



MICHIGAN CLEAN ENERGY REPORT

A Profile of Clean Energy Efforts in Seven Michigan Communities

June 2015

Michigan Saves' analysis of clean energy technologies in Michigan comprises two major works: this profile of clean energy efforts in seven Michigan communities, and a statewide overview of energy use and clean energy technology deployment throughout the state titled "Michigan Clean Energy Report: Statewide Profile of Energy Use and Deployment of Four Clean Energy Technologies." Both reports were released on June 1, 2015.

Funding for the Clean Energy Report was provided to Michigan Saves by the C.S. Mott Foundation.

Background and Purpose

Communities that address clean energy issues have much to gain. Not only do those communities reduce energy waste; they also save money, create opportunities for local economic development, increase energy security, and create a cleaner, more livable environment. In order to develop thorough, responsible, and achievable actions to address energy issues, communities and the organizations that serve them need to have accurate, consistent baseline information. Community goals, strategies, and actions will be most effective if they are informed by, and built on, current data and community-specific context. This ensures that organizations' and communities' actions address true gaps and needs, can serve as a baseline for measuring future progress, and are achievable.

The purpose of this section of the Michigan Clean Energy report is to describe the experiences of a handful of Michigan cities in supporting and deploying clean energy in their communities.

The following community analysis provides a picture of how communities of various sizes, geographies, levels of capacity and economic position are moving forward on clean energy efforts, and highlights key factors of success and challenges. The goal is that a similar analysis could be used by other communities to create a baseline from which to measure progress from investments in future clean energy initiatives at the community level. Case studies are presented so that others can learn about some of the opportunities and tools that can be used for advancing the use of clean energy in their own communities.

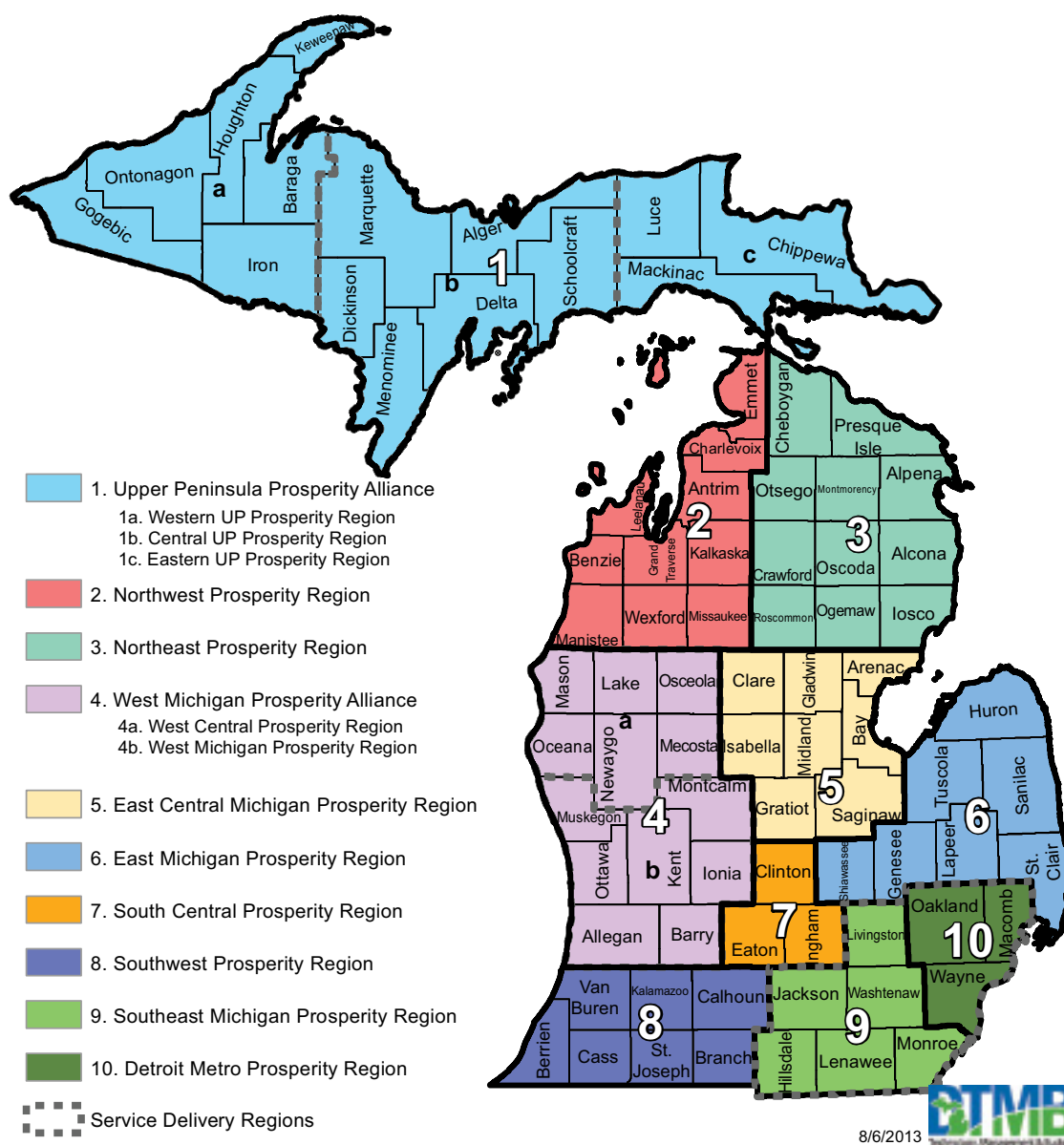
Approach

Michigan Saves staff conducted research on a select group of seven mid-sized communities to get a baseline understanding of where communities in Michigan fall on the continuum of interest and investments made in clean energy. We engaged stakeholders from statewide agencies and nonprofits to aid in the selection of communities, seeking a selection of cities with a diverse but representative sample of geographic spread, size, level of capacity, economic position, and at different stages of clean energy deployment so that communities throughout the state could see themselves in these examples and find lessons or tools that might be applicable to their own situation.

We started by looking at population and location, with a goal of including communities of various sizes and from different Michigan Prosperity Regions (see Exhibit 1 for a map of Michigan's ten prosperity regions) in order to provide some geographic diversity.

We then looked at a list of cities in those regional areas with populations between 10,000 and 120,000 people. The rationale for focusing on cities of this size was to get a sample of small to medium-sized communities versus some of the larger cities, like Grand Rapids or Detroit, which have unique clean energy assets and opportunities.

Exhibit 1: State of Michigan Prosperity Regions



Source: Michigan Department of Technology, Management and Budget (DTMB) August 6, 2013. State of Michigan Prosperity Regions. Available at: http://www.michigan.gov/documents/dmb/Prosperity_Map1_430346_7.pdf (accessed 4/30/15).

We selected seven communities in those regions based on a range of demographic and city capacity measures including economic stability (e.g., financial distress or poverty rates), unemployment and crime rates, funding for municipal services, educational achievement, presence of higher educational institutions (particularly those with clean energy programs), and whether the community had thriving “green” initiatives like farmer’s markets and recycling initiatives. Exhibit 2 lists the seven selected communities and some of their demographic characteristics.

Exhibit 2: Selected Cities' Demographic Characteristics

Small-Medium Cities	Prosperity Region	Population 2010	Population change 2000–2010	Median household income, 2009–2013	Persons below poverty level, percent, 2009–2013
Alpena	3	10,483	-7.30%	\$33,311	22.40%
Kalamazoo	8	74,262	-3.70%	\$31,893	34.30%
Holland	4	33,051	-5.70%	\$43,413	19.20%
Marquette	1	21,355	3.10%	\$37,770	25.50%
Pontiac	10	59,515	-11.90%	\$27,528	36.60%
Saginaw	5	51,508	-16.60%	\$27,707	37.40%
Ypsilanti	9	19,435	-12.60%	\$33,406	30.20%

Source: U.S. Census Bureau. March 22, 2011. MICHIGAN – 2010 Census Results Total Population by County. Available at: https://www.census.gov/2010census/news/pdf/cb11cn106_mi_totalpop_2010map.pdf (accessed 4/30/15).

Once the communities were selected, Michigan Saves staff conducted research on the cities' policies, plans, and deployment of four clean energy technologies: energy efficiency, distributed renewable energy, smart grid/microgrid, and electric vehicles. Exhibit 3 describes the four areas of clean energy technology in more detail.

Exhibit 3: Description of Clean Energy Technologies Evaluated in the Baseline Study

Energy Efficiency:

Consistent, comprehensive baseline energy-use metrics for all building types are difficult to achieve at the community level. The best source for this data is utility data, which is often not tracked at the community level and can be difficult to acquire. Baseline energy-use information is available in some communities throughout Michigan; however, it is often difficult to decipher, with inconsistent formats, definitions, terminology, and approaches. Additionally, the depth and breadth of information varies significantly by community and by clean energy issue area. Absent data from utilities, we determined a proxy for an energy efficiency baseline by compiling a list of energy efficiency actions that could be taken within a community and by conducting interviews with key stakeholders to evaluate progress against the list of actions.

Distributed renewable energy:

Distributed renewable energy includes solar, wind, and biomass installations at the community level. Data was collected through literature review and interviews to get information on the number and type of distributed renewable energy projects in each community. We also used information on the number of net metering customers from the utilities serving each community as an additional piece of information on distributed renewable energy deployment.

Microgrid/smart grid:

Our assessment of the microgrid baseline includes the number of small, independent power systems that are used to increase reliability of distributed generation. Smart grid includes the number of customers in a city with Advanced Metering Infrastructure (AMI), which comprises a system of smart meters, communications networks, and data management that allows two-way communication between utilities and customers. AMI allows for load management and time-based rate programs.

Electric vehicles:

We measured progress on this aspect of clean energy by documenting the number of electric vehicle charging stations installed in each community. Information on total number of electric or hybrid vehicles registered in each community could be purchased if a community was interested in tracking this information. Potential sources are IHS Automotive or Experian Automotive.

The research included review of literature and interviews with staff from each city and, where applicable, municipal utilities and other clean energy organizations. Appendix A includes a list of people interviewed, and Appendix B is the interview guide employed by Michigan Saves staff. At the municipal level, we generally interviewed staff within both public works/public services and planning or administration in order to get the full picture of clean energy policy and deployment efforts.

Michigan Saves staff utilized the Michigan Municipal League's (MML) [Green Communities Challenge](#)¹ checklist as a guide for our research—incorporating specific checklist elements into our interview guide and literature searches—because many of the program's measures of sustainability achievement are related to clean energy. In this way, we hoped to use consistent language and measures so these seven profile cities (as well as other communities) could track clean energy progress and ideally work with the MML to become certified Green Communities, if they have not already done so.

