

climate RESILIENCY

a resident's guide



Durham
Environmental
Advisory Committee



This guide has been prepared by the Durham Environmental Advisory Committee (DEAC). DEAC is a Council-appointed citizen volunteer committee that provides advice on the environmental impacts of planning matters and promotes community outreach and stewardship through various activities across the Region.

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introduction

We increasingly hear about climate change on the news, and from our friends and neighbours. We all impact the Earth's climate, but understanding what that means can be a challenge. This guide provides a general understanding of what climate change is and how it affects us as individuals and residents of Durham Region. Most importantly, this guide offers suggestions on what you can do at home and in your day-to-day life to help you better respond to, and prepare for the impacts of climate change.

What the concern is about

Let's start by understanding the difference between weather and climate. Weather refers to short-term changes in the atmosphere (e.g. day-to-day temperature, humidity, rainfall, and barometric pressure), while climate describes what the weather is like over a long period of time in a specific area – average weather, so to speak.

You have probably heard about greenhouse gases (GHGs), like carbon dioxide and methane, as much as you have about climate change, and this is for good reason.

When we talk about the problem of climate change, we are referring to the unprecedented rate at which the Earth's climate is warming because of rising concentrations of GHGs in our atmosphere. GHGs absorb energy from the Earth's surface and act like a greenhouse trapping heat in the atmosphere. This greenhouse effect results in temperatures on Earth that allow for life to exist here.

However, the problem now is that our activities have started to release GHGs at an alarming rate, which have led to worrisome changes in our climate. The build-up of these gases has led to more and more heat being trapped on Earth. As a consequence, we are experiencing a rise in global average temperatures that have shifted our climate, presenting us with the new challenges, including extreme weather.

Why you should care

Climate change challenges our status quo, in terms of what we are used to doing for our work, travel, leisure, food, health, and at home. There are many reasons for why you should care, and they are all closely tied to the climatic changes we can expect in Durham Region over the next two decades.

For example, along with warmer temperatures, we can anticipate hotter summers, higher wildfire risks, and more heat and air pollution alerts. As a result, we will need to pay greater attention to our health, especially those of us already at risk of heat stroke and respiratory conditions during heat waves and smog advisories. We also need to pay attention to our home, especially if we live in areas that may be vulnerable to wildfires.

Other key changes we can anticipate in the region include warmer, shorter winters with less snow but more rain, overall increased amounts and intensity of precipitation, and more extreme weather events such as tornadoes, violent storms, and floods. Building our resiliency to the challenges posed by climate change helps us become less vulnerable to its risks as individuals and as a society.

Let's consider the reasons why the climate might be changing and focus on what can and should be done to reduce our carbon footprints. The foundation of climate change is based on the release of carbon back into the environment at a rate that cannot naturally be controlled. Everything we do—eat, drink, drive, breathe, play, and shop—influences our carbon footprint. We cannot expect to ever reduce it to zero, but we can make it much smaller. Every small action will make a positive difference.

Looking ahead

Municipalities, such as Durham Region, are putting scientifically based strategies in place to predict what will happen in the next 10, 20, or 50 years. These predictions are like estimations that are used to help determine what the potential range of impacts is over long periods of time. While there will always be a degree of uncertainty which prevents us from being 100 per cent right, we can trust that science will help to most accurately tell us what to expect in the future.

As the title of this document implies, we, as residents of Durham, need to be resilient if we are to succeed in overcoming negative climatic impacts. We all have to be proactive and act innovatively to develop and implement our own solutions to improve the Earth so the impacts of carbon are minimized. We must not simply adapt and respond to changes forced on us by changes in climate.

What you can do about it

One of the difficulties we may face is that, although we want to help, we may not have the information on how to do so. We need to be prepared to examine our lifestyles and make informed choices where possible. How often and how far do we drive? Could we have walked or taken public transit instead? Do we buy products from companies with a huge carbon footprint? Do we recycle and compost? Do we challenge ourselves and our leaders to make wise and useful decisions that can actually produce useful outcomes?

