

City of Rochester

SUSTAINABLE PRACTICES

FOR BUILDING OWNERS AND OCCUPANTS

A Pragmatic Guide



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Introduction

This guide is an extension of the City of Rochester Bureau of Planning & Zoning's [Developer Guidance Handbook](#), which assists prospective developers through the City's permitting and code requirements and facilitates the City's construction-related development and rehabilitation processes. Furthermore, this guide is one of the implementation actions of the City's [Climate Action Plan](#) to reduce greenhouse gas (GHG) emissions by 40% from 2010 levels by 2030.

As global climate change impacts have become increasingly common and widespread in the form of extreme weather events and natural disasters, sustainability has become a priority concern at the forefront of many national, state, and local leaders' policies and agendas. In the context of this handbook, sustainability refers to the preservation of natural resources to protect human health and economic growth by addressing the causes of climate change, specifically through GHG reduction.

On a local scale, the City of Rochester (City) has invested time into planning for a sustainable and prosperous future. One of the resulting outcomes from this effort is the City's 2017 Climate Action Plan (CAP) which highlights impacts to the local community that are likely to result from climate change, puts forth a greenhouse gas emissions reduction target, and outlines strategies to achieve this target reduction goal. Impacts related to climate change expected in the Rochester region include, but are not limited to:

- Increasing temperature
- Changing precipitation patterns
- Impacts to the Great Lakes
- Reduced winter recreation
- Impacts to agriculture
- Impacts to human health and equity



2017 Flooding in Rochester on Lake Ontario Shoreline

Many of these impacts are already being felt; 2017 has brought approximately twice the average annual rainfall to the City of Rochester and the entire Lake Ontario drainage basin. At its peak, Lake Ontario saw a lake level rise of at least two (2) feet.

To address growing climate change impacts, the state of New York has set the following energy reduction goals to be reached by the year 2030. Outlined in Governor Andrew Cuomo’s strategy entitled Reforming the Energy Vision (REV), these goals include:

- A 40% Reduction in Greenhouse Gas Emissions from 1990 levels (and 80% by 2050)
- Obtaining 50% of NYS electricity from renewables and;
- A 23% reduction in building energy consumption from 2012 levels

The focus on sustainability as it relates to environmental protection, public health, and economic growth has become a priority in the City of Rochester, so it is of utmost importance for new and existing development to prioritize sustainability as well. Therefore, this handbook seeks to achieve the following:

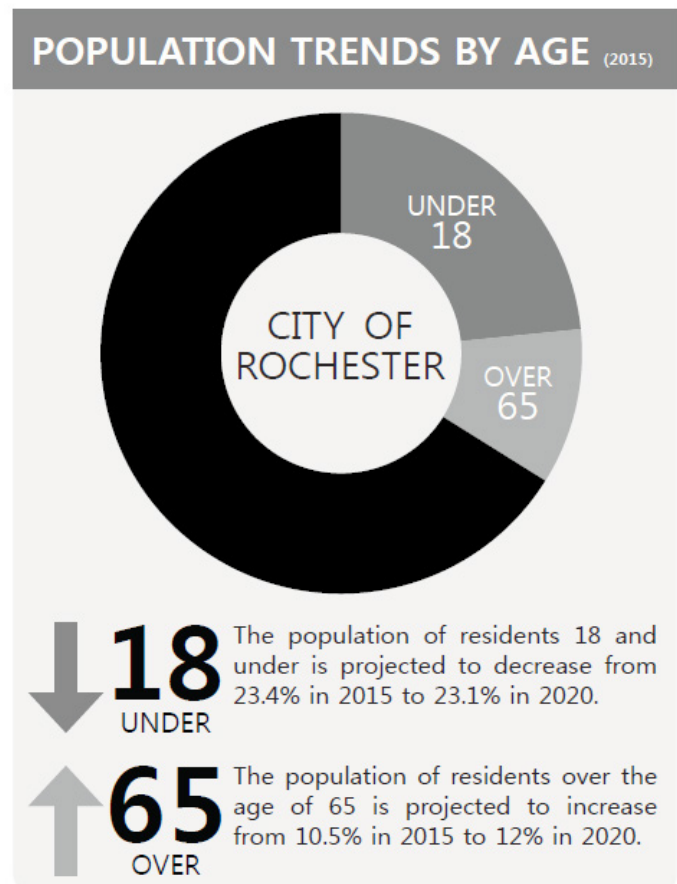
- Provide pragmatic guidance and information for all members of the Rochester community (including homeowners, tenants, developers, and institutions) to incorporate sustainable planning and design practices into the development of residential, commercial, and mixed- use projects within the City.
- Sustainable planning and design practices are defined as anything that contributes to the long-term, environmental benefits associated with building design, renovation, or construction.
- Contribute to City-wide goals to reduce greenhouse gas emissions.
- Improve and protect public health.
- Build community and neighborhood interactions through a combined effort towards City-wide sustainability.
- Create equity within neighborhoods.

EXISTING CONDITIONS IN ROCHESTER

Since 2000, the City of Rochester’s population declined by approximately 5%. In 2015, the City’s population was 208,271. In 2015, approximately 23% of the City’s population consisted of residents under the age of 18 years old. Approximately 10.5% of the City’s population were residents over the age of 65. In the year 2015, the City of Rochester was reported to have a median household income of \$31,434.








Fifty seven percent (57%) of the City’s housing stock was built in 1939 or earlier and only 2% of the housing stock has been built in the past 15 years. The current housing stock is made up of approximately 50% single family homes. However, building permits show that large multifamily developments are on the rise in the City given that 84% of permits in 2015 were for multifamily projects. The median home value in the City of Rochester is \$86,058. In 2016, approximately 36.1% of land in the City was residential, 19% commercial, 8% industrial, 6.6% vacant, with the remainder being public services, parks, agricultural, recreation and community services.

Refer to Appendix A, Project Task 3.1 Existing Conditions Report for additional information.



Icon Key

TARGET GROUPS

-  Developer
-  Homeowner
-  Landlord
-  Tenant
-  Business Owner
-  Institution (e.g. public/private universities, hospitals, government)
-  Neighborhood (all parties listed above)

BENEFITS TO IMPLEMENTING SUSTAINABLE PRACTICES

-  Economic
-  Health
-  Safety
-  Environmental Responsibility

What These Icons Represent

Throughout this guidance document, the reader can reference content applicability based on his/her interests or occupation. The icons represent target groups, which are potential users of this guidance document. The second group of icons shows the benefits to implement sustainable practices. This second group helps the reader identify the types of upgrades or design improvements that will provide the desired outcome in terms of monetary value, improved health, safety, or environmental responsibility. For example, if the reader is a commercial developer looking for a specific type of sustainable certification for a building, the reader should look for the orange “D” icon, paired with “ER”. This will provide the most relevant applications of sustainable practices for a commercial developer looking to incorporate environmental benefits.

List of Sustainable Practices

The remainder of this guidance document outlines select sustainable practices as they are applicable to the pre-designated target groups and incentives. A full list of the reviewed Sustainable Practices is below. Look for the icons, described in the Icon Key, in the top right and left corners of each practice sheet. This document is intended to present suggestions and recommendations rather than requirements. Where helpful, City codes may be referenced.

BUILDING ENVELOPE

- Insulation
- Air Infiltration
- Windows

BUILDING ENERGY EFFICIENCY

- High Efficiency Furnaces/Boilers (Including High Performance HVAC)
- Heat Pumps (Including Geothermal)
- Lighting
- On Demand Hot Water Heaters
- High Efficiency Appliances
- Internal Energy Monitoring

RENEWABLE ENERGY

- Photovoltaic Panels
- Wind

WATER EFFICIENCY

- Efficient Fixtures
- Indigenous Landscaping

INDOOR AIR QUALITY

- VOC-Containing Materials
- Mold/Mildew Prevention

STORMWATER MANAGEMENT/GREEN INFRASTRUCTURE

- Porous Pavement
- Stormwater Capture
- Green Roofs
- Rain Gardens

RECYCLING

- Recycling
- Compost

REUSE OF BUILDING MATERIALS

- Recycled Materials
- Construction and Demolition Waste

REUSE OF VACANT AND UNDERUTILIZED PROPERTIES

- Greyfield Redevelopment
- Vacant Land/Underutilized Properties

GREEN SPACE

- Create or enhance green open space networks

TRANSPORTATION

- Parking
- Alternate Transportation

COMMUNITY-ORIENTED SERVICES

- Mixed-use Development

How to Use this Guide

WHAT YOU SEE

In the *top left* of every page, there will be circle icon(s) each with a letter inside (For example, you see a yellow “N” above). This is meant to communicate the intended audience of each page.

In the *top right* of every page, there will be circle icon(s) with a letter inside (For example, you see two blue circles with “E” and “ER” in them above). This is meant to communicate the benefits of implementing the practices shown on each page.



RECYCLING

Background:

The City of Rochester has recently introduced a new Mixed Recycling program to make it easier for all members of the Rochester community to recycle.

Concept:

Recycling programs such as the Mixed Recycling Program are intended to keep recyclable material out of landfills. By not forcing the consumer to sort their recyclables, recycling stream volumes have increased.



DID YOU KNOW?

In 2011, New York set a goal to reduce MSW from 4.5 lb/person/day to 0.6 lb/person/day by 2031? - NYSDEC*

**SUSTAINABLE PRACTICES
FOR BUILDING OWNERS AND OCCUPANTS**

BUILDING ENVELOPE

**INSULATION
AIR INFILTRATION
WINDOWS**

Insulation



Background:

In Rochester, 57% of the housing stock was built before 1940. As a result, many of these homes do not have adequate insulation, making energy conservation a challenge.

Concept:

Insulation slows the rate of heat transfer between the conditioned indoor space and the outside environment. Insulation creates trapped air spaces, which serve as a good insulator, since the thermal conductivity of air is low compared to solid materials.

Helpful Tools:

The U.S. Department of Energy created an online tool called the [Home Energy Saver](http://homeenergysaver.lbl.gov/consumer/). This tool allows you to:

- Understand the paybacks of potential insulation upgrades.
- Understand the carbon impact of those upgrades.
- Receive recommendations for the best locations to insulate.



Did you know?

R-values are the key indicator of an insulation's thermal performance. The higher the R value, better the thermal performance of the insulation.

Did you know?

New construction in Rochester is guided by Section 39 of the City Code. Thermal shell requirements are set in this section according to the 2015 International Energy Conservation Code (IECC) for both commercial and residential buildings. Existing buildings do not need to comply with code - but some renovations do need to meet thermal shell requirements.

Hyperlink: <http://homeenergysaver.lbl.gov/consumer/>

Insulation



TARGET GROUP	WHAT CAN I DO
Developer, Landlord, Business Owners, Institutions 	<ul style="list-style-type: none"> Be aware of changes to the requirements of the thermal shell of buildings (the IECC is typically updated every 3 years)
Homeowner 	<ul style="list-style-type: none"> Be aware of changes to the requirements of the thermal shell of buildings (the IECC is typically updated every 3 years). Seek the services of a qualified energy auditor who can recommend insulation improvements or do it yourself with tools like the Home Energy Saver.
Tenant 	<ul style="list-style-type: none"> Ask your landlord, or potential landlord about the thermal shell of the rental property.

LOCATION IN STRUCTURE	POTENTIAL INSULATION OPTIONS
Roof	<ul style="list-style-type: none"> Fiberglass batts (can be applied in a retrofit) Blown insulation (fiberglass and foam) (can be applied in a retrofit) Rigid foam insulation
Walls	<ul style="list-style-type: none"> Fiberglass batts - for existing buildings this can be difficult to install. Blown insulation (fiberglass and foam) - can be done with penetrations from outside the home. Works well with new construction as well. Rigid foam insulation – suitable for retrofits and existing construction. Vacuum-insulated panels - somewhat new technology, can be expensive but offers very high insulation values (~R-50). Offers ability for structures in harsh climates, with high energy costs to achieve higher R values with less insulation depth. Foam insulated sheathing
Foundation	<ul style="list-style-type: none"> Insulated concrete forms (new construction) Rigid insulation under concrete pad (new construction) Insulated core concrete masonry units (new construction)

Hyperlink: <http://homeenergysaver.lbl.gov/consumer/>

Air Infiltration



Background:

Regardless of the quality of the windows or insulation of a structure - air can still leak in through places like the bottom of a door, window cracks, fireplaces, unfinished drywall, flooring, etc.