We used the research to create a baseline dashboard of progress and develop a narrative summary of each community's clean energy efforts. The intent was to create a base of information and an approach for assessing progress that all communities in Michigan could use for evaluating their own efforts.

Findings

As we expected, the experiences among the seven communities were quite varied. Some have made substantial progress in clean energy through active community participation and committed leadership. Others have struggled to do more than basic energy upgrades. While the communities' approaches and success have been quite different, there are common issues among the communities that can help direct future federal, state, nonprofit, and foundation support for clean energy initiatives in Michigan.

¹ The Michigan Green Communities Challenge is a program designed to recognize and support communities in being sustainability leaders. It provides communities with peer-to-peer opportunities to share best practices. The challenge gives communities points in four categories—Administration and Planning (AP), Built Environment (BE), Economic Development (ED), and Natural Resources (NR)—each comprised of several action items.

Clean Energy Policies and Goals

Michigan Saves staff evaluated the extent to which the seven cities have adopted policies and goals related to clean energy. We looked at whether the city had developed a specific clean energy or climate action plan focused on reducing municipal and broader community energy use. In addition, we asked communities whether they had adopted other related policies, including:

- Updated zoning ordinances that address requirements for deployment of clean energy, particularly for distributed renewable energy
- Electric vehicle purchasing policy for municipal fleets
- Other sustainability policies or goals that are related to energy use, such as recycling, tree cover, or water conservation

Exhibit 4 characterizes the status of each community's clean energy policies and goals. These characterizations are meant only to provide a general picture of the cities' efforts at this point in time. For all measures except the vehicle purchasing policy, communities' status was characterized as either grey (no policy/goal), light green (city has a policy/goal, but it is only applicable to municipal operations), and dark green (city has a policy/goal that is applicable to both municipal and community efforts). For vehicle purchasing policies, we characterized communities as grey (no policy) or dark green (city has a policy).

Exhibit 4: Status of Case Study Communities' Clean Energy Policies and Goals

	ALPENA	HOLLAND	KALAMAZOO	MARQUETTE	PONTIAC	SAGINAW	YPSILANTI
City has clean energy or sustainability plan	None	Municipal + Community	Municipal	None	Municipal	Municipal	None
Clean Energy addressed in city's master plan	Municipal	Municipal + Community	Municipal + Community	Municipal + Community	Municipal + Community	None	Municipal + Community
Clean Energy addressed in city's zoning ordinances	Municipal + Community	Municipal + Community	None	Municipal + Community	Municipal + Community	None	Municipal + Community
City has a renewable energy goal	None	Municipal + Community	Municipal	None	None	None	Municipal + Community
City has an electric vehicle purchasing policy	None	None	Has a policy	None	None	None	None
City has other related sustainability plans or programs (e.g., tree cover, recycling)	Municipal + Community	Municipal + Community	Municipal + Community	Municipal + Community	None	Municipal	Municipal

Energy Efficiency

The biggest successes have been in the area of energy efficiency. While several communities have implemented modest renewable energy efforts, by far most of the communities' focus (both in policy and deployment) has been on making energy efficiency improvements. However, these improvements are not just for municipal facilities. Several of the communities have offered or actively participate in community-based programs, such as incentives for residential or business energy audits and efficiency upgrades, in order to help residents and businesses understand and improve their energy use.

Exhibit 5 provides a snapshot of the seven communities' progress on deploying energy efficiency technologies in their communities based on our research. We qualitatively characterized communities' progress on a spectrum of no progress made to date (grey) to substantial deployment of energy efficiency technologies in the community (dark green; at both the municipal and community levels). In between is a large range of progress. For example, a city may have conducted energy audits or retrofits on some municipal buildings, but not all. We characterized that measure ranging from light green to medium green, depending on what percentage of municipal infrastructure was addressed. As with the assessment of progress on policies and goals, these characterizations are meant only to provide a general picture of the cities' efforts regarding energy efficiency measures at this point in time.

Exhibit 5: Snapshot of Community Energy Efficiency Deployment Progress

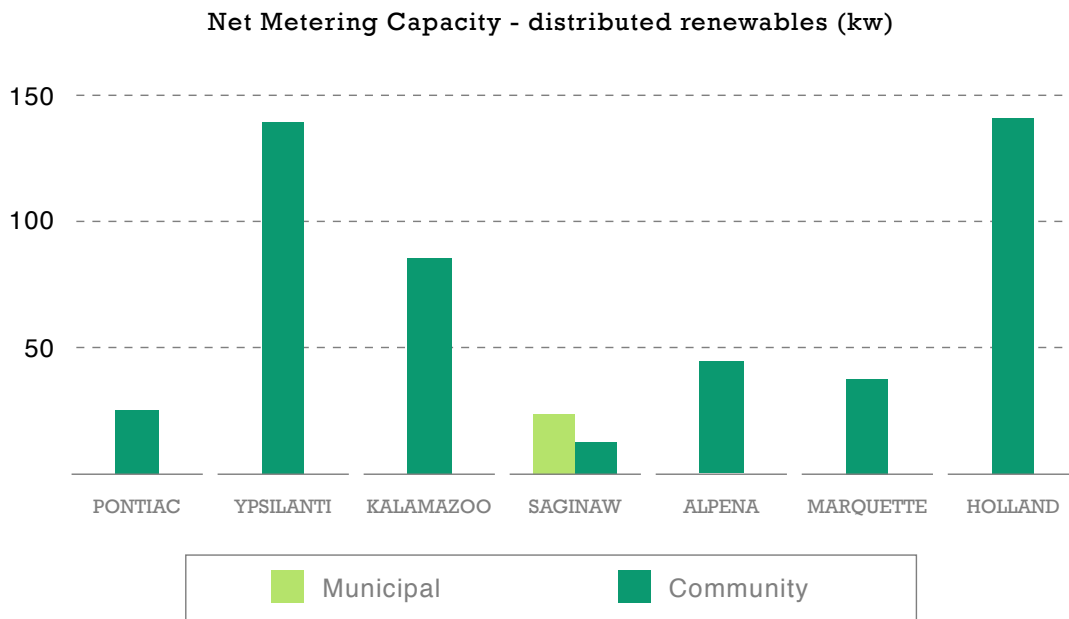
	ALPENA	HOLLAND	KALAMAZOO	MARQUETTE	PONTIAC	SAGINAW	YPSILANTI
Energy audits for municipal buildings	Medium Green	Dark Green	Dark Green	Light Green	Light Green	Dark Green	Medium Green
Upgrades of outdoor lighting (eg. streetlights, other public lights)	Light Green	Dark Green	Light Green	Dark Green	Dark Green	Dark Green	Dark Green
Upgrades of traffic signal lights	Grey	Dark Green	Grey	Medium Green	Grey	Dark Green	Grey
Indoor lighting upgrades in municipal buildings	Light Green	Dark Green	Medium Green	Medium Green	Medium Green	Dark Green	Medium Green
Heating ventilation and air conditioning upgrades in municipal buildings	Grey	Medium Green	Light Green	Light Green	Grey	Medium Green	Grey
Other municipal energy efficiency improvements	Medium Green	Dark Green	Medium Green	Dark Green	Light Green	Grey	Grey
Community energy efficiency initiatives (non-utility energy optimization programs)	Grey	Dark Green	Grey	Dark Green	Grey	Grey	Dark Green

Distributed Renewable Energy

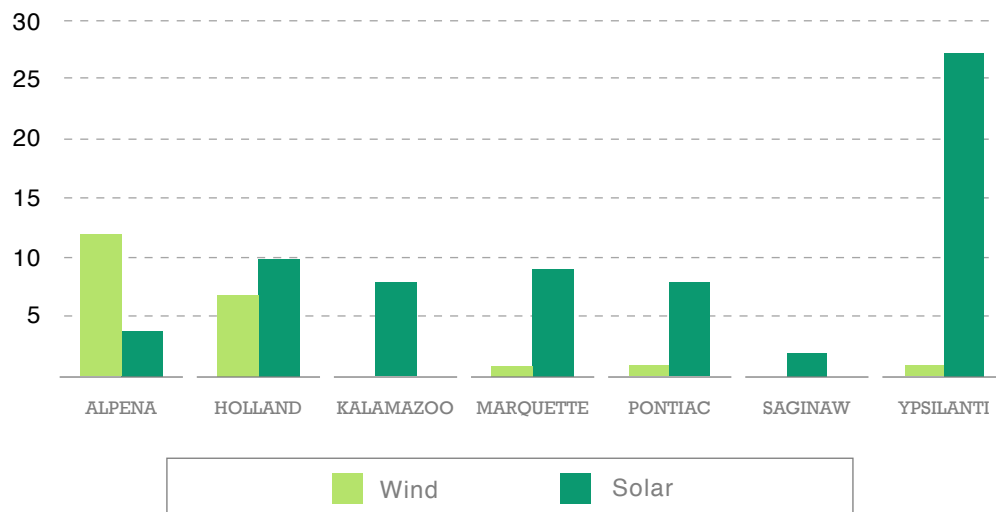
Renewable energy has not been a considerable focus of clean energy efforts in the seven case study communities except in Ypsilanti, where a community action group—SolarYpsi—has helped generate interest in and deployment of solar energy projects. Exhibit 6 shows the number of renewable energy projects in each community (measured by number of net metering customers). As the graph shows, deployment levels vary. Overall, even in the leading communities of Ypsilanti and Alpena, the number of participants is still a small fraction of the communities' overall populations (less than 0.15 percent).

At the municipal level, progress has been similarly modest. Saginaw has two renewable energy installations (solar). The other communities have not deployed renewable energy at the municipal level.

Exhibit 6: Number of Municipal and Private Net Metering Customers



Number of Wind and Solar Net Metering Installations (Community and Municipal)

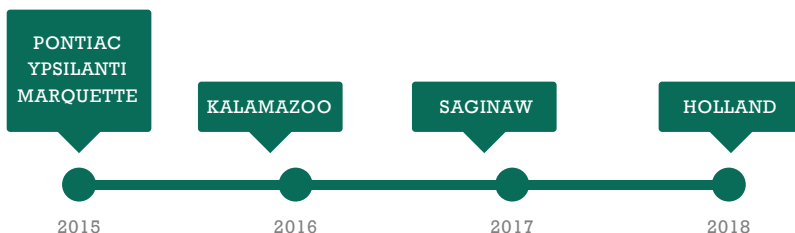


Microgrid/Smart Grid

None of the communities evaluated has either policies regarding or completed projects for municipal or community energy microgrids. Utilities in several communities have made progress in deploying smart meter technology including installation of AMI, which allows customers to make informed choices about energy usage based on the price at the time of use. Exhibit 7 summarizes the status of AMI Deployment in the seven case study communities.