This guide is intended to help you understand how your actions can both negatively and positively affect the climate. Thinking about the things you do, such as driving or buying new products, will help build an understanding of how to make changes that will offset the impacts of climate change. The guide will also help you take action by providing you with various options to pick and choose from, depending on what applies to you. The information that follows is organized into themes including your home, food, waste, health and wellness, transportation, water, energy, and business. So, let's get started!

Image taken in: North Pickering, ON ▶

Cracks in the soil are an indicator of dry soil. Clay particles in this soil swell when they soak up water and then shrink when the soil dries out. If climate change results in rapid, but infrequent rain events, this will become a common sight on our landscape.





Key Terms

Climate Change

The Government of Canada defines climate change as “a long-term shift in weather conditions identified by changes in temperature, precipitation, winds, and other indicators. Climate change can involve both changes in average conditions and changes in variability, including, for example, extreme events”.¹ It occurs when long-term weather patterns are altered.²

Resilience

Resilience is strengthening the capacity of human and non-human systems, be it an individual, a forest, a city, or an economy, to withstand and respond to the changes in the Earth’s climate, and continue to develop while bridging the gap between adaptation and mitigation approaches.³

According to the Intergovernmental Panel on Climate Change (IPCC), it is also “the ability of a system and its component parts to anticipate, absorb, accommodate, or recover from the effects of a hazardous event in a timely and efficient manner, including through ensuring the preservation, restoration, or improvement of its essential basic structures and functions.”⁴

Adaptation

Natural Resources Canada defines adaptation to climate change as “any activity that reduces the negative impacts of climate change and/or takes advantage of new opportunities that may be presented”.⁵

The United Nations Framework Convention on Climate Change (UNFCCC) defines adaptation as “adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts. It refers to changes in processes, practices, and structures to moderate potential damages or to benefit from opportunities associated with climate change”.⁶

Mitigation

Disaster mitigation measures are those that eliminate or reduce the impacts and risks of hazards through proactive measures taken before an emergency or disaster occurs.⁷

What is Durham doing?

The Region of Durham

On January 29, 2020, Durham Regional Council declared a [climate emergency](#), accelerating actions to reduce greenhouse gas (GHG) emissions. Council committed to embedding environmental sustainability and climate change as a factor in the decisions of Regional Council, in daily operations, and as a strategic priority.

The following principles will guide future responses linked to climate:

- Regional infrastructure, programs, and services are low carbon and resilient to climate impacts.
- Climate change considerations are included in business planning for both municipal governments and the broader public sector, as well as private sector organizations.
- Citizens, businesses, and public sector organizations are aware of climate change, and have the knowledge, skills, and resources to take action.
- Initiatives with the greatest value added are put into action based on cost effectiveness and co-benefit the Region's economic and social priorities.
- Durham Region sustains itself as an attractive place to live and invest, and strives to be a leader in climate action.

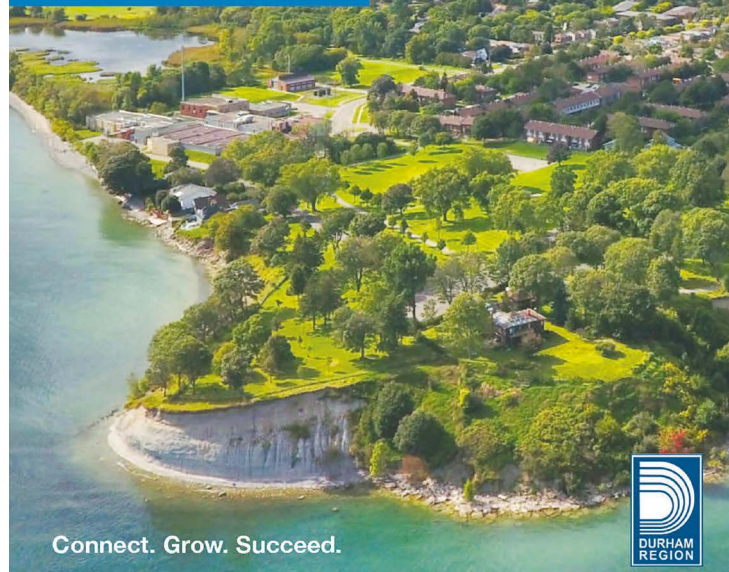
Additional plans that focus specifically on climate change are outlined below.