Concept:

Air infiltration should be minimized to make energy conservation effective. However, a home that is sealed too tightly can lead to moisture and indoor air quality problems. There are guidelines on how to strike this balance and on whether mechanical ventilation may be required.

Common Locations of Air Infiltration:

- Roof or wall vents
- Electrical outlets
- Recessed lights
- Attic hatch
- Outdoor water faucets
- Crawl spaces
- Door and window frame

Energy Audits

Performing energy audits on buildings can help understanding of potential areas of improvement. To learn more about how to apply for a home energy assessment [click here](#).



Common places of Air Infiltration in a home

Did you know?

The United States Department of Energy estimates 30% of heating and cooling costs can be saved by addressing infiltration.








Did you know?

Rochester currently uses the 2015 International Energy Conservation Code (IECC) to guide new construction. Existing buildings do not need to comply, however, additions to an existing building do need to comply with code. Code specifies that a blower door test (which tests the air-tightness of a home) must be completed. Air leakage rates need to be quantified and shown to be below established thresholds. Read more about these tests [here](#).

Hyperlink: https://www.energycodes.gov/sites/default/files/documents/BECP_Building%20Energy%20Code%20Resource%20Guide%20Air%20Leakage%20Guide_Sept2011_v00_lores.pdf
<https://www.nyserda.ny.gov/residential>

Air Infiltration



TARGET GROUP	WHAT CAN I DO
All members of the Rochester Community 	<ul style="list-style-type: none"> • Be aware of changes to the requirements of air infiltration buildings (the IECC is typically updated every 3 years).
Developer, Landlord, Business Owners, Institutions    	<ul style="list-style-type: none"> • Ensure buildings are built to code and meet blower door requirements. • On existing buildings perform tests such as the blower door test, infrared camera investigations or the basic smoke test to close leaks. • Be cautious not to seal too tightly to prevent indoor air problems. Provide mechanical ventilation if needed.
Homeowner 	<ul style="list-style-type: none"> • Conduct a Blower door test • Seal bottom of door, windows, frame wall, fireplace, drywall, flooring to close off locations of potential air infiltration. • Conduct a basic smoke test • Make use of Infrared cameras to detect leakage areas.
Tenant 	<ul style="list-style-type: none"> • Add temporary window insulation. • Add rubber water sealing to close gaps and drafts. • Consider cellular shades or insulated curtains.

Windows



Background:

In Rochester, over 57% of the housing stock was built before 1940. House construction methods in this period often used single pane windows and minimal insulation.

Concept:

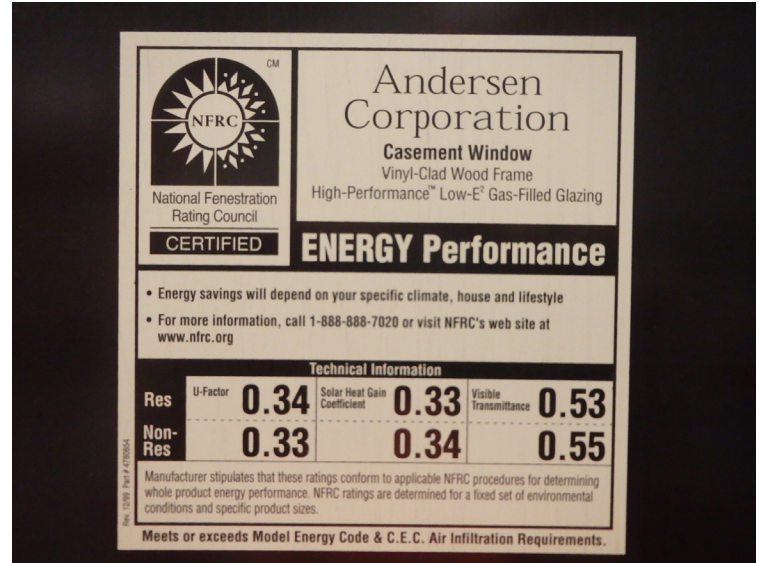
Glass has a higher thermal conductivity value than air. Double-pane windows place air in between glass, which improves the ability of the window to insulate.

Helpful Tools:

The U.S. Department of Energy made an online tool called the Home Energy Saver. This tool allows you to:

- Understand the paybacks of potential window upgrades; and
- Calculate the carbon impact of those upgrades.

Note: In order to achieve desired results, all windows in a home should be replaced.



Did you know?

The Energy Information Administration estimates that 1/3 of the heat loss associated with the average home is from windows and doors¹.

Did you know?

Rochester currently uses the 2015 International Energy Conservation Code (IECC) to guide new construction. Existing buildings do not need to comply, however, additions to an existing building do need to comply with code. Code specifies that a blower door test (which tests the air-tightness of a home) must be completed. Air leakage rates need to be quantified and shown to be below established thresholds. Read more about these tests [here](#).

Photo Credit: <https://energy.gov/energysaver/energy-efficient-windows>

¹ <https://energy.gov/energysaver/articles/improving-energy-efficiency-existing-windows>



TARGET GROUP	WHAT CAN I DO
Developer, Landlord, Business Owners, Institutions 	<ul style="list-style-type: none"> Be aware of changes to window requirements for buildings (the IECC is typically updated every 3 years).
Homeowner 	<ul style="list-style-type: none"> Inspect your windows. If single pane, simple treatments include installing curtains, or winter-proofing. If double pane, replace windows if you observe moisture buildup between panes as the windows may not effectively block out air infiltration anymore. Be aware of changes to window requirements for buildings (the IECC is typically updated every 3 years).
Tenant 	<ul style="list-style-type: none"> Inspect your windows. If single pane, simple treatments include installing curtains, or winter-proofing. If double pane, report moisture buildup between panes to the landlord as the windows may not effectively block out air infiltration anymore.

In general, there are three mechanisms that transfer heat through a window:

- 1) Conduction, e.g. a single pane window loses heat through conduction.
- 2) Convection, e.g. convective cells form in double pane windows which can transfer heat.
- 3) Radiation, e.g. sunlight coming through a window will heat the indoor environment.

Here is an overview of available window technologies to address these heat transfer mechanisms:

WINDOW	BENEFITS
Double Pane	<ul style="list-style-type: none"> Air gaps are poor conductors for heat transfer. Gaps are typically spaced to avoid effective convection by the manufacturer which minimizes heat loss.
Walls	<ul style="list-style-type: none"> Low-emissivity glass offers the ability to not only reflect solar radiation outdoors away from the home during the summer, but also reflect radiation back indoors into the home during the winter.
Foundation	<ul style="list-style-type: none"> Similar to double pane windows, but often more expensive, these windows offer more insulation.
Inert Gas Filled	<ul style="list-style-type: none"> Some double and triple pane windows can be filled with inert gases other than air. These gases (e.g. argon) are heavier than air and more resistant to convective cell formation, thus generating less heat loss.

Hyperlink: <http://homeenergysaver.lbl.gov/consumer/>

**SUSTAINABLE PRACTICES
FOR BUILDING OWNERS AND OCCUPANTS**

BUILDING ENERGY EFFICIENCY

**HIGH EFFICIENCY FURNACES/BOILERS
HEAT PUMPS
LIGHTING
ON DEMAND HOT WATER HEATERS
HIGH EFFICIENCY APPLIANCES
INTERNAL ENERGY MONITORING**

High Efficiency Furnaces / Boilers



Background:

Space heating is the largest energy expense in the average U.S. home and accounts for approximately 45% of energy bills.¹ Furnace efficiency is measured by the annual fuel utilization efficiency (AFUE).

Concept:

Analyze benefits and savings of installing a high efficiency furnace.

Did you know?

Upgrading a furnace from 56% to 90% efficiency will save a household an average of 1.5 tons of CO² per year.²

Types of Furnaces:

	LOW EFFICIENCY	MID EFFICIENCY	HIGH EFFICIENCY
Air Flow	Natural draft	Exhaust fan	Condensing flue gases in second heat exchanger
Ignition Source	Continuous pilot light	Electronic ignition	Sealed combustion
AFUE	56%-70%	80%-83%	90%-98.5%

Helpful Equations:

$$AFUE = \frac{\text{Annual Heat Output}}{\text{Total Annual Fossil Fuel Energy}}$$

$$\text{Percent Savings} = \frac{\text{New Efficiency} - \text{Existing Efficiency}}{\text{New Efficiency}} * 100\%$$

Did you know?

If your existing furnace is 56% efficiency, you could save up to 43% on your annual heating bills. If your existing furnace is Mid Efficiency, it may be more cost effective to perform small updates such as installing a flue dampener.

¹ Energy Saver 101 Infographic: Home Heating; ^{2,3} Energy.gov Furnaces and Boilers
Hyperlink: <https://greatercomfort.com/blog/heating-service/10-surprising-furnace-facts/>

High Efficiency Furnaces / Boilers



TARGET GROUP	WHAT CAN I DO
Developer, Landlord, Business Owners, Institutions 	<ul style="list-style-type: none"> In the market to replace an old furnace, or install one into a new build? Check out this link for Consumer Report’s buying guide to furnaces. Want to learn more about efficiency ratings of furnaces and boilers? Click here Looking for tax credits? Click here
Homeowner 	<ul style="list-style-type: none"> Rochester Gas and Electric offers rebates for replacement of existing furnaces with high efficiency replacements. Click here to learn more. Click here for a specific "Residential Natural Gas Equipment Rebate Program. The City’s Emergency Assistance Repair Program provides financial assistance to eligible owner-occupants for furnace, hot water tank, and water line repair or replacement. Click here and click “Grant Programs” to find out if you are eligible.
Landlord 	<ul style="list-style-type: none"> Are you or your tenants responsible for the heating bill? Replacing old furnaces will reduce your monthly bills.
Tenant 	<ul style="list-style-type: none"> Ask your landlord what type/efficiency furnace is heating your rental unit.

Did you know?

All furnaces contain these three components:

1. A burner (in gas furnaces) or a heating element (in electric furnaces) dictates how the heat is created;
2. A heat exchanger: separates combustion gas from breathable air;
3. A blower: sends the breathable air through the duct system in the house.

Hyperlinks: <https://www.consumerreports.org/cro/gas-furnaces/buying-guide>

<https://energy.gov/energysaver/furnaces-and-boilers>

https://www.energystar.gov/about/federal_tax_credits

<http://www.rge.com/UsageAndSafety/usingenergywisely/eeps/default.html>

<http://www.cityofrochester.gov/HomeRepairGrants/>

http://www.rge.com/MediaLibrary/2/5/Content%20Management/Shared/UsageAndSafety/PDFs%20and%20Docs/Res_Nat_Gas_Rebate_Application.pdf

Heat Pumps



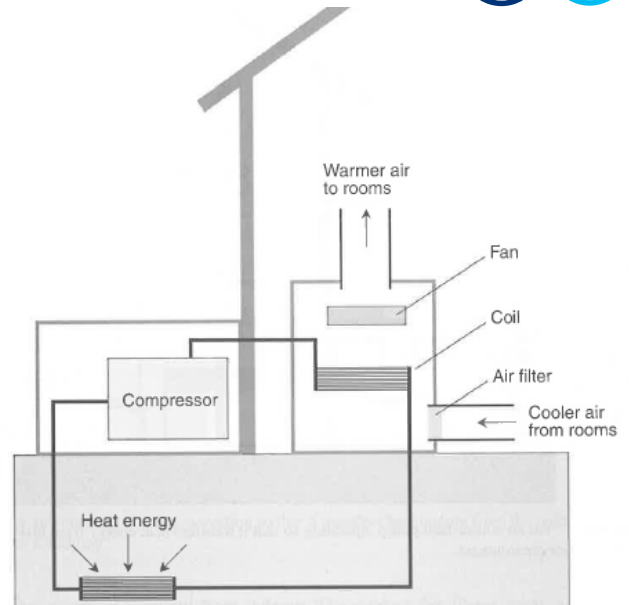
Background:

There are two main types of heat pumps. One is known as an air source heat pump and the other is a geothermal or ground source heat pump. Both use similar concepts to transfer heating or cooling from the outdoor environment to the indoor environment and are very efficient at doing so.