Exhibit 7: Status of AMI Deployment in the Case Study Communities

Deployment of Advanced Metering Infrastructure (Smart Meters)
(showing dates of estimated completion)



Electric Vehicles

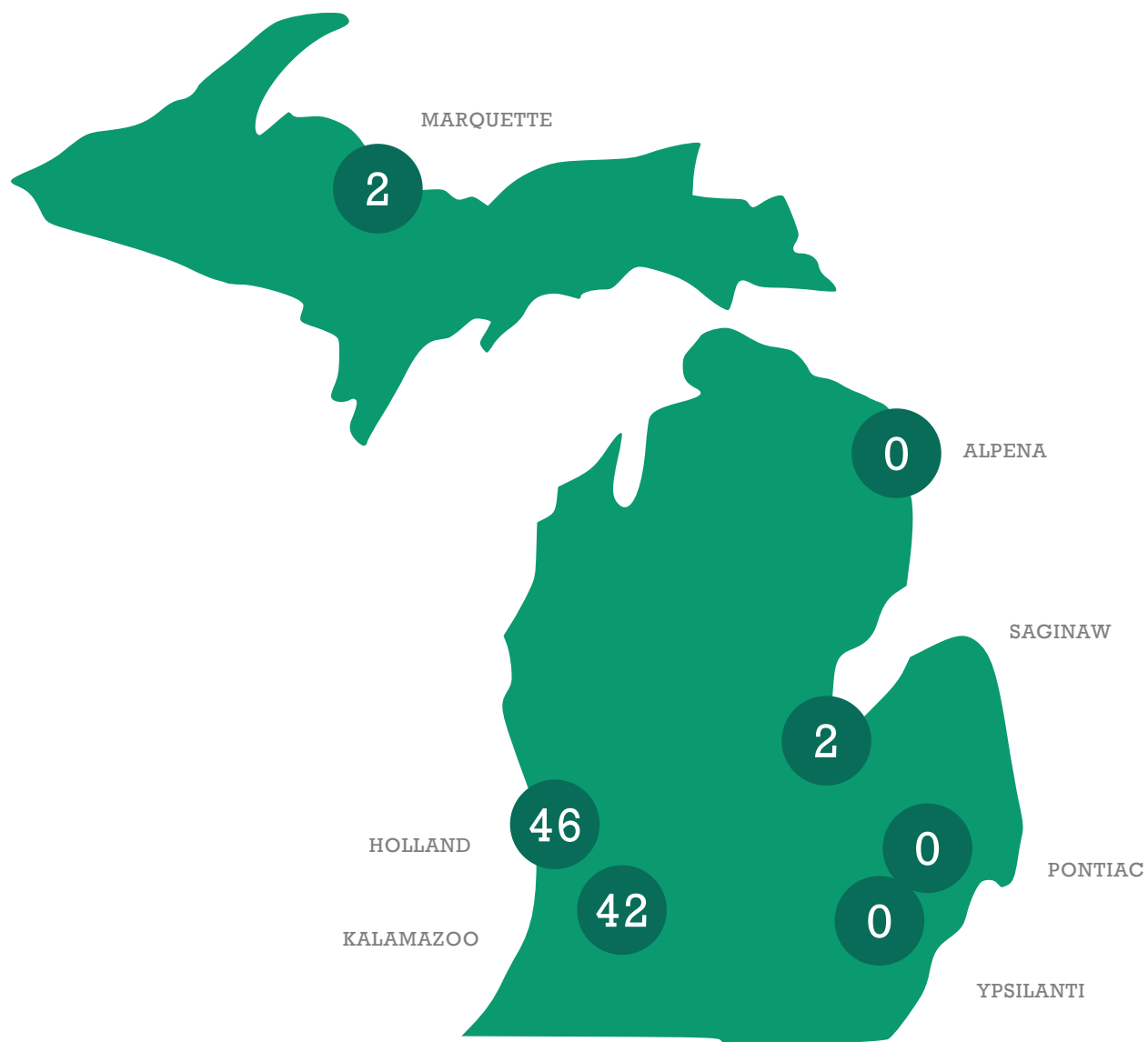
While a few of the communities have green fleet policies and have purchased alternative energy vehicles, these have generally been alternative fuel and hybrid electric vehicles versus plug-in electric vehicles. Cost continues to be the biggest limiting factor to cities expanding their clean energy fleet.

Michigan is, however, ranked seventh nationally on electric vehicle purchases, and demand is expected to grow (Clean Energy Coalition 2011) given statewide rates of electric vehicle sales. While the seven cities have not made a significant investment in electric vehicles for their municipal fleets, several have supported electric vehicle deployment by investing in electric vehicle charging stations for their businesses and residents.

Exhibit 8 summarizes the number of electric vehicles in each city's municipal fleet and the number of electric vehicle charging stations in each community.

Exhibit 8: Status of Electric Vehicle Deployment in Case Study Communities

Number of public electric vehicle charging stations



Other Observations

Ongoing funding makes a significant difference. All of the communities have had clean energy successes when funding for planning and technology implementation has been widely available. The Energy Efficiency Conservation Block Grant (EECBG) funding in the late 2000s facilitated a large part of the energy efficiency and renewable energy efforts of these seven communities.

But those that have found mechanisms for maintaining some steady funding (not tied to fluctuating and time-intensive grant programs) have been able to continue making progress. Holland and Saginaw, for example, have created funds that are capitalized with energy cost savings from efficiency upgrades and as such are in a better position to continue chipping away at ongoing clean energy needs.

Dedicated and consistent staff in place results in more progress. All the communities interviewed indicated that having staff dedicated to energy conservation and/or sustainability does or would make a significant difference in the level of progress the communities make on clean energy deployment. Those with greater clean energy capacity—who have either dedicated staff and/or city sustainability-related teams—have the ability to be innovative, push harder for progress, and pursue funding and community support for clean energy projects.

The interviews further indicated that consistency of staff is as important as the number of people. Saginaw, for example, had a longtime staff person who was very focused on energy efficiency and other clean energy initiatives. When that person left, the knowledge base and responsibilities for maintaining the momentum declined considerably. Holland has recognized this issue and created the Holland-Hope Sustainability Institute at Hope College to provide clean energy information and leadership that spans beyond any single resource or administration.

Leadership and partnership are important factors in success. Of the communities evaluated, those with strong leadership and support—at the political, staff, and community level—are the ones that have had the most success. Clean energy adoption requires acceptance by community members and staff who may or may not understand all of the benefits of it. Strong leaders help create community interest, focus resources, advocate for change, and maintain momentum.

Nowhere is this more evident than in the cities of Holland and Ypsilanti. Holland has had strong and dedicated leadership at the city and at the Holland Board of Public Works. These leaders have actively engaged with the community and aggressively sought investments in clean energy. The city's leaders and the volunteer groups working on city sustainability initiatives have also been strong partners and advocates for each other's efforts. In Ypsilanti, city staff and political leaders have been active supporters of clean energy. But just as important, a grassroots group of solar advocates has provided time, resources, and outreach to help the community embrace and proactively pursue renewable energy technologies. Both have been important leaders in moving Ypsilanti forward on clean energy.

Partnership with utilities also seems to be an important factor, and is one that varies significantly among the communities. Holland noted that having a municipal utility gives the city flexibility and a built-in partner. Marquette, which also is served by a municipal utility, has not had as much success working hand in hand with that partner.

Concentrated effort creates exponential results. In communities where there has been a concentrated geographic, timebound, or technology-focused clean energy effort, the resulting progress is much greater. Concentration of efforts helps gain greater adoption of clean energy in a community because residents, businesses, and city staff can see it being deployed in many places. It creates a “buzz” and momentum among community members and staff. In Ypsilanti, SolarYpsi noted that it can provide economies of scale on the costs of solar energy technologies because equipment sales and installers can more efficiently get their product installed. Finally, concentrated efforts create greater public and media attention, and this can be helpful both in building momentum and in pursuing additional funding.

Moving Ahead

The following pages provide a more detailed, deeper narrative of each community’s experience in clean energy planning and implementation. Overall the communities have made some impressive progress, and all are in a position to do more. The stories about their clean energy approaches and the successes and challenges they have encountered are instructive for other communities that want to begin or more rapidly advance the use of clean energy technologies. Our hope is that these stories will provide a starting point for peer-to-peer learning about clean energy strategies among Michigan communities.

In addition to the lessons learned from these seven communities and the information available from the MML Green Communities Challenge mentioned above, there are a number of regional, statewide, and national tools that can be used by Michigan communities to help guide and support their clean energy efforts. Among them are these examples of potential resources available to communities:

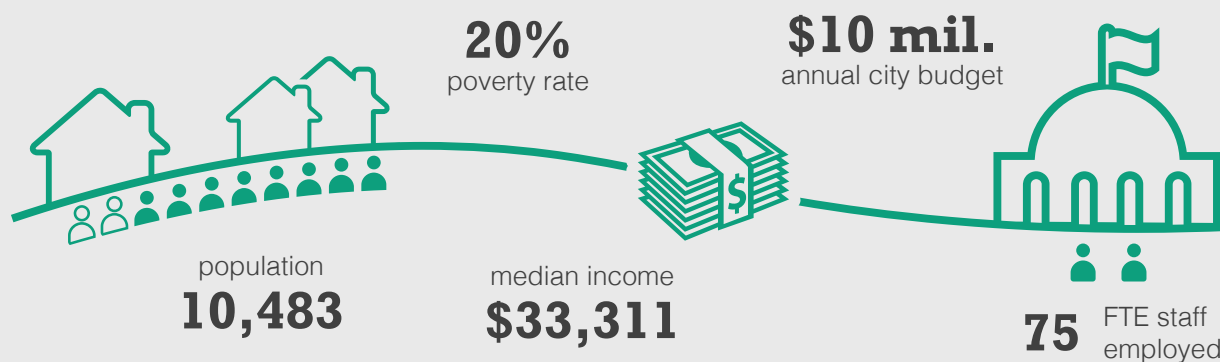
- Later in 2015, the Michigan Energy Office will release a Clean Energy Toolkit for Michigan local governments seeking to incorporate energy efficiency, renewable energy, and related sustainability goals and initiatives into local government plans and operations.
- The [Southeast Michigan Regional Energy Office](#) has developed an Energy Management Planning Framework to help local governments identify and implement opportunities to save energy and costs in a systematic and comprehensive way.
- The Environmental Protection Agency’s [Energy Star Portfolio Manager](#) can be used to measure municipal energy use and savings.
- The U.S. Department of Energy’s [Home Energy Score](#) allows homeowners to compare the energy performance of their homes to other homes nationwide and provides recommendations for improving energy efficiency.
- [Clean Energy Coalition’s Plug-In Ready Michigan](#) report provides tools to planners, local officials, consumers, and private enterprises to prepare for an increase in plug-in electric vehicle use.

City of Alpena, Michigan: Clean Energy Profile



Alpena is a community of just over 10,000 people in Michigan's northern Lower Peninsula, and is the smallest of the communities highlighted in this clean energy community profile report. Alpena has implemented some modest energy efficiency efforts in recent years, and there are a number of distributed renewable energy projects in the city. But overall, there has not been a significant deployment of clean energy technologies.

About Alpena



SOURCES: U.S. CENSUS BUREAU 2013; CITY OF ALPENA 2014

Planning, Policies, and Goals

The city has made progress in planning for and supporting distributed renewable energy installations, and it has updated its zoning code to define and lay out requirements for renewable energy projects on private property. While energy efficiency and renewable energy are not included as specific goals in the city's most recent master plan, the plan does include an action item for supporting Leadership in Energy and Environmental Design (LEED) development within the city in order to improve energy efficiency (City of Alpena 2007).

The city also has several related sustainability plans that indirectly impact community energy use. For example, the city has a tree planting partnership with residents that reimburses them for half the cost of planting trees between the curb and the property line, and there is a recycling committee that is working to expand recycling within the community.

The city does not have any alternative energy vehicle purchasing policies for its municipal fleet.

Energy Efficiency

The city worked with Efficiency United, the nonprofit provider of Alpena Power Company's energy optimization (EO) program,² to replace some incandescent lighting with higher-efficiency fixtures. The city is also exploring options to replace aging boilers with more efficient systems (\$80,000 is allocated in the 2014-2015 budget to install an upgraded boiler at the Public Safety Facility and motor control upgrades at the wastewater treatment plant). For 2015, the city has allocated \$45,000 to implement city-wide lighting efficiency projects (City of Alpena 2014). Rebates available through Efficiency United are helping the city pay for these projects.

Distributed Renewable Energy

There have been a number of renewable energy projects implemented in Alpena. A statewide net metering program that was established under Public Act 295 of 2008 applies to all investor-owned and municipal utilities, cooperatives, and alternative energy suppliers. As of 2014, over 32 kilowatts of distributed renewable energy had been installed through Alpena Power Company's net metering program.

Also, the Alpena Water Recycling Plant uses a biodigester to break down sewage sludge. The methane produced during this process is used to fuel a motor that runs both the facility's boiler and a wastewater pump engine, thereby saving the city about \$15,000 per year on energy costs (City of Alpena n.d.).

² Under Michigan Public Act 295, retail electric and gas providers collect surcharges from customers via their utility bills and use the funds to provide or contract with qualified, independent nonprofit organizations selected by the Michigan Public Services Commission to provide energy efficiency services and products to customers (Efficiency United 2012).

Microgrid/Smart Grid

Alpena Power Company has begun replacing existing meter infrastructure with Automatic Meter Reading (AMR) meters. So far 8,200 meters have been installed, and the company expects all meter replacements to be completed by the end of 2015. AMR meters allow a utility to collect energy consumption data without needing to send an employee to every individual meter. This technology can be used to improve the company's operational efficiency (U.S. EIA 2015).

However, Alpena Power Company has indicated it has no plans to install Advanced Metering Infrastructure (AMI), which provides two-way communication between the utility and the customer so that customers have information on use and electricity pricing. AMI allows utility companies to use a variety of load reduction and energy savings programs.

There are no microgrids in the city of Alpena.

Electric Vehicles

Alpena does not have electric or alternative energy vehicles in its municipal fleet, and there are no electric vehicle charging stations in the city.

Other Observations

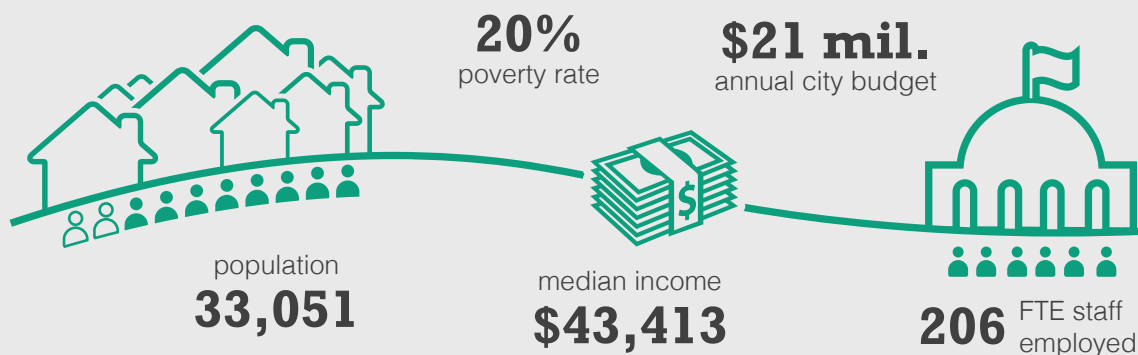
Alpena is a small community, and availability of staff resources and funding present a constant challenge to deploying more clean energy efforts. The Public Works Department pursues clean energy projects as funds are available or as existing equipment fails and needs replacement, but capacity limits the pace of progress.

The community of Alpena has been fairly well engaged in environmental sustainability issues, including the restoration and protection of Thunder Bay (which is a national marine sanctuary) and the Alpena River, as well as the development of trails for non-motorized use and cleanups of community beaches. Alpena County is also home to the world's first cellulosic biobutanol refinery. While these sustainability efforts have helped mobilize the community in many ways, to date none have focused on clean energy issues. Without a significant community interest and demand, progress in deploying clean energy has been slow.

City of Holland, Michigan: Clean Energy Profile

Holland is a mid-size city located on the shores of Lake Michigan, just southwest of Grand Rapids. The city is the most affluent of the seven communities profiled in this clean energy report and is served by a municipal utility. Holland has made great strides in clean energy planning, policy, and deployment. The community has been very engaged in clean energy efforts, and the city has made a lot of progress in implementing planned public and private clean energy improvements.

About Holland



SOURCES: U.S. CENSUS BUREAU 2013; CITY OF HOLLAND 2014.

Planning, Policies, and Goals

Over the past ten years, the City of Holland and the Holland Board of Public Works (HBPW) have largely focused their clean energy efforts on energy efficiency and the development of a new combined cycle natural gas power plant to replace the city's 77-year-old coal facility.

Community dialogue around meeting future baseload power needs was an important catalyst in the city's clean energy planning efforts. Concerns over the HBPW's initial plans to expand its coal-fired power plant led to a substantial community engagement process regarding future energy use and supply options. Businesses, residents, environmental leaders, city staff, and city leaders worked with consultants to help quantify the economic value of the city's important assets and values, including things that go beyond energy (such as the waterfront and recreational opportunities). Stakeholders participated in a Monte Carlo exercise that pointed to various scenarios, such as buying off the grid and building new power generation facilities. The results showed that developing a new combined cycle gas plant provided the best financial and sustainability return on investment. HBPW broke ground on the facility in April 2015 and is pursuing top honors from the [Institute for Sustainable Infrastructure's Envision™ sustainable infrastructure rating](#). The plant not only provides a new power source, it is a gateway to the city, provides public learning and education opportunities, and is a destination space (it connects to trails and Windmill Island).

The Holland Community Energy Plan, updated in 2011, was a result of the community engagement around the new power plant. The effort started small, with the development of some clean energy strategies, and gradually grew as the community became more engaged and comfortable with the initiative, and then enthusiastic. The energy plan includes:

- Baseline data, gathered through initial energy audits of sixteen city buildings and an energy baseline study using utility energy cost data
- Goals and recommended actions for municipal energy efficiency improvements such as street lighting, traffic signals, parking lots/parks, irrigation systems, city buildings, other city infrastructure, and vehicle fleet
- Goals and recommended actions to reduce community energy use and greenhouse gas emissions, including improvements to the over 7,000 single-family homes in the city, distributed renewable energy, use of waste heat for expanded snow melt and district heating, replacement of the municipality's coal-fired electric power plant, and efficiency improvements to other community buildings (City of Holland 2011)

The community's engagement in these efforts has continued and expanded. In addition to a standing Sustainability Committee (commissioned by the City Council), the city has seven energy-related task forces made up of city and HBPW staff, residents, and other stakeholders including³:

- Holland Home Energy Retrofit Task Force
- Building Energy Labeling Task Force
- Commercial and Institutional Task Force
- District Heat Task Force
- Power Generation Task Force
- Community outreach Task Force
- Industrial Services Bundle Task Force

³ Some of these task forces will dissolve when their work is complete (such as the Building Energy Labeling Task Force, which has largely completed its work).

Energy Efficiency

The City of Holland and HPBW have been very successful in moving forward on energy efficiency deployment. A few of the major successes include these:

- The city completed initial upgrades to municipal buildings, and is about to conduct another round of more comprehensive audits for all municipal buildings.
- The city replaced 50 pedestrian lights in Centennial Park with LEDs (for a 65 percent energy savings over the previous lighting technology) and plans to convert 1,600 street lights to LED this year. The total estimated cost is \$480,000. The city expects that the energy savings from this project will be enough to repay the initial investment in six years. The city has also replaced all traffic signals and all pedestrian lights downtown with LED fixtures.
- MAX Transit partnered with the city and replaced all pedestrian lights (29 lights total) in its Downtown Transportation Center parking lots with LED fixtures.
- Holland was selected as a semifinalist for the Georgetown University Energy Prize, a two-year competition that challenges communities to implement long-term plans for improvement of energy efficiency with innovative, replicable, and scalable plans. Participating cities are competing for a \$5 million prize, and could potentially save more than \$1 billion in total energy costs in their communities. The final prize will be awarded in 2017.
- The city is currently evaluating options for requiring an energy performance certification at the time of home sales. A 50-home pilot program tested the assessment process and evaluated homes against performance measures. A draft ordinance for the point of sale “know your number” requirement has been developed, and is undergoing staff review now.
- The city developed and piloted the Home Energy Retrofit Program, which provides free audits and recommended energy efficiency improvements to homeowners. Contractors guarantee and demonstrate that recommended improvements will result in energy savings. The required demonstration is provided through use of a blower door test that measures airflow and resulting heating or cooling loss. The city piloted the project with 25 homes, and nearly all have proceeded with the efficiency improvement work.
- The Home Energy Retrofit program is currently only available for owner-occupied homes. The city needs to work through policy issues to address ways in which it can make the program available to renters. At this time the program requires homeowner cooperation, approval, and investments, but in the case of rental units, the “homeowner” would be the landlord.
- Partnering on the development of a Holland Energy Trust, which will provide grants and revolving loans for energy improvements and support education activities. The vision for the Trust is to incentivize homeowners to do deep energy retrofits with longer payback periods that they might not otherwise undertake.
- HPBW is beginning an on-bill financing program that is targeted toward helping customers implement deep energy retrofits and finance the improvements on their utility bill, using energy savings to pay for some or all of the financing payments.
- The city developed an incentive program to provide mini grants to smaller businesses to be used for retrofits/green building improvements. A total of \$20,000 will be available, and the city expects to issue a request for proposal this year.
- SEMCO has partnered with Homeserve USA to provide a turnkey energy assessment and home retrofit energy financing program for its customers. Homeserve is showing residents how their energy use compares to similar homes in their community, and providing participants energy assessments and recommended upgrades. If customers make energy improvements and finance those improvements using Homeserve, they pay back the loan over five years on their SEMCO bill (currently at an interest rate of 5 percent).

- HBPW is also evaluating options for providing industrial park integrated energy services, whereby customers would share utilities and any waste heat would be put to beneficial use in other buildings. HBPW is even exploring options for making compressed air part of the integrated utility offering.

Distributed Renewable Energy

While the city's energy planning and implementation efforts have not focused extensively on distributed renewable electricity production (e.g., solar electricity), the city and HBPW are working on opportunities for expanding district heating and cooling opportunities. At this time the energy plan does call for evaluating the use of street trees that have to be removed to fuel a wood boiler for heating the parks building.

In 1988, Holland installed what is currently the largest municipal street and sidewalk snowmelt system (450,000 acres) in the U.S. The system melts snow using waste heat from the power plant. The resulting dry streets and sidewalks have been an economic boon for downtown businesses and a popular winter running spot for local runners/residents. Waste heat from the new combined cycle plant will allow the city to expand the downtown snow melt system fivefold. The initial expansion will convert the system to a closed loop. The city is considering the possibility of using the system for district heating as well. Toward that end, the city is working with potential partners including the Downtown Development Authority (DDA) and Hope College to evaluate options for deploying the system downtown and/or on campus.

Microgrid/Smart Grid

HBPW has replaced all of its meters with AMR technology ten years ago, and in June 2014 the Board of Directors and Holland City Council approved a \$6 million project to replace the AMR meters with AMI Smart Meters. The project is expected to be implemented over five years.

There are no microgrids in the city of Holland.

Electric Vehicles

The City of Holland does not have any electric vehicles in its municipal fleet, but has the highest number of electric vehicle charging stations (46) of any of the seven communities highlighted. HBPW supplies electricity to those charging stations at no charge to customers in order to support the economic growth of the city's advanced battery cluster.

Other Observations

Citizen engagement has been a critical part of Holland's success. It has helped shape decisions, generate enthusiasm, build teams of volunteer workers, and instill a stronger sense of civic pride. One example is the Community Outreach Task Force's efforts to establish the Holland-Hope Sustainability Institute at Hope College. The purpose is to ensure a long-standing, consistent mechanism to catalyze partnerships between local governments and place-based foundations for community-based sustainability efforts.

The city was also fortunate to be selected for the Georgetown University Energy Prize. Much of the city's energy efficiency work was already under way, but this program has been a catalyst for raising awareness and creating a sense of urgency and enthusiasm within the community.

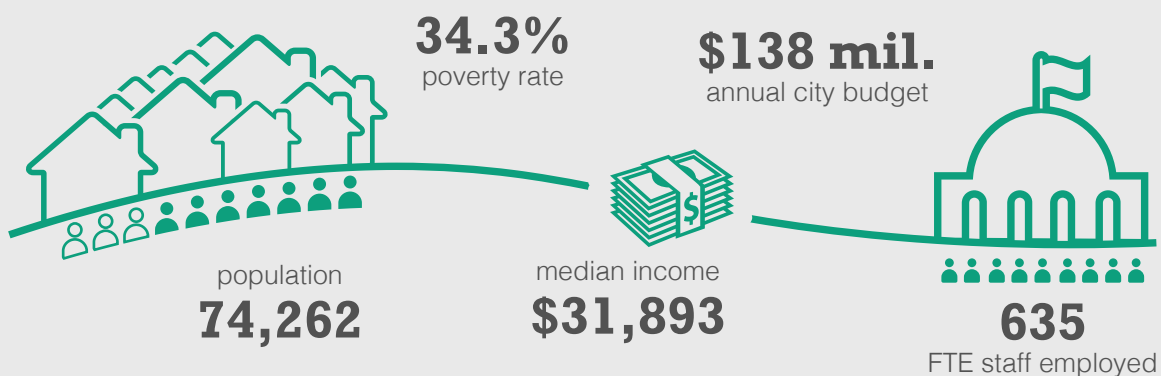
Interviewees also noted that municipal and political leadership has been critical to Holland's success. The city has strong and supportive leaders within both the City of Holland and the HBPW. These leaders recognize the potential economic, environmental, and community benefits of advancing clean energy in Holland. Holland is also one of 41 communities in Michigan with a municipal utility, and this has given the city a ready partner on clean energy improvements. According to city leaders, having a municipal utility has made it very easy for Holland to be visionary.

Finally, while the city has largely been very successful in moving forward on its clean energy goals and efforts, both available funding and available staff continue to be ongoing challenges for the city.

City of Kalamazoo, Michigan: Clean Energy Profile

Kalamazoo is a community of over 70,000 people in southwest Michigan. It is the largest of the communities highlighted in this clean energy community profile report. Kalamazoo has made some strong progress on planning and deploying clean energy. While the focus of deployment efforts have largely been on replacing or upgrading equipment as old systems fail or are retired, the community has done some planning around clean energy, and energy and sustainability are substantially incorporated into its master plan and other city policies.

About Kalamazoo



SOURCES: U.S. CENSUS BUREAU 2013; CITY OF KALAMAZOO 2014

Planning, Policies, and Goals

In 2006, Kalamazoo developed a report titled *Blueprint for Action: A Sustainable Community*, which laid out the city's vision and objectives for community sustainability. The blueprint included a goal to "incorporate Leadership in Energy and Environmental Design (LEED) certification standards into construction of City-owned buildings" (City of Kalamazoo 2006). Several studies on how to implement this goal have been discussed, but to date capital funds have not been available to move forward.

In addition, the city's most recent master plan recommends that the city consider several strategies to make municipal improvements and generate energy savings. The recommended strategies are broken down into immediate, short term, mid-term, and long term (City of Kalamazoo 2010). Clean energy strategies recommended in the plan include the following:

- Explore the adoption of new lighting technologies, such as induction and LED lighting (for new lighting and retrofits) and timing systems (immediate).
- Strive for city building and renovation projects to meet green building standards (such as LEED) that provide long-term payback on investment (immediate).
- Explore and pursue opportunities for using alternative fuels and hybrid or electric vehicles in city fleets (short term).
- Develop, adopt, and maintain an energy conservation program with reduction targets and progress monitoring. This program should use public buildings and facilities as a model for energy reduction practices (mid-term).
- Pursue opportunities for generating renewable energy within the city and promote the purchase of electricity originating from renewable sources (mid-term).
- Create informational and incentive programs to encourage private sector green buildings (i.e. LEED), through the Brownfield Redevelopment and Tax Increment Financing programs (mid-term).

Finally, Kalamazoo is a partner in two related regional and national sustainability efforts. The city is part of the Southwest Michigan Regional Sustainability Covenant, and has formed a "Sustainability Team" to organize and promote sustainability initiatives within the community (City of Kalamazoo 2010). Also, Kalamazoo has signed the U.S. Conference of Mayors Climate Protection Agreement and has pledged to meet the Kyoto Protocol targets (7 percent reduction in greenhouse gas emissions from 1990 levels by 2012) (City of Kalamazoo 2010).

Energy Efficiency

The city has undertaken several energy efficiency upgrade projects. While some of these have been funded with grants or other sources (the city was awarded \$762,200 in Energy Efficiency Conservation Block Grant funding in 2009), the city has generally implemented upgrades as old systems fail or need to be replaced. Some examples of energy efficiency projects include:

- Replacing incandescent and other outdated lighting technologies with energy efficient LEDs as fixtures fail. Approximately ten percent have been replaced so far.
- Replaced basement and garage lights in City Hall with more efficient fixtures.
- Upgraded 18 (all) outdoor lighting fixtures in the city mall downtown.
- Replaced about twenty percent of the outdoor lighting at the Kalamazoo Water Reclamation Plant.
- Installed occupancy sensors in City Hall and several other city buildings to cut down waste.
- Installed management systems at nine city buildings to control heating, cooling, and ventilation.
- Installed a green roof, new efficient chiller, an energy recovery system on the roof, and storm windows at City Hall. The next phase is to convert city hall from steam heat, and the city is considering using air locks for city buildings. The city plans to apply for utility rebates for efficient pumps to help pay for the costs of the planned upgrade.
- Kalamazoo's Public Service Department recently upgraded its Secondary Processes facility at the Wastewater Treatment Plant. The redesigned system and new efficient blowers have saved the city approximately 100,000 kilowatts per year.

Kalamazoo schools have also been working to implement energy efficiency upgrades in their buildings and operations. There are eighteen schools in the city that have been certified as Energy Star buildings.

Finally, Kalamazoo County voted to establish a Property Assessed Clean Energy (PACE) district in April 2015, which allows for businesses to finance energy efficiency, water efficiency, and renewable energy investments through a property tax special assessment over a 15- to 20-year term. The City of Kalamazoo supported the establishment of the county's PACE district.

Distributed Renewable Energy

The city has not undertaken a significant amount of effort in deploying distributed renewable energy technologies. The city itself has no municipal renewable energy projects, and only eight residents or businesses have installed renewable energy projects (as measured by net metering agreements). However, those eight community-based projects are generating over 85 kilowatts of electricity.

Microgrid/Smart Grid

Consumers Energy, the major electric utility provider in Kalamazoo, has begun installing AMI within the city. Full deployment of the AMI is expected by the end of 2015.

There are no microgrids in the city of Kalamazoo.

Electric Vehicles

The city has added several hybrid vehicles to its municipal fleet in recent years, including buses. In addition, the city is using one electric vehicle and is experimenting with its effectiveness. Within the broader community there has been increased use of electric vehicles. There are now 40 electric vehicle charging stations located around the city, including two in city-owned parking ramps.

Other Observations

As with other communities, funding and capacity are two of the biggest challenges standing in the way of Kalamazoo making more aggressive progress on clean energy. The city has laid out ambitious goals for clean energy and related sustainability efforts—both for municipal operations and for the community at large—but does not have enough staff dedicated to pushing forward on those initiatives, and is generally only able to make upgrades on a regular cycle of equipment replacement.

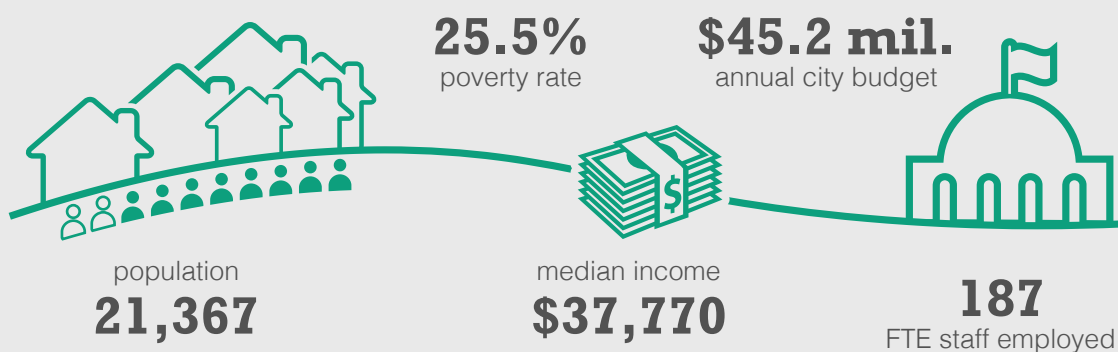
The city has been able to strategically take advantage of utility rebates for funding and implementing clean energy projects. While the amount and schedule of the rebates is not sufficient, it has been an important source of clean energy funding.

Finally, the city has struggled to move forward on some potentially high-impact energy efficiency projects. One such project in particular is street lighting, because there is a disincentive to replace streetlights when the lights are owned by the utility (as opposed to being owned by the municipality). Under the current rate structure, the city pays for the replacement but doesn't see the full cost savings benefits associated with the lower energy use. Kalamazoo had a similar issue with its wastewater treatment plant upgrades. The improvements substantially reduced energy use, but the city's costs did not drop in a commensurate way because their rate structure with Consumers Energy changed at the same time. For these projects to work, communities need to work with local utilities and the Michigan Public Service Commission to propose and agree to a tariff structure that works for both parties.

City of Marquette, Michigan: Clean Energy Profile

Marquette is a community of just over 20,000 people in Michigan's Upper Peninsula, and is home to Northern Michigan University. The city has made some fairly good progress on clean energy deployment in recent years. At both the municipal and community levels the majority of Marquette's clean energy efforts have been focused on energy efficiency, but almost a dozen distributed renewable energy projects have also been implemented in the community.

About Marquette



SOURCES: U.S. CENSUS BUREAU 2013; CITY OF MARQUETTE 2014

Planning, Policies, and Goals

The City of Marquette has been proactive in evaluating energy use and identifying opportunities for energy efficiency improvements. The city has a standing Sustainability Team made up of staff, residents, and local partner organizations such as the Lake Superior Watershed Partnership. The purpose of the team is to establish short- and long-term sustainability goals for the city; evaluate city operations and make recommendations for reducing the environmental impacts of city operations; and discuss creative ways for the city to partner with local businesses and the community to help preserve the natural environment and decrease energy consumption.

In 2002 and again in 2012, city staff and the Sustainability Team worked with Michigan Energy Options to conduct an energy assessment and plan for several municipal facilities, including the Wastewater Treatment Facility, Lakeview Arena, City Hall, and street lighting across the community. The baseline assessment was developed in order to track energy consumption, identify high-impact energy efficiency improvements, and measure efficiency gains.

Finally, the city's recently updated Master Plan (draft released for public comment in spring 2015 with the expectation of approval by June 2015) calls for developing ordinances and zoning changes specifically to allow for smaller alternative energy systems (wind, solar photovoltaic, solar water-thermal, and wood boilers) within the city for residential and commercial, as well as larger industrial systems. It also includes several related sustainability and climate adaptation objectives.

Energy Efficiency

The city always evaluates energy use in facilities projects and includes upfront and annual maintenance cost in the analysis of return on investment in order to ensure that the city is considering the most efficient upgrades. The city also works with developers of private parcels to encourage them to evaluate long-term energy costs and incorporate higher-efficiency elements into their projects. The city and Marquette Board of Light and Power (MBLP) have implemented several energy efficiency projects in recent years, including these:

- Upgraded the heating and cooling system at City Hall. Costs for the project were paid using the city's capital outlay budget.
- Replaced lighting and motor drives at the wastewater treatment plant, significantly reducing energy use.
- Replaced 154 streetlights with LED fixtures for substantial energy savings.
- Replaced the light fixtures in the downtown Bluff Street parking ramp with LED fixtures
- MBLP implemented a net metering and co-generation policy and application for customers.
- Replaced 172 metal halide bulbs with fluorescent T-8 lights in the Lakeview Ice Arena, saving the city almost \$4,000 per year on energy cost, and installed a new LED scoreboard as well.

MBLP and the city are discussing a partnership project to replace all the traffic signals with LED fixtures. The city is also determining whether there are opportunities to use the methane produced from the water reclamation plant operations to heat boilers at the prison next to the plant.

Marquette was a grant recipient in the statewide BetterBuildings for Michigan program funded by the U.S. Department of Energy. The program offered homeowners a range of opportunities for improving energy efficiency in their homes, starting with a comprehensive energy assessment. Based on the results of the assessment, participants could choose to implement recommended retrofits using reduced interest rates, utility rebates, and other financial incentives (BetterBuildings for Michigan 2013). Marquette had 712 participants in the BetterBuildings program, the highest participation of any city in the state. On average, residential participants in the program realized an estimated 14 percent in energy savings (BetterBuildings for Michigan 2013).

In 2015, Michigan Energy Options worked with Marquette to enroll the city in the State of Michigan's Community Energy Management program. Through this program, Michigan Energy Options is providing a comprehensive package of energy efficiency services to the City, such as technical energy building audits, financing and utility incentive options, and ongoing energy monitoring.

Distributed Renewable Energy

Deployment of distributed renewable energy in Marquette has been somewhat limited to date. The city itself has no municipal renewable energy projects, but 10 residents or businesses have installed renewable energy projects (as measured by net metering agreements). Those community-based projects are generating 38 kilowatts of electricity.

Microgrid/Smart Grid

MBLP has already completed its installation of AMI for all customers in the city of Marquette. The effort was completed by the beginning of 2015.

There are no microgrids in the city of Marquette.

Electric Vehicles

There has been no deployment of electric vehicle infrastructure to date in Marquette. The city does not have electric or hybrid electric vehicles in its fleet, and there currently are no public charging stations located in the city.

Other Observations

During our research and interviews, Michigan Saves staff noted several other considerations that likely impact Marquette's progress in clean energy efforts. A lack of staff capacity is probably the biggest limitation to pushing forward on clean energy efforts. While there are several staff members who have a role in clean energy efforts, there is no one person dedicated to tracking energy use and advocating for new opportunities. Staff and stakeholders have identified some great ideas for clean energy efforts, but the capacity to pursue those projects is limited given daily responsibilities.

Funding is a constraint in some cases as well. For example, the city does not have a fleet purchasing policy that requires use of electric (or other alternative energy) vehicles, and on a case-by-case basis, the costs are just too high for the city to select clean energy fleet options versus traditional fossil fuel vehicles. Availability of funding also limits the pace of implementing building efficiency and/or renewable energy projects because the city must make those upgrades when capital budgets allow (generally on a rolling replacement schedule).

A further challenge lies in the fact that there is a general lack of clean energy vision and opportunities within the community. Although the city developed and later updated an energy efficiency plan, staff felt that it was not visionary enough and was too focused on small efficiency improvements. Staff would rather set bolder goals and pursue high-impact projects—i.e., high energy savings for the dollar—in order to achieve a more significant impact on energy reduction.

Having a municipal utility could be a strong asset for the community, but there has not been an extensive partnership between the city and MBLP until recently. There is considerable opportunity to strengthen that relationship and work together to more aggressively support clean energy projects.

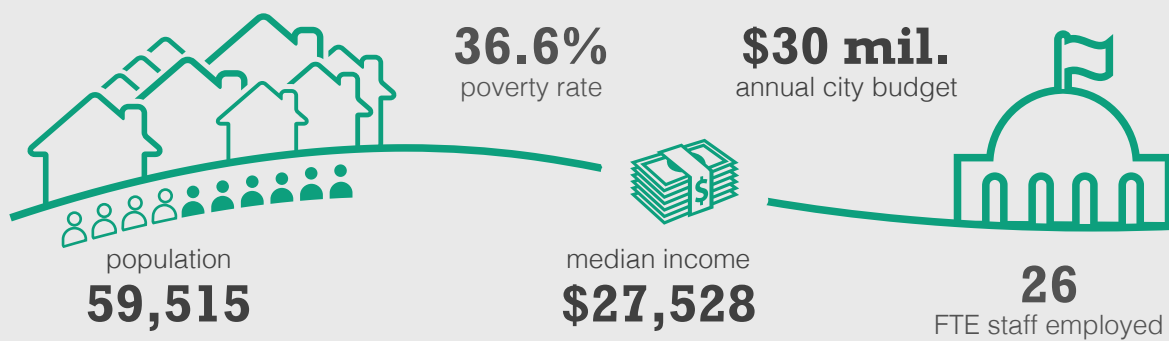
Finally, outreach and education directed to residents has not been consistent or coordinated. Generally, clean energy education efforts have been deployed when there are specific programs to offer (such as BetterBuildings for Michigan or utility rebates) or when individual entities (e.g., the city, MBLP, Superior Watershed Partnership, Michigan Energy Options) have employed separate and modest outreach efforts, such as websites or school programs.

City of Pontiac, Michigan: Clean Energy Profile

Pontiac is a community of almost 60,000 people in southeast Michigan. It is the second largest of the communities highlighted in this clean energy community profile report. The city has had substantial financial issues in the last two decades, and was under the management of governor-appointed emergency financial manager from 2009 to 2013.

Despite these fiscal challenges, the city has made some modest progress on clean energy policies, plans and deployment.

About Pontiac



SOURCES: U.S. CENSUS BUREAU 2013; CITY OF PONTIAC 2015

Planning, Policies, and Goals

The city's master plan includes several clean energy and sustainability-related goals, including a goal to change the perception of Pontiac to the "greenest municipality in Michigan" (City of Pontiac 2014). As a part of achieving that goal, the city expects to embrace green development and become a leader in energy efficient design and construction. The city is considering developing incentives for using recycled building materials, alternative stormwater management principles, and strong neighborhood design standards, and possibly providing financial incentives for residents and businesses that develop LEED-certified buildings. The master plan also states that the city will lead by example and make all municipal buildings more energy efficient (City of Pontiac 2014).

The city has updated its zoning ordinance (section 2.541) to allow for distributed renewable energy projects. The ordinance allows for renewable energy generation, including small wind and solar, in every one of the city's zoning districts. The ordinance sets specific standards and definitions for "sustainable energy generation," such as height and placement (City of Pontiac 2012).

Energy Efficiency

In 2009 the city received almost \$700,000 in Energy Efficiency Conservation Block Grant funding. The funds were used to develop an energy conservation strategy, conduct energy assessments of city-owned buildings, make energy efficiency improvements to city buildings, develop energy efficient water pumping operations at the water treatment plant, and upgrade street lighting. The city also was selected for additional energy efficiency funding through Michigan's Cities of Promise. Each of the Cities of Promise received over \$450,000 for installation of renewable energy technology and establishment of a revolving energy fund to pay for energy management support and future investments (Clean Energy Coalition 2010).

The city has used these opportunities to implement several energy efficiency improvements in recent years. Working with the Clean Energy Coalition, the city conducted audits on City Hall and the Phoenix Parking garage, and made improvements to the wastewater treatment facility (e.g., pump upgrades) to improve the efficiency of those systems. In 2014, the city spent about \$900,000 to replace more than 3,000 streetlights with LED fixtures. The expected annual savings from this project is approximately \$275,000, and because the city owns the streetlights (rather than the utility owning them), the payback on the expenditure is just over three years.

In 2015, the city plans to update additional outdoor lighting systems to solar lighting, possibly funded through grants. In addition, the aging air conditioning units in City Hall will be replaced with more efficient units.

Distributed Renewable Energy

Deployment of distributed renewable energy in Pontiac has been somewhat limited to date. The city itself has no municipal renewable energy projects, but nine residents or businesses have installed renewable energy projects (as measured by net metering agreements). Those community-based projects are generating over 25 kilowatts of electricity.

Microgrid/Smart Grid

Both DTE and Consumers Energy have been working to deploy AMI technologies to customers in the City of Pontiac. The utilities expect to have full installation by the end of 2015.

There are no microgrids in the city of Pontiac.

Electric Vehicles

There has been no deployment of electric vehicle infrastructure to date in Pontiac. The city does not have electric or hybrid electric vehicles in its fleet, and currently there are no public charging stations located in the city.

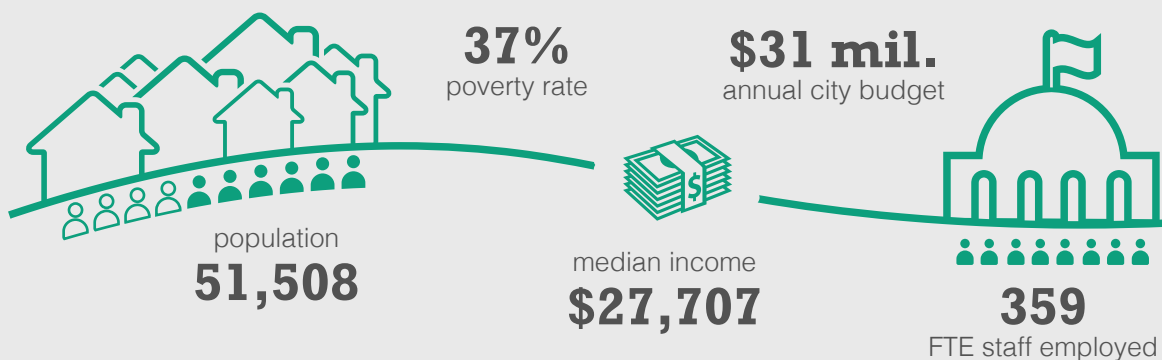
Other Observations

Given Pontiac's financial challenges over the last ten years, it is impressive that the city has been able to make as much progress on clean energy as it has. The ability to do this work has been tied to the availability of substantial grant funding. The city is still coming out of its financial crisis, and city budgets are extremely limited, which in turn limits the availability of staff focused on clean energy issues. The city does not have a dedicated energy manager or a standing energy or sustainability committee to help generate ideas, oversee projects, and drive community engagement. This impacts the city's capacity to move forward on clean energy deployment. And while the recently adopted master plan has a goal for Pontiac to become the "greenest municipality in Michigan," there are no specific actions or strategies identified for moving toward that ambitious goal.

City of Saginaw, Michigan: Clean Energy Profile

Saginaw is a mid-sized community of about 50,000 people in the central Michigan and “thumb” regional area. Saginaw has had budget and economic challenges in recent years, but has still made some modest strides in clean energy planning, policy, and deployment efforts. The city received a significant amount of grant funds in 2009, which spurred quite a bit of effort around energy efficiency and, to a lesser extent, renewable energy. Since that time progress has slowed considerably, but the city continues to make ongoing investments in energy efficiency as grant and other funds are available and as improvements in equipment or buildings are made.

About Saginaw



SOURCES: U.S. CENSUS BUREAU 2013; CITY OF SAGINAW 2014

Planning, Policies, and Goals

In 2009, the city developed an Energy Efficiency and Conservation Strategy using EECBG funds. The strategy includes a preliminary municipal energy-use analysis, and it benchmarks the city's facilities against other buildings with similar characteristics. Energy audits, lighting analyses, and building walk-through energy assessments were used to identify potential energy savings. The plan includes specific recommended actions for building efficiency improvements, with costs and potential energy savings described (AKT Peerless 2010).

In addition, the city has developed a funding tool to support clean energy improvements called the Clean Energy Coalition (CEC) Fund, which "accounts for the projects that provide and promote clean energy technology within the City of Saginaw" (City of Saginaw 2015). When the fund was developed, the major source of revenue was federal and state grants, as well as loan distributions. Since 2013, as grants and loans have declined or been spent, the CEC Fund has been getting a \$40,000 annual transfer from the general fund. The amount is based on what the city estimates it has saved or will save from previous years' clean energy projects (City of Saginaw 2014).

Energy Efficiency

Using about \$500,000 in EECBG funds, the city implemented several clean energy retrofit projects, including:

- Internal and external lighting retrofits
- Lighting and thermostat controls
- Heating and cooling duct and ventilation improvements

Most of these upgrades were done at City Hall, but some were also implemented at the Department of Public Services and the Police Department. The city estimates that these upgrades have saved \$150,000 to \$200,000 a year.

In addition, Saginaw was selected as one of Michigan's eight Cities of Promise—a statewide quality-of-life initiative designed to help urban areas address declining population, blight, and economic development (Clean Energy Coalition 2010). The program brought some additional funding to the city, and about \$220,000 of that funding was used to retrofit all of the city's traffic signals (103 traffic signal fixtures). The city procured the material and had its own Department of Public Services crew install the fixtures to ensure maximum cost effectiveness. The resulting energy savings from this project have been about \$150,000 per year—a payback period of less than two years.

In 2015 and early 2016, the city will undertake a \$3 million project to replace 7,000 streetlights. The project will save the city about \$400,000 in annual energy costs. The city will procure the materials for the project to get the most competitive cost, and will use contractors to install the new fixtures. The city is borrowing the money for the project, and energy savings will help pay back the loan. The city intends to install the replacements in the winter of 2015 and 2016 to take advantage of lower contractor installation costs during slow periods in the contractor's business cycle. Because the city owns the streetlights, the energy savings will accrue to the city and be put toward legacy costs and the general fund.

Finally, the city set aside \$15,000 from its EECBG funds to offer local businesses free energy audits of their facilities. The city worked with a local energy contractor to provide the audits; business owners can then choose whether to implement recommended energy efficiency improvements.

Distributed Renewable Energy

The City of Saginaw was selected to participate in the Consumers Energy Experimental Advanced Renewable Projects program. The city spent about \$150,000 for a 24-kilowatt solar energy system at the Public Services building. The bulk of the system (20kW) is a rooftop-mounted system of static solar panels; a smaller (4kW) pole-mounted tracking array sits in front of the building. The electricity generated, for which Consumers Energy will pay the city just over \$6,000 per year for 15 years, is sent directly to Consumers Energy's secondary utility lines. The city used some of its EECBG funding to pay part of the system's cost and borrowed the remainder from Saginaw County's EECBG revolving loan fund, to be paid back through energy savings over time (City of Saginaw n.d.).

The Dow Event Center, in downtown Saginaw, partnered with Saginaw County to put a \$350,000 solar array on the side of the event center. The array is expected to offset the Dow Events Center's annual energy costs by several thousand dollars per year. The Center will install a digital monitor that will allow people to see how much energy is being generated by the solar panels.

No other distributed energy projects have been deployed in the city.

Microgrid/Smart Grid

Consumers Energy has been working to deploy AMI technologies to customers in the city of Saginaw. The utility expects to have full installation by the end of 2016.

There are no microgrids in the city of Saginaw.

Electric Vehicles

The City of Saginaw does not have any electric or hybrid electric vehicles in its municipal fleet, and there has been little deployment of supporting electric vehicle charging station technology (currently there are two electric vehicle charging stations in the city).

Other Observations

As with other communities, staff capacity and funding were noted as the biggest challenges to accelerating clean energy deployment. The city does not have a single staff person or committee focused on clean energy. The Department of Public Services oversees municipal infrastructure, and the Planning Department addresses clean energy and overall sustainability policy and zoning. Although these departments try to coordinate, their daily job requirements often limit their level of collaboration and ability to sufficiently leverage each other's efforts.

The city has been proactive in funding smart projects with high return on investment and in maintaining a fund to continue ongoing energy efficiency improvements. While the fund amount has been modest during the past few years, it is a great vehicle for not only making continuous upgrades but also keeping the need for further clean energy improvements on the radar of local leaders.

City staff also noted that grants could provide significantly more funds to get larger clean energy projects done, but significant staff time is required to seek out those projects and provide all of the required reporting. This administrative burden is often a barrier to pursuing additional grant funds. Staff indicated that having an organization that could provide weekly or bi-weekly updates of grant opportunities related to clean energy would help, because they don't have the time to do grant proposal searches themselves.

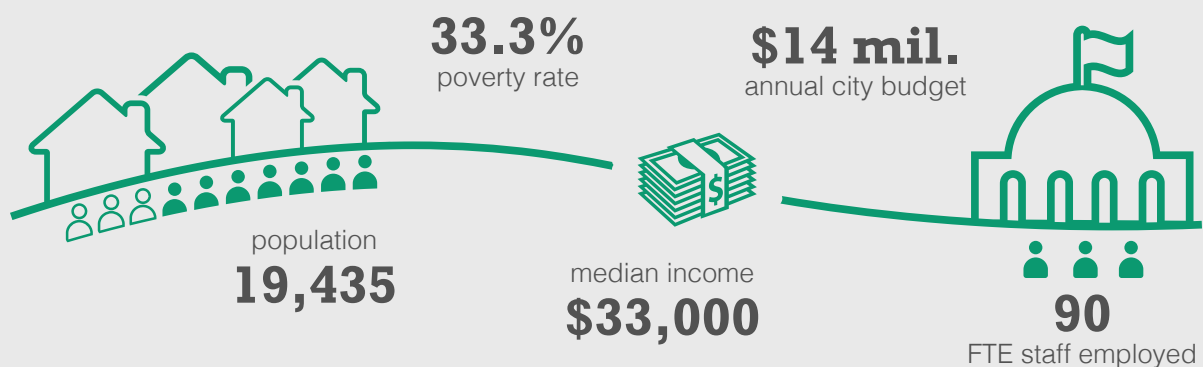
Progress in deploying clean energy has likely also been slowed due to a lack of strong vision and goals around what the community is striving for. The city's energy plan is solely focused on energy efficiency in municipal buildings and operations; it does not include any broader clean energy goals or objectives (such as deployment of renewable energy, microgrids, or vehicle fleets). Absent a clear picture of clean energy goals the community would like to achieve, progress will continue to be piecemeal and opportunistic rather than strategic.

Finally, Saginaw undertook community engagement efforts (such as public forums) during the EECBG project, but there has been no ongoing community visioning, engagement, or outreach around clean energy efforts in the city. As an example, there is no educational kiosk or panel outside the Department of Public Services to inform the public about the solar array project or provide them with information about ways in which the project is helping to the city save money. Aside from utility energy efficiency program outreach, there is no comprehensive or coordinated effort to encourage clean energy efforts in the broader community.

City of Ypsilanti, Michigan: Clean Energy Profile

Ypsilanti is a city of almost 20,000 people located in southeast Michigan near Ann Arbor. Ypsilanti has been a leader in deploying clean energy technologies, particularly at the community level. Programs like BetterBuildings for Michigan and SolarYpsi, a grassroots effort of private individuals/ solar energy advocates, have been successful in reducing energy and expanding renewable energy use in the community. Residents and businesses are engaged in sustainability issues, and city staff believe that residents and businesses choose to locate there because of the sustainability ethos in the community.

About Ypsilanti



SOURCES: U.S. CENSUS BUREAU 2013; CITY OF YPSILANTI 2014

Planning, Policies, and Goals

From a planning and policy perspective, Ypsilanti has been proactive on clean energy issues. The city's master plan has strong sustainability elements, including goals for production of renewable energy and reduction of greenhouse gas emissions. In addition, the city developed solar project guidelines for historic district properties, and updated zoning codes to identify standards for renewable energy in different land use zones (such as residential and commercial districts). The policies allow for distributed solar and geothermal, and provides city discretion for other technologies as they emerge. The city is also a Michigan Municipal League Green Communities Challenge silver level member, which reflects the city's commitment to being a sustainability leader.

Energy Efficiency

The city has made some fairly significant improvements to reduce its own energy use. Energy audits were completed for properties owned and managed by the city, including City Hall, the fire station, and the police station. As a result of these audits, the city has been making modest building efficiency improvements as resources have allowed, such as replacing lighting with more efficient fixtures. In addition, the city has converted almost 100 percent of its streetlights to LED fixtures. The cost of the upgrade was paid through a special assessment. The city also created a municipal energy efficiency revolving loan that allows use of cost savings from energy efficiency upgrades to fund additional municipal energy efficiency projects.

The City of Ypsilanti partnered with other cities and stakeholder organizations in the region to establish the Southeast Michigan Regional Energy Office (SEMREO), which has secured millions of dollars in grants to deploy energy efficiency and renewable energy projects in the region.

In addition, Ypsilanti was one of several BetterBuildings for Michigan communities. This program offered homeowners comprehensive energy assessments for a small co-pay amount, and up to \$5,000 in incentives and/or zero percent financing through Michigan Saves to help residents make energy-saving improvements to their homes. Almost \$200,000 in energy efficiency assessments and improvements were implemented by the 159 households that participated in the program.

Finally, because Washtenaw County has created a Property Assessed Clean Energy (PACE) district, the city is able to offer PACE financing projects for commercial, industrial, and nonprofit building owners in Washtenaw County. PACE allows these property owners to finance clean energy projects using long-term loans repaid as voluntary property assessments.

Distributed Renewable Energy

Some of Ypsilanti's greatest progress and leadership has been in solar energy deployments made as a result of citizen volunteer efforts. A local group of dedicated advocates, SolarYpsi, has been actively working for many years to increase the deployment of distributed solar energy throughout the community. A 2013 report by Environment Michigan notes that Ypsilanti is on its way to becoming a "solar destination" and renewable energy advocates hope the city's image as a solar destination will attract tourists as well as businesses and residents to the city. Presently, there are almost 30 solar power installations in the city for a total of 144 kW (which is an average of about seven watts per person). In 2014 SolarYpsi worked with the city to pass a resolution supporting a goal of 1,000 solar projects in the city by 2020 (Solar Ypsi n.d.). The group has conducted assessments of solar opportunities, raised over \$200,000 in funds, and provided direct technical assistance to dozens of residents and businesses in Ypsilanti. SolarYpsi believes that focusing renewable energy deployment in a small geographic area is better than working at a larger scale because the work is more visible, thereby creating more community buzz and momentum, and provides economies of scale that help lower the costs for residents and businesses.

SolarYpsi also provides significant public education and outreach around solar energy in the community. The group has a website that describes each of the solar energy projects, and it puts Quick Response (QR) barcode tags on each of the existing solar projects so that people can scan the tags and link directly to the website to learn more about the project. In addition, the group hosts solar energy education events and gives presentations at schools as well as business and community events.

The city of Ypsilanti has also tried to pursue municipal renewable energy projects. An initial effort with DTE Energy to build a \$4 million solar array project at a former city landfill fizzled over concerns about siting a solar project on a landfill site. DTE is now working with the city to site a solar array project at Highland Cemetery in Ypsilanti.

Microgrid/Smart Grid

DTE Energy has been working to deploy AMI technologies to customers in the city of Ypsilanti. The utility expects to have full installation of AMI by the end of 2015.

There are no microgrids in the city of Ypsilanti.

Electric Vehicles

There has been no deployment of electric vehicle infrastructure to date in Ypsilanti. The city does not have electric or hybrid electric vehicles in its fleet, and currently there are no public charging stations located in the city.

Other Observations

Participants interviewed agreed that personal relationships and word of mouth are critical to adoption of clean energy, which means that Ypsilanti's smaller size and general sense of community pride have helped contribute to the city's success in advancing energy efficiency and renewable energy efforts.

Like other communities, however, Ypsilanti has ongoing challenges in making greater progress on clean energy programs and projects. The lack of staff time and capacity has been a constraint on progress. While the city's staff is very supportive of clean energy efforts, there simply are not enough people or resources to move forward on all the efforts the staff would like to pursue. There is no single staff person (such as an energy or sustainability coordinator) dedicated to pushing forward on clean energy projects and tracking their progress, and the city does not have a standing sustainability or energy committee.

Funding is also an ongoing challenge. The city has been successful in getting grant funding, but that is cyclical and doesn't cover nearly enough of the costs. For that reason the city is hopeful that the new energy efficiency revolving loan will help to provide funding for future, ongoing energy efficiency upgrades to city facilities.

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Appendix A: People Interviewed for the Community Clean Energy Report

Anne Saliers, Conservation Programs Manager	Holland Board of Public Works
Ryan Cotton, City Manager	City of Holland
Rich Sullenger, Public Works Department Head	City of Alpena
Phil Karwat, Director of Public Works	City of Saginaw
Curt Goodman, Director of Public Works	City of Marquette
Jim Sabo, City Planner	City of Pontiac
Bonnie Wessel, Planning Manager	City of Ypsilanti
Dave Strenski	SolarYpsi
Jacob Corvidae, Executive Director	EcoWorks
Laura Lam, Director of Community Planning and Development	City of Kalamazoo
Jerome Kisscorni, Assistant City Manager	City of Kalamazoo

Appendix B: Mott Energy Baseline Project Community Interview Guide

We are partnering with the Mott Foundation to conduct a statewide assessment of the clean energy landscape. As part of the effort we are drilling down into a handful of communities to get a better understanding of what this looks like at the local level. I have a few questions to ask you about municipal and community-level policies, programs and activities related to clean energy. It will probably take about 15 – 20 minutes.

Municipal clean energy policies/regulations

1. Do you have a specific clean energy (and/or climate action) plan for your community that addresses energy use, conservation, and other clean energy efforts?
2. Local policies or ordinances that either require or incent energy efficiency and/or renewable energy in your community (e.g., building codes, PACE legislation)
3. Are energy efficiency and renewable energy efforts integrated into the fabric of the community in other ways such as through the master plan? Are there goals established, action steps, accountabilities, benchmarks, etc. in place in that plan that support the efforts?
4. Are there other related sustainability policies in place (e.g., green building incentives or requirements)
5. Do you have a designated Sustainability Team or Sustainability Coordinator at the city who is in charge of organizing and moving sustainability efforts forward? Are energy efficiency and clean energy technologies part of that person/group's charge?

Clean energy deployment and tracking

6. Has your community done municipal-level energy efficiency audits? If so, how are those audits tracked and measured? How were they funded?
7. Have you made building upgrades/improvements or investments in clean energy technologies (e.g., lighting, renewable energy) to address audit findings? If so, would you be willing to share that data (e.g., building type, square footage, audit results, infrastructure improvements made, costs)? How were investments funded?

8. Are there programs available in your community for doing private (residential, commercial, industrial) energy audits (e.g., through utility programs, BetterBuildings, MI Saves or others) and energy efficiency/clean energy improvements?
 - i. If so, do you track how many people participate and the results (audit results, implementation of improvements)?
 - ii. How is that done (i.e., is there a way for those residents/businesses to report that to a centralized place)?
9. Do you have any LEED-certified or Energy Star buildings in your community? If so, how many?

Participation in related Clean Energy Programs

10. Is the community involved in broader county or regional clean energy initiatives?
E.g., weatherization, utility programs, clean cities/fleet programs.
11. Does your community participate in state and national organizations such as MML's Green Communities Challenge, U.S. Conference of Mayors Climate Protection Agreement or Energy Star Program?

Communicating/Sharing Results

12. What energy-efficiency educational and outreach programs are available in your community? How do people know what tools are available to them?
 - i. Are these programs provided by you or another group in your community?
 - ii. Do you know how they are funded?

Other considerations

13. Are there other things you'd like to share about clean energy in your community, such as key factors of success or challenges?