Durham Strategic Plan

Regional Council adopted the [Durham Region Strategic Plan 2020-2024](#) in March 2020. This Plan identifies five goal areas, namely Environmental Sustainability, Community Vitality, Economic Prosperity, Social Investment, and Service Excellence. Actions identified to meet the environmental goal include:

- Adopt green technologies and clean energy solutions faster through strategic ►

Durham Region Strategic Plan 2020-2024



Connect. Grow. Succeed.



FROM VISION TO ACTION

Region of Durham
Community Climate Change
Local Action Plan 2012



If this information is required in an accessible format, please contact 1-800-372-1102 ext. 2600.

Seizing the opportunity:

The Clean Energy Economy in Durham

PART 1: THE PLAN

DURHAM
COMMUNITY
ENERGY
PLAN

SSC SUSTAINABILITY
SOLUTIONSGROUP
whatIf?



TOWARDS RESILIENCE

Durham Community
Climate Adaptation Plan 2016

If this information is required in an accessible format, please contact 1-800-372-1102 ext. 2600.

The Durham Community Climate Change Local Action Plan includes the following vision and mission:

Vision: Durham Region is a carbon-neutral, sustainable, prosperous, and resilient community with a high quality of life.

Mission: Work with our community to develop and advocate innovative policies, strategies and actions that address the threat of climate change.

KEEPING OUR COOL

Managing Urban Heat Islands in Durham Region
2018



partnerships and investment.

- Increase waste diversion and resource recovery.
- Protect, preserve, and restore the natural environment, including greenspaces, waterways, parks, trails, and farmlands.
- Be a leader in sustainability and addressing climate change.
- Expand sustainable and active transportation.

Durham Community Climate Change Local Action Plan

Regional Council adopted the [Durham Community Climate Change Local Action Plan](#) and set community GHG emission reduction targets that are consistent with the Intergovernmental Panel on Climate Change (IPCC) that will limit global warming to 2°C in an attempt to prevent catastrophic change to the climate.

Durham Community Energy Plan

The [Durham Community Energy Plan](#) recommends a Low Carbon Pathway identifying six key programs that will help to significantly reduce GHG emissions while growing the local economy.

Durham Community Climate Adaptation Plan

The Region has a [Community Climate Adaptation Plan](#) that outlines 18 actions to be undertaken to ensure Durham remains a livable, resilient, and prosperous community.

Urban Heat Islands Study

Urban Heat Islands happen when pockets of higher temperatures occur, usually in urban areas because of higher density development without green spaces. These urban heat islands have health, social, economic, and environmental impacts. Refer to [Keeping our Cool – Managing Urban Heat Islands in Durham Region](#) for more information.

Proposed Mixed Waste Pre-sort and Anaerobic digestion (AD) Facility

At the time of publishing this guide, Durham Regional Council approved the development of a Mixed Waste Pre-sort and Anaerobic Digestion (AD) Facility. The facility will remove non-combustible materials and capture additional recyclables from the waste stream, helping increase our diversion rate while freeing up capacity at the Durham York Energy Centre.

Anaerobic digestion is a natural composting process that breaks down organic material into compost, producing methane as a byproduct. This methane can be collected and added to natural gas, creating renewable natural gas. You can track the progress of this project online on the [Region's webpage on Anaerobic Digestion](#).

LEAF Program

The [Local Enhancement and Appreciation of Forests Program](#), or LEAF, supports landowners to plant more trees through their subsidized Backyard Tree Planting Program. LEAF is committed to protecting and improving our urban tree cover through planting, education, and training. They provide support to landowners to restore and improve properties by planting native trees and shrubs that help to provide a windbreak, absorb water where it falls, and reduce soil erosion.





