Creating a more Resilient Washtenaw

Reducing energy use, costs, and greenhouse gas emissions in municipalities' buildings

A toolkit for local governments

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Ann Arbor/Washtenaw 2030 District

U-M SEAS Resilient Washtenaw Capstone Team

Washtenaw County

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Glossary

AERC Attachments Energy Rating Council

BTU British Thermal Unit (measure of energy use, usually for non-electric sources)

CCF 100 Cubic Feet (Often of Natural Gas)

COP Coefficient of Performance, ratio of heating/cooling effect to net work input, unitless.

CVT City, Village, or Township

DOE U.S. Department of Energy

EER Energy Efficiency Ratio, the average rate of cooling to the average rate of electrical energy consumed, measured in Btu/Watt-hour

EPA U.S Environmental Protection Agency

HSPF2 Heating Seasonal Performance Factor (2), an updated heating energy efficiency metric from the HSPF metric.

kWh kilowatt hour (a measure of energy use, usually for electricity)

MEAP Municipal Energy Action Plan

NFRC National Fenestration Rating Council

PPA Power Purchase Agreement

RECs Renewable Energy Certificate

When one MWh of renewable energy is generated, a tradeable credit is created, called a renewable energy certificate. This REC represents the social and environmental benefits of that electricity, the most frequently cited benefit being the emissions reductions as compared to fossil fuel generation. Not all RECs are created equal. The highest-quality RECs:

- Support projects that are "additional", meaning the project wouldn't have happened without the purchase of that REC[1]
- Are verifiable; come from a third-party certified generation facility[1]
- Come from local sources, supporting local businesses and reducing emissions within Michigan[1]

For more information on RECs, please see the **EPA's writeup**.

SEER2 Seasonal Energy Efficiency Ratio, an updated measure of cooling efficiency from SEER. It measures cooling output over a typical season over the energy it uses in Watt-hours.

UEF Uniform Efficiency Factor (measure of the efficiency of water heaters)

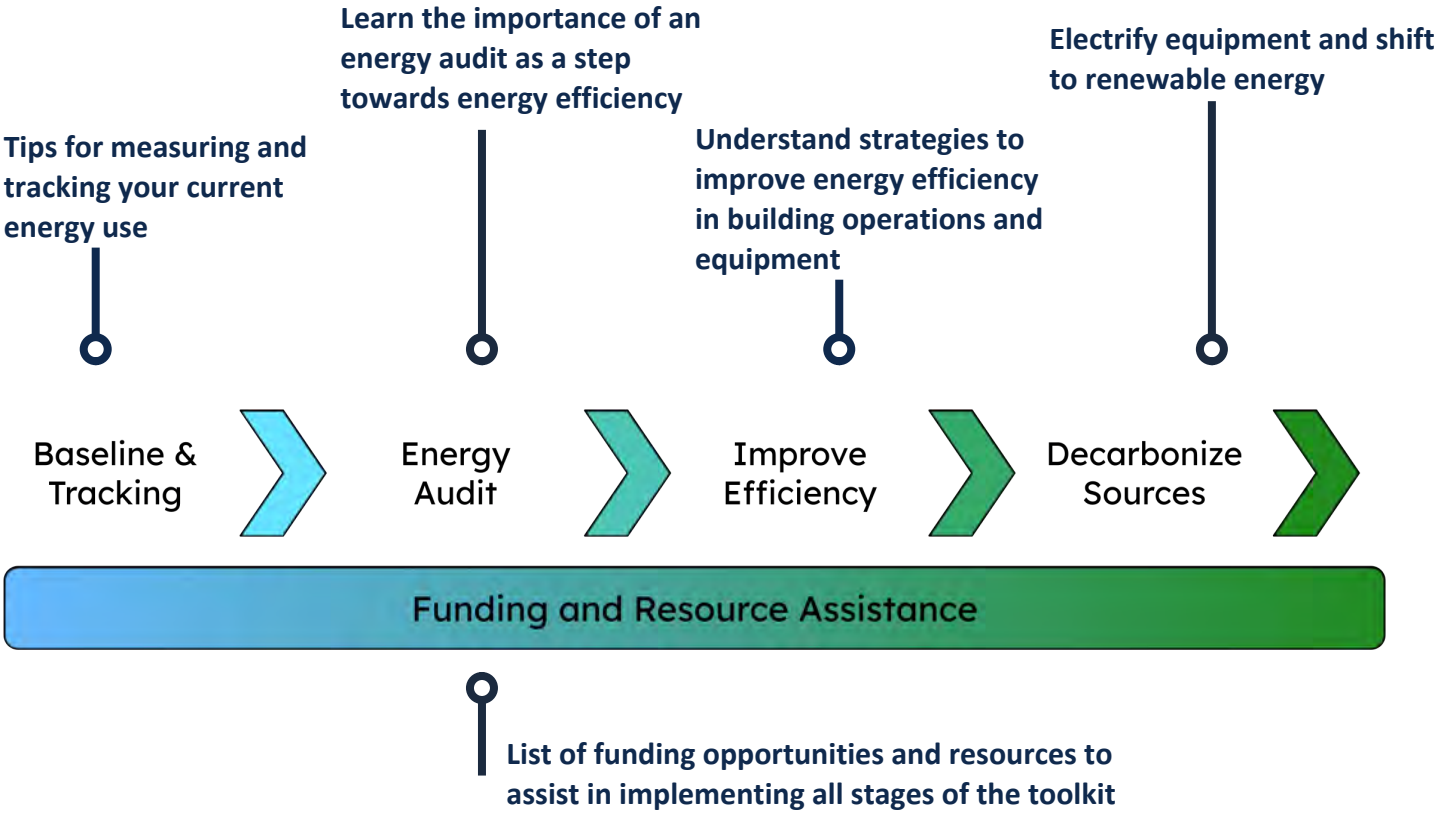
Introduction

TOOLKIT GOAL

Communities in Washtenaw County have been leaders in implementing energy efficiency projects. With the adoption of the **Resilient Washtenaw Plan**, Washtenaw County looked to learn more about common challenges, provide resources to support communities, and accelerate the pace of energy efficiency project adoption. While working with Washtenaw County officials and the **Ann Arbor/Washtenaw 2030 District**, our project team met with local government officials from CVTs across the county to learn about their experiences with energy efficiency in their municipal-owned buildings. These meetings established the foundation for this toolkit, designed to assist Washtenaw County municipalities with energy efficiency implementation. Based on the size and structure of many municipal buildings, the information is tailored for smaller buildings. For more information on larger commercial buildings, consider visiting the resources we have linked throughout the toolkit.

Toolkit Roadmap

This toolkit is split into steps in an energy efficiency journey, starting with developing an understanding of current energy use and ending with electrification and renewable energy. Each of these steps may require support, which can be found in the **Funding and Resource Assistance** section. This guide is color coded for your convenience, beginning in light blue (Baseline & Tracking) and becoming greener as you implement changes in your building(s) from efficiency improvements to decarbonizing sources.



Baseline & Tracking

TRACK ENERGY USE IN YOUR BUILDING

Tracking energy use in your building allows you to gain a more in-depth understanding of how much energy is being used, at what times energy is being used, and what activities use the most energy. It also helps you document the tangible benefits from making energy efficiency improvements in your building.

Before establishing any energy efficiency targets for your building(s), it is important to understand existing building energy use. Energy benchmarking is a quick and simple way to begin to estimate energy use intensity for a building with readily available information from gas and electric bills. This enables facilities managers to assess energy use over time. **ENERGY STAR Portfolio Manager** is a free program created by the EPA that tracks electricity and gas use for municipalities. It may be more expedient to partner with the Ann Arbor/Washtenaw 2030 District, which has experience connecting utility accounts to buildings for accurate tracking and will not charge you for this service.

ENERGY STAR Portfolio Manager offers an accurate, comprehensive, and secure energy use tracking system. Although some steps in setting up ENERGY STAR Portfolio Manager for your building can be complicated, the Ann Arbor/Washtenaw 2030 District is experienced with this system and is ready to assist you - please reach out to **jculbertson@2030Districts.org**.[2]

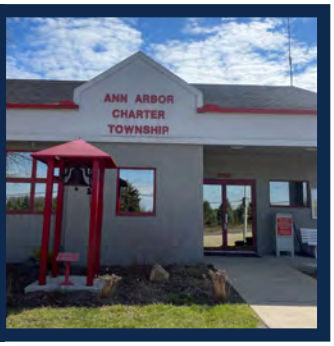
Information needed for each building includes:

- Year building constructed (estimate is fine)
- Building square footage
- Building uses (e.g. office, police station, fire station), and approximate square footage (or percentage of building space) associated with each use
- Account number(s) for gas & electricity
- Written consent for DTE to share this information with Ann Arbor/Washtenaw 2030 District

We feature municipal buildings from across the county throughout the report. A photo of the township hall for each city, village, and township is presented alongside the year it was founded.

ANN ARBOR TOWNSHIP

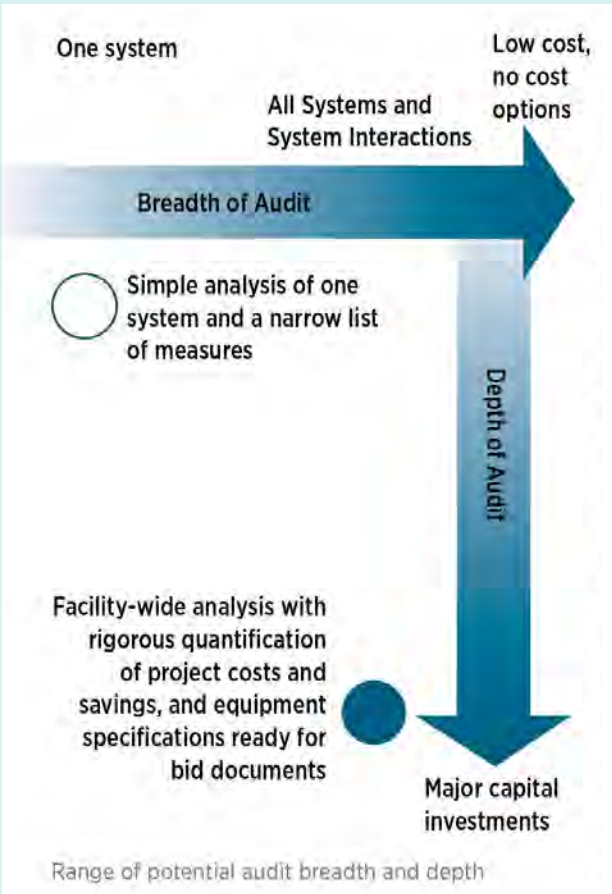
Founded in 1827



Energy Audit

WHAT IS AN ENERGY AUDIT?

An energy audit documents a building's energy flows, including assessing the building's shell, mechanical systems, and lighting system. An audit provides information such as the amount of energy used during a given period, where inefficiencies lie, and which problem areas should be pursued.[3] By understanding and prioritizing specific areas of building efficiency, you can deploy resources effectively while achieving improvements in energy use. This video summarizes commonly asked questions. Energy audits are comprehensive assessments of a building's overall energy use. They can either be conducted by building managers or by certified professional energy auditors.

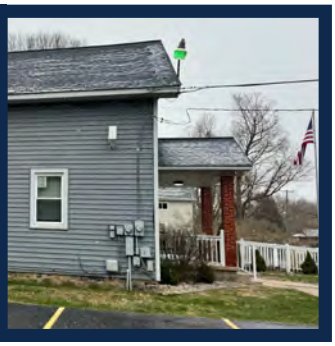


Source: PNLL for DoE: A Guide to Energy Audits[4]

The manager or auditor will analyze the building's previous energy bills, gather background information about the age and composition of the building, gather information from building occupants on any temperature issues, and examine the equipment and layout of every room in the building. The manager or auditor will then offer recommendations on how to best address energy efficiency-related issues in the building that help to maximize cost savings and comfort.[3] Conducting an energy audit is an excellent first step in learning more about overall energy use in your building and determining areas for improvement![5]

AUGUSTA TOWNSHIP

Founded in 1836



BARTON HILLS VILLAGE

Founded in 1913

Energy Audit

TYPES OF ENERGY AUDITS

An energy audit can help you identify energy waste, improve efficiencies, and save money. Energy audits come in different shapes and sizes, but there are three main types for commercial facilities, as defined by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), the body that oversees and sets energy audit standards.

A **Level One** audit (or Energy Assessment) is the most basic kind of energy audit. It is often offered by utility companies at no cost. It gives general energy savings ideas for building managers, but does not include specific energy analysis, costs, or savings estimates. It is a great starting point for buildings that have never been audited before, as well as giving managers an idea of whether the building is a good candidate for further assessment.

A **Level Two** audit includes a more detailed analysis of a building's energy costs and use (usually through examination of energy bills), and includes conducting a brief on-site survey of the building. This analysis will identify and provide a savings and cost analysis of low-cost/no-cost measures. It will also provide a list of potential capital improvements that merit further consideration, and an initial judgment of potential costs and savings.

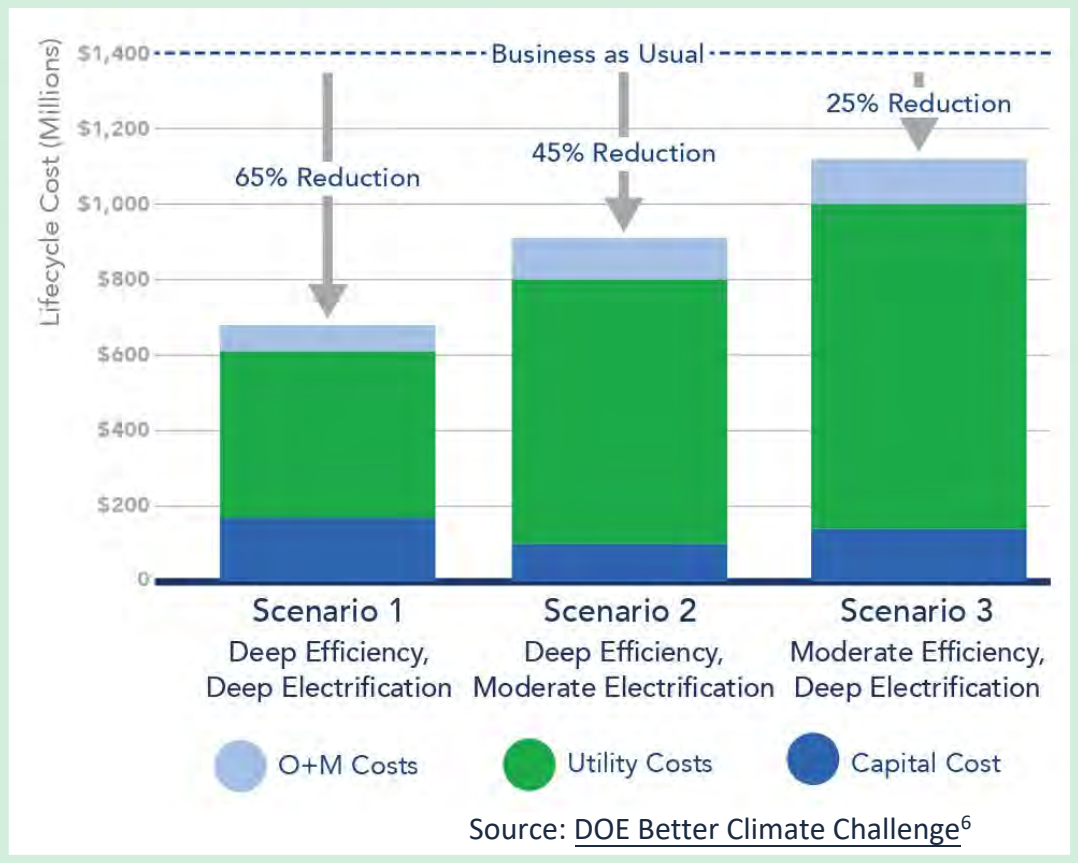
A **Level Three** audit, or "investment grade" audit is a more detailed building survey and energy analysis. This will include a breakdown of the energy use within the building, as well as identifying and providing savings and cost analysis of all practical measures that meet the owner's constraints and economic criteria. It will also include a discussion of any changes to operation and maintenance procedures and provide a listing of potential capital-intensive improvements that require more thorough investigation and financial analysis.

Energy Audit Summary[4]

TYPE	COST	LEVEL OF ANALYSIS	PROJECT COST ANALYSIS	USE CASE
Level One	$	Surface	No	Small facilities without capital improvement budget
Level Two	$$	More in-depth	General	Larger facilities without previous audits, or facilities looking to undergo renovations
Level Three	$$$	Complex	More specific	Larger facilities without previous audits, or facilities looking to undergo renovations

SECTION 1: EXISTING EQUIPMENT

Lifecycle cost analysis can help organizations evaluate the longterm implications of their emission reduction investments. This figure illustrates how different scenarios can be compared from a lifecycle cost perspective, with higher upfront investments leading to lower long-term operational costs.



Source: DOE Better Climate Challenge[6]

RETROFIT VERSUS UPGRADE

Retrofitting

- Quicker
- Cheaper
- Preferred if the building is largely efficient, has a small budget, or a limited amount of time.[7] An example of retrofitting would be adding timers or installing motion sensors to the current lighting system

Upgrading

- Better option if the building is largely inefficient with significant areas that can be improved.[8]
- Upgrading involves changing the physical parameters of the building. One example of an upgrade would be installing an entirely new lighting system.[9]

Improve Efficiency

Create a Facility Equipment List

Creating a facility equipment list (if one does not already exist) is another option to help plan and prioritize energy efficiency improvements. It will take some time for your facilities manager to compile. By ensuring easy access to the information shown below, current and future facilities managers will be able to make decisions on equipment based on a single, easy to consult source of information, increasing the ease of future projects. Centrally tracking existing equipment, including age and condition, enables and streamlines the implementation of equipment efficiency and performance standards.[10]

Kinds of equipment often included:

- Rooftop HVAC units and air handlers
- Boilers, furnaces, air conditioners
- Pumps and fans
- Building management systems and other controls

Information about equipment often included:

- Location (facility)
- Type, model, description, etc.
- Capacity
- Unit age or date installed
- Anticipated life (total and remaining)

Establish Reduction Goals & Create a Municipal Energy Action Plan[96]

Once the energy audit is complete, begin establishing reduction goals and a municipal energy action plan (MEAP) specific for each system.[7] One strategy is to consider the following:

- Develop concise, measurable goals for your municipality's energy use
- Identify implementable strategies assigned to specific departments or individuals to help achieve these goals
- Establish a timeline for completing or implementing your strategies
- Estimate the costs and funding resources for your strategies
- Share your MEAP with stakeholders and community leaders to solicit feedback and support
- Legitimize your MEAP through adoption by your local unit of government

CITY OF DEXTER

Founded in 1824

CITY OF MILAN

Founded in 1831

Improve Efficiency

Applying Evaluation Criteria to Scenarios

The figure shown below provides one example of using evaluation criteria to evaluate various depth of upgrades scenarios. Evaluation criteria help you answer the question: What information do stakeholders need to evaluate decarbonization pathways? The evaluation criteria is different for each building. This example highlights an organization using a qualitative assessment of equally weighted criteria to compare three different scenarios. Each scenario is evaluated based on the depth of the energy efficiency and electrification upgrades. Selecting a pathway is a critical step in improving efficiency. This evaluation should focus on identifying the best pathway for the organization to meet its target based on the established evaluation criteria.

Evaluation Criteria	SCENARIOS: Deep Efficiency, Deep Electrification	SCENARIOS: Deep Efficiency, Moderate Electrification	SCENARIOS: Moderate Efficiency, Deep Electrification	NOTES
Lifecycle Cost	●	◒	○	Deep efficiency scenarios reduce operating costs, and full electrification allows for more cost to be offset by on-site solar.
Capital Cost	○	●	◒	Full electrification has a higher capital cost, but pairing it with deep efficiency measures mitigates some of these costs. Moderate efficiency requires more solar/storage to meet goals.
Emissions Reductions	●	◒	◒	Partial electrification reduces the ability to displace emissions with on-site and off-site renewables and lowers benefit of a Greening Grid.
Occupant Benefits	●	●	◒	Deep efficiency options improve thermal comfort and occupant well-being.
Risk	●	○	◒	Deep efficiency/moderate electrification has a small margin of safety for achieving the 80% reduction target and leaves regulatory risk due to continued reliance on natural gas

○ Fair ◒ Good ● Best

Source: DOE Better Climate Challenge[6]

BRIDGEWATER TOWNSHIP

Founded in 1832

CITY OF CHELSEA

Founded in 1820

SECTION 2: LIGHTING

Lighting is the starting point to improve energy efficiency and there are several easy, low-cost strategies to reduce energy use while also creating a happier and more productive environment.[11]

To ensure that a lighting upgrade leads to an effective and efficient system, design the system to provide the appropriate amount of light for the tasks to be performed in that space. To determine the amount of foot-candles currently in your buildings, divide the current lumen rating of your light fixtures by the total square footage. If there are multiple lighting sources add the total lumens together and divide by total square footage.[12]

The table below from ENERGY STAR Portfolio Manager offers a guide for foot-candle targets based on the tasks being performed in the space.[11] Keep in mind that the lighting level targets should be considered average maintained levels for the task; they should not necessarily be applied uniformly as the ambient light level for the entire space. Lighting levels should be customized through the use of supplemental task lighting in areas requiring higher localized levels. Target lighting levels should be the sum of the ambient and task lighting levels.

Category	Description	Illuminance (foot-candles)
Orientation and simple visual tasks in public spaces where reading and visual inspection rarely take place and visual performance is not crucial. Higher levels recommended for tasks where visual performance might be required.		
A	Public spaces	3
B	Simple orientation for short visits	5
C	Working spaces where simple visual tasks are performed	10
Common visual tasks in commercial, industrial, and residential applications—where visual performance is important. Recommended illuminance levels differ based on the visual tasks being illuminated. Higher levels recommended for visual tasks with critical elements of low contrast or small size.		
D	Performance of visual tasks of high contrast and large size	30
E	Performance of visual tasks of high contrast and small size or low contrast and large size	50
F	Performance of visual tasks of low contrast and small size	100
Special visual tasks including tasks with critical elements of very small or very low contrast. Visual performance is critical. Recommended illuminance levels should be achieved with supplementary task lighting. Higher recommended levels are often achieved by moving the light source closer to the task.		
G	Performance of visual tasks near threshold	300–1,000

Source: EPA ENERGY STAR Portfolio Manager[11]

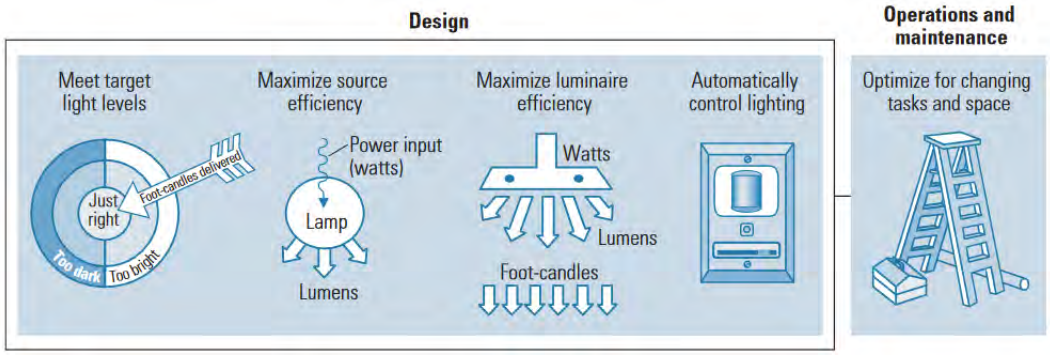
Improve Efficiency

Determine the total number and type of lights present in municipal buildings. If it is difficult to determine the specific type, NCAT's article on common lighting types may be helpful. This will set a baseline level of energy that the current lighting system uses and the lumens, or amount of light, produced. This is the appropriate time for an energy audit and facility equipment list. These create easy access to information, making a single record for facilities managers to track lighting history and plan for future upgrades. The energy audit results will help yield an action plan for lighting changes.

Lighting options to increase efficiency:

- Changing incandescent light bulbs to LEDs (easy and offers several benefits such as lifespan, energy efficiency, durability, and are ecologically friendly)[13]
- Installing timers on lights where necessary (i.e. areas that are not used often, outdoor lights)[14]
- Motion sensor lights (achieve 30-60% energy savings)[14]
- Smart lights or remotely controlled lights
- Implementing daylight dimming will adjust the brightness or color of the lights based on the amount of light coming into the building

Example of a comprehensive lighting upgrade strategy roadmap



Source: EPA ENERGY STAR [11]

The potential cost savings of switching to energy efficient lighting are summarized below:

Lifetime Savings for Efficient Omni Directional Light Bulb Models

PERFORMANCE	BEST AVAILABLE	ENERGY STAR	LESS EFFICIENT
Light Output (lumen)	800	800	800
Input Power (watt)	5.5	11	18
Annual Energy Use (kWh)	21.45	43	70
Annual Energy Cost	$2.12	$4.25	$6.95
Lifetime Energy Cost	$11.60	$23.19	$37.95
Lifetime Cost Savings	$26.35	$14.76	======

Source: Federal Energy Management Program[15]

SECTION 3: HVAC

Starting Out

Beginning an energy efficiency process for building systems can seem daunting and expensive. While this is certainly a concern for capital projects, there are many low-cost steps to increase system efficiency while they are planning for future building upgrades.

Maintenance

Replacing air filters every three months is one of the simplest measures to increase operating efficiency of your furnace.[16] This, combined with other recommended maintenance from ENERGY STAR's checklist, like checking thermostat settings and system controls, can help improve your equipment's operations at very little cost.[17]

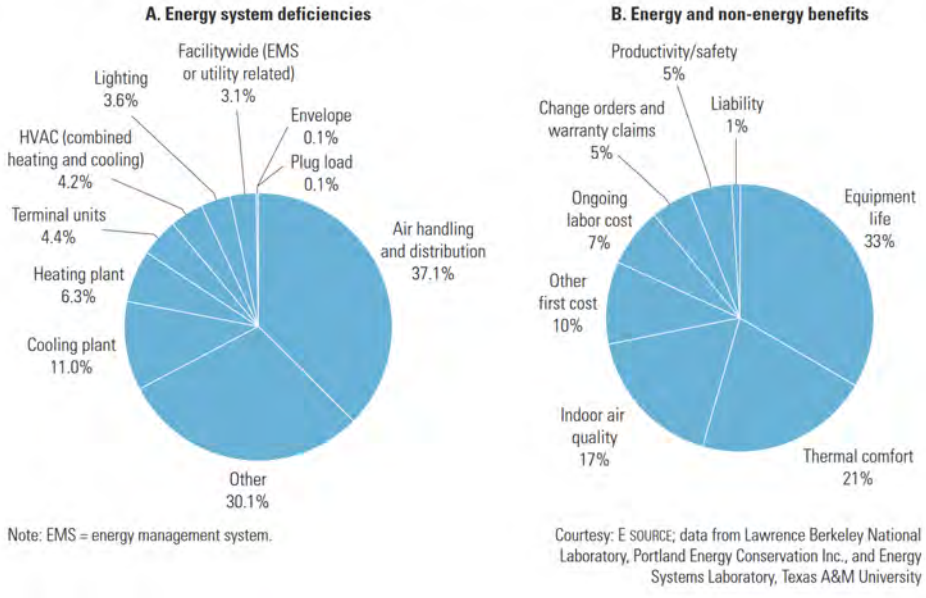
Retrocommissioning

Retrocommissioning your HVAC system is a process to examine existing systems to ensure proper function, going beyond basic maintenance practices. It's a whole-building approach that considers occupant comfort (and often other systems like lighting) in addition to equipment function. This process can be jumpstarted by an Energy Audit. The below diagram from ENERGY STAR shows the benefits of retrocommissioning for your building.[18] The EPA estimates that retrocommissioning can result in 15% energy savings and a payback period of 0.7 years.[18]

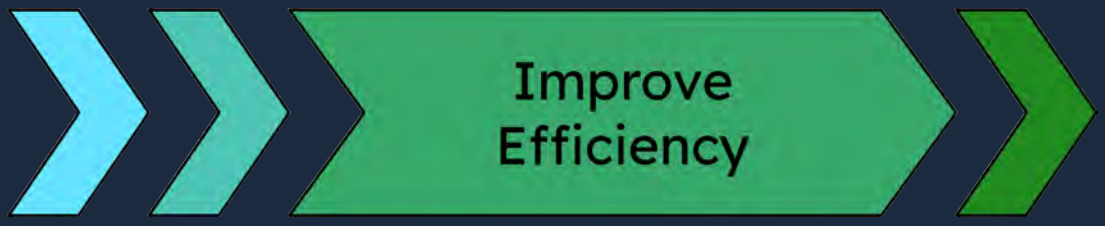
The EPA shows that retrocommissioning increases thermal comfort, indoor air quality, and equipment longevity, saving money and improving the work environment.[18]

Benefits of Retrocommissioning

Building energy system deficiencies: A recent study of retrocommissioning revealed a wide variety of problems—those related to the overall HVAC system were the most common type (A). Energy and non-energy benefits: Retrocommissioning provided both energy and non-energy benefits—the most common of these, noted in one-third of the buildings surveyed, was the extension of equipment life (B).



Source: ENERGY STAR Building Upgrade Manual Chapter 5[18]



Retrocommissioning Continued

One particularly important aspect of retrocommissioning an HVAC system is appropriately sealing air leaks in ductwork. It is estimated that 20-30% of air is lost from ducts,[19] decreasing system efficiency by as much as 20%.[20] By finding and addressing these inefficiencies, you can save money and energy on heating and cooling. These steps also increase occupant comfort and safety, as they improve air circulation, and reduce the risk of "backdrafting", a process by which carbon monoxide or other combustion gases are drawn into living spaces, potentially harming the occupants.[21]

Continued Progress

Once you have accomplished the basics in **Section 1** and the retrocommissioning process discussed n the previous page, you may seek to make more complex changes to your building(s)'s heating and cooling systems.

Programmable Thermostats

Switching to a programmable thermostat is a great way to improve the efficiency of an HVAC system. These thermostats allow building users to set active hours without manually changing the thermostat, increasing comfort for office users without the chill or heat that comes with changing the thermostat upon arrival.

As discovered while speaking to peer municipalities, not every programmable thermostat works with every HVAC system, so this should be done in consultation with an installer who can confirm compatibility and troubleshoot if needed. The ENERGY STAR program provides a buying guide and comparison tool, **linked here**.

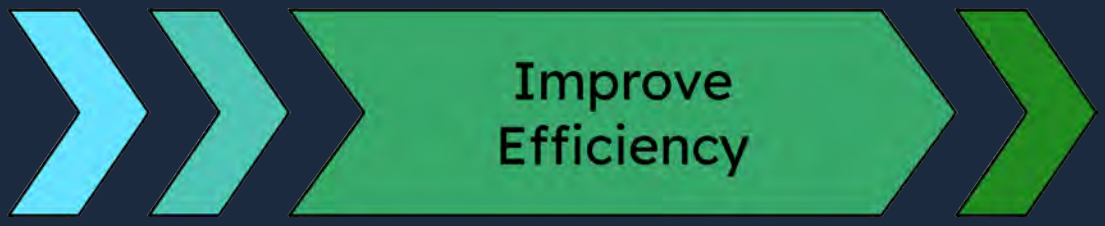
Airflow Management

Another tool of facilities managers is the ability to reduce or eliminate airflow to areas of the building that are not in use at certain times, saving energy by reducing unnecessary heating and cooling. Some occupancy sensors (see **Lighting**) may give managers the ability to connect the two systems for maximum energy efficiency during unoccupied periods.[18]

Replacement

Eventually, all systems must be replaced. This is an excellent time to implement a less carbon-intensive heating and cooling system. We believe that electric systems are the future of low-carbon, efficient buildings and should be your first choice in system replacement. For more information, see **Heating and Cooling Decarbonization.**

For more information on this and other heating and cooling strategies, consider visiting the Department of Energy's Better Buildings Website



SECTION 4: BUILDING ENVELOPE

Starting Out

Air Seal Your Building

There are many areas in buildings that are prone to leaking air - both from the inside-out and the outside-in. Air sealing can be done through two main methods: caulking and weatherstripping. Caulking involves applying sealing material around stationary building features like window frames, door frames, air conditioners, electrical wiring, plumbing, and ducting. The DOE has determined that the most effective materials for caulking are caulk, rubber, and foam.[22] Weatherstripping involves applying insulating material around movable building features like windows and doors. Common weatherstripping materials include foam, vinyl, and magnets.[23]

You can identify the air leaks in your building in a few different ways. The most simple and preliminary way is to visually inspect the areas around windows, doors, air conditioners, vents, electrical outlets, switch plates, electrical wiring, plumbing, and ducting for cracks and gaps.[24] You could also use a thermal imager to identify areas of your building with more extreme temperatures. For a more comprehensive understanding of where air leaks are in your building, you can conduct a "blower door test" during your building's energy audit. This test involves mounting a specialized fan in the frame of an exterior door to suck air out of the building. This causes higher-pressure outside air to rush into any cracks or gaps in your building, allowing you to more clearly identify which areas would benefit most from air sealing.[25]

Install Thermal Blinds or Shades on Windows

Insulating materials' resistance to conductive heat flow is measured through a number called an R-value, with higher R-values correspond to greater effectiveness. Along with providing an additional physical barrier on windows to prevent air from entering and escaping, thermal blinds or shades are designed to increase the R-value of your windows by trapping cool air in summer and warm air in winter.[22] If you decide to install thermal blinds or shades, look for products that have the AERC certification. This indicates that the product has been designed and tested to improve energy efficiency and indoor comfort.[26]

Apply Window Films

If you want to improve the R-value of your windows but don't want to compromise your view, you can apply window films to maintain comfortable indoor temperatures. These polyester films alone can block up to 78% of heat from the sun and lower your energy bills by 30% during the hottest months of the year.[27] Another benefit of these films is that they are relatively low-cost and accessible. As with thermal blinds or shades, look for products that have the AERC certification.[26]

Improve Efficiency

Continued Progress

Improve Insulation

According to the Department of Energy (DOE), the amount and type of insulation you will need for your building "depends on your climate, type of heating and cooling system, and the part of the [building] you plan to insulate."[28] You can also use the DOE's **insulation resources** to determine the most energy efficient and cost-effective amount and placement of insulation in your building.[29]

Generally, you should install insulation in the following places in your pre-existing or newly-constructed buildings:

- Attics
  - If unfinished, floor joists, rafters, and access doors
  - If finished, between the studs of "knee" walls, and between the studs and rafters of the exterior walls and the roof, joist space, and ceilings
- Walls
  - All exterior walls
  - Walls connected to unheated garages, sheds, roofs, or storage areas
  - Foundation walls above ground level
  - Foundation walls in heated basements
  - Foundation walls of unvented crawl spaces
- Floors
  - Floors above unconditioned spaces like vented crawl spaces and unheated garages
  - Any portion of the floor in a room that is cantilevered beyond the exterior wall below
  - Slab floors built directly on the ground
- Ducts in unconditioned spaces
- All band joists
- All windows and doors (through caulking)[29]

Strategic placement of high-quality insulation materials in your building can save you an average of 16% on your annual heating and cooling bills in southeast Michigan.[30]

CITY OF SALINE

Founded in 1825

CITY OF YPSILANTI

Founded in 1825

Below is information on the materials, installation methods, and advantages associated with the most common types of insulation:

Materials, Installation Methods, and Advantages of Common Insulation Types

INSULATION TYPE	POSSIBLE MATERIALS	INSTALLATION METHOD	ADVANTAGES
Blanket: Batts & Rolls	• Fiberglass • Mineral (rock or slag) wool • Plastic fibers • Natural fibers	• Fitted between studs, joists, and beams	• Simple Installation • Suited for standard stud and joist spacing that is relatively free from obstructions • Relatively inexpensive
Concrete Block Insulation	• Foam board	• Require specialized skills • Can be stacked without mortar (dry-stacked) and surface bonded	• Moderate indoor temperatures • 10 times the insulating value of conventional concrete
Foam Board or Rigid Foam	• Polystyrene • Polyisocyanurate • Polyurethane • Phenolic	• Interior: must be covered with 1/2-inch gypsum board for fire safety • Exterior: must be covered with weatherproof facing	• High insulating value for relatively little thickness • Can block thermal short circuits when installed continuously over frames or joists
Insulating Concrete Forms (ICFs) (New Construction Only)	• Foam board • Foam blocks	• Installed as part of the building structure • Cores in the blocks are typically filled with concrete to create the structural component of the wall	• Insulation is literally built into the building's walls, creating high thermal resistance
Loose-Fill & Blow-In	• Cellulose • Fiberglass • Mineral wool	• Blown into place using special equipment	• Good for adding insulation to existing finished areas, irregularly shaped areas, and around obstructions

Improve Efficiency

Materials, Installation Methods, and Advantages of Common Insulation Types

INSULATION TYPE	POSSIBLE MATERIALS	POSSIBLE MATERIALS	ADVANTAGES
Reflective	• Foil-faced kraft paper • Plastic film • Polyethylene bubbles • Cardboard	• Foils, films, or papers fitted between wood-frame studs, joists, rafters, and beams	• Simple Installation • Prevents downward heat flow
Rigid Fibrous	• Fiberglass • Mineral wool	• HVAC contractors fabricate the insulation into ducts either at their shops or at the job sites	• Can withstand high temperatures
Sprayed Foam or Foam-in-Place	• Cementitious • Phenolic • Polyisocyanurate • Polyurethane	• Applied using small spray containers • In larger quantities, installed as a pressure sprayed (foamed-in-place) product	• Good for adding insulation to existing finished areas, irregularly shaped areas, and around obstructions

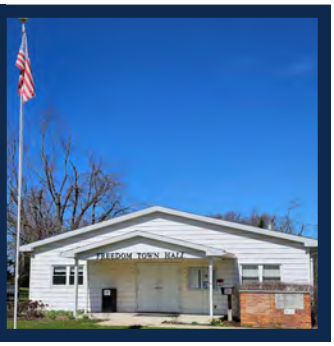
Source: U.S. Department of Energy[31]

DEXTER TOWNSHIP

Founded in 1825

FREEDOM TOWNSHIP

Founded in 1834



Improve Efficiency

Below are the DOE's recommendations on which insulation types should be used in different areas of your building:

Recommended Types of Insulation for Each Building Area

BUILDING AREA	RECOMMENDED TYPES OF INSULATION
Unfinished Walls	Blanket: Batts & Rolls, Concrete Block Insulation, Foam Board or Rigid Foam, Insulating Concrete Forms (ICFs), Reflective, Structural Insulated Panels (SIPS)
Finished Walls	Concrete Block Insulation
Unfinished Floors	Reflective, Structural Insulated Panels (SIPS)
Unfinished Attic Floors	Loose-Fill & Blow-In, Sprayed Foam or Foam-in-Place
Finished Floors	Blanket: Batts & Rolls, Foam Board or Rigid Foam
Unfinished Ceilings	Structural Insulated Panels (SIPS)
Finished Ceilings	Blanket: Batts & Rolls, Foam Board or Rigid Foam
Ducts in Unconditioned Places	Rigid Fibrous

Source: U.S. Department of Energy[31]

LIMA TOWNSHIP

Founded in 1832

LODI TOWNSHIP

Founded in 1834

It is also important to consider the embodied carbon of different insulation materials. According to the EPA, embodied carbon "refers to the amount of greenhouse gas emissions associated with upstream stages (extraction, production, transport, and manufacturing) of a product's life."[32] Below are the embodied carbon of various common insulation materials:

Embodied Carbon of Common Insulation Materials

MATERIAL	EMBODIED CARBON BY WEIGHT*
Straw Bales	0.063 kg CO_2e/kg
Mineral Wool Batt	1.28 kg CO_2e/kg
Fiberglass Batt	1.35 kg CO_2e/kg
Denim Batt	1.5 kg CO_2e/kg
Dense Packed Cellulose	0.63 kg CO_2e/kg
Extruded Polystyrene Foam	3.42 kg CO_2e/kg
Expanded Polystyrene Foam	3.29 kg CO_2e/kg
	*Figures from Inventory of Carbon and Energy (ICE) 2.0

Carbon Smart Materials Palette[33]

Final Steps

Install Storm Windows

If you are looking to significantly improve the energy efficiency of your windows without completely replacing them, consider installing storm windows. These windows are attached to the interior or exterior of preexisting windows and help to reduce air flowing in and out of them. According to the DOE, installing storm windows can yield similar energy savings to installing new double- or triple-pane windows for a third of the cost.[41]

While older models of storm windows were meant to be seasonal fixtures that would be removed in summer, many modern models are permanent installations that still allow preexisting windows to be opened and closed. Most modern models also have low-emissivity (low-e) coatings that more effectively insulate buildings in winter and keep heat out in summer.[41]

Improve Efficiency

Install Double or Triple Pane Windows

Replacing single pane windows with ENERGY STAR certified double pane windows can save you an average of $101 - $538 per year on your energy bill.[34] Unlike typical single pane windows, double and triple pane windows have two and three panes of glass respectively to assist with insulation.[35] Because these windows have multiple panes, manufacturers can insert argon gas between them for even greater insulation.[36] To get the greatest reductions in heating and cooling costs, multi-pane windows should have low-emissivity (low-e) coatings and be paired with strong and insulating window frame materials like vinyl, fiberglass, and composite wood.[37]

The energy efficiency of windows and doors is often measured by a U-value or U-factor. The U-value represents "the rate at which a window or door transmits non-solar heat flow," with lower U-values indicating greater insulation. This number is the inverse of an R-value, which is defined in the previous section on thermal blinds.[38]

If you decide to replace your building's windows, look for windows that have ENERGY STAR and/or NFRC labels- these provide key information about their U-values and indicate that they are energy efficient products.[39]

Lifetime Savings for Efficient Residential Window Models

PERFORMANCE	BEST AVAILABLE	ENERGY STAR	LESS EFFICIENT
Annual Energy Use (kBtu/ft^2)	108	137	174
Annual Energy Cost ($/ft^2)	$1	$1	$2
Lifetime Energy Cost ($/ft^2)	$16	$17	$20
Lifetime Cost Savings ($/ft^2)	$4	$2	======

Source: Federal Energy Management Program[40]

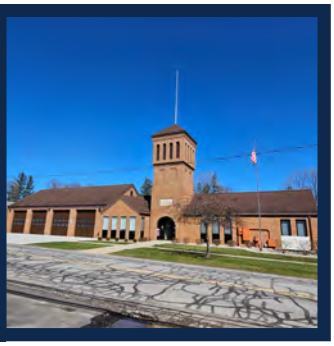
These are estimates for residential windows, performance depends on the size and type of building.

LYNDON TOWNSHIP

Founded in 1836

MANCHESTER TOWNSHIP

Founded in 1837



Install New Exterior Doors

Old, uninsulated, and improperly air-sealed doors can cause air leakage in your building and increase heating and cooling costs.[43] Below are the benefits and drawbacks associated with the most common door materials, sorted in order from most to least insulating:

Benefits and Drawbacks of Common Door Materials

DOOR MATERIAL	PROS	CONS
Fiberglass	• The most insulating material for doors • Does not warp, rot, or expand • Can be made in a variety of styles	• Cannot be installed in all buildings
Vinyl	• Low-cost • Lightweight	• Can be broken down by sun
Steel	• Does not warp • Offers extra security and soundproofing	• Requires inner foam layer to be effective • Can be easily dented or scratched
Wood	• Can be made in a variety of styles	• The least insulating material for doors • Can warp, rot, or expand • Often require storm doors and weatherstripping

Sources: Constellation[40], Brothers Services Company[44]

To get the greatest reductions in heating and cooling costs, new doors should be paired with strong and insulating door frame materials like fiberglass, vinyl, and thermally-broken aluminum.[42] Thermal breaks are plastic insulators that are installed between the inner and outer parts of door and window frames.[45]

During installation, ensure that the new door frame is as square as possible so the new door can fit snugly to the jamb. Foam caulk should be applied around the new door frame to further reduce the risk of air leaks.[45]

If you decide to install new exterior doors, look for ones that have ENERGY STAR and/or NFRC labels. These provide key information about their U-values and indicate that they are energy efficient products.[45]

SECTION 5: WATER HEATING

Water heating is a small but important portion of energy consumption in municipal buildings at around 5% of end-use energy consumption.[46] While the only way to fully decarbonize water heating would be through purchasing an electric water heater and powering it with clean electricity, there are a variety of steps that can be taken to help minimize the cost and emissions from hot water before investing in a new water heater.

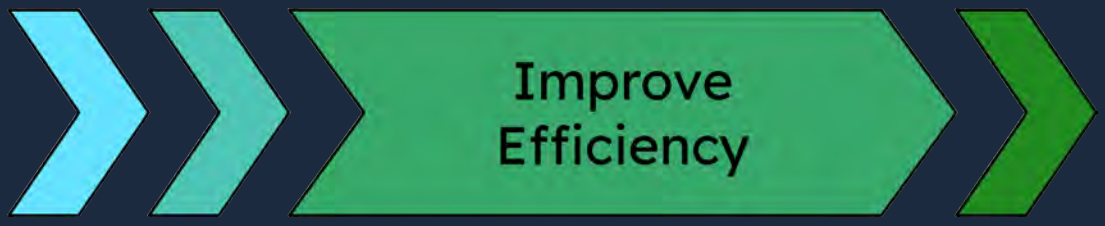
Starting Out

The simplest and cheapest step to reduce the energy consumption from heating water is to lower the temperature of your water heater.[47] Doing so is completely free and could result in significant savings on your energy bill. Another easy and cheap way to reduce your water heating costs is to ensure that your hot water pipes are all insulated. By insulating your pipes, the water that initially comes out of the faucet will be warmer and the average hot water temperature will also increase. By doing this, you may have the opportunity to lower your water heater temperature even further to maximize your savings.

Another low cost option to reduce hot water consumption is to install low-flow fixtures. Low-flow fixtures also reduce the energy required for heating water by reducing the total amount of hot water used. If all of the faucets in your building currently have a two gallon per minute flow rate, adding aerators that have a one gallon per minute flow rate could reduce your hot water consumption by as much as 50%. With aerators costing around two dollars each, reducing hot water consumption through this method can be incredibly affordable and pay for itself quickly. This option also has the additional benefit of reducing total water consumption and saving you money on your water bill.

Source: EPA[48]

When replacing fixtures, look for the "WaterSense" faucets and aerators to find which ones meet EPA requirements for water flow.



Continued Progress

The steps listed above are a great way to start saving money on water heating. One of the important benefits of those options is that they can be done at any point in a water heater's life. If you want to go even further, that will require replacing your water heater. One option would be to upgrade to a more efficient water heater when your current water heater needs to be replaced. By doing this, the only additional investment you are making to save money and energy would be the cost premium of the efficient model compared to the standard model. When upfront investment isn't as much of a concern, you should compare the cost of purchasing a new unit before your old one reaches the end of its life with the benefits of saving money over time. To maximize emissions reductions, replacing an inefficient water heater with an efficient water heater as soon as possible will always be the best option.

There are many different types of water heaters available today with multiple different fuel options. For the purposes of this toolkit, we will discuss the following options:[49]

- Standard Natural Gas Tank
- Efficient Natural Gas Tank
- Standard Natural Gas Tankless
- Efficient Natural Gas Tankless
- Resistance Electric Water Heater
- Electric Heat Pump
- Higher Efficiency Electric Heat Pump

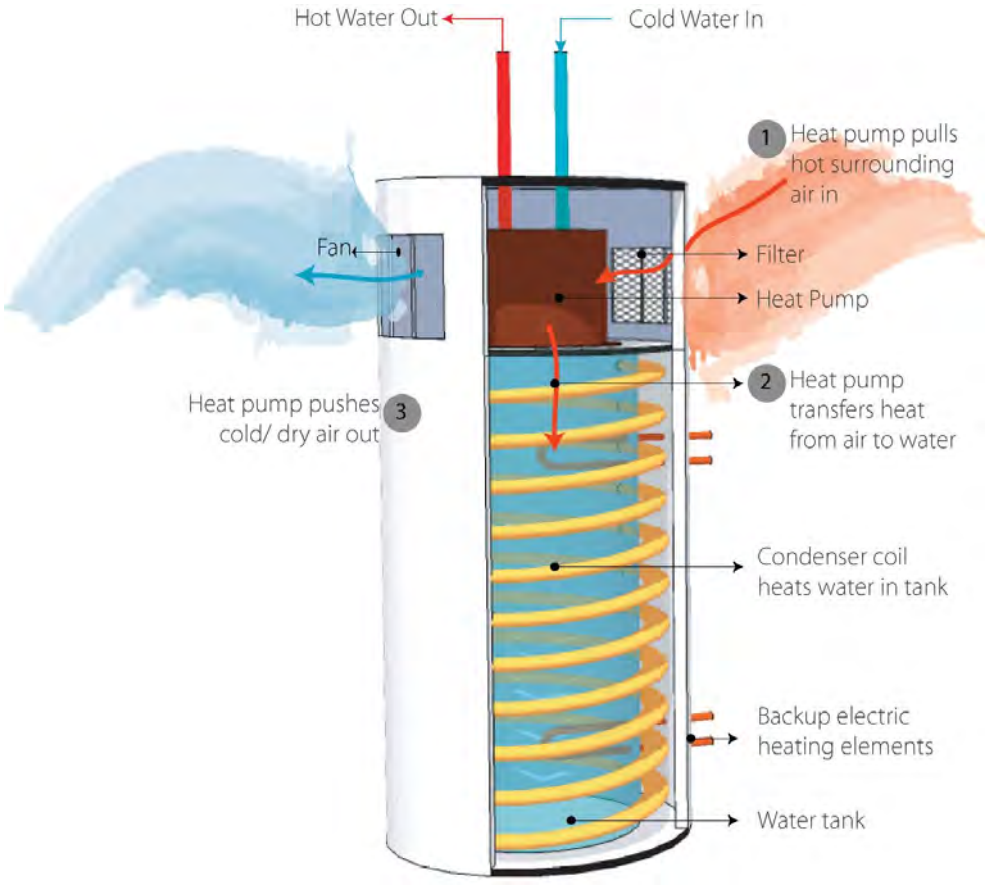
A water heater with a tank is designed to store hot water ready to be used. Because of this storage period, there are heat losses that increase the cost of hot water, especially during extended periods where hot water isn't being used. One problem with tank water heaters is that they can run out of hot water if hot water is continuously being consumed over an extended period.

A tankless water heater is designed to heat water on demand. Assuming the water heater is adequately sized, this will meet all hot water needs at a higher energy efficiency due to the lack of heat loss during storage. If the water heater is not adequately sized, that means it will not be able to simultaneously meet all the hot water demands of the building and some areas will not get all the hot water demanded.

Natural gas, propane, and resistance electric water heaters (tankless or with a tank) all heat water through the conversion of energy. In a natural gas or propane water heater, gas is burned to produce heat which is then used to heat up the water. A resistance electric water heater uses electricity to make heat, similar to an electric cooktop, and uses that generated heat to heat up the water. While natural gas water heaters tend to have lower emissions than resistance electric water heaters currently, this will change as the electricity grid moves towards more low or zero carbon sources of electricity. Electricity will get cleaner, while natural gas will not.

Improve Efficiency

A heat pump water heater works very differently from a resistance electric water heater. Instead of using electricity to generate heat, it uses electricity to move heat from the surroundings, like a refrigerator in reverse. While a refrigerator takes heat out from inside and moves it to the surroundings, a heat pump water heater takes heat from the surroundings and moves it to the water. By moving heat instead of converting electricity into heat, you get extremely high efficiency and cost savings. It is worth noting that heat pump water heaters usually include a storage tank, meaning they can run out of hot water just like any other tank water heater.



Source: Department of Energy[50]

When looking at any water heater, the most important value to consider is the uniform energy factor (UEF). This tells you how much your water is heated per unit of energy that you pay for after accounting for heat losses. The tables below shows how much energy is required to heat 100 gallons of water to 125 °F based on different UEFs. The cost to do so is based on a natural gas price of $0.82 per CCF and an electricity price of $0.1673 per kWh as listed on DTE's website.[51, 52] The emissions factors used in the table are 5.5 kg CO_2 per CCF of natural gas combusted and 0.55 kg CO_2 per kWh (Michigan Electricity Average Emissions) as sourced from the EPA.[53, 54]

Comparing the Energy Consumption, Cost, and Emissions of Natural Gas Water Heaters

	STANDARD NATURAL GAS TANK	EFFICIENT NATURAL GAS TANK	STANDARD NATURAL GAS TANKLESS	EFFICIENT NATURAL GAS TANKLESS
UEF	0.63	0.93	0.82	0.97
Energy (CCF)	1.00	0.68	0.77	0.65
kg CO_2 Emissions	5.51	3.74	4.24	3.58
Energy Cost	$0.82	$0.56	$0.63	$0.53
$ Savings Relative to Standard Tank	$0.00	$0.26	$0.19	$0.29
kg CO_2 Savings Relative to Standard Tank	0.00	1.77	1.27	1.93

Sources: ENERGY STAR Building Manual,[55] "What is Uniform Energy Factor?"[56]

To reduce energy costs and carbon emissions, the most important step is to move away from the least efficient options listed. If you currently have an electric resistance water heater, replacing it with a heat pump water heater will reduce carbon emissions and energy costs by 71% to 77%. While the savings are less dramatic from upgrading an inefficient natural gas water heater to a more efficient natural gas water heater, you could still reduce emissions and energy costs by 23% to 35%.

Comparing the Energy Consumption, Cost, and Emissions of Electric Water Heaters

	ELECTRIC RESISTANCE	ELECTRIC HEAT PUMP	HIGHER EFFICIENCY ELECTRIC HEAT PUMP
UEF	0.94	3.30	4.10
Electricity (kWh)	19.68	5.61	4.51
kg CO_2 Emissions	10.83	3.08	2.48
Energy Cost	$3.29	$0.94	$0.75
$ Savings Relative to Electric Resistance	$0.00	$2. 35	$2.54
kg CO_2 Savings Relative to Electric Resistance	0.00	7.75	8.35

Source: ENERGY STAR[56]

HEATING & COOLING DECARBONIZATION

Replacing Your HVAC System

When upgrading HVAC equipment, look for a high efficiency model. Much of this process is building specific and depends on the size and needs of your facility. ENERGY STAR provides a guide that separates systems by type and provides a more detailed analysis, **found here**.[57]

Replacing Your Furnace with a Heat Pump

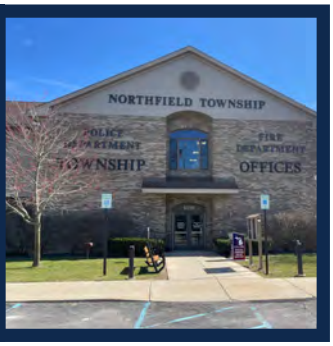
Heat pumps installed in cooler climates, like Washtenaw County, need to be designed to manage lower temperatures.[58] They are a less carbon-intensive than a traditional natural gas furnace, and also combine heating and cooling functions in a single unit, eliminating the need for a separate air conditioner. They also can provide more efficient heating than furnaces.[59] To find out how much money and greenhouse gas emissions a heat pump will save your building and organization, use the **ENERGY STAR Savings Calculator**. A very brief overview of the three most common types of heat pumps is shown below. Air source heat pumps are most compatible with existing HVAC ducts. To see ENERGY STAR's list of certified heat pumps and buying guidance, click **here**.

AIR SOURCE HEAT PUMPS	GEOTHERMAL HEAT PUMPS (GROUND OR WATER SOURCE)	ABSORPTION HEAT PUMPS
• Most common • Most compatible with existing ductwork • More effective at dehumidifying than standard air conditioning system • Depending on the price of electricity, may be more expensive to heat your building compared to a natural gas furnace.	• More expensive to install • Installation feasibility is extremely site-specific • Include a cooling system that may run underground, taking advantage of the temperature differential to heat/cool the building passively • Lower operating costs (long term), and can reduce energy use by 70-80% • More reliable in extreme climates	• Relatively new technology • More expensive than air-source heat pumps • Less common • Can use natural gas as a fuel source, so do not necessarily see the same emissions reductions associated geothermal or air source heat pumps.

Source: Energy Saver, DOE[59]

NORTHFIELD TOWNSHIP

Founded in 1832



PITTSFIELD TOWNSHIP

Founded in 1824

Because the majority of municipal buildings in Washtenaw County are comparable to residential buildings in size, the below tables include cost savings models for residential capacity units. If your municipal buildings are larger than this, consider visiting the **Federal Energy Management Program's website** for information on cost savings for commercial heating and cooling systems.

The chart below shows savings on efficient air-source heat pumps. Seasonal Energy Efficiency Rating (SEER2) and Heating Seasonal Performance Factor (HSPF2) are measures of cooling and heating efficiency, respectively. The standards for these measurements are set by the DOE.[60,61]

Lifetime Savings for Efficient Residential Air-Source Heat Pump Models

PERFORMANCE	BEST AVAILABLE	ENERGY STAR	LESS EFFICIENT
SEER2/HSPF2	28.1/11.5	15.2/7.8	14.3/7.5
Annual Energy Use—Heating and Cooling (kWh)	6,176 kWh	9,777 kWh	10,244 kWh
Annual Energy Cost—Heating and Cooling ($)	$533	$844	$885
Lifetime Energy Cost-15 years ($)	$6,037	$9,557	$10,014
Lifetime Cost Savings ($)	$3,977	$457	======

Source: Federal Energy Management Program[62]

FEMP also provides measurements of cost savings for ground-source, or geothermal heat pumps, which may be more effective in colder climates, but are also more expensive to install. Energy Efficiency Ratio (EER) measures the cooling efficiency of a heat pump at 95°F.[63] The Coefficient of Performance (COP) is the ratio of cooling or heating effect to its net work input.[60]

Lifetime Savings for Efficient Geothermal Heat Pumps

PERFORMANCE	BEST AVAILABLE	ENERGY STAR	LESS EFFICIENT
EER/COP	30.5/5.2	17.1/3.6	15.0/3.1
Annual Energy Use-Heating and Cooling (kWh)	4,493 kWh	7,050 kWh	8,125 kWh
Annual Energy Cost-Heating and Cooling ($)	$388	$609	$702
Lifetime Energy Cost-15 years($)	$6,339	$9,948	$11,464
Lifetime Cost Savings ($)	$5,124	$1,516	======

Source: Federal Energy Management Program[62]

WATER HEATING DECARBONIZATION

Replacing Your Water Heater

Decarbonizing water heating is an important step in minimizing carbon emissions. Based on the average emissions of Michigan's 2024 electricity grid, heating water via electric resistance is the most energy and carbon intensive option.[65] While natural gas water heaters currently have lower emissions than resistance electric water heaters, this will not be the case as the carbon intensity of Michigan's electricity decreases as Michigan heads to 100% clean electricity by 2040.[66]

If you are unable to move away from natural gas or propane, upgrading to an efficient tankless natural gas water heater can reduce emissions from water heating by up to 35%. If you already have an electric water heater or want to move to electric, a high efficiency heat pump water heater is your best replacement option. They are already the lowest emissions option among all water heaters and those emissions will continue to go down as Michigan's electricity grid is decarbonized or if your building uses an increases share of renewable electricity.

Comparing the Emissions of Different Water Heaters for Heating 100 Gallons of Water

	ELECTRIC RESISTANCE	EFFICIENT NATURAL GAS TANK	EFFICIENT NATURAL GAS TANKLESS	HIGH EFFICIENCY ELECTRIC HEAT PUMP
UEF	0.94	0.93	0.97	4.10
Energy	19.68 kWh	0.68 CCF	0.65 CCF	4.51 kWh
kg CO_2 Emissions	10.83	3.74	3.58	2.48
kg CO_2 Savings Relative to Electric Resistance	0.00	7.09	7.25	8.35

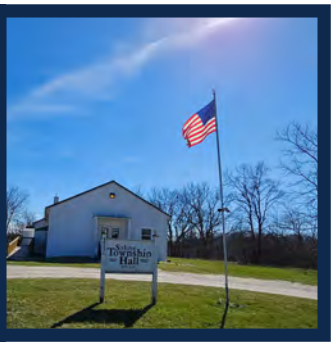
Source: ENERGY STAR[56]

SALEM TOWNSHIP

Founded in 1833

SALINE TOWNSHIP

Founded in 1819



RENEWABLE ENERGY

There are many opportunities to increase the use of renewable energy in your municipality and take advantage of its associated benefits. The most commonly cited benefit is reduced carbon emissions, as nearly 60% of Michigan's electricity came from natural gas and coal in 2022.[67] There are many other benefits, including reduced energy costs, increased resilience in the face of power outages, and supporting local businesses. Some of the solutions below may not be achievable in the near-term for your municipality, but could serve as longer-term goals.

Emissions Savings

Determining whether a project or purchase will result in emissions savings is not entirely straightforward, and has two main components: whether overall emissions are reduced, and who gets to claim those reductions.

Determining whether overall emissions are reduced depends on whether this project or purchase involves electricity or just renewable energy certificates (RECs). If electricity is involved, then emissions are reduced when that electricity is coming from sources that are cleaner than the grid. In the case of renewable energy in Michigan, this is currently true because of the amount of electricity on the grid coming from natural gas and coal. If only RECs are involved, then overall emissions are reduced when those RECs are high-quality and are retired**.** More information on what defines high-quality RECs can be found in the **Glossary**.

SCIO TOWNSHIP

Founded in 1832

SHARON TOWNSHIP

Founded in 1834

Decarbonize Sources

Section Summary

This table provides a summary of the options for renewable energy that are covered in this section:

- Utility green power
- Physical power purchase agreement (PPA)
- Virtual PPA
- On-site generation

	EASE OF IMPLEMENTATION	IMPLEMENTATION COST	FINANCIAL SAVINGS	EMISSION SAVINGS
UTILITY GREEN POWER				
PHYSICAL PPA				
VIRTUAL PPA				
ON-SITE GENERATION				

Weakness ← → Strength

SUPERIOR TOWNSHIP

Founded in 1831

SYLVAN TOWNSHIP

Founded in 1883

Decarbonize Sources

Utility Green Power

One of the simplest options to start using renewable energy is to join your utility's green energy program, which supports renewable energy generation projects from your utility. With DTE's MI Green Power, enrolled customers currently *save* $0.0034 per kWh due to DTE's pricing model.[68] Consumers' Solar Gardens program is slightly more complicated: customers who opt-in pay $8 per 0.5 kW of solar generation capacity, then receive a bill credit each month based on how much electricity that capacity generated.[69] This means that the bill credit will fluctuate month by month, as there is more generation on sunny days than overcast days. In 2018, the average monthly credit was $4.54 per 0.5 kW of generation capacity.[70]

MI Green Power is a popular option for residential as well as larger customers, with Dearborn enrolling to cover all of the energy needs of its municipal buildings,[71] and both the Detroit Zoo and Washtenaw Community College have committed to covering 100% of their electricity needs through the program.[72, 73]

Financial Savings

Financial savings vary depending on the specifics of your utility's program. DTE's program currently results in small savings on electricity bills but Consumer's does not result in any savings compared to standard electricity.

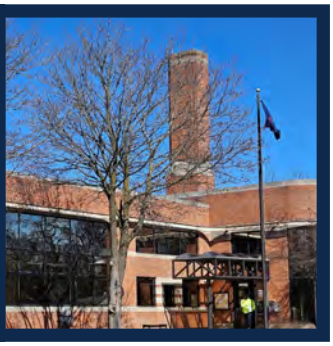
Emission Savings

Both Consumers and DTE programs will result in emissions reductions because they support new renewable energy facilities in Michigan, however neither company publishes data on reduction amounts.[68, 69, 74]

Scio Township has implemented utility green power. All Scio Township buildings and infrastructure (except for seven streetlights) are enrolled in MI Green Power at 85%, as of March 2023. The DTE's generation averages 15% renewables, so the combination totals 100% renewable power. Streetlights are not metered and not eligible for enrollment. All but two streetlights are LED.[75]

VILLAGE OF MANCHESTER

Founded in 1826



WEBSTER TOWNSHIP

Founded in 1833

Physical PPA

A physical PPA is an alternative to owning and maintaining renewable energy generation infrastructure. In these agreements, a third party develops, finances, and owns the infrastructure that is built on the host's site. Both parties then sign a contract for the host to purchase the generated electricity, generally at a rate that is lower than market rate.[76] Depending on the specifics of the contract, the associated RECs may be owned by the developer or the host.[76] In 2017, Michigan State University entered into a power purchase agreement for on-campus solar arrays that are projected to save the school $10 million over 25 years.[77]

Financial Savings

Financial savings will depend on the contract negotiated between the host and developer, but some savings should be expected.[78]

Emission Savings

Given the significant use of fossil fuels to power the current electricity grid in the Midwest, physical PPAs will displace grid electricity use and result in emissions savings.[79]

Virtual PPA

A virtual PPA is an agreement between a renewable energy generator and a buyer where the buyer purchases only the RECs, while the electricity is sold to other customers.[74] This allows the buyer to support the building of new renewable energy facilities when barriers like distance to generating facilities make directly using the electricity infeasible.

Financial Savings

Because this is a method of purchasing RECs, not electricity, there are no financial savings over just purchasing electricity. However, depending on the specifics of the agreement negotiated between the generator and the buyer, purchasing RECs through a virtual PPA may be cheaper than purchasing RECs on the open market.

Emission Savings

Where the RECs are purchased from will impact overall emissions savings, as only projects that are supporting additional, verifiable renewable energy generation will result in overall savings.

On-Site Generation

On-site generation is an alternative to purchasing renewable electricity or RECs where the organization owns, operates, and maintains the generation equipment. This can require a significant amount of work and expertise.

The equipment may be located directly on or near municipal buildings, (allowing the electricity to be used in that building) or it may be located off-site (in which case the electricity can be sold to a utility). Either setup will generate RECs, which can be held on to or sold. Adding battery storage to a project will increase its cost, but will mean that excess electricity can be stored to use later if power from the grid is interrupted.

This generation infrastructure can go in a variety of locations. Mounting on the roof of an existing building is a popular option, as is mounting directly on the ground, carports, or another type of covered parking.

Many municipal governments across the state have installed solar panels. The city of Harrison in Clare County, for example, undertook a project to install 659 kW of solar panels in 2021, which is projected to save $162,000 in electricity costs each year for 30 years.[80]

Financial Savings

With the Inflation Reduction Act funding, the Commercial Technical Assistance program of the 2030 District has generally found that the payback ranges from 7-10 years depend on the size and location of the system.[81]

Emission Savings

On-site generation will displace grid electricity use and result in overall emissions reductions.[79]

YORK TOWNSHIP

Founded in 1834

YPSILANTI TOWNSHIP

Founded in 1827

Funding and Resource Assistance

FINAL REMARKS

Energy efficiency gains can be achieved through a variety of pathways. While we hope that the information provided in this toolkit is sufficient to meet your energy efficiency goals, we wanted to connect you with additional resources and funding to help reach those goals. Below is a list of resources to further assist you in your energy efficiency and decarbonization efforts. Good Luck!

FUNDING FOR ENERGY AUDITS

Ann Arbor/Washtenaw 2030 District[82]

- Link to Learn More
- Link to Apply

RESTART (Lawrence Tech & EGLE Technical Assistance Partnership)[83]

- Link to Learn More
- Link to Apply

DTE Small Business Program[84]

- Link to Learn More
- Call 855.748.2525 or email DTE-Small-Business@franklinenergy.com to apply

Consumer's Small Business Program[85]

- Link to Learn More and Apply

FUNDING FOR ENERGY EFFICIENCY AND SOLAR

SEMCOG (Southeast Michigan Council of Governments)[86]

- Link to Learn More and Apply

Community Energy Management Program[87]

- Award Amount $5,000-$100,000
- Link to Learn More
- Link to Apply
- Request for Proposals

Energy Efficiency and Conservation Block Grant (EECBG) Program Formula Grant[88]

- Link to Learn More and Apply

Federal Solar Tax Credits[89]

- Award Amount usually ranges from 30-60% of Solar Array Cost
- Link to Learn More

Funding and Resource Assistance

TECHNICAL ASSISTANCE

- *NREL Technical Assistance*[90]
  - Link to Learn More
  - Clean Energy RFP Information
  - Contact NREL for Assistance

- *Solar Energy Planning Guide*[91]
  - Link to Learn More

MICHIGAN GREEN COMMUNITIES

Michigan Green Communities (MGC) is a statewide network of local government staff and officials that collaborate with one another, through peer learning and information sharing, to promote innovative sustainability solutions at the local, regional, and state level.[92]

Michigan Green Communities Challenge: The Challenge includes several categories and each is comprised of several action items. Communities earn points by completing these action items. Participation is free and open to any local government in Michigan

They also offer research funding opportunities and a template for sustainability plan resources!

The City of Ypsilanti and Pittsfield Township participated in the 2022 MGC Challenge

SEMCOG

SEMCOG can help local governments apply for grant funding in many ways:[86]

- SEMCOG membership includes access to GrantFinder, the largest searchable database of private, state, and federal grants available to municipalities and local non-profits
- Dedicated staff that can assist in specific project funding
- Their database holds relevant information on: people, economy and jobs, housing, transportation, and environment and land use information by region, county, community or custom geography, which can support grant applications
- Access to Data and Maps provides interactive databases and mapping applications featuring demographic, transportation, economic, employment, land use, aerials, and GIS information

SEMCOG member governments may request a Grant Writing USA scholarship for a two-day workshop on grant writing or grant management. The grant writing course covers how to write grant proposals from start to finish and how to locate and track relevant grant opportunities. Federal, state, local and non-governmental, and private sector grants are covered. You'll learn everything you need to know to get started writing grants.

Funding and Resource Assistance

CATALYST COMMUNITIES

The Catalyst Communities Initiative is a comprehensive program to provide education, training, planning and technical resources to local governments as they work toward their sustainability goals.[93]

This program offers an array of resources on various environmental, social, and economic topics to help communities across Michigan make a just transition to decarbonization. The Catalyst Communities Initiative aims to provide a range of options to meet communities wherever they are, regardless of geography, population size, or pre-existing knowledge.

They offer a database comprised of federal funding opportunities along with webinars and technical assistance to support local and tribal governments who seek to access federal funding through the Bipartisan Infrastructure Law (BIL) (also known as the Infrastructure Investment and Jobs Act [IIJA]) and the Inflation Reduction Act (IRA).[94]

They have a large suite of webinars on various topics, a few that may be of most help for this work include:

- **Community Energy Management (CEM) Program Request for Proposal and Application Overview Webinar:** Discusses the CEM Program and highlights the additional funding and increased award sizes that are available, along with the expanded eligible project areas that communities can consider when applying.[95]
  - Zoom Link to watch webinar

- **Conducting Energy Audits on Municipal Facilities:** In this webinar, Tracey Laitinen (Operations Manager, Sault Ste. Marie), Eric Witte (Deputy Director of Public Works, Dearborn), and Dave Norwood (Sustainability Coordinator, Dearborn) share their experiences and tips conducting energy audits.[95]
  - YouTube Link to watch webinar

- **EGLE's Energy Efficiency Programs for Communities:** Join the State Energy Program Specialist, Julie Staveland, and the EGLE Community Programs Coordinator, Miles Biel, as they introduce EGLE's wide variety of Energy Services and Community Energy Management programs. Hear what programs and levels of assistance are available, including success stories from across the state.[95]
  - Link to watch webinar

These are just a few of the webinars they offer, spanning a wide variety of topics such as climate and federal funding technical assistance. We encourage you to check out these webinars as well!

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