Ground-source heat pumps have low operating costs, low environmental impact and a long life expectancy. Air-source heat pumps have technologically improved in recent years, making them effective options for providing heating in cold climates. NYSERDA currently offers several rebate programs for both ground-source and air-source heat pumps.

Concept:

The outdoor environment is used as a heat source in the winter and a heat sink in the summer. A heat pump system typically has two coils on a loop. Coils are where the exchange of heat between the environment and a liquid (likely a refrigerant) will take place. See figures below for a depiction of the different types of heat pumps.



Ground-Source Heat Pump Loop

Did you know?


Each year, about 80,000 geothermal units are installed in the U.S. (geothermal energy is used in all 50 U.S. states today, with great potential for near-term market growth and savings) and 27,000 in Sweden. In Finland, a geothermal heat pump was the most common heating system choice for new detached houses between 2006 and 2011 with market share exceeding 40%.

Did you know?

Heating/cooling equipment is defined by how well it supplies heating/cooling compared to the energy required to operate the system. This parameter is known as the Coefficient of Performance (COP). Heat pumps typically have a COP greater than 1, meaning it supplies more useful heat (heat that is used to condition a space and not lost to the environment) than the energy it requires to operate.

Heat Pumps



TARGET GROUP	WHAT CAN I DO
<p data-bbox="103 459 496 531">All members of the Rochester community</p> 	<ul data-bbox="630 464 1513 1062" style="list-style-type: none"> • If you do install a heat pump system, or currently are operating one, consider the type of refrigerant you are using. Avoid certain refrigerants such as CFC (chlorofluorocarbon) based refrigerants which are known to degrade the ozone layer and contribute to climate change. Refer to LEED's Refrigerant Management credits for further guidance. • Purchase ENERGY STAR certified heat pumps for efficient units. • Consult NYSERDA for resources such as approved designers and installers. • Research rebate/grant programs such as NYSERDA's Ground Source Heat Pump Rebate which allows customers to use NYSERDA approved designers/installers to obtain rebates on system installations for residential, commercial, institutions and industrial customers. NYSERDA's Air Source Heat Pump Rebate applies only to residential units currently.

Hyperlinks: LEED Refrigerant Management Credits: <https://www.usgbc.org/credits/ea7>
 NYSERDA Ground Source Heat Pump Manual: <https://portal.nyserderda.ny.gov/servlet/servlet.FileDownload?file=00Pt0000002xy5ZEAO>
 NYSERDA Air Source Heat Pump Manual: <https://portal.nyserderda.ny.gov/servlet/servlet.FileDownload?file=00Pt0000002gtL7EAI>

Lighting



Background:

Lighting is one of the most important technologies that people benefit from every day. In 2012, the lighting industry created new standards. Read about them [here](#).

Concept:

Because lighting benefits almost every facet of America's infrastructure today, it is critical to better understand and incorporate the latest, most optimal and energy efficient lighting technology whenever and wherever possible.

Helpful Information:

For more information on how to select an Energy Star certified build for application into your house, click [here](#).



LED Light Bulbs (Department of Energy)

Did you know?

LED's are considered directional lights. This means that instead of emitting light in all directions, light is emitted in a specific direction, increasing the efficiency by focusing light emitted at specific angles.

TYPES OF LIGHTING	EFFICIENCIES*	TYPICAL LIFESPAN	ADDITIONAL INFORMATION
Incandescent	1.5-2.5%	1,200 hours	Emission of light is caused by heating the filament.
Compact Fluorescent (CFL)	7-10%	8,000 hours	Take longer and more energy to reach full brightness. Once operating, CFL's use ~70% less electricity than incandescents.
Light Emitting Diode (LED)	~85%	25,000 hours	Require very low voltage source, easily applied into solar energy generation systems.

**Efficiencies presented represent the percentage of energy that is converted into lighting. The remainder is lost as heat.*

Did you know?

You can save approximately \$6 in energy costs each year if you replace one 100W incandescent light bulb with an Energy Star rated CFL.

**Savings based on usage of 2 hours per day at 11 cents per kilowatt hour.*

Hyperlinks: <https://energy.gov/energysaver/new-lighting-standards-began-2012>
https://www.energystar.gov/products/choose_a_light
 Sources: <https://greenbuildingelements.com/2014/02/12/guest-post-7-benefits-using-led-bulbs/>
 Photo Credit: <https://energy.gov/energysaver/led-lighting>

Lighting



TARGET GROUP	WHAT CAN I DO
All members of the Rochester Community 	<ul style="list-style-type: none"> Energy Star offers a variety of rebates for energy efficient lighting. Click here to see if you qualify.
Developer (Non-newbuild), Landlord, Business Owners, Tenants, Institutions 	<ul style="list-style-type: none"> Rochester Gas and Electric has a current rebate program for multi-family energy efficiency. Click here to learn more.
Developer, Landlord, Business Owners, Institutions 	<ul style="list-style-type: none"> Where feasible, consider using occupancy sensors. To learn more, assess your current energy use and potential savings, click here.
Landlord 	<ul style="list-style-type: none"> Click here to learn more about RG&E's current multi-family energy efficiency program. Qualifying properties can receive free installation of energy-efficient products.
Developer 	<ul style="list-style-type: none"> The City of Rochester's code outline Lighting regulations in Section 120-170. Click here to read more.
Tenant 	<ul style="list-style-type: none"> Replace incandescent light bulbs with Energy Star LED bulbs. Consider installation of motion sensors and timers to control lighting. Confirm if a sub meter has been installed for your rental unit Determine if you are paying for electricity directly to the utility or to the landlord. Discuss lightbulb replacement options with your landlord.

Hyperlinks:https://energy.gov/savings/search?f%5B0%5D=im_field_rebate_state%3A860101
<http://rge.com/UsageAndSafety/usingenergywisely/eeps/multifamily.html>
<http://www.wernermn.com/assets/files/PDF/green/Sensors-EnergyTips.pdf>
http://www.rge.com/MediaLibrary/2/5/Content%20Management/Shared/UsageAndSafety/PDFs%20and%20Docs/MultiFamily_Overview_Free_Measures.pdf
<http://www.ecode360.com/8682809#8682767>

On Demand Hot Water Heaters



Background:

Hot water heaters are appliances that heat water above its initial temperature for uses around the home. Typical uses include cleaning, bathing and cooking.

Concept:

Tankless water heaters, also referred to as on-demand or Instantaneous water heaters, provide hot water on a demand based basis -only heating the water when a water fixture is turned on. For a comparison of all types of water heaters, [click here](#).

Sizing Criteria:

Size: The size of a water heater is based on the purposes for which hot water is used (i.e., showering, washing dishes, washing clothes, etc.) multiplied by the number of times hot water is used in one hour for each purpose. [Click here](#) to learn more, or use a spreadsheet similar to the example given below to calculate your total peak hour demand.

Fuel Type: Ensure that the type of water heater you are looking at will be compatible with your fuel source. [Click here](#) to learn more.

Energy Efficiency: Calculate your water heater's energy efficiency using an energy factor (EF). The energy factor is based on the ratio of hot water produced to the fuel consumed. A higher energy factor directly relates to the efficiency of the water heater. [Click here](#) to learn more.

Costs: Check on the installation and maintenance costs associated with the types of systems under consideration. Once all costs are determined, payback time can be estimated. [Click here](#) to learn more.

Did you know?

The average household spends between \$400 and \$600 on water heating each year. Water heating is most likely the 2nd largest expense for your home. On average it accounts for 14-18% of your utility bills.



USE	AVERAGE GALLONS OF HOT WATER PER USAGE		TIME USED PER HOUR		TOTAL GALLONS USED IN 1 HOUR
Shower	Ex: 10 gal/shower*	X	2	=	20
Hand Washing	1	X	4	=	4
Shaving	2	X	1	=	2
Dishwashing (hand)	4	X	1	=	4
			Total Peak Hour Demand	=	30

* Red text designates example calculation. Not reflective of personalized application.

Hyperlinks: <https://energy.gov/articles/new-infographic-and-projects-keep-your-energy-bills-out-hot-water>
<https://energy.gov/energysaver/sizing-new-water-heater>
<https://energy.gov/energysaver/selecting-new-water-heater>
<https://energy.gov/energysaver/estimating-costs-and-efficiency-storage-demand-and-heat-pump-water-heater>

On Demand Hot Water Heaters



TARGET GROUP	WHAT CAN I DO
<p>All members of the Rochester Community</p> 	<ul style="list-style-type: none"> • Calculate how much installing an On-Demand hot water heater can save your home, development or community building by using the process outlined on the previous page. • For additional ways to save on water heating bills, reference “High Efficiency Appliances” and “Efficient Fixtures”.
<p>Homeowner</p> 	<ul style="list-style-type: none"> • There is a current tax credit for a solar water heater installation. Through 2019, a taxpayer may claim a 30% credit for the installation of a solar water heater in their residence. Click here to learn more or click here to apply.

Hyperlinks: <https://energy.gov/savings/residential-renewable-energy-tax-credit>
https://www.energystar.gov/about/federal_tax_credits

High Efficiency Appliances



Background:

Energy Star is a U.S. Environmental Protection Agency (EPA) voluntary program that helps businesses and individuals save money and protect the climate through superior energy efficiency. To date, homeowners, business developers, institutions and members of communities have saved over \$297 million in utility bills and avoided CO2 emissions of 2.1 billion tons.



ONE CHANGE CAN MAKE A BIG DIFFERENCE

If every American home replaced a single light bulb with one that has earned the ENERGY STAR, together we would prevent greenhouse gas emissions equivalent to the carbon sequestered annually by more than 3 million acres of average U.S. forests.

Each tree represents 100k acres of U.S. forests.

Energy Star Infographic

Did you know?

ENERGY STAR has been instrumental in helping consumers and businesses save energy and reduce GHGs. ENERGY STAR benefits have grown steadily over time, nearly tripling in the last decade.






Did you know?

Energy use in homes, buildings, and industry account for two thirds of greenhouse gas emissions in the United States.¹ An Energy Star-certified washing machine uses 70 percent less energy and 75 percent less water than the standard washing machine of 1997.

Sources: ¹EPA's INVENTORY OF U.S. GREENHOUSE GAS EMISSIONS AND SINKS: 1990 – 2010; ²https://www.energystar.gov/about/origins_mission
https://www.energystar.gov/products/24_hours_saving_energy_earth_day_infographic

High Efficiency Appliances



TARGET GROUP	WHAT CAN I DO
<p>All members of the Rochester Community</p> 	<ul style="list-style-type: none"> Reduce your overall energy use, bills and environmental impacts by installing or upgrading your appliances to Energy Star rated appliances.
<p>Developer, Landlord, Business Owners, Institutions</p> 	<ul style="list-style-type: none"> Install high efficiency appliances in your buildings.
<p>Homeowner</p> 	<ul style="list-style-type: none"> Select high efficiency appliances for use in your home.
<p>Landlord</p> 	<ul style="list-style-type: none"> Consider the use/benefit of using high efficiency appliances. Select high efficiency appliances for use in your building.
<p>Tenant</p> 	<ul style="list-style-type: none"> Inquire into the types of appliances that exist in apartments.

Internal Energy Monitoring



Background:

Residential homes typically have a singular electric service and natural gas service meter. Commercial scale apartment buildings also have metered utility service, but often do not provide individual unit metering to allow an individual tenant to understand their energy usage.

Concept: In order to reduce one's energy usage, one must better understand what activities contribute to the highest energy consumption.

Wi-Fi Enabled Thermostats:

Thermostats can now be hooked up to Wi-Fi, which enables:

1. Remote temperature control in the home
2. The qualifying of participation in programs that decrease energy demand during peak demand hours in the summer by allowing the utility to adjust home energy usage. Credits can be made on the utility bill each time the utility adjusts energy usage

The starting price for Wi-Fi enabled thermostats is approximately \$200.