Local Municipalities

The Region and local municipalities, including Ajax, Brock, Clarington, Oshawa, Pickering, Scugog, Uxbridge, and Whitby, are actively engaged in climate change initiatives, including the following:

- Durham Region, together with local municipalities, was awarded funding to install 60 level two electric vehicle chargers in public spaces for community use.
- The Region and the Town of Whitby are developing a Low Carbon Fleet Strategy for their corporate fleets.
- Durham Region Transit is piloting eight electric buses.
- Durham Region is investigating rooftop solar photovoltaic opportunities.
- The Town of Whitby approved a Green Development Standard.

Local municipalities may have further information regarding ongoing projects on their websites. Visit your municipality's website for details.

What can you do?

A [2014 survey of Canadian homes](#) found that Canadians were concerned about threats of severe weather, power outages, disease outbreak, industrial or transportation accidents, contamination or shortages of food and water, floods, and earthquakes. More broadly, the World Economic Forum 2020 Risk Registry published this [infographic](#) to communicate the most likely risks in the next decade.

In the survey of Canadians, only 47 per cent of households had emergency supply kits. The quality and duration of this survey was not noted in the published results.

The lists in this guide are not meant to cause fear but are meant to start a conversation around our changing climate and to help build a resilient community that works together to mitigate and adapt to its impacts.

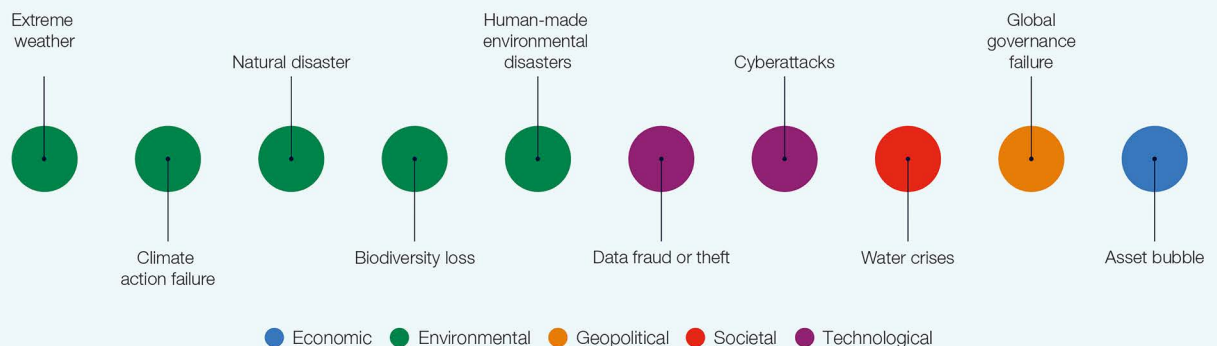
How big is your circle of community? In some ways it can be difficult to expand it, but the widespread use of video conferencing has opened up a new avenue to meet people, attend group chats, webinars, or conferences. You may even consider joining a club or sharing your thoughts on climate resilience with friends and family.

TOP 10 RISKS OVER THE NEXT 10 YEARS

Long-Term Risk Outlook: Likelihood



Multistakeholders





your home

Home is often where we feel safest and tends to be the largest single monetary commitment we will make in our lives. Whether you rent or own a house, condo, or apartment, it's important to look ahead and set yourself and your family up for the best chances of effectively responding to the impacts of climate change.

Why it's important

The weather in recent years has been unusual compared to past trends in local climate. A [study](#) on future climate conducted by SENES Consultants for the Region of Durham indicates that the coming decades will be “wilder, warmer, and wetter”. Without preparation, this will mean increased use of air conditioning, a risk of wet basements due to flooding, and storm damage. Insurance companies are paying attention to the changes in climate and this could mean rate increases or reduced coverage in risky areas.

What to expect in the next 20 years

Changes to our local climate are expected to be relatively moderate compared to tropical regions thanks, in part, to the calming effects of the Great Lakes. We can expect far less snow and much more rain in the winter, reduced wind chill, as well as shorter and warmer winters overall. Summers will have many more heat alerts, dangerously high humidex on occasion, and more rain in July and August.

