable Energy Credit; ACEC=Advanced Cleaner Energy Credit

** CEREC=Capacity, Energy, and Renewable Energy Attributes

Appendix F - Requests for Proposal (RFP) Summary

DTE Electric Company : Request for Proposals/Requests for Information/Pre-Qualifications					
Issue Date	Type	Description	Requested Capacity	Company Owned	Applicable Technology*
5/29/2018	RFP	Build Transfer of Wind Energy Assets Within the State of Michigan	300 MW	Yes	Wind
8/21/2018	RFP	Parking Structure Rooftop Solar + Storage EPC	1.4 MW	Yes	Solar + Storage
6/19/2017	RFP	Build Transfer of Wind Energy Assets Within the State of Michigan	150 MW	Yes	Wind
5/20/2016	RFP	Wind Ownership Option	Up to 150	Yes	Solar
6/20/2015	RFP	Up to 50 MW Solar Engineering Procurement and Construction	50 MW	Yes	Solar
6/20/2014	RFP	Requested bids for the Installation of a Utility Owned Wind Farm	100 MW by 12/31/2015	Yes	Wind
2/17/2014	RFP	Up to 100 MW of Utility Owned Wind Turbines (Pinnebog)			
2/6/2013	RFP	Phase II Solar Engineering Procurement and Construction			
9/28/2012	RFP	Phase I Solar Engineering Procurement and Construction	1.25 MW	Yes	Solar
5/3/2012	RFP	100 MW of Wind	100 MW by 12/31/2013	No	Wind
4/17/2012	RFP	EPC (Echo)	NA	Yes	Wind
12/7/2011	Auction	Requested RECs* Without the Associated Energy	2009 and 2010 Vintage	No	All
10/12/2011	RFP	110 MW of Utility Owned Wind Turbines (Echo)	110 MW by 12/31/2013	Yes	Wind
5/6/2011	RFP	EPC (Thumb)	N/A	Yes	Wind
3/24/2011	RFP	Solar Panels	12 MW	Yes	Solar
3/10/2011	RFP	Wind Ownership Option	50 MW by 12/31/2014	Yes	All
3/9/2011	RFP	109 MW of Utility Owned Wind Turbines (Thumb)	109 MW by 12/31/2012	Yes	Wind
2/28/2011	RFP	Requested bids for the Installation of Utility Owned Solar	N/A	Yes	Solar
2/10/2011	RFP	O&M Services	N/A	Yes	Wind
11/18/2010	RFP	Requested CEREC**	245 MW by 12/31/2014	No	All
7/26/2010	Pre-Q	Pre-qualification for 100-200 MW of Utility Owned Wind Turbines	N/A	Yes	Wind
3/29/2010	SOI	Solicitation of Interest to Host Utility Owned Solar at the Customers Location	N/A	Yes	Solar
11/23/2009	RFP	Requested bids for the Installation of Utility Owned Solar	3 MW	Yes	Solar
10/23/2009	Pre-Q	Pre-Qualification for the Installation of 3 MW of Utility Owned Solar	N/A	Yes	Solar
8/18/2009	RFP	Joint Development for Utility Owned Wind	75 MW by 12/31/2011	Yes	Wind
8/18/2009	RFP	Requested CEREC**	106 MW by 12/31/2011	No	All
5/22/2009	RFI	Request for Information for the Joint Development of Wind Farms	N/A	Yes	Wind
12/23/2008	RFP	Requested RECs* and ACECs* Without the Associated Energy	250,000 RECs*/Year	No	All

* All=Any Renewable Energy Resource defined by 2008 PA 295; REC=Renewable Energy Credit; ACEC=Advanced Cleaner Energy Credit

** CEREC=Capacity, Energy, and Renewable Energy Attributes

Michigan Utility Scale Wind Farms*

* Prepared by MPSC Staff and includes all wind farms operational, planned or under contract with an MPSC-rate-regulated electric provider. Additional wind farms are included as MPSC Staff becomes aware of the project.

Appendix G- Michigan Utility Scale Wind Farms

- 22 Apple Blossom, 100 MW
 - 1 Beebe Wind, 81 MW
 - 20 Beebe 1B, 50.4 MW
 - 21 Big Turtle, 20 MW
 - 23 Big Turtle II, 30 MW
 - 19 Brookfield, 74.8 MW
 - 16 Crosswinds, 111 MW
 - 16 Crosswinds II, 44 MW
 - 16 Crosswinds III, 76 MW
 - 24 Deerfield Wind, 150 MW
 - 2 Echo Wind, 112 MW
 - 3 Garden Wind Farm, 28 MW
 - 4 Gratiot County Wind, 212.8 MW
 - 28 Gratiot Farms, 150 MW
 - 5 Harvest I Wind, 52.8 MW
 - 6 Harvest II Wind, 59.4 MW
 - 7 Lake Winds Energy Park, 100.8 MW
 - 8 Mackinaw City, 1.8 MW
 - 9 McKinley, 14.4 MW
 - 10 Michigan Wind I, 69 MW
 - 11 Michigan Wind II, 90 MW
 - 12 Minden, 32 MW
 - 18 Pheasant Run Wind, 74.8 MW
 - 26 Pine River Wind, 161.3 MW
 - 25 Pinnebog, 51
 - 27 Polaris Wind, 168 MW
 - 15 Sigel, 64 MW
 - 14 Stoney Corners, 81 MW
 - 13 Tuscola Bay Wind, 120 MW
 - 17 Tuscola Bay Wind II, 100.3 MW
- 1925.3 MW Total Operational

- Currently Operational
- Under Development