RG&E is offering a "Smart Savings Reward" for consumers who agree to install a Wi-Fi connected thermostat. For more information on the program, [click here](#), or to read the frequently asked questions, [click here](#).



Did you know?

For the cost of \$20 to \$30, the energy usage of individual appliances can be measured with usage monitors, which can be plugged into a traditional wall socket.

Did you know?

Rochester Gas & Electric (RG&E) is currently offering up to an \$50 rebate to upgrade an existing thermostat to a Wi-Fi enabled thermostat. [Click here](#) for more information.

Hyperlinks: <https://enrollmythermostat.com/smartsavingsroch/>
<https://enrollmythermostat.com/smartsavingsroch/faq/>
<http://www.rge.com/usageandsafety/usingenergywisely/eeeps/default.html>

Internal Energy Monitoring



TARGET GROUP	WHAT CAN I DO
Developer, Landlord, Business Owners, Institutions 	<ul style="list-style-type: none"> In cases where tenants are charged a monthly flat rate for utilities, provide tenants with a history of their past electricity and natural gas usage data in order to allow tenants to better understand their energy usage data and incentivize them to reduce their energy consumption. Be aware that rating systems such as Enterprise Green Communities provide points for individual unit electricity monitoring (read about it here).
Homeowner 	<ul style="list-style-type: none"> Purchase a \$20 to \$30 individual energy usage monitor and take note of any appliances that need an energy efficiency upgrade. Enroll in the Wi-Fi Connected Thermostat program. See if you qualify by clicking here. If you have natural gas service from RG&E and use it for heating and/or cooling, look into a Wi-Fi enabled thermostat.
Tenant 	<ul style="list-style-type: none"> Ask for copies of monthly utility bills if you do not have access to them. Use individual energy usage monitors to alert landlords of faulty appliances.

Hyperlinks: <http://www.enterprisecommunity.org/solutions-and-innovation/green-communities/criteria>
<https://enrollmythermostat.com/smartsavingsroch/>

**SUSTAINABLE PRACTICES
FOR BUILDING OWNERS AND OCCUPANTS**

RENEWABLE ENERGY

**PHOTOVOLTAIC PANELS
WIND**

Photovoltaic Panels



Background:

Photovoltaic panels allow users to obtain clean energy from a renewable resource. A typical residential photovoltaic system consists of the following components:

1. Solar array: Converts solar energy to direct current (DC) electricity.
2. Inverter: Converts direct current (DC) electricity to alternating current electricity (AC) which is used in homes.

Systems can either be connected to the local utility or be installed independent of the local utility.

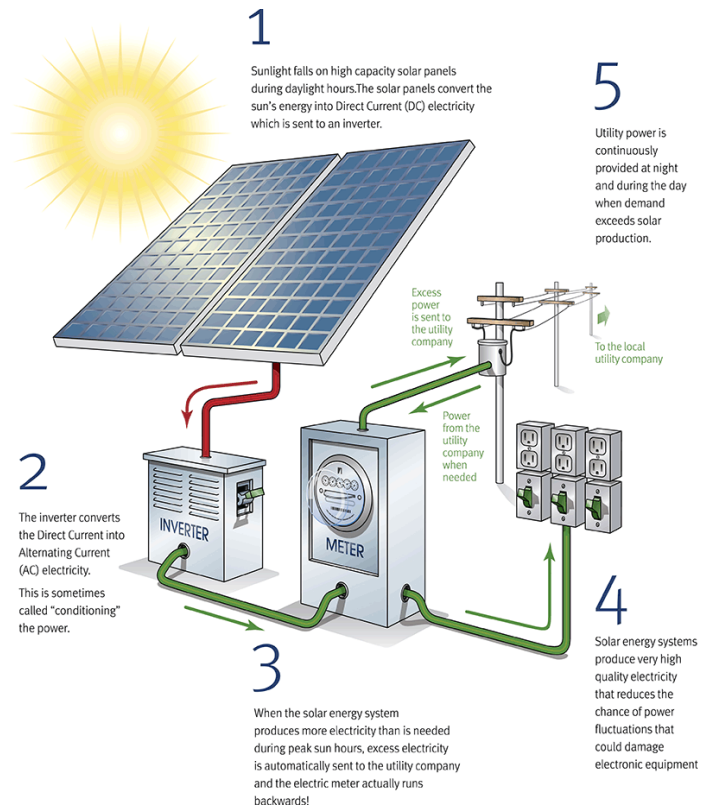
Some systems also include:

1. Battery: Stores electricity produced by solar array.
2. Bypass diodes: Allows certain solar cells to be bypassed if they are not producing electricity.
3. Blocking diodes: Prevents a battery from draining itself during the night when it is not being charged by the array.

Applicable City of Rochester Codes:

1. Section 120-148.2: Describes requirements for solar energy system installations.
2. Section 120-163: Indicates locations where solar arrays may be installed on a site.

Different codes may apply based on zoning.



Did you know?

The City of Rochester has adopted the New York State Unified Solar Permit, which speeds up the permitting process for solar projects up to 25 kilowatts and decreases costs. [Click here](#) to learn more.

Did you know?




The federal government extended the renewable energy tax credit through 2021. Through 2019 the credit remains at 30% of the cost of the system for both residential and commercial participants. This credit expires after 2021 for residential users, but remains at 10% for commercial users. New York State also provides a solar energy system equipment credit, which is a credit of 25% of a qualified solar system's equipment costs. The credit is capped at \$5000.

Sources: <https://energy.gov/savings/residential-renewable-energy-tax-credit>
<http://www.nrel.gov/docs/fy04osti/35297.pdf>
<http://solarcraft.com/wp-content/uploads/2013/04/how-solar-panels-work-illustration.gif>

Hyperlink: <https://www.nyseda.ny.gov/All-Programs/Programs/Clean-Energy-Communities/Clean-Energy-Communities-Program-High-Impact-Action-Toolkits/Unified-Solar-Permit>

Photovoltaic Panels



TARGET GROUP	WHAT CAN I DO
<p>All members of the Rochester Community</p> 	<ul style="list-style-type: none"> • Consider the economic benefits of solar panels as described below. <p>To pursue solar photovoltaic panels, consider the following components:</p> <ul style="list-style-type: none"> • The useful life of the arrays • Array warranties compared to the expected useful life • The current state of the roof (structurally and the next time the roof shingles will need to be replaced) • Available space. The rule of thumb is for every 100 square feet, 1kW may be produced. • Expected energy production
<p>Developer, Business Owners, Institutions</p> 	<ul style="list-style-type: none"> • Consider solar-ready construction (e.g. run conduit to the roof, orient new construction to have southern facing slopes, plan for roof penetrations to not be located on the southern facing roof slope, etc.) in the event installation costs decrease and/or utility costs increase. • Be aware that rating systems such as Enterprise Green Communities provide points for solar ready design. • Consider the federal residential renewable energy tax credit (30%) (not applicable for rental units) and the federal commercial depreciation allowance.
<p>Homeowner and Landlord</p> 	<ul style="list-style-type: none"> • Consider the federal residential renewable energy tax credit (30%) (not applicable for rental units) and the NYS tax credit (25%).

Calculate Payback Period:

$$\text{Payback (Years)} = \frac{\text{Total System Cost} - \text{Federal and State Tax Credits}}{\text{Total Energy Savings Per Year}}$$

Note: Total system costs include costs for arrays, installation, any application fees and system components.

The National Renewable Energy Laboratory estimates energy savings in Rochester, NY to be 1500 kW-hr/kW-year for a net-metered system. Multiply this conversion number by the kW of your photovoltaic system. Then multiply by the cost per kW-hr of your utility provider. Ex: 5 kW * 1500 kW-hr/kW-year * \$0.14/kW-hr = \$1,050 saved in total energy savings over a year.

Wind



Background:

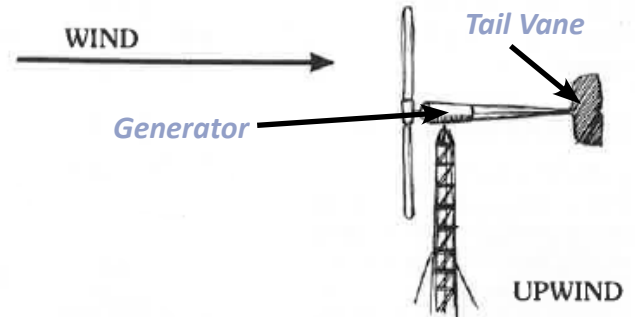
Wind is a renewable resource that can generate electricity through turbines. Wind turbines offer the ability to extract energy from certain geographical locations based on wind speeds. There are two basic types of turbines:

Horizontal Axis Wind Turbines:

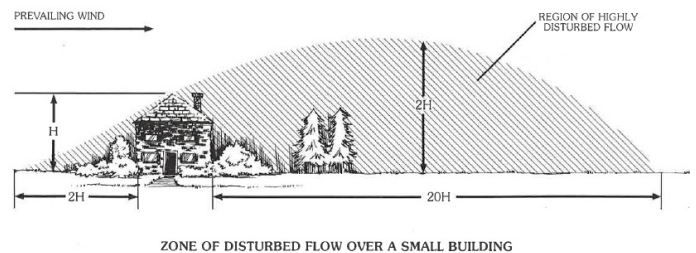
The first way to extract energy from wind turbines is through the horizontal axis, which is the most common way. The tail vane is used to keep the turbine facing the wind. The generator is mounted at the top of the tower (hub height).

Vertical Axis Wind Turbines:

The major difference with vertical axis turbines from horizontal axis wind turbines is that the shaft is vertical. The generator can be mounted at the ground level which helps with maintenance. Vertical axis turbines do not rely on specific wind direction.

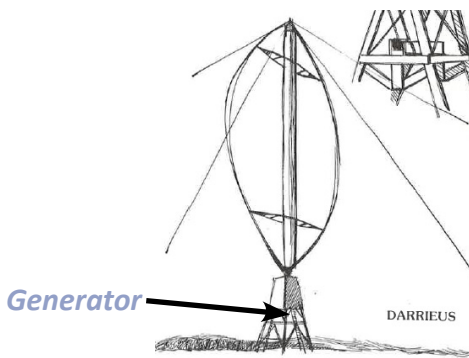


Horizontal Axis Turbine



Did you know?

Section 120-163 of the City Code permits wind energy conversion systems for both residential and non-residential uses if certain conditions are met.



Vertical Axis Turbine

Did you know?

NYSDERDA currently has a Small Wind Turbine Program that will provide incentives to install up to 2 MW of turbines per site. Residential, commercial, institutional and government users are eligible. [Click here](#) for more information.



TARGET GROUP	WHAT CAN I DO
All members of the Rochester Community 	<ul style="list-style-type: none"> • Consider the economics of wind turbine installation using the "Calculate Payback Period" section below. • If you choose to install turbines, some factors to consider include: <ul style="list-style-type: none"> • Zoning restrictions • Site obstructions • Costs of energy production and payback • NYSERDA funding for small wind turbines
Developer, Business Owners, Institutions 	<ul style="list-style-type: none"> • Consider wind-ready construction (e.g. run needed conduit to the future tower location) in the event installation costs decrease and/or utility costs increase.

Calculate Payback Period:

$$\text{Payback (Years)} = \frac{\text{Total System Cost} - \text{Federal and State Tax Credits}}{\text{Total Energy Savings Per Year}}$$

Note: Total system costs include the costs for the turbine, tower, installation, any application fees and system components.

**SUSTAINABLE PRACTICES
FOR BUILDING OWNERS AND OCCUPANTS**

WATER EFFICIENCY

**EFFICIENT FIXTURES
ON-SITE WATER REUSE
INDIGENOUS LANDSCAPING**

Efficient Fixtures

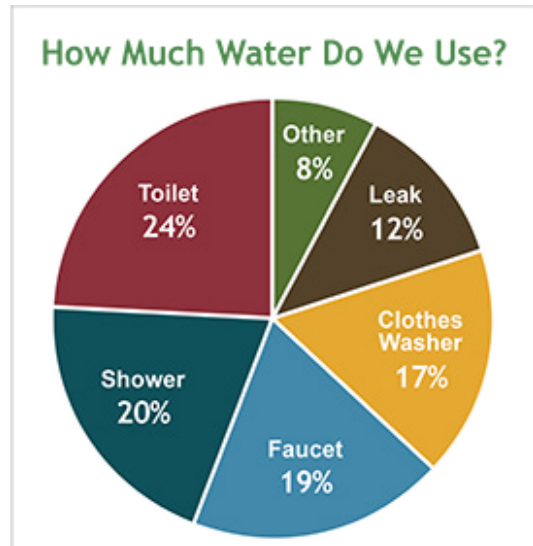


Background:

Fixtures such as shower heads, kitchen sinks, and bathroom sinks play a significant role in the water efficiency of any occupied space.

Concept:

Upgrading existing fixtures to energy-efficient fixtures can reduce energy and water bills, while providing environmental benefits.



Source: Water Research Foundation, Residential End Uses of Water 2016

Did you know?

Pre-1980s toilets use 5.0+ gallons per flush. Present day, high-efficiency toilets use 1.28 gallons per flush on average. A leaking toilet can waste more than 50 gallons of water each day. Over a year that can amount to over 18,000 gallons wasted.

Example Calculation: Low-Flow Shower Head

$$\frac{14 \text{ min}}{\text{shower}} \times \frac{1 \text{ shower}}{\text{day}} \times \frac{365 \text{ days}}{\text{year}} \times \frac{2.5 \text{ gal}}{\text{min}} \times 2.4 \text{ people} = 30,660 \text{ gal/ year}$$

$$\frac{14 \text{ min}}{\text{shower}} \times \frac{1 \text{ shower}}{\text{day}} \times \frac{365 \text{ days}}{\text{year}} \times \frac{2.0 \text{ gal}}{\text{min}} \times 2.4 \text{ people} = 24,528 \text{ gal/ year}$$

Potential Savings: 6,132 gallons per year

* Calculation use average values, references in sources

Did you know?

The average family uses more than 300 gallons of water per day.

* Average values taken from EPA Exposure Factors Handbook 2011 and Census Reporter.org

1. <https://censusreporter.org/profiles/16000US3663000-rochester-ny/>

2. <http://wateruseitwisely.com/time-low-flow-toilets-take-bow/>

3. https://www.epa.gov/sites/production/files/styles/medium/public/2017-02/ws-ourwater-water-pie-chart-version-two_0.png

Indigenous Landscaping



Background:

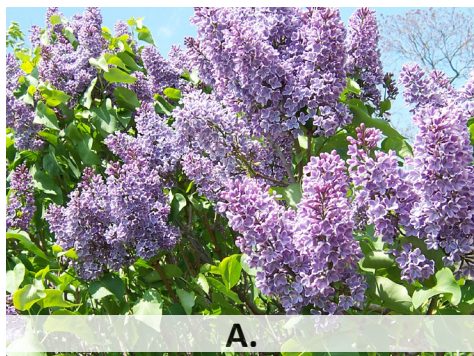
Indigenous plant species are native to the local environment, meaning that, compared to their non-indigenous counterparts, they require less water and fewer resources to maintain and stay healthy. Indigenous plants can also provide beneficial habitats and food for native wildlife.

Pollinator Gardens:

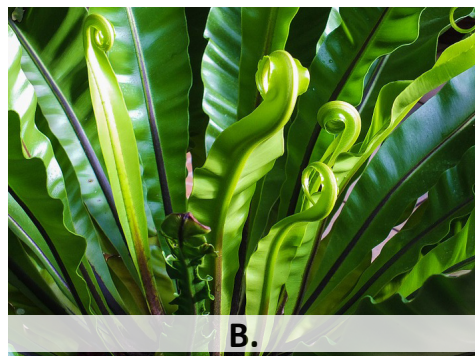
Pollinator gardens are a great way to help your own backyard. [Click here](#) to learn more.

Test Your Knowledge:

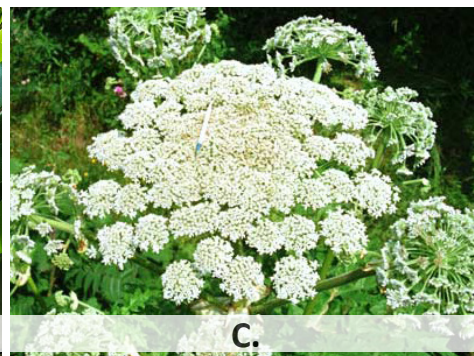
Identify each of the plants from the below picture. Then decide if they are (1) Native, (2) Endangered, or (3) Invasive species



A.



B.



C.

Plant Classifications and Lists

1. Indigenous Species

[Click here](#) for a list provided by the New York Flora Atlas

[Click here](#) for a list provided by the United States Department of Agriculture

2. Invasive Species

Definition (DEC): A species that is non-native to a particular ecosystem, and whose introduction causes or is likely to cause economic or environmental harm or harm to human health. Invasive species are not permitted to be planted on a site.

[Click here](#) for a list of invasive species to Monroe County

3. Endangered Species

[Click here](#) for a list of Monroe County's Endangered plant species provided by the DEC

Test Your Knowledge Solution:

A. Native Lilac
 B. Endangered Harts Tongue Fern
 C. Invasive Giant Hogweed

Classification:

Sources: <https://emswcd.org/native-plants/native-plant-benefits/>
 **<https://www.eia.gov/tools/faqs/faq.php?id=307&t=11>
<http://newyork.plantatlas.usf.edu/>
 Hyperlinks: <http://www.ecode360.com/8682809#8682712>
<http://newyork.plantatlas.usf.edu/results.aspx>

<https://www.nrs.fs.fed.us/data/il/ilpin/county/county.asp?county=133>
<https://www.nrs.fs.fed.us/data/il/ilpin/county/county.asp?county=133>
<http://www.dec.ny.gov/animals/7133.html>
<https://www.fws.gov/pollinators/pollinatorpages/yourhelp.html>

**SUSTAINABLE PRACTICES
FOR BUILDING OWNERS AND OCCUPANTS**

INDOOR AIR QUALITY

**VOC-CONTAINING MATERIALS
MOLD/MILDEW PREVENTION**

VOC-Containing Materials

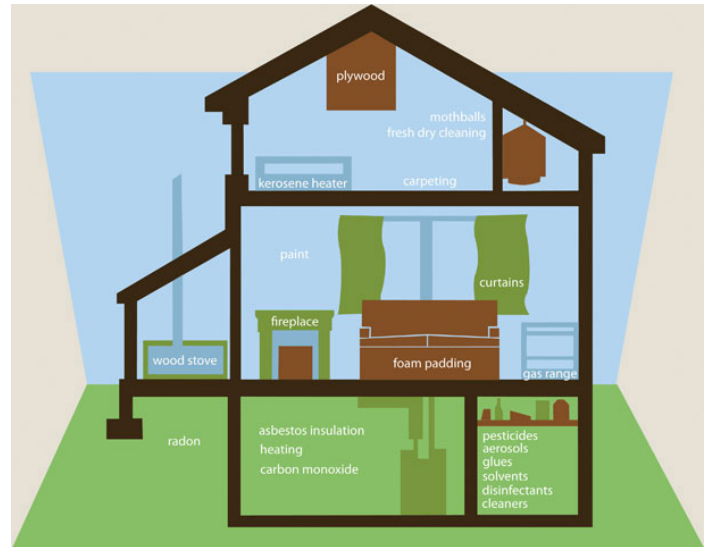


Background:

VOCs (volatile organic compounds) are chemicals that are emitted from liquids and solids as gases. In the indoor environment VOCs are emitted from common, everyday items listed in the section below. The US EPA has reported that VOCs in indoor air are often 2 to 5 times higher than outdoor air¹. VOCs have been known to cause both short- and long-term health effects.

Common Household VOC containing Materials:

- carpet
- composite
- wood products
- insulation
- paints
- adhesives
- furniture
- cleaning products
- copy and fax machines
- tobacco smoke
- deodorant and cologne



Sources of Indoor Air Pollution (Red River College)

Did you know?

No federally enforceable standards have been set for VOCs in non-industrial settings¹.

Did you know?



Sick Building Syndrome (SBS) is often associated with VOC health effects. Effects such as headaches, dizziness, nausea, eye, nose or throat irritation, dry coughs, fatigue, asthma, etc. are all possible symptoms.

Sources: Photo Credit: Red River College (<https://blogs.rrc.ca/wellness/2014/02/watching-paint-drywhats-actually-happening-2/>)

¹<https://www.epa.gov/indoor-air-quality-iaq/volatile-organic-compounds-impact-indoor-air-quality>

VOC-Containing Materials



TARGET GROUP	WHAT CAN I DO
<p>All members of the Rochester Community</p> 	<ul style="list-style-type: none"> • Be aware of what household products contain VOCs and avoid and/or reduce use. • Select low or no VOC products where available.
<p>Developer, Landlord, Business Owners, Institutions, Homeowners</p> 	<ul style="list-style-type: none"> • Specify low-VOC or no VOC building materials. • Prior to moving in tenants, conduct building flush-outs. LEED for New Construction EQc3.2 offers a possible method of construction management to flush-out a building.

Mold/Mildew Prevention



Background:

Mold growth occurs when excessive moisture accumulates in buildings or on building materials (insulation, carpet, ventilation systems, etc.) Mold growth is found almost everywhere: indoor and outdoors.

Concept:

Controlling moisture is the most important strategy for reducing indoor mold growth.

Mold Likes to Grow In:

Indoor spaces with a relative humidity of greater than 50% is favorable for mold growth, damp and dusty conditions and/or rooms with stagnant air.



Mold growth in poorly ventilated space



Mold resistant materials

Did you know?

Moisture trapped in walls of a home can decrease insulation values and the structural integrity of wood frame construction.

Did you know?

The most common indications of mold exposure are allergies and irritation of the throat, eyes or skin.¹ Individuals with current health conditions such as allergies, asthma or emphysema are often more sensitive to mold than others.

Sources: ¹<https://www.health.ny.gov/publications/7287/> (NY Dept of Health)

Mold/Mildew Prevention



TARGET GROUP	WHAT CAN I DO
<p>Developer, Landlord, Business Owners, Institutions, Homeowners</p> <p>D L B I H</p>	<ul style="list-style-type: none"> • When constructing a new development or performing a renovation of an existing structure, ensure that the potential for exposure to rain or other sources of water are thoroughly noted. LEED offers guidance on construction indoor air quality. • Use materials such as cement board to meet the ASTM D3272 standard that are moisture-resistant behind showers and tubs. • Use properly sized-exhaust fans in bathrooms, along with mold/mildew resistant paint and caulk. • Use breathing building envelope membranes to allow moisture to leave the inside of the structure but not enter it. • Waterproof, seal, and insulate foundation walls. • Install vapor barriers under concrete slabs. • Use dehumidifiers. • Consider using paperless, or moisture-resistant sheetrock. • Track indoor humidity. • Practice proper indoor housekeeping.
<p>Tenants</p> <p>T</p>	<ul style="list-style-type: none"> • Pay attention to high moisture areas and try to keep them dry. If mold growth is persistent and/or a water leak is identified, contact your landlord for repair. • Ensure exhaust fans are working and report issues to the landlord. • Track indoor humidity. • Practice proper indoor housekeeping. • Use dehumidifiers.

**SUSTAINABLE PRACTICES
FOR BUILDING OWNERS AND OCCUPANTS**

**STORMWATER
MANAGEMENT/
GREEN
INFRASTRUCTURE**

**POROUS PAVEMENTS
STORMWATER CAPTURE
GREEN ROOFS
RAIN GARDENS**

Porous Pavements



Background:

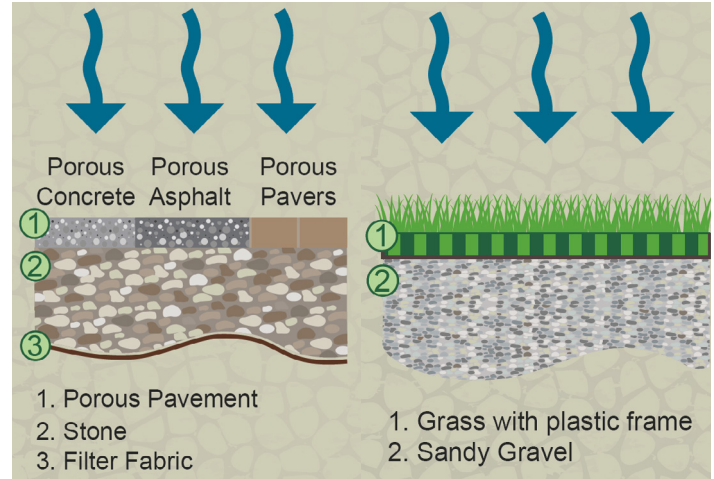
Typically, asphalt and concrete surfaces are largely impermeable to water infiltration. As a result, water runoff occurs on the surface and must be collected or is discharged to waterways with contaminants that may be on those surfaces.

Concept:

Porous pavements, which allow water to infiltrate into the ground, can range from porous asphalt, porous concrete, to grass pavers. The objective of all of these surfaces is the same: to reduce stormwater runoff from a site and increase infiltration into the ground.



Turning Point Park Porous Pavements



Turning Point Park Porous Pavements

Did you know?

The City of Rochester has installed permeable pavement in the parking lot at City Hall.

Did you know?

The City of Rochester has incorporated green infrastructure at Turning Point Park, and included signage for educational awareness. There are installations of porous asphalt, porous concrete, and porous pavement. Also included are rain gardens and bioretention areas.

TARGET GROUP

Developer, Landlord, Business Owners, Institutions, Homeowners



WHAT CAN I DO

- Consult the City of Rochester & Monroe County Green Infrastructure Retrofit Manual ([linked here](#)) and/or the New York State Stormwater Management Design Manual ([linked here](#)) for information on how to design porous pavement surfaces.
- Visit Turning Point Park and learn about porous pavements.

Sources: ¹<https://www.health.ny.gov/publications/7287/> (NY Dept of Health)
 Hyperlinks: <http://www.cityofrochester.gov/article.aspx?id=8589972332>
<http://www.dec.ny.gov/chemical/29072.html>

Stormwater Capture



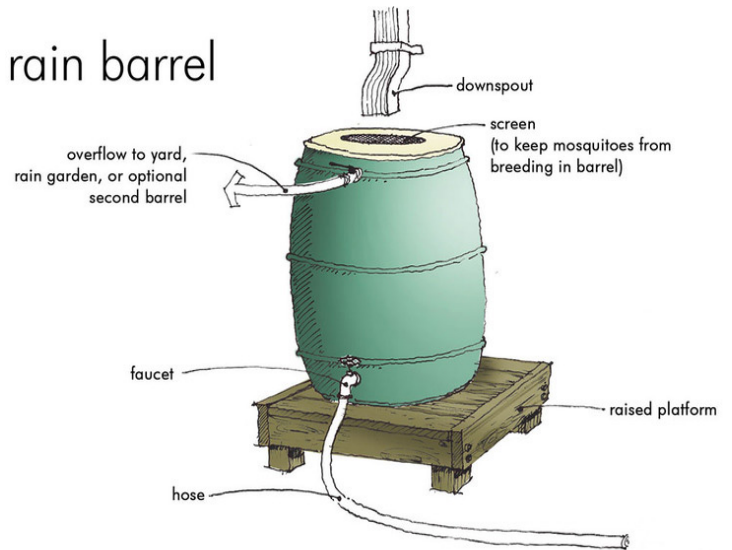
Background:

Stormwater capture is the process of preserving stormwater in order to use it for various purposes, such as gardening. Past standards of construction dictated that the stormwater downspouts of roofs connect to the combined sewer system. The combined sewer system is a system whereby sewers are designed to collect rainwater runoff, domestic sewage, and industrial wastewater in the same pipe. Most of the time, combined sewer systems transport all of their wastewater to a sewage treatment plant, where it is treated and then discharged to a water body (EPA).

Concept:

Water treatment plants have experienced an increase in inflows due to factors such as population growth, leading to greater water usage which have led to maximum capacity issues in water treatment plants. These plants have sought to encourage stormwater to be routed elsewhere other than the sewer system as stormwater typically does not need high levels of treatment. As a remedy, stormwater should be rerouted on-site and reused for non-potable needs.

rain barrel



Rain Barrel System Components

Did you know?

The Monroe County Crime Lab uses a 1,500 gallon rainwater storage tank for toilets and other non-potable uses.

Did you know?

Section 120-163 of the City Code permits rain barrels for residential and non-residential uses in the side or rear yards of a structure. Rooftop disconnects are also allowed as long as the stormwater is discharged in a manner that is not a public nuisance.

Sources: <https://www3.epa.gov/region1/eco/uep/cso.html>

Photo Credit: <http://www.watershedcouncil.org/uploads/7/2/5/1/7251350/633260.jpg?731>

Stormwater Capture



TARGET GROUP	WHAT CAN I DO
<p>Developer, Landlord, Business Owners, Institutions, Homeowners</p> <p>D L B I H</p>	<ul style="list-style-type: none">• Consult the City of Rochester & Monroe County Green Infrastructure Retrofit Manual (located here) and/or the New York State Stormwater Management Design Manual (located here) for information on how to design residential or commercial stormwater recapture systems.• Consider building a rain barrel system to capture some roof water runoff for non-potable purposes such as watering plants.

Sources: <http://www2.monroecounty.gov/des-stormwater-coalition>

Green Roofs



Background:

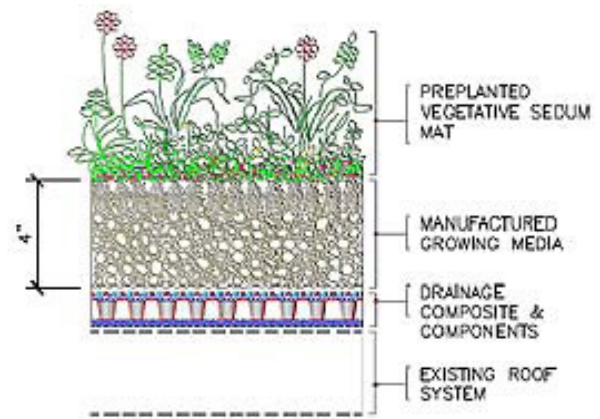
Stormwater runoff is rain water that is not absorbed in the ground due to impermeable surfaces, such as concrete and asphalt roads or parking lots.

Concept:

Many urban areas face difficulties with stormwater runoff because of the high percentage of impermeable surfaces. The New York State Department of Environmental Conservation (DEC) defines the main purpose of a green roof as a method to provide runoff capture by a layer of vegetation and soil installed on top of a conventional flat or sloped roof. The rooftop vegetation allows evaporation and evapotranspiration processes to reduce volume and discharge rate of runoff entering the conveyance system.



City Hall Green Roof



Green Roof Cross Section from DEC Stormwater Design

Did you know?

A green roof can increase a roof's useful life by about 20 years.

Benefits of installing green roofs:

- Helps to achieve stormwater management goals by reducing runoff volumes
- Provides insulation from heat and cold via the layers of soil and vegetation, helping moderate indoor temperatures
- Protects rooftop materials from ultraviolet radiation
- Helps filter and bind airborne dust, improving air quality
- Reduces heat island effect in urban areas

Considerations:

- Failure of waterproofing elements present a risk of water damage
- Extreme weather events can hinder plant survival
- More maintenance compared to traditional rooftops
- Additional water retention must be accounted for in determining the structural capacity required to install a green roof.

Did you know?


Green roofs have been a concept since the 1960s, starting with Northern Scandinavian sod roofs.

Sources: http://www.dec.ny.gov/docs/water_pdf/swdm2015entire.pdf
<http://www.cityofrochester.gov/greenroof/>

"The Value of Green Infrastructure: A Guide to Recognizing its Economic, Environmental, and Social Benefits"

Green Roofs



TARGET GROUP	WHAT CAN I DO
<p>Developer, Business Owners, Institutions</p> 	<ul style="list-style-type: none">• Consider installing a green roof on the building(s) as a way to reduce the runoff during large storm events, improve the surrounding air quality and extend the roof's useful life.

SAFETY MOMENT: Access to roofs can be dangerous. Make sure you provide proper and safe railings or parapets at the proper height around the entire roof perimeter. Consult the City of Rochester Building Department if you have any questions.

Rain Gardens



Background:

The DEC defines a rain garden as a method to manage and treat small volumes of stormwater runoff using a conditioned planting soil bed and planting materials to filter runoff stored within a shallow depression.

Requirements for an Effective Rain Garden System:

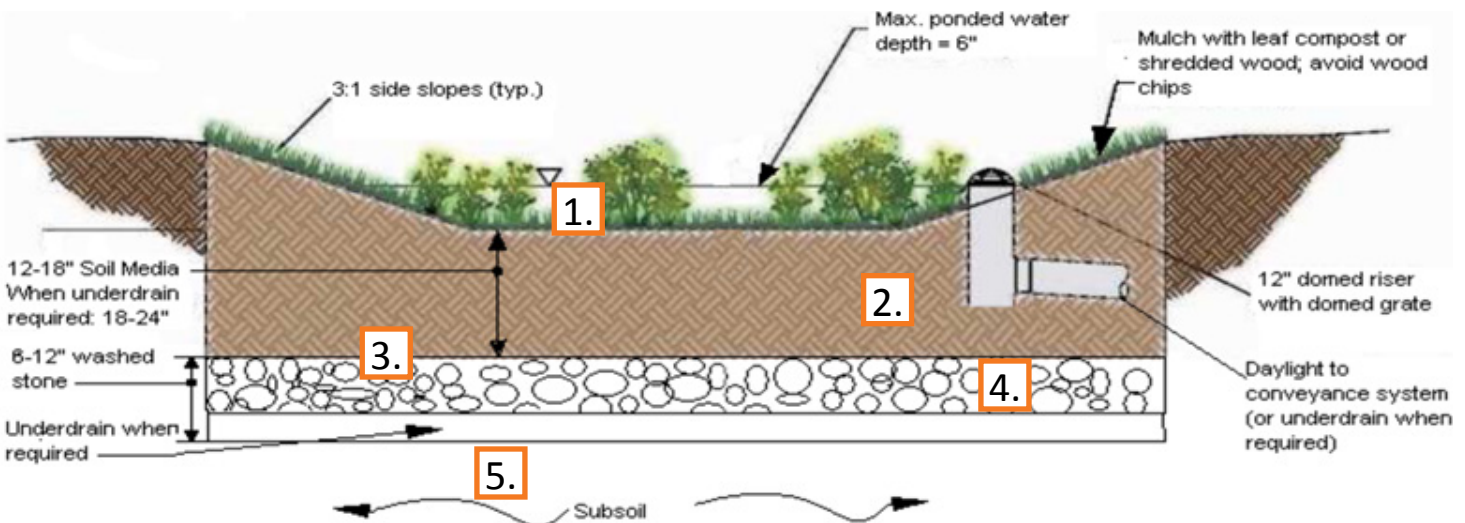
1. Plants tolerant of diverse weather conditions (i.e. drought, extreme temperatures)
2. Soil must be tested and remediated if necessary
3. Soil and reservoir stone must be separated by non woven geotextile fabric
4. Reservoir stone must be graded to provide maximum storage capacity
5. Native soil has a permeability high enough to allow for infiltration. If this condition is not met, an underdrain can be used.

Benefits:

- Pollutant treatment for residential rooftops and driveways
- Groundwater recharge augmentation
- Micro-scale habitat
- Aesthetic improvement to turfgrass or otherwise impermeable surfaces

Considerations:

- Fairly flat slopes required to effectively filter runoff through the system
- Appropriate materials required as compacted and clay sub soils are too dense to provide appropriate infiltration
- Must be situated in a manner that overflow can safely be conveyed to the formal drain system




Rain Garden Cross Section from DEC Stormwater Design Manual

Did you know?

The City of Rochester developed a “Green Infrastructure Retrofit Manual” . This manual outline how to effectively design and construct a rain garden system. [Click here](#) to read more.

Rain Gardens



TARGET GROUP	WHAT CAN I DO
All members of the Rochester Community 	<ul style="list-style-type: none">• Consider installing a rain garden to manage, utilize and treat small volumes of stormwater runoff.

**SUSTAINABLE PRACTICES
FOR BUILDING OWNERS AND OCCUPANTS**

RECYCLING

**RECYCLING
COMPOST**

Recycling

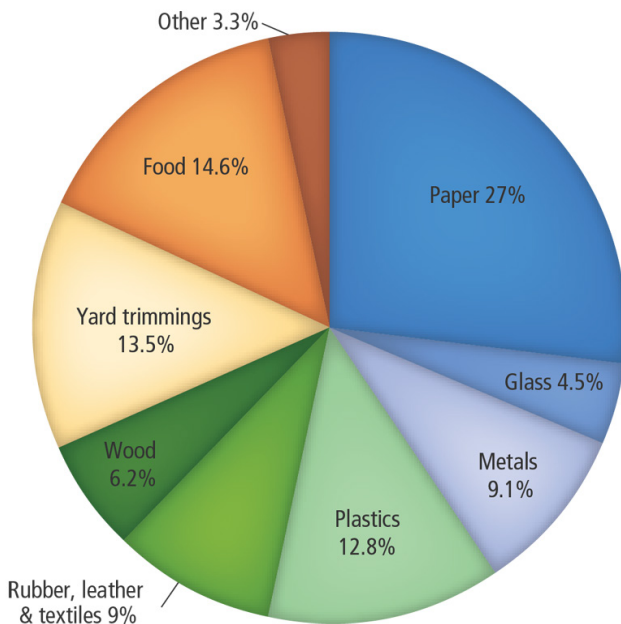


Background:

The City of Rochester has developed the Mixed Recycling program to make it easier for all members of the Rochester community to recycle. Mixed recycling refers to the process whereby recyclable materials do not need to be separated during disposal. For example, glass, paper, and aluminum can all be recycled in the same container.

Concept:

Recycling programs such as the Mixed Recycling Program are intended to keep recyclable material out of landfills. By not forcing the consumer to sort their recyclables, it is intended that recycling stream volumes will increase.



2013 Municipal Solid Waste (MSW) Generation**

Did you know?

In 2011, New York set a goal to reduce MSW from 4.5 lb/person/day to 0.6 lb/person/day by 2031? - NYSDEC*

Key Statistics:

According to the United States Environmental Protection Agency (EPA), in 2014 the amount of materials recycled or composted provided an annual reduction of CO₂ emissions comparable to the annual emissions of 38 million cars.

Did you know?

It is illegal not to recycle in the City of Rochester according to Section 20 of the Rochester City Code. To understand what can be done, refer to the next page.

Sources: *New York State Department of Environmental Protection (NYSDEC) - <http://www.dec.ny.gov/chemical/47861.html>

**Photo Courtesy: United States Environmental Protection Agency

Recycling



TARGET GROUP	WHAT CAN I DO
All members of the Rochester Community 	<ul style="list-style-type: none"> Be aware that it is required by law to recycle. Monetary fines can be levied for non-compliance. Be aware of what materials are and are not recyclable by viewing this list.
Developer, Landlord, Business Owners, Institutions 	<ul style="list-style-type: none"> Prepare a plan for source separation and collection of recyclables. Pickup may either be public or private but must abide with Chapter 20 Article IV of the Rochester City Code.
Homeowner 	<ul style="list-style-type: none"> If you do not have a recycling container, click here to request one from the City of Rochester. To find out when your recyclables will be picked up, click here.
Landlord 	<ul style="list-style-type: none"> Be aware that you may apply for a waiver of primary responsibility for recycling by showing proof tenants have assumed this responsibility.
Tenant 	<ul style="list-style-type: none"> Confirm whether your lease obligates you as the primary responsible party for recycling. Ask the landlord about recycling if it is not currently implemented in the apartment complex.

Use this link to view the full Recycling and Recyclables Code for the City of Rochester: [Rochester City Code - Chapter 20 Refuse Collection, Article IV Recycling and Recyclables](#)

To learn about the Mixed Recycling Program: [City of Rochester Mixed Recycling Program](#)

Compost



Background:

Currently in Rochester, food and organic waste go directly to the landfill. However, food and organic waste could be diverted from the landfill via composting. Composting is an environmentally preferable way to dispose of food or organic waste as it can be reused as fertilizer for soil treatment.

Concept:

Moisture, carbon, oxygen, and nitrogen are key factors involved in composting. At a residential scale, most people approach composting with simply a pile or a bin. On a commercial scale, composting can be aerated to expedite the process.

Key Statistic:

According to the United States Environmental Protection Agency (EPA) food scraps and yard waste currently make up 20 to 30 percent of waste and could be composted instead.



Did you know?

New York City (NYC) has a law which requires certain food industry businesses to separate their organic waste. NYC is also on its way towards providing all residents the option to use a “brown bin” to separate organics^{1,2}.



Sources: ¹<https://www.nytimes.com/2017/06/02/nyregion/compost-organic-recycling-new-york-city.html>

²<http://www1.nyc.gov/assets/dsny/zerowaste/businesses/food-scraps-and-yard-waste.shtml>

³<http://www.seattle.gov/util/MyServices/Garbage/HouseResidentsGarbage/FoodWasteRequirements/index.htm>

Compost



TARGET GROUP	WHAT CAN I DO
<p>Developer, Landlord, Business Owners, Institutions</p> 	<ul style="list-style-type: none"> • While Monroe County has limited commercially viable composting facilities for food/organic waste (as of July 2015 only one facility was registered¹), on-site measures could be taken such as educational materials and small-scale composting bins. • Consider using private companies which will take food waste from commercial entities.
<p>Homeowner, Tenants</p> 	<ul style="list-style-type: none"> • Consider using private companies that will pickup compost. • Start your own composting bin on-site. Learn key information on how to compost through the EPA via this link.

Sources: ¹Monroe County Department of Environmental Services. July 2015. Final Local Solid Waste Management Plan.

**SUSTAINABLE PRACTICES
FOR BUILDING OWNERS AND OCCUPANTS**

REUSE OF BUILDING MATERIALS

**RECYCLED MATERIALS
CONSTRUCTION
DEMOLITION**

Recycled Materials



Background:

Developers must focus on the details when it comes to the long-term life cycle of a building, including the building's location, resource consumption, and environmental impact. One detail to consider during development is the materials used during construction, including the use of recycled materials.

Concept:

Two main goals:



1. To minimize environmental impacts and damage
2. To use materials efficiently

Benefits of Recycled Materials:

- Reduction of material and waste disposal costs
- Increased competitive advantage
- Reduced CO² emissions
- Responding to preemptive changes in public policy



Interested in using recycled materials?
 For a list of companies and sites that manufacture and/or sell recyclable materials approved by the US Green Buildings Council, [click here.](#)

TARGET GROUP	WHAT CAN I DO
<p>All members of the Rochester Community</p> 	<ul style="list-style-type: none"> • Transition to using materials that contain more recycled content
<p>Developer</p> 	<ul style="list-style-type: none"> • A variety of credits are available via Green Building rating systems (such as LEED, Envision, Enterprise Green Communities, among others) by incorporating recycled materials into the design of new or existing buildings

Sources: <https://www.usgbc.org/search/Recycled%20materials>

Construction and Demolition Waste



Background:

- Reducing waste is an important factor impacting the environment during the building process.

The EPA defines three ways to reduce waste:

- **Source Reduction:** the practice of purchasing, or using materials in ways that reduce the amount/toxicity of trash created.
- **Re-use:** stops waste at its source; delays or avoids item's entry into the waste collection and disposal system.
- **Recycling:** converts materials that would otherwise become waste into valuable resources.

Concept:



Reducing, reusing and recycling will help reduce the demand for natural resources such as trees, water, and fossil fuels.

Did you know?

534 million tons of construction and demolition (C&D) debris were generated in the United States, in 2014—more than twice the amount of generated municipal solid waste¹.

Typical Construction and Demolition Materials²:

- Concrete
- Asphalt
- Wood
- Glass
- Metals
- Brick
- Windows, doors
- Materials with environmental concerns (lead, PCBs, asbestos, mold, mercury)

TARGET GROUP	WHAT CAN I DO
<p>All members of the Rochester Community</p> 	<ul style="list-style-type: none"> • Actively consider ways to re-use materials in your home instead of buying new. • If dealing with the removal, encapsulation, enclosure, repair or the disturbance of friable and non-friable asbestos, refer to the requirements of NYS Industrial Code Rule 56 by clicking here. Certain materials may require testing to understand if they are asbestos containing materials (ACM) (e.g. vermiculite insulation). Seek the services of a licensed asbestos inspector/abatement designer in order to understand how to properly handle ACM. Also note that Code Rule 56 does not apply to owner occupied single family dwellings where the owner performs the work. • Click here to learn how to create a basic waste management plan.
<p>Developer</p> 	<ul style="list-style-type: none"> • Demolition is often associated with health concerns in the City of Rochester. Make sure you refer to the HUD Guidelines for environmental hazards such as lead when completing renovation or demolition projects. • To learn how to apply for a demolition permit, click here and click on “Demolition” under the “Brochures” category • During a project, actively plan for ways to reduce construction and demolition waste. Consult LEED for in depth guidance.

Sources: 1) <https://www.epa.gov/smm/sustainable-management-construction-and-demolition-materials>
 2) <https://www.usgbc.org/search/Recycled%20materials>

Hyperlinks: <https://labor.ny.gov/workerprotection/safetyhealth/Links/CR56.htm>
https://your.kingcounty.gov/solidwaste/greenbuilding/documents/Waste_Management_Plan_Checklist.pdf
https://www.hud.gov/program_offices/healthy_homes/enforcement/regulations
<http://www.cityofrochester.gov/permits/>

**SUSTAINABLE PRACTICES
FOR BUILDING OWNERS AND OCCUPANTS**

**REUSE OF
VACANT AND
UNDERUTILIZED
PROPERTIES**

**GREYFIELD REDEVELOPMENT
VACANT LAND/UNDERUTILIZED PROPERTIES**

Greyfield Redevelopment



Background:

Urban development has altered the retail market in many ways. The once popular strip developments and mall settings of the 1960's do not have the strong appeal they once had to consumers. Greyfields, those half-empty shopping plazas and malls that can no longer compete with newer nearby retail centers, are the legacy of our changing preferences in shopping experience and community aesthetics.

Concept:

Reconfiguration of outdated plaza configurations presents an opportunity for communities to redefine themselves. These sites already contain utilities, connections to roadways, stormwater collection systems and often commercial zoning. Reuse of these sites is the largest example of recycling and reuse. It also has the potential to bring life to vacant structures and parking lots.

Key Statistic:

About 140 Regional Malls in the U.S. are greyfields and another 250 are in danger of becoming so¹.
18 percent of regional malls are in danger of becoming greyfields¹.





Artist rendering of a transformed greyfield

Sources: ¹Congress for New Urbanism and PriceWaterhouse Coopers. "Greyfields into Goldfields – From Failing Shopping Centers to Great Neighborhoods"

Greyfield Redevelopment



TARGET GROUP	WHAT CAN I DO
<p>All members of the Rochester community</p> 	<ul style="list-style-type: none"> • Consider the re-use and reconfiguration of abandoned structures and plazas. This may require the adoption of development standards to accompany new zoning regulations and may involve changes in land use patterns, with possible setback changes. Get involved in any municipal public meetings that involve zoning or plans. • Learn more about greyfields and the re-use of vacant structures and plazas by clicking here.
<p>Developers</p> 	<ul style="list-style-type: none"> • Consider the re-use of vacant plazas structures and parking lots. Discuss options with the City of Rochester Bureau of Planning and Zoning.

Vacant Land/Underutilized Properties



Background:

Rochester has many abandoned properties. The solutions of how to handle these properties varies for each city due to a number of factors.

Concept:

Rochester has several agencies that assist homeowners with decisions about what to do with properties along with providing assistance to support renovations. The choice of whether to renovate or demolish is the primary choice that exists for homeowners (and municipalities). The trouble with demolition is that it is very final. When a housing structure is demolished, the frontage of the street is broken. Depending on your perspective, this may be an opportunity for a pocket park or it can be seen as an unfor-giving gap in the streetscape – “a missing tooth”.



TARGET GROUP	WHAT CAN I DO
All members of the Rochester community 	<ul style="list-style-type: none"> Participate in City of Rochester initiatives and meetings regarding vacant or unused properties. Get informed about any local initiatives to preserve houses and neighborhoods.
Developer, Landlord 	<ul style="list-style-type: none"> Attend the city's property auction. Click here to learn more about this opportunity to rehabilitate properties.

Potential Resources/Agencies to Contact:

Our community has numerous agencies that are primed to assist homeowners. They include (but are not limited to):

- [NeighborWorks](http://nwrochester.org/) – Provides funding, construction management and financing. (<http://nwrochester.org/>)
- [Action for a Better Community](http://www.abcinfo.org/about-us/mission-and-history) – Promotes and provides opportunities for low-income individuals and families to become self-sufficient. (<http://www.abcinfo.org/about-us/mission-and-history>)
- [Pathstone](http://www.pathstone.org/about/) – Regional community development and human service organization. (<http://www.pathstone.org/about/>)
- [Rochester Land Bank](http://www.cityofrochester.gov/landbank/) – Acquires, holds and disposes real property that is vacant, abandoned or underutilized with a goal of retuning those properties to productive use. (<http://www.cityofrochester.gov/landbank/>)



Potential Approaches to Underutilized Properties

Renovate / Upgrade Existing Houses

Positives:

- Preserves interior woodwork, exterior façade, and the history of the structure
- Maintains original streetscape appearance

Challenges:

- Potential material challenges: lead paint, asbestos, lead solder in domestic piping.
- Upgrades to HVAC likely needed
- Building insulation upgrades likely needed

Relocate Existing Structure to a New City Lot

Positives:

- May allow for the restoration of a missing house on a street.
- Preserves frontage appearance of street

Challenges:

- Cost – Transportation, foundation construction at destination
- Cost – Structure may need to meet all codes once moved

Demolish and Rebuild

Positives:

- Allows for the building of an energy efficient house meeting all current codes.
- Allows for use of updated materials and technology

Challenges:

- Costs for demolition, new foundation, structure, HVAC, Electrical
- The cost / value may exceed assessments of some of the surrounding homes

**SUSTAINABLE PRACTICES
FOR BUILDING OWNERS AND OCCUPANTS**

GREEN SPACE

**CREATE OR ENHANCE GREEN
OPEN SPACE NETWORKS**

Create or Enhance Green Open Space Networks



Background:

Rochester's available housing exceeds its current demand. In some areas of the city, this imbalance is more noticeable than others. There are also parcels of land with vacant industrial or commercial space.

Concept:

Open space can be existing or created. In some situations, an abandoned industrial or commercial site becomes available. In some cities, a residential area may have become so run down that the benefit of creating open space is greater than the option of renovating the homes. In each case, it would be a community decision.

The open space that is created can take the form of several uses:

- A community park.
- A community garden.
- A recreational complex.
- A stormwater treatment facility
- Other uses as defined by the community.

Did you know?

The City of Philadelphia has dedicated over 900 acres of land for the creation of public parks, recreation centers, and playgrounds. These green spaces provide a great opportunity for stormwater management systems, as they can capture runoff from adjacent streets, parking lots, and other impervious areas.

This 16-acre site in lower North Philadelphia was acquired by the City of Philadelphia in 1968. Originally planned for open space, the parcel had remained vacant for over 40 years. When the neighborhood was identified in Philadelphia's "Green 2015" Plan as an area under served by public parks, Community Ventures saw this as an opportunity to create a landmark development that would provide the much-needed public space, while addressing the Philadelphia Water Department's stormwater management goals. The result will create a focal point and amenity for a new residential development facing the park.

The stormwater management system features utilized porous pavement surfaces, a bioswale, and three hydraulically-connected rain gardens with subsurface storage. The systems manage runoff from approximately two (2) acres of the park and adjacent street network.



Typical Green Parks Program



Did you know?

The City of Rochester has created and updated forestry plan to guide the care and maintenance of approximately 70,000 public trees located along City streets and in City parks and cemeteries. Find more about the updated 2012 "Urban forest Master Plan: City in a Forest, Third Edition" and the Forestry Department by [clicking here](#).

Sources: ¹Congress for New Urbanism and PriceWaterhouse Coopers. "Greyfields into Goldfields – From Failing Shopping Centers to Great Neighborhoods" Hyperlink: <http://www.cityofrochester.gov/article.aspx?id=8589936664>

Create or Enhance Green Open Space Networks



TARGET GROUP	WHAT CAN I DO
<p>All members of the Rochester community</p> 	<ul style="list-style-type: none"> Participate in neighborhood meetings to discuss thoughts about the area and what uses would be beneficial for the community. Attend planning meetings for community masterplans and become active in the process.
<p>Developers</p> 	<ul style="list-style-type: none"> Consider green infrastructure and local benefits as a part of the project when preparing schematic site plans for projects.

Helpful Links:

[City of Rochester Planning Department](#)

[City of Rochester Zoning](#)

[Rochester Farmers Markets](#)

Sources: <http://www.cityofrochester.gov/category.aspx?id=8589934809>
<http://www.cityofrochester.gov/zoningcode/>
<http://www.farmersmarketsroc.com/>

**SUSTAINABLE PRACTICES
FOR BUILDING OWNERS AND OCCUPANTS**

TRANSPORTATION

**PARKING
ALTERNATE TRANSPORTATION**

Parking



Background:

Rochester's current transportation infrastructure relies heavily on the automobile. As a result, parking plan discussions are often a necessity when considering development in the City of Rochester.

Concept:

In order to address long-term environmental sustainability, reduce air pollution, and achieve the City of Rochester's greenhouse gas emissions reduction goals, future discussions that involve the development of parking spaces will be a factor in helping reduce vehicle miles traveled and encourage public transportation or other, more environmentally conscious transportation options.

City Codes:

Parking is referenced in the Rochester City code in § 120-173 linked [here](#).

Subsection references:

- Parking transfer credits: 120-173E(3)(f)
- Shared parking: 120-173E(3)(a)(2)
- Bicycle parking: 120-173E(3)(c)

Did you know?

The University of Rochester uses a mobile application called Pango to increase parking efficiency.

Did you know?

Parking lots are designed to provide spaces during peak demand hours, leading to a surplus of availability during times of regular to no demand. As a result, the constructed parking lots creates an impervious surface which is far larger than needed¹.



Heat Island Effect:

In an urban area, the heat island effect occurs when the sun heats up parking lots, roofs and other dark surfaces. A hot zone is created that can act as an island of heat. The Solar reflective Index (SRI) is a metric used to compare various materials. Materials with high SRI's are ones having white or light colors. Materials with a low SRI include black or gray shingles, asphalt and traditional concrete. Projects can reduce the heat island effect by methods such as:

- Minimizing the development footprint
- Using undercover / underground parking
- Using materials with high reflectance
- Covering roofs with high SRI material
- Installing green roofs
- Providing shade from trees





Rochester's Turning Point Park

Sources: ¹New York State Stormwater Management Design Manual (http://www.dec.ny.gov/docs/water_pdf/swdm2015entire.pdf)
Hyperlink: <http://www.ecode360.com/8682809>

Parking



TARGET GROUP	WHAT CAN I DO
<p>All members of the Rochester community</p> 	<ul style="list-style-type: none"> • Seek alternate methods to travel (e.g. Rochester-Genesee Regional Transit Authority (RGRTA) Buses, walking, biking, Uber/Lyft/Ride Share), carpool (reference "Alternate Transportation" in this guide). • Refer to "Stormwater Management/Green Infrastructure" Section of this guide for helpful sustainable practices that can be applied to parking lots.
<p>Developer, Landlord, Business Owners, Institutions, City Officials</p> 	<ul style="list-style-type: none"> • Contact the City of Rochester Planning Department for a listing of currently vacant or unused parcels. Meet with the City to discuss options for the parcels and see if they fit into your goals. Consider green infrastructure and local benefits as a part of your project.

Alternate Transportation



Background:

With increasing awareness of the emissions associated with individual vehicles, alternate forms of transportation are becoming more and more accessible.

Shared Vehicles:

The City of Rochester piloted a Van pool program in late 2016. A *van pool* is a group of up to 12 commuters who voluntarily participate in a rideshare arrangement. To apply to create a new Van pool [click here](#).

Electric Vehicles:

The City of Rochester has 24 charging ports located in City Parking lots and garages. [Click here](#) to learn more and view where the charging ports are located.

Buses:

The Rochester Regional Transit Service (RTS) has created a website that will assist with the determination of which bus route(s) need to be taken to travel to your destination. [Click here](#) to determine a route and check the schedule. RTS has also created a website to inform riders about the actual bus locations. [Click here](#) to learn more.

Zip Cars:

Zip cars are becoming more popular in the Rochester area. Programs are starting up at Rochester Institute of Technology (RIT) and the University of Rochester. Zip car locations can be found by [clicking here](#).



Bike Share Program



Electric Car Charging Station



Did you know?

The City of Rochester launched a Bike Share program in July 2017. [Click here](#) to learn more information on the program! [Click here](#) if to sign up for the bike share in Rochester.

Sources: <http://www.cityofrochester.gov/Vanpool/> -- Italicized text is direct quote from City Website
Hyperlinks:<http://www.cityofrochester.gov/article.aspx?id=8589970571>
<http://apps.vride.com/Find/Employer?q=rochester>
<http://www.cityofrochester.gov/evcharging/>
<https://www.myrts.com/Maps-Schedules/RTS-Monroe/Schedule-pdfs>
<https://www.myrts.com/wmb>
<http://www.zipcar.com/>
<http://www.cityofrochester.gov/article.aspx?id=8589970571>
<http://bike.zagster.com/roc/>

Alternate Transportation



TARGET GROUP	WHAT CAN I DO
<p>All members of the Rochester community</p> 	<ul style="list-style-type: none"> Consider ways to adjust daily routines to accommodate alternative transportation such as shared vehicles and bike share.
<p>Developer, Landlord, Business Owners, Institutions, City Officials</p> 	<ul style="list-style-type: none"> Accommodate alternative transportation in a site plan (e.g. provide an electric car charging station or run conduit for an electric charging station to the parking lot for future installation). Site near transit routes and walkable areas.

**SUSTAINABLE PRACTICES
FOR BUILDING OWNERS AND OCCUPANTS**

COMMUNITY ORIENTED SERVICES

MIXED-USE DEVELOPMENT

Mixed-Use Development



Background:

Urban sprawl has led to the increase of single-purpose buildings as opposed to mixed-use buildings. Historically, cities' building infrastructure was designed for mixed-use buildings for commercial, residential, and recreational purposes.

Concept:

The benefits of mixed-used buildings include greater proximity of more diverse services to residents; potentially reduced vehicle miles traveled if proximity is within walking distance; urban sprawl reduction; enhanced neighborhood connections.

Did you know?

Built on the site of the former Midtown Plaza, Tower280 is an example of new mixed-use buildings in the City.

Key Statistic:

Over 46 commercial buildings have been converted to residential or mixed-use and there is currently \$857 million being invested in real estate projects throughout downtown Rochester¹.



Potential Layout of a Mixed-Use Building


Did you know?

LEED for Neighborhood Development provides credits for incorporating mixed-use projects into a neighborhood.

Sources: ¹City of Rochester Climate Action Plan. May 2017. <http://www.cityofrochester.gov/climateactionplan/>

Mixed-Use Development



TARGET GROUP	WHAT CAN I DO
<p>Developers, Landlord, Business Owners, Institutions</p> 	<ul style="list-style-type: none">• Incorporate mixed-uses in site plan submittals to the City.• Consider LEED guidance or Enterprise Green Communities Criteria for mixed-use neighborhoods.

Hyperlinks: ¹<https://www.usgbc.org/credits/neighborhood-development-plan-neighborhood-development/v4-draft/npdc3>; ²<http://www.enterprisecommunity.org/solutions-and-innovation/green-communities/criteria>