What you can do about it

When buying a new home

- **Stay informed.** Consider flood potential and good drainage around your home. If you are buying a newly built home, ask your local municipality or conservation authority what the 100 year high water mark is, especially if the home is near a lake, creek, or body of water, and ask if your home is located above that. Ask your builder if they have considered this during construction.

An R-value is an indicator of how well building materials, such as insulation, retain heat in your home, and is based on the thickness and density of the material. The higher the R-value, the more effective it is in preventing the flow and transfer of heat to the outside or inside of your home.

- **Now is the best time to insulate your house.** Ask about increasing the R value in the walls, attic, and windows. This incremental increase can make a significant difference in your home's ability to retain heat. The cost of materials for triple pane, gas filled windows are only 10 to 15 per cent more expensive compared to standard windows, but will increase insulation by 25 per cent or more.
- **Exterior insulation** under the slab, footing, and around the basement can retain significant heat and provide thermal mass, which will moderate indoor temperatures.
- **Consider buried electrical service.** It is more reliable during extreme weather.

Buried electrical service refers to underground cables that connect your home to the utility pole, as opposed to overhead wires that are susceptible to extreme weather impacts such as heavy wind or snowfall.

- **Shine some sunlight on the solar aspect.** How does the sun hit your home? Facing south will be bright year-round; but in the summer, it could be a burden on your air conditioner, wallet, and comfort without shade from trees or awnings. Similar to southern exposure, facing west will bring increased heat in the evening, so you may consider windows that reflect more UV and are shaded. Eastern exposure will warm early in the day though it will be less noticeable. Windows on the north will lose a lot of heat in the winter. For this reason, you may wish to consider smaller windows and/or higher R value for your walls, attic, and windows.
- **Choosing lighter coloured roofing** over dark will reduce heat loading in the summer.
- **Consider using efficient electrical appliances** like induction stoves and air-to-air heat pumps instead of gas stoves and furnaces. The Ontario electrical grid has a low carbon footprint.
- **Heat mitigation** through passive (trees, awnings, overhangs, insulation) and active (air conditioning, generator back-up) sources should be considered when making decisions about your home, especially if personal health or age is, or could become a concern.



Renovations

- **Consider investing in more insulation**, robust roofing, southern awnings or overhangs, and tree preservation or planting. Many of the considerations for new homes will also apply for renovations.
- **Look for changes made by previous owners** that might put you at risk, such as drainage swales filled in, downspouts not routed away from homes, or basement repairs that might indicate drainage or flooding problems.

As outlined earlier in this guide, **the urban heat island effect** refers to the warmer temperatures in an area that result from light-absorbing and impermeable surfaces in our built environment. See [Durham Region's Urban Heat Islands Study](#) for more information.

- **Reduce heat generated by your property** to reduce the urban heat island effect and lower overall temperatures.
 - **Using building material that is light in colour or has a high-reflectivity coating** on your driveway, roof, or house exterior will reflect more sunlight (rather than absorb it). This will reduce temperatures around your property, which you may appreciate in the heat of the summer! Traditional materials used for building roads, parking lots, and houses like asphalt, steel, and brick are often dark in colour and absorb all wavelengths of light from the sun and convert it into heat.
 - **Increasing the proportion of your property that is vegetated** will enable water to cycle through naturally, and result in evaporative cooling. Other permeable materials you can use include mulch, gravel, and paver stones designed to let grass and ground cover grow through. This combats higher temperatures that result from impervious surfaces where water cannot flow through and evaporate, which is what happens in a natural water cycle and enables cooling to take place.
 - **Adding permeable surfaces on your property**, such as your driveway for example, allows more natural rainwater filtration as well as better mitigation and control of stormwater runoff which is important for reducing the risk of flooding. It also prevents potential contaminants from entering storm drains. This is covered in greater detail in the Water section.

Trees

- **Planting deciduous trees south and west of your home** will help with summer shade, while allowing winter sunlight and heat through. Locusts are a good choice for their fast growth, hardiness, and dappled shade which will allow grass or other plants to grow underneath.
- **Planting evergreens to the north of your home** will block cold winds and reduce heat loss. This can also delay frost and increase the number of growing days in your garden. Trees are a great investment and when planted properly (by removing nursery baskets, having a doughnut of mulch, and regular watering while establishing) will grow quickly, increase in value, utility, and beauty.



food

While the most significant climate impact mitigation is fueled at the policy and systems level, our food choices are a major factor in our individual and collective environmental impact. This is good news because it means our individual choices can make a difference. As transport is a significant component of society, consider learning more about local food options like Community Supported Agriculture (CSA) food shares and think about starting your own small garden. A packet of seeds costs as much as a handful of herbs from the store. With this equivalent investment, you can have a season's worth of fresh, tasty, and more nutrient packed greens at home. The money you can save by growing a herb garden will surprise you, and the nutrient-dense and flavour-packed produce will seal the deal.

In our global economy, supply lines stretch across the oceans, wind through superhighways, and plod up major rivers. These complex systems are efficient and provide us with produce and supplies which, only a few decades ago, were seasonal, or unavailable. These systems are not fool-proof and are subject to our changing climate. In 2012-13 the drought in the United States reduced the level of the Mississippi River to historic lows and endangered the shipping of 60 per cent of that country's grain among other commodities.⁸

What you can do about it

We can start to build our household resilience through new skills. Starting small is a great way to go; and even better if you can enlist family or friends to try it too. By beginning, we start to build our household resilience through new skills while yielding a new source of fresh food for you and your family. If you aren't sure where to put your plants, perhaps you have some empty containers, planters or a patch of grass? Start there and reach out to your circle of contacts for help. Locally, there are groups like D.I.G. (Durham Integrated Growers) that can assist with knowledge or a place to grow. There are endless resources online through YouTube, Facebook, Reddit, or other platforms that can help you get started. Here are some more ways:

- **Consider occasionally exchanging proteins from meat sources for a plant-based option like lentils, or beans** – you won't believe how delicious lentil tacos taste! Our protein sources (meat) are often highlighted in the news and documentaries and can be confusing. Factory farmed meat is known to have a negative impact on the environment, but is often a necessity for many families. Another option is sourcing your meat from a farmer who incorporates sustainable practices like regenerative grazing or holistic land management. These practices increase the health of the soil, animals, and ultimately the health ►





and flavour of the food. Learn more about sourcing local food from Durham farms on the [Invest Durham Local Food webpage](#). Beef from sustainable sources are a net benefit to the environment, net sequestering more carbon in the soil than methane emitted by the animals.^{9,10,11}

Did you know?

Some greenhouse gases are more harmful to the climate than others? For example, methane is 21 times more potent than carbon dioxide in its ability to trap heat in the atmosphere. Methane emissions in our hands, so to speak, come from landfills, sewage, and animal waste, including burps and farts.

- **Backyard layer hens** are another option that's gaining popularity. They are permitted in Durham if your property is located within a Prime Agricultural area, but make sure to check with your local municipal Official Plan and zoning by-laws first. Raising your own chickens means delicious eggs; and as a bonus, it is a great use of your lawn and kitchen scraps to supplement their feed.
- **Reduce your intake of toxic chemicals** by trying to buy organic produce, or trying to purchase from a local farmer who practices regenerative techniques. Durham Region has buying groups, food co-ops, farmers markets, and Consumer Supported Agriculture (CSA). Visit [Durham Farm Fresh](#) for more information. An easy way to try organic produce is to start with the most often contaminated foods, or "[The Dirty Dozen](#)".

Making food changes one step at a time is a great idea. Try incorporating "Meatless Mondays" into your week, especially if you have picky eaters in the house. Remember, this is a journey, not a race. The internet is a fantastic resource for recipes, gardening advice, and household resiliency that can help you along the way. In the end, consider the advice of Food Inc. author Michael Pollan, "eat food (that your great grandparents would recognize), not too much and mostly plants".



waste

We, as a society, generate a lot of waste. Whether it's food that is left over or gone bad, yard waste from gardening activities, the newspapers we read, packaging material from deliveries, fast food containers, or a range of other conveniences that we simply have come to accept as part of our lifestyle. It's all waