



Michigan Farm Energy Program: Sustainability Roadmap

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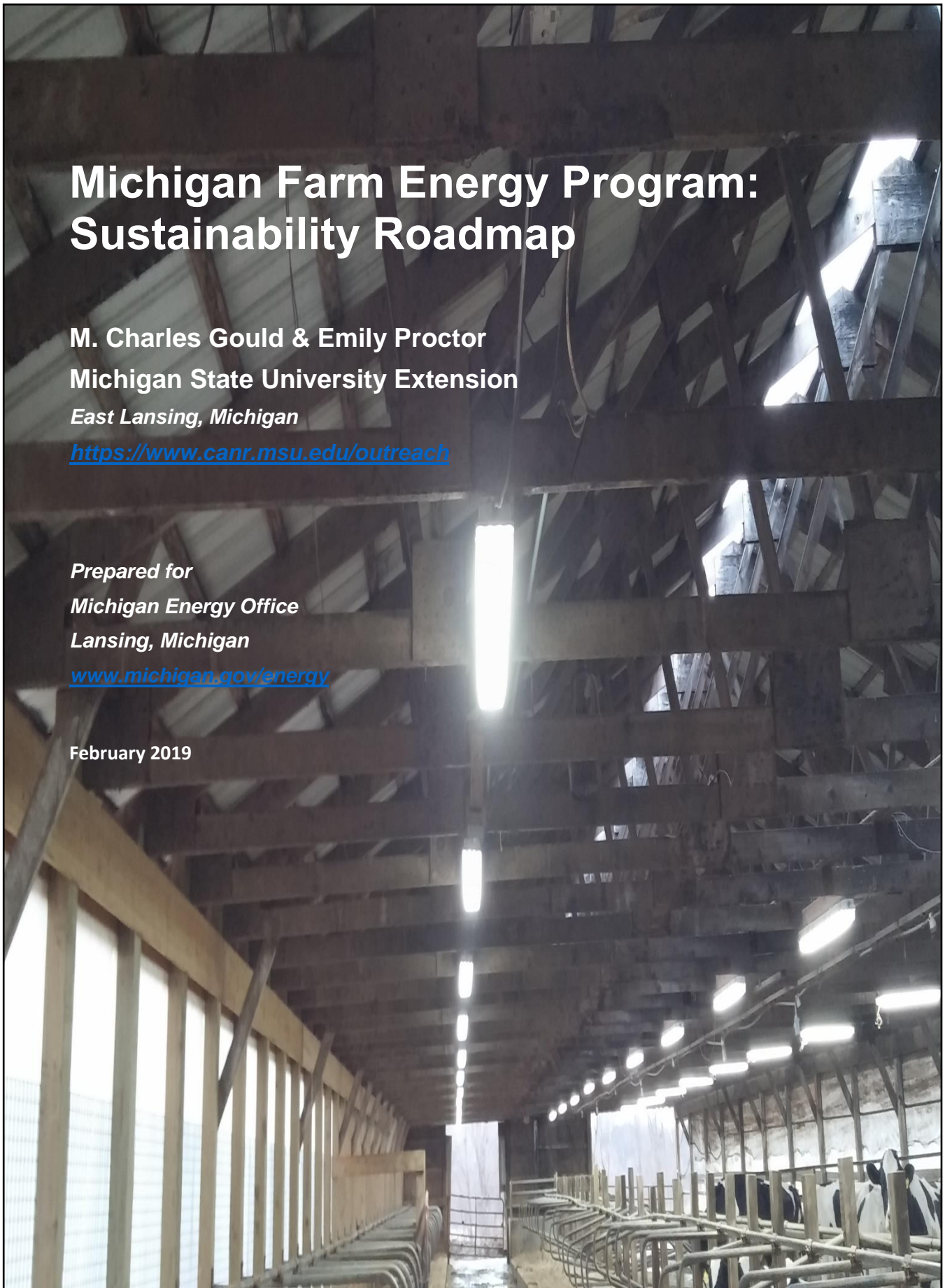
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Cover photo: Long day lighting project in free stall barn at Wing Acres Dairy, Eaton County, Michigan. (Courtesy Aluel S. Go)

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**Michigan Farm Energy Program: Sustainability Roadmap****Executive Summary**

The purpose of the Michigan Farm Energy Program (MFEP) is to assist farms and rural small businesses in reducing their energy use while maintaining or improving overall productivity, profitability, safety, and operator comfort, and to maintain the technical excellence and acceptance of its energy audits and expertise. Most financial support for the MFEP comes from the Michigan Energy Office and grants from the U.S. Department of Agriculture Rural Development [Rural Energy for America Program](#) (REAP). It is in the best interests of the MFEP to develop a strategy to become financially self-sufficient and in control of its future. A companion report, titled *Michigan Farm Energy Program: Gaps, Issues, and Opportunities*, laid the foundation for the recommendations and action items for creating a sustainable MFEP that are presented in this report. The recommendations follow:

- Increase personnel support for the MFEP.
- Increase funding support for the MFEP.
- Aggressively market the MFEP to agriculture, rural businesses, and food industry facilities.
- Redefine the purpose and scope of an energy audit.
- Increase the frequency and scope of auditor training.
- Improve auditor compensation.
- Increase partner involvement in the MFEP.
- Increase the number of energy measures and renewable energy projects financed by lending institutions.

Forty action items were distilled from the *Michigan Farm Energy Program: Gaps, Issues and Opportunities* paper and other information sources. Each action item is aligned with one of the recommendations. The result is a detailed roadmap for creating a sustainable MFEP.



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Table of Abbreviations

ACEEE American Council for an Energy-Efficient Economy

AgP2 Program Agricultural Pollution Prevention Program

ANSI American National Standards Institute

ASABE American Society of Agricultural and Biological Engineers

DESEU Delaware Sustainable Energy Utility

DSIRE Database of State Incentives for Renewables & Efficiency

EOP Energy Optimization Program

EPA [U.S.] Environmental Protection Agency

EQIP Environmental Quality Incentives Program

FDA [U.S.] Food and Drug Administration

kWh kilowatt hour

MAEAP Michigan Agriculture Environmental Assurance Program

MAEC Michigan Agricultural Electric Council

MDARD Michigan Department of Agriculture and Rural Development

MEA Maryland Energy Administration

MEO Michigan Energy Office

MFEP Michigan Farm Energy Program

MMPA Michigan Milk Producers Association

MPSC Michigan Public Service Commission

MSU Michigan State University

NCR-SARE North Central Region Sustainable Agriculture Research and Education Program

NRCS Natural Resources Conservation Service

NYSERDA New York State Energy Research and Development Authority

REAP Rural Energy for America Program

USDA U.S. Department of Agriculture



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Problem Statement

The bulk of the financial support for the Michigan Farm Energy Program, or MFEP, comes from the Michigan Energy Office (MEO) and grants from the USDA Rural Development Rural Energy for America Program, or REAP. These funding sources may not be available in the future, so it is in the best interests of the MFEP to develop a plan for becoming financially self-sufficient. A companion report to this one, called *Michigan Farm Energy Program: Gaps, Issues, and Opportunities*, and a previously unpublished paper called *Michigan Agricultural Energy Efficiency Needs* (visit <http://bioenergy.msu.edu/> for the full report), contain significant insights into developing such a plan. The authors of this report have used these insights to inform and guide the recommended next steps for developing a sustainable MFEP.

Description of the Michigan Farm Energy Program

Purposes of the Michigan Farm Energy Program

In 2006, the Michigan Department of Environmental Quality Agricultural Pollution Prevention Program (AgP2 Program) spearheaded an agricultural energy needs identification process with Michigan agricultural leaders. That effort resulted in the creation of the AgriEnergy Alliance, whose initial purpose was to provide guidance on energy efficiency to policy makers and farmers. The AgriEnergy Alliance recommended that the AgP2 Program fund Michigan State University to develop a farm energy audit program. This program ultimately came to be called the Michigan Farm Energy Program, or MFEP. The purpose of the MFEP is to:

- Assist farms and rural small businesses in reducing their energy use, while maintaining or improving overall productivity, profitability, safety, and operator comfort.
- Maintain the technical excellence and acceptance of its energy audits and expertise.

These purposes are accomplished in the following ways:

1. Conducting certified ASABE (American Society of Agricultural and Biological Engineers) / ANSI (American National Standards Institute) S612 standards for type 2 energy audits and renewable energy assessments by trained certified auditors.
2. Providing training for new auditors, ongoing technical support and updates for certified auditors, and certificate administration.
3. Disseminating research-based, unbiased educational materials and programs to farmers, small rural businesses, commodity groups, agricultural associations, and government agencies.
4. Providing technical support and expertise for outreach and Extension.
5. Hosting on-farm demonstrations of energy efficient and renewable energy measures.
6. Developing energy policy and programs affecting the food and agricultural sectors.
7. Conducting applied energy efficiency research, innovative applications, and testing.
8. Establishing technical recognition and academic excellence in the area of farm energy efficiency.
9. Grant and research project development, processing, management, and reporting.



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Structure & Funding

The MFEP manager coordinates all energy auditor training, auditor certification, farm energy technology demonstrations, grant writing, program and projects management, reporting, technical assistance, academics and research, and works with state and federal agencies on agricultural energy-related program and policy issues. The MFEP manager also collaborates with MSU Extension educators to provide Michigan farmers and rural small businesses with energy efficiency and renewable energy information. The MFEP manager's expertise is frequently solicited to assist in developing state energy policy. Other than the MFEP manager and an occasional student funded by grant projects, no other people are employed by the MFEP. The manager is designated a faculty member and visiting specialist in the Department of Biosystems and Agricultural Engineering at MSU, and is subject to the requirements and evaluation standards of MSU tenure-track faculty as a nonvoting and nonrecurring appointment. This requires the manager to establish technical recognition and academic and research excellence in the position area of expertise, academic class development and participation, and to meet publication expectations. The position also has an energy specialist designation with MSU Extension and is required to meet requirements and commitments established by MSU Extension.

The Michigan Agricultural Electric Council (MAEC) agreed to allow its operational manager to continue the responsibilities of the MFEP manager with the understanding that funding for the MFEP manager position and all MFEP activities would be generated by grants or other funding sources. No MAEC or MSU funds were initially provided or committed for the establishment of the MFEP manager position and its activities. Office space already allocated to the MAEC and support resources were made available as part of the MAEC operational manager position.

From the 2009 program kickoff through 2017 no funding was allocated, other than from grants, for the MFEP manager position. The program manager is solely responsible for developing and attaining grants to sustain the MFEP and the position. Though there is no required obligation for the MAEC to fund the MFEP manager position and activities, it has provided support to augment grant funding shortfalls through the years. The MAEC has also benefited in years with sufficient grant funds to support MAEC graduate and undergraduate students, as well as activities, as in-kind reimbursement.

Currently, the MFEP manager is funded part time, with 0.25 FTE funded by MSU through MSU Extension, 0.25 FTE from grants to serve as principal or co-principal investigator of those projects, and the other half of the position (0.50 FTE) funded by MAEC as the operational manager of MAEC.

Since 2006, the MFEP has been involved in projects totaling \$5.67 million and has received \$2.19 million in grant funding to implement specific project activities. Grants received from funding sources other than the MEO have included a line item for the project management position. MEO grants have included a line item for the MFEP manager's salary and benefits. Funding sources, project amount, grant amounts received, and project years are shown in Table 1. Funding received from federal, state, and other sources are shown in Table 2.



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Table 1. Funding source involvement by the Michigan Farm Energy Program from 2006 to 2018.

Funding Source	Project Amount (\$)	MFEP Amount Received (\$)	Project Year(s)
Penn State University	187,572	16,500	2018
MAEC (annually)	603,000	0	2009-2018
DTE Energy/Engineering Society of Detroit	117,000	117,000	2017
USDA Rural Development REAP ¹ (six separate grants)	600,000	600,000	2010-2013, 2015-2017
Michigan Energy Office (MEO)	749,523	249,500	2016-2019
MEO	180,163	120,000	2014-2015
MEO	430,179	200,000	2014-2015
MEO	151,521	100,000	2013-2014
MEO	60,187	30,000	2013
MEO	160,500	85,500	2013
MEO	365,282	300,000	2010-2012
Herrick Foundation	1,275,515	250,000	2009, 2012
The University of Nebraska	192,000	92,000	2011
MEO	476,000	0	2010
NCR-SARE ²	100,000	7,000	2009
Michigan Department of Environmental Quality AgP2 Program	29,738	24,900	2006-2007
TOTAL	5,678,180	2,192,400	NA

1. USDA Rural Development Rural Energy for America Program, or REAP.

2. North Central Region Sustainable Agriculture Research and Education Program, or NCR-SARE.

Table 2. Federal, state and other funding for the Michigan Farm Energy Program from 2007 to 2018.

Funding Source	Project Amount (\$)	MFEP Amount Received (\$)
Federal ¹	1,079,572	715,500
State ²	2,603,093	1,109,900
Other ³	1,995,515	367,000
TOTAL	5,678,180	2,192,400

1. USDA RD REAP, NCR-SARE, University of Nebraska and Penn State University.

2. Michigan Energy Office and State of Michigan (MDEQ & Agricultural Pollution Prevention Program).

3. Herrick Foundation, MAEC, and DTE Energy/Engineering Society of Detroit.



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Options for a Sustainable Michigan Farm Energy Program

Michigan Farm Energy Program: Gaps, Issues & Opportunities Report

Thirteen people with intimate knowledge of the MFEP were interviewed in 2018 to determine gaps, issues, and opportunities with the MFEP. Their input was augmented with comments from phone interviews held in 2014 and 2018 with 79 farmers and small business owners who had completed type 2 audits. Their collective input was reported in *Michigan Farm Energy Program: Gaps, Issues and Opportunities*. Eight broad recommendations for making the MFEP sustainable were distilled from that paper:

- Increase personnel support for the MFEP.
- Increase funding support for the MFEP.
- Aggressively market the MFEP to the agriculture industry, rural businesses, and the food industry.
- Redefine the purpose and scope of energy audits.
- Increase the frequency and scope of auditor training.
- Improve auditor compensation.
- Increase partner involvement in the MFEP.
- Increase the number of energy conservation measures and renewable energy projects financed by lending institutions and utilities.

Action items identified in this report accompany these recommendations and are found in Tables 3 to 7.

Michigan Agricultural Energy Efficiency Needs Report

In 2012, MFEP manager Al Go wrote an internal report for administrators in the MSU Department of Biosystems and Agricultural Engineering titled *Michigan Agricultural Energy Efficiency Needs* (visit <http://bioenergy.msu.edu/> for the full report). The report identifies the following six MFEP needs:

- Expand MFEP operations to train an adequate number of certified farm energy auditors, expand funding to cover farm energy audits for 20% of the 55,000 Michigan farms in the next 5 years, provide technical support and continuing education updates for auditors, and conduct field testing in farm energy efficiency and renewable energy.
- Encourage the Energy Optimization Program, or EOP, to allow farms that are grandfathered into the residential or farm classifications of utility rates to participate in the commercial and industrial options of the program. (**Note:** The EOP is managed by the Michigan Public Service Commission, or MPSC, but is implemented by Michigan utility companies.)
- Provide agricultural operations and rural businesses with affordable access to three-phase electrical service. Encourage the expansion of three-phase electrical service by utility companies.
- Provide farm rewiring funding assistance similar to that offered in surrounding states to facilitate the implementation of energy efficiency measures, ensure electrical safety, improve wiring efficiency, and eliminate fire hazards posed by old, often self-installed electrical systems.
- Engage the MAEC in helping to develop, advise, and possibly implement energy efficiency programs for agriculture.
- Invest in creating a Center for Farm Energy and Application that would serve as a state and regional facility offering long-term support to the agriculture, rural business, and food industries.

Agricultural Energy Efficiency Programs in Other States

The authors conducted an extensive web search to identify programs whose mission and scope were similar to those of the MFEP. They are listed in Appendix A. Though some programs were found that offer similar services or are funded from similar sources, none were an exact match in mission and



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scope with the MFEP. Two state programs with unique funding sources and partnership structures that may have implications for a sustainable MFEP are profiled in this section.

The Colorado Agricultural Energy Efficiency Program – This is an example of state and federal governmental agencies working together to deliver a program to reduce agricultural energy consumption. It is a partnership between the Colorado Department of Agriculture, the Colorado Energy Office, the USDA Natural Resources Conservation Service–Colorado, and other partners. Funding for the program comes exclusively from the On-Farm Energy Initiative of the USDA NRCS Environmental Quality Incentives Program, or EQIP. In Michigan, the EQIP On-Farm Energy Initiative is severely underused. For the past several years, no Michigan farmers have applied for funding from this program to pay for costs associated with implementing energy conservation measures.

The Energize Delaware Farm Program – This program was developed by the Delaware Sustainable Energy Utility, or DESEU. It is a unique nonprofit organization offering a one-stop resource through its Energize Delaware initiative to help residents and businesses save money through clean energy and efficiency. DESEU was created in 2007 by the State of Delaware to foster a sustainable energy future for the state. As an independent nonprofit, the program is able to leverage multiple sources of funding to serve Delaware's clean energy needs.

(**Note:** REAP and EQIP On-Farm Energy Initiative are not included in Appendix A because they are funding sources for energy efficiency programs that serve agriculture, not actually agriculture-focused energy efficiency programs offered by states or utility companies.)

Energy Audit Delivery Options in Michigan

Audits Conducted by Agricultural Commodity Groups' Field Staff

The Michigan Milk Producers Association, or MMPA, is a dairy farmer owned cooperative and dairy processor based in Novi, Michigan. Founded in 1916, the MMPA serves over 1,700 members in Michigan, Indiana, Ohio and Wisconsin. The co-op provides a wide range of on-farm services to assist members in producing the highest quality milk possible. The MMPA believes in empowering its producers and their employees by providing training and assistance to improve the producers' milk quality and profitability. The success of MMPA members in having one of the lowest somatic cell count averages in the nation is due in part to these services.

One service the MMPA provides its members is low-cost energy audits. These audits are performed by five field staff members who are certified by the MFEP to perform dairy farm energy audits. From 2010 to 2018, 49 type 2 audits were completed for MMPA members. The estimated savings from the energy efficiency practices recommended by these audits is nearly \$700,000.

The certification process prepares the MMPA field staff members to advise the co-op members they work with about how to reduce energy expenses and where to find rebates, grants, and low-interest loans to pay for energy efficiency projects. Combining that knowledge with their practical experience in the dairy industry enables them to make realistic recommendations on the best use of human and financial resources to lower members' energy costs.

The model used by MMPA to provide low-cost audits to its members could be duplicated by other commodity or producer groups. There are more than 40 commodity or producer groups in the state (see Appendix B for a partial list).

Audits Conducted by Agricultural Commodity Groups' Contractors

Some commodity groups do not employ field staff to work with their members. Such groups could hire or contract with certified auditors to work exclusively with their members at no or reduced cost to the members. (Visit <http://maec.msu.edu/farmenergy/auditors.html> for a list of certified auditors.)



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The MFEP manager could tailor training sessions to meet the needs of specific commodity groups on a fee basis, perhaps augmented by grant funding, financial support from utilities or the EOP (depending on the power provider), or from the savings on energy costs realized by commodity group members as a result of the training.

The Michigan Agricultural Environmental Assurance Program

The [Michigan Agriculture Environmental Assurance Program](#) (MAEAP) is a free, voluntary environmental stewardship recognition program that is administered by the Michigan Department of Agriculture and Rural Development, or MDARD. It is “an innovative, proactive program that helps farms of all sizes and all commodities voluntarily prevent or minimize agricultural pollution risks.”¹

The local conservation district technician and the farmer seeking environmental verification for the farm conduct a walkthrough of the farm to identify potential sources of ground and surface water pollution. They develop a plan from recommended practices the farmer can implement to prevent or reduce ground and surface water contamination. Once the recommended practices are completed, a MAEAP verifier visits the farm to confirm that the work has actually been completed. Verification of installed practices results in the farm being designated as an MAEAP “environmentally verified” farm.

Verification is available in four systems: [cropping](#); [farmstead](#); [forests, wetlands and habitat](#), and [livestock](#). Once a farm is verified in a system, the farmer is eligible for rebates, cost-share incentives, low-cost lending and reduced liability insurance premiums from participating companies, organizations, and associations.

MAEAP verification is free and is a good fit for large and small farms. State law guarantees that everything learned about a farm through the program is confidential.

MAEAP technicians, who cover every county in the state and have agricultural backgrounds, could be trained to conduct MFEP energy audits. The mechanisms that MAEAP and MFEP use to spur farmers to action are similar.

- MAEAP technicians use risk assessments and MFEP energy auditors use energy audits.
- Approved energy audits qualify farmers for financial help to implement the recommended action plans.
- Risk assessments and energy audit reports are confidential.

Recommendations for a Sustainable Michigan Farm Energy Program

The recommendations and action items in Tables 3 to 7 are derived from the options explained in the Options for a Sustainable Michigan Farm Energy Program section of this paper. Developing a plan with short- and long-range goals based on these action items will help ensure a sustainable future for the MFEP.

¹ Michigan Agriculture Environmental Assurance Program. (2019). *Get Verified: Michigan Agriculture Environmental Assurance Program* [web page]. Retrieved from <http://www.maeap.org/>



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Table 3. Recommendations & Action Items for the Michigan Farm Energy Program.

Recommendation	Action Item
Increase personnel support for the Michigan Farm Energy Program, or MFEP.	<ul style="list-style-type: none"> • Secure funding from munis (municipal utilities), electric co-ops and commercial utilities, commodity groups, MSU departments, and MSU Extension for: <ul style="list-style-type: none"> ○ One fulltime MFEP manager. ○ One fulltime MSU Extension specialist position to provide agricultural energy efficiency and renewable energy technical support. ○ Two fulltime MSU Extension educator positions to accomplish specific deliverables that support the mission of the MFEP. • Increase MSU faculty support for energy efficiency and renewable energy.
Increase funding support for the MFEP.	<ul style="list-style-type: none"> • Secure funding at a negotiated level between commodity groups, utilities, and MSU college, department, and Extension administrations to support the overall mission of the MFEP. (Note: This is in addition to funding positions.) • Invest in the establishment of a Center for Agriculture and Rural Business Energy and Application that would serve as a state and regional facility supporting the agriculture, rural business and food industry. Make the MFEP a component of the new center. • Determine the feasibility of an independent nonprofit organization, similar to the Delaware Sustainable Energy Utility, to leverage multiple sources of funding in support of Michigan’s clean energy needs, including the MFEP.
Aggressively market the MFEP to the agriculture industry, rural businesses, and the food industry.	<ul style="list-style-type: none"> • Develop a marketing plan in concert with agricultural lending institutions, agricultural commodity groups, the Michigan Farm Bureau, and the Michigan Agri-Business Association to inform their members about the benefits of energy audits and the resources available to them through the MFEP. • Develop a logo, branding guidelines, and strategies for implementing the marketing plan. • Explore making audit components part of the Michigan Agriculture Environmental Assurance Program (MAEAP) Farm*A*Syst program. • Overhaul the MFEP website and populate it with relevant and timely educational materials for farmers and small businesses. Designate an employee to keep the website current. Provide current state-specific energy efficiency and renewable energy project funding information (on the Database of State Incentives for Renewables and Efficiency website or a similar website).

Table 4. Recommendations & Action Items to Improve Energy Audits.

Recommendation	Action Item
Redefine the purpose and scope of energy audits.	<ul style="list-style-type: none"> • Establish criteria for the type of energy audit required to accomplish the energy efficiency and renewable energy goals of the farm, rural business, or food industry business. • Promote renewable energy projects following implementation of energy efficiency measures. • Explore measuring and reporting water usage as part of an energy audit. • Explore measuring and reporting the impact of greenhouse gas emissions from a farm, rural business, or food industry business in terms of energy use per unit of production (see Appendix C for an example from a Michigan dairy farm). • Develop templates and tools to support various types of energy audits. • Change the job title of people conducting audits from “energy auditor” to “energy advisor.” • Track data on implementation of audit-recommended energy conservation practices.



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Table 5. Recommendations & Action Items for Auditor Training & Compensation.

Recommendation	Action Item
Increase the frequency and scope of auditor training.	<ul style="list-style-type: none"> • Use web conferencing technology to provide timely instruction and updates. • Evaluate all auditor training sessions. • Routinely conduct needs assessments among auditors to identify areas in which they need skill and knowledge boosts.
Improve auditor compensation.	<ul style="list-style-type: none"> • Reduce the amount of time it takes for MSU to pay energy auditors. • Develop an incentive for auditors to encourage follow up visits after completion of an energy audit. • Increase the number of auditors who are approved Natural Resources Conservation Service (NRCS) technical service providers for the EQIP On-Farm Energy Initiative Program.

Table 6. Recommendations & Action Items to Increase Utility Involvement.

Recommendation	Action Item
Increase partner involvement in the MFEP.	<ul style="list-style-type: none"> • Encourage the EOP to give farms grandfathered into the residential or farm utility customer classifications access to the program’s commercial and industrial options. • Provide affordable access to three-phase electrical service for agricultural operations and rural businesses. Encourage the expansion of three-phase electrical service. • Inform farmers about the impact of demand charges on their electricity bills and help them take steps to reduce these charges. Fund a project to assess how peak demand affects agricultural facilities and how farmers can implement energy management plans and production strategies and invest in equipment to minimize costs associated with demand charges. These measures would help foster long-term, positive, and sustainable benefits for their operations. • Help farmers determine whether they have the proper rate classifications. • Identify, target, and replace specific inefficient energy practices and technologies. Offer incentives for their removal to speed up adoption of new energy efficient practices and technologies. • Provide incentives for mini-splits for agricultural labor housing in areas where such housing lies outside of the natural gas service area to reduce energy expenses and improve the lives of agricultural workers and their families. (Mini-splits are energy efficient heating and air conditioning units. For more information on mini-splits visit https://www.energy.gov/energysaver/ductless-mini-split-air-conditioners) • Increase partnering and collaboration opportunities with the agricultural industry, agricultural lending institutions, agricultural regulatory agencies, and MSU. • Increase energy audit incentives. • Encourage utility representatives and auditors to work together for the benefit of the client. • Encourage utilities to adopt and support distributed generation power. • Increase municipal utility, electric co-op, and commercial utility promotion of the MFEP. • Reestablish the AgriEnergy Alliance to act as a MFEP advisory board to include partnership involvement and support. • Increase the number of projects approved by the USDA NRCS EQIP On-Farm Energy Initiative.



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Table 7. Recommendations & Action Items to Increase Project Implementation.

Recommendation	Action Item
Increase the number of energy conservation measures and renewable energy projects financed by lending institutions and utilities.	<ul style="list-style-type: none">• Increase lending institution understanding of:<ul style="list-style-type: none">○ The role energy audits play in funding agricultural energy conservation and renewable energy projects.○ Opportunities to work with the USDA NRCS EQIP On-Farm Energy Initiative and REAP to finance agricultural energy conservation and renewable energy projects.• Encourage utilities to expand on-bill financing and other creative financing options for energy efficiency improvements to include farms and agribusinesses.



Appendices



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APPENDIX A: Agricultural Energy Efficiency Programs

Program Title	Program Description	For More Information
<p>Colorado Agricultural Energy Efficiency Program</p>	<p>Purpose: To remove barriers that prevent producers from investing in energy efficiency by bringing existing resources and partners together and leveraging new funding with a turnkey approach.</p> <p>Program benefits: Program participants receive a free energy audit, a preliminary renewable energy assessment, technical assistance, energy coaching, and support for financing and implementing projects.</p> <p>Partners: The Colorado Department of Agriculture, the Colorado Energy Office, the USDA Natural Resources Conservation Service-Colorado, and others.</p> <p>Funding source: USDA Natural Resources Conservation Service Environmental Quality Incentives Program (EQIP) On-Farm Energy Initiative.</p>	<p>https://www.colorado.gov/pacific/energyoffice/agricultural-energy-efficiency</p> <p>https://www.colorado.gov/pacific/agconservation/acre-participate</p>
<p>Consumers Energy’s Agriculture Energy Efficiency Program (Michigan)</p>	<p>Purpose: To assist agricultural producers to save money and energy and to create a more sustainable future for Michigan.</p> <p>Program benefits: Provides rebates for audits and energy efficiency upgrades. Franklin Energy employees implement the program on the farm level.</p> <p>Partners: MSU Extension and the Michigan Farm Energy Audit Program.</p> <p>Funding source: Customers in the Consumers Energy service area.</p>	<p>https://www.consumersenergy.com/business/energy-efficiency/special-programs/agriculture</p> <p>Note: This program was recognized nationally in 2019 by the American Council for an Energy-Efficient Economy, or ACEEE, as an exemplary energy efficiency program serving agricultural clientele. See their profile on pages 108-109 of The New Leaders of the Pack: ACEEE’s Fourth National Review of Exemplary Energy Efficiency Programs.</p>
<p>Delaware Sustainable Energy Utility (DESEU) Energize Delaware Farm Program</p>	<p>Purpose: To help producers secure loans and grants to use toward the installment of energy efficiency measures on farms.</p> <p>Program benefits: This program provides energy audits, cash incentives for qualifying equipment, support for project installation, low-interest loans, and help accessing additional financial support. It was developed by the Delaware Sustainable Energy Utility (DESEU) and its partner EnSave to help producers secure loans up to \$400,000 and grants up to \$100,000 toward the implementation of energy efficiency measures.</p> <p>Partners: DESEU and EnSave.</p> <p>Funding source: As an independent nonprofit, DESEU is able to leverage multiple sources of funding to serve Delaware’s clean energy needs. Current funding sources include:</p> <ul style="list-style-type: none"> • Tax-exempt bonds and leases • Regional Greenhouse Gas Initiative (https://www.rggi.org/) • Fees and interest on financing • Fees for services 	<p>https://www.energizedelaware.org/energize-delaware-farm-program/</p> <p>https://www.energizedelaware.org/Sustainable-Energy/</p> <p>https://evogov.s3.amazonaws.com/media/50/media/178967.pdf</p> <p>https://www.energizedelaware.org/your-farm</p>
<p>DTE Energy’s Energy</p>	<p>Purpose: Implement energy efficiency measures on farms and</p>	<p>https://webtools.dnvgl.com/proje</p>



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Program Title	Program Description	For More Information
Efficiency Program for Business (Michigan)	<p>agribusinesses.</p> <p>Program benefits: Offers rebates for audits and energy efficiency upgrades.</p> <p>Partners: The Michigan Farm Energy Program.</p> <p>Funding source: Customers in the DTE Energy service area.</p>	<p>https://www.dteenergy.com/Portals/8/Public%20Files/2018%20DTE%20Catalog.pdf?ver=2018-10-05-204828-190</p>
Energy Optimization Program (Michigan)	<p>Purpose: To provide rebates for energy efficiency measures implemented on farms and agribusinesses in electric co-op service areas in Michigan.</p> <p>Program benefits: Provides rebates for audits and energy efficiency upgrades.</p> <p>Partners: Alger Delta Electric Cooperative, City of South Haven, Cloverland Electric Cooperative, Great Lakes Energy Cooperative, HomeWorks Tri-County Electric Cooperative, Marquette Board of Light and Power, Midwest Energy and Communications, Ontonagon County Rural Electric Association, and Presque Isle Electric and Gas Co-op.</p> <p>Funding sources: Customers in the service area of each electric co-op.</p>	<p>https://www.michigan-energy.org/</p>
Entergy Arkansas, Agricultural Energy Solutions	<p>Purpose: To produce long-term, cost-effective electricity savings. The program targets both existing facilities and new construction, and any agricultural customer at a facility receiving electrical service from Entergy Arkansas is eligible.</p> <p>Program benefits: Helps farmers and other agribusinesses make their property more energy efficient by offering farm energy audits, prescriptive and custom incentives, education for suppliers of agricultural equipment, and trade ally oversight, training, and quality control.</p> <p>Partners: Consulting firm ICF, whose account managers, along with lighting supply trade ally networks, promote the program one-on-one. The program supports account managers with print, radio, and digital advertising targeted to the agricultural sector.</p> <p>Funding source: Entergy Arkansas Energy Efficiency Cost Recovery rider.</p>	<p>http://www.energy-arkansas.com/your_business/save_money/EE/agricultural.aspx</p> <p>It should be noted that this program was recognized nationally in 2019 by ACEEE as an exemplary energy efficiency program serving agricultural clientele. See their profile on pages 106-107 of The New Leaders of the Pack: ACEEE's Fourth National Review of Exemplary Energy Efficiency Programs.</p>
Focus on Energy (Wisconsin)	<p>Purpose: Provide incentives for equipment upgrades that deliver real, measurable energy and financial savings for Wisconsin's farms and agribusinesses.</p> <p>Program benefits: Provide incentives to agriculture producers who install energy-saving technology.</p> <p>Partnerships: None.</p> <p>Funding source: Funded by Wisconsin's investor-owned energy utilities, as required under Wisconsin Statute § 196.374(2)(a), and participating municipal and electric cooperative utilities.</p>	<p>https://www.focusonenergy.com/programs/agriculture-and-farms</p>
Great River Energy (Minnesota)	<p>Purpose: Reduce on-farm energy expenses.</p> <p>Program benefits: Qualified agricultural producers receive one-on-one assistance in identifying and prioritizing energy efficiency opportunities that result in energy management plans they can implement.</p>	<p>https://greatriverenergy.com/</p> <p>https://greatriverenergy.com/co-ops-roll-out-new-farm-energy-</p>



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Program Title	Program Description	For More Information
	<p>Partnerships: None.</p> <p>Funding source: A \$100,000 grant from the USDA Rural Development Rural Energy for America Program (REAP). Program participants pay 25% of the cost of an agricultural audit, with the other 75% covered by the grant. The average audits cost about \$2,500 but the cost can vary based on operation size.</p>	<p>management-program/</p>
<p>Maryland Energy Administration (MEA) Kathleen A. P. Mathias Agriculture Energy Efficiency Program</p>	<p>Purpose: Implement energy efficiency measures in agriculture.</p> <p>Program benefits: Subject to funding availability, MEA will provide grants on a competitive basis to farms and businesses in the agriculture sector to cover up to 50% of the cost of eligible energy efficiency upgrades, if applicable, after all other incentives have been applied.</p> <p>Partnerships: Mathias Agriculture Energy Efficiency Program and EnSave (provides technical assistance to those completing program applications).</p> <p>Funding source: About 90% from the Regional Greenhouse Gas Initiative (https://www.rggi.org/) and 10% from MEA.</p>	<p>https://energy.maryland.gov/business/Pages/incentives/MathiasAg.aspx</p> <p>https://www.futureharvestcasa.org/2019-kathleen-p-mathias-agriculture-energy-efficiency-program</p>
<p>Massachusetts Farm Energy Program</p>	<p>Purpose: Reduce energy use and produce renewable energy.</p> <p>Program benefits: Provide full-service technical and financial assistance to agricultural producers across all agricultural sectors to bring projects from concept to completion. Services include technical resources and referrals, audits and consultations, financial incentives, and funding facilitation.</p> <p>Partnerships: The Center for EcoTechnology and the Massachusetts Department of Agricultural Resources.</p> <p>Funding source: Massachusetts Department of Agricultural Resources</p>	<p>https://massfarmenergy.com/</p> <p>https://www.mass.gov/service-details/massachusetts-farm-energy-program-mfep</p>
<p>MidAmerican Energy Agribusiness Program (Iowa)</p>	<p>Purpose: Reduce monthly energy bills and offset equipment costs for its participants.</p> <p>Program benefits: This program offers free on-site energy assessments. An energy expert helps participants identify ways to reduce energy use. Participants receive report on energy-saving actions and estimates of energy-saving potential. Franklin Energy employees conduct the audits.</p> <p>Partnerships: None.</p> <p>Funding source: Fees collected from MidAmerican Energy and Alliant Energy utility customers.</p>	<p>https://www.midamericanenergy.com/ia-bus-agribusiness.aspx</p>
<p>New York State Energy Research and Development Authority (NYSERDA) Agricultural Energy Audit Program</p>	<p>Purpose: Reduce operating costs and carbon emissions while improving energy efficiency.</p> <p>Program benefits: Technical assistance to identify energy efficiency measures for eligible farms and on-farm producers. NYSERDA assigns consultants to perform energy audits for eligible farms. Audits can be targeted for specific systems, energy efficiency measures, or renewable energy projects.</p> <p>Partnerships: None.</p> <p>Funding source: Customers of a New York State investor-owned electric</p>	<p>https://www.nyserda.ny.gov/Business-and-Industry/Agriculture</p> <p>https://www.taitem.com/wp-content/uploads/AEAP-flyer-DW.pdf</p>



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Program Title	Program Description	For More Information
	utility.	
XcelEnergy (Wisconsin)	Purpose: To supplement what Focus on Energy offers to farmers and agribusinesses.	(800) 762-7077 or wimidmarket@excelenergy.com



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APPENDIX B: Agricultural Commodity Groups in Michigan

This appendix lists names and contact information for agricultural commodity groups based in Michigan (or in a few cases, the Great Lakes region). The list was current as of February 2019.

Agricultural Commodity Group	Contact Information
Celery Research Inc.	P.O. Box 306 Hudsonville, MI 49426 Phone: 734-527-9150 Website: https://www.michbio.org/members/?id=24908273
CGI: Chestnut Growers, Inc.	Phone: 800-667-6704 Email: info@chestnutgrowersinc.com Website: www.chestnutgrowersinc.com
Corn Marketing Program of Michigan	13750 S. Sedona Parkway, Suite 5 Lansing, MI 48906 Phone: 517-668-2676 Email: corninfo@micorn.org Website: www.micorn.org
Great Lakes Canola Association	Website: https://www.agry.purdue.edu/ext/canola/
Hop Growers of Michigan	P.O. Box 122 Cedar, MI 49621 Phone: 248-795-8940 Email: HGofMI@gmail.com Website: www.hopgrowersofmichigan.com
MBG Marketing – The Blueberry People	P.O. Box 322 Grand Junction, MI 49056 Phone: 269-434-6791 or 239-591-1664 Email: info@naturipefarms.com Website: www.naturipefarms.com
Michigan Allied Poultry Industries	P.O. Box 144 Hamilton, MI 49419 Phone: 517-372-5250 Email: info@mipoultry.com Website: www.mipoultry.com
Michigan Apple Committee	13750 S. Sedona Parkway, Suite 3 Lansing, MI 48906 Phone: 517-669-8353 Email: staff@michiganapples.com Website: www.michiganapples.com
Michigan Asparagus Advisory Board	12800 Escanaba Drive, Suite A P.O. Box 550 DeWitt, MI 48820 Phone: 517-669-4250 Email: miasparagus@gmail.com Website: www.michiganasparagus.org
Michigan Bean Commission	516 S. Main Street, Suite D Frankenmuth, MI 48734 Phone: 989-262-8550 Email: jcramer@michiganbean.com or gvarner@michiganbean.com Website: www.michiganbean.org
Michigan Bean Shippers' Association	1501 North Shore Drive, Suite A East Lansing, MI 48823 Phone: 517-336-0226



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Agricultural Commodity Group	Contact Information
	Website: http://www.miagbiz.org/index.php/programs/michigan-bean-shippers
Michigan Beef Industry Commission	2145 University Park Drive, Suite 300 Okemos, MI 48864 Phone: 517-347-0911 Website: www.mibeef.org
Michigan Beekeepers Association	Phone: 248-921-6601 Email: president@mba-bees.org or silentkapiary@gmail.com (Ottawa County representative) Website: www.michiganbees.org
Michigan Blueberry Commission	Michigan Blueberry Commission P.O. Box 338 Grand Junction, MI 49056 Email: KRobson@MichFB.com Phone: 734-716-8960 Website: https://www.michiganblueberrycommission.org/
Michigan Carrot Commission	12800 Escanaba Drive, Suite A P.O. Box 550 DeWitt, MI 48820 Phone: 517-669-4250 john@michiganasparagus.org
Michigan Cattlemen's Association	2145 University Park Dr., Suite 300 Okemos, MI 48864 Phone: 517-347-8117 Website: https://www.micattlemen.org/
Michigan Celery Promotion Cooperative Inc.	P.O. Box 306 Hudsonville, MI 49426 Phone: 616-669-1250 Website: www.michigancelery.com
Michigan Cherry Committee	Cherry Marketing Institute 12800 Escanaba Drive, Suite A DeWitt, MI 48820 Phone: 517-669-4264 Email: info@choosecherries.com Website: www.choosecherries.com
Michigan Christmas Tree Association	P.O. Box 252 Durand, MI 48429 Phone: 517-545-9971 Website: www.mcta.org
Michigan Cranberry Council	Mike DeGrandchamp, President 1791 Hillandale Rd. Benton Harbor, MI 49022
Michigan Grape & Wine Industry Council	P.O. Box 30017 Lansing, MI 48909 Phone: 517-284-5733 Website: www.michiganwines.com
Michigan Grape Society	P.O. Box 151 Baroda, MI 49101 Email: Mich.grapesociety@gmail.com Facebook: https://www.facebook.com/MichiganGrapeSociety/
Michigan Greenhouse Growers Council	P.O. Box 278 Bath, MI 48808 Phone: 517-367-2033 Email: mail@mifgc.org



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Agricultural Commodity Group	Contact Information
Michigan Forage Council	Website: www.mifgc.org Attn: Kim Cassida, Treasurer Michigan State University 1066 Bogue St., Rm A486 East Lansing, MI 48824 517-355-0271 ext. 1194 Website: http://michiganforagecouncil.org/Home
Michigan Horse Council	P.O. Box 22008 Lansing, MI 48909 Website: https://michiganhorsecouncil.com/
Michigan Maple Syrup Association	Kirk Hedding, President Phone: 734-323-5378 Email: heddingk@gmail.com Website: www.michiganmaple.org/
Michigan Meat Association	1013 Carom Circle Mason, MI 48854 Phone: 517-490-0036 Email: chloe@michiganmeatassociation.org Website: http://www.michiganmeatassociation.org/
Michigan Milk Producers Association	41310 Bridge Street P.O. Box 8002 Novi, MI 48376 Phone: 248-474-6672 Website: https://www.mimilk.com/
Michigan Nursery & Landscape Association	2149 Commons Parkway Okemos, MI 48864 Phone: 517-381-0437 Website: www.mnla.org
Michigan Nut & Fruit Growers Association	Dennis Strahle, President Phone: 517-204-8600 Email: dendiesel66@gmail.com Website: https://michigannut.org/
Michigan Onion Committee	P.O. Box 278 Bath, MI 48808 Phone: 517-372-1500 Website: www.michiganonion.com
Michigan Peach Sponsors	P.O. Box 1035 Coloma, MI 49038 Email: mips@michiganpeach.org Website: www.michiganpeach.org
Michigan Pork Producers Association	3515 West Road, Suite B East Lansing, MI 48823 Phone: 517-853-3782 Email: kelpinski@mipork.org Website: www.mipork.org
Michigan Potato Industry Commission	3515 West Road, Suite A East Lansing, MI 48823 Phone: 517-253-7370 Website: www.mipotato.com
Michigan Sheep Producers Association	5859 East E. Ave. Kalamazoo, MI 49004 Phone: 269-569-9592



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Agricultural Commodity Group	Contact Information
	Email: kaercher@msu.edu Website: https://misheep.org/
Michigan Sod Growers Association	Phone: 517-381-0437 Website: https://www.michigansod.org/
Michigan Soybean Promotion Committee	P.O. Box 287 Frankenmuth, MI 48734 Phone: 989-652-3294 Email: soyinfo@michigansoybean.org Website: www.michigansoybean.org
Michigan Sugar	122 Uptown Drive, Suite 300 Bay City, MI 48708 Phone: 989-686-0161 Website: www.michigansugar.com
Michigan Turfgrass Foundation	P.O. Box 27156 Lansing, MI 48909 Phone: 517-392-5003 Email: miturfgrass@gmail.com Website: http://www.michiganturfgrass.org/
Michigan Vegetable Council (Cabbage, Cucumbers, Pumpkins & Squash, Snap Beans, Sweet Corn, Tomatoes)	P.O. Box 367 Mason, MI 48854 Phone & Fax: 517-663-6725 Email: gbird@michiganvegetablecouncil.org Website: www.michiganvegetablecouncil.org
Michigan Wheat Program	P.O. Box 25065 Lansing, MI 48909 Phone: 888-943-2801 Website: www.miwheat.org
United Dairy Industry of Michigan	2163 Jolly Road Okemos, MI 48864 Phone: 517-349-8923 Email: info@milkmeansmore.org Website: www.milkmeansmore.org
West Michigan Nursery & Landscape Association	P.O. Box 96 West Olive, MI 49460 Phone: 616-402-4885 Email: wmnla2013@gmail.com Website: https://wmnla.com/
Western Michigan Greenhouse Association	1621 River Street Kalamazoo, MI 49048



Michigan Farm Energy Program: Sustainability Roadmap

APPENDIX C: Energy Use Per Unit of Production (Michigan Dairy Farm)

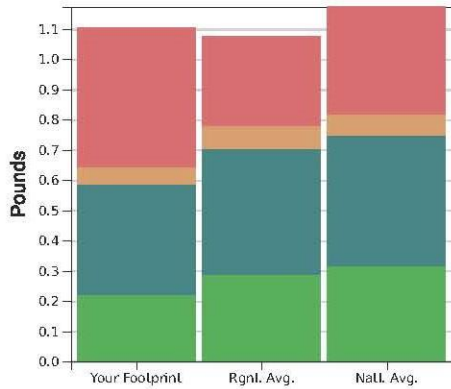


Environmental Stewardship

09 2766
October 15, 2018 at 5:05 PM

Your Farm Greenhouse Gas Emissions

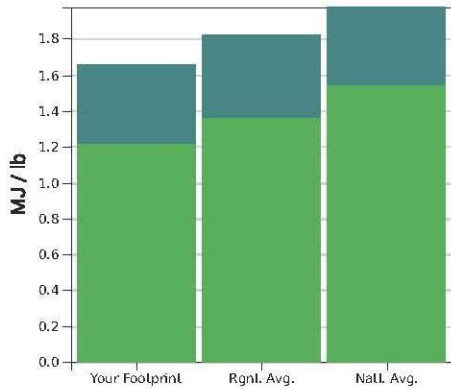
lb CO2e / lb FPCM produced



	Your Footprint	Rgnl. Avg.	Rgnl. Diff.	Natl. Avg.	Natl. Diff.
On-Site Manure	0.46	0.30	-0.16	0.36	-0.10
On-Site Fuel Use	0.06	0.07	0.02	0.07	0.01
On-Site Enteric	0.37	0.42	0.05	0.43	0.06
Feed Production	0.22	0.29	0.07	0.32	0.10
TOTAL	1.11	1.07	-0.03	1.17	0.07

Your Farm Energy Use

MJ / lb FPCM produced



	Your Footprint	Rgnl. Avg.	Rgnl. Diff.	Natl. Avg.	Natl. Diff.
On-Site Energy Produced	0.00				
On-Site Fuel Use	0.44	0.47	0.03	0.43	-0.00
Feed Production	1.22	1.36	0.14	1.55	0.33
TOTAL	1.65	1.83	0.17	1.98	0.32



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Environmental Stewardship

National Dairy FARM Program

Evaluator: Nicole Ayache
Phone: 703-243-6111
Evaluation Date: October 15, 2018
Email: nayache@nmpf.org
Company: NDFP

Facility Name: 09 2766
Address: 2766 Farm Way
Verification, OH 12345
Premise ID: P2766

Producer: 09 Farm 2766
Co-op / Processor: NDFP Test Co-op

Milk Production

Total Annual Milk Production (lbs.): 54000000
Avg milk protein content (%): 3.15
Avg milk fat content (%): 3.7

Herd Profile

Annual Avg # of Lactating & Dry cows: 2000
Annual Avg # of Dry cows (% of herd): 15
Annual Avg # of Heifer calves raised ON farm: 150
Annual Avg # of Heifer calves raised OFF farm: 0
Annual Avg # of Heifers raised ON farm: 1500
Annual Avg # of Heifers raised OFF farm: 0

Beef Production

Annual # of mature cows culled for beef: 800
Average weight per cow (lbs): 1650
Total annual number of calves sold for beef: 1100
Average weight at time of sale (lbs): 85

Energy Source

Electricity Total annual on-farm use (KWh): 1742857 % used for dairy activities: 100
Diesel Total annual on-farm use (Gal): 0 % used for dairy activities: N/A
Biodiesel Total annual on-farm use (Gal): 0 % used for dairy activities: N/A
Fuel-Oil Total annual on-farm use (Gal): 0 % used for dairy activities: N/A
Propane Total annual on-farm use (Gal): 0 % used for dairy activities: N/A
Natural Gas Total annual on-farm use (therms): 7778 % used for dairy activities: 95
Gasoline Total annual on-farm use (Gal): 4200 % used for dairy activities: 95



Michigan Farm Energy Program: Sustainability Roadmap

Pasture Animals

Lactating	# Weeks/Year: 0	Hours/Day: 0
Dry	# Weeks/Year: 35	Hours/Day: 12
Young Stock	# Weeks/Year: 0	Hours/Day: 0

Lactating Cow Ration Dry Matter Make-up

Average Dry Matter Intake (DMI): 56	
Corn Grain: 17	Corn Silage: 38
Wet DGS: 0	Dry DGS: 0
Soybean (raw or roasted): 0	Soybean Meal: 19
Alfalfa Hay: 0	Alfalfa Silage: 19
Grass Hay: 0	Grass Silage: 0
Pasture: 0	All Other Feed: 7

[Notes about where the ration information came from]

Crop

Soybean (%): 0	Corn Silage (%): 100
Corn Grain (%): 20	Alfalfa Silage (%): 50
Alfalfa Hay (%): 0	Grass Silage (%): 0
Grass Hay (%): 0	

Manure Management Systems

MMS #1: Covered anaerobic lagoon	MMS #1 %: 90
MMS #2: Composting - natural aeration	MMS #2 %: 10
MMS #3: None	MMS #3 %: N/A

[Notes about MMS estimations]

Anaerobic Digesters

What is the volatile solids conversion efficiency (values typically range from 20-55%; 30%)?:	N/A
What is the Manure Management System for Effluent (after digester)?:	N/A
What is the percent of electricity generation potential utilized?:	N/A
What is the percent of heating potential utilized?:	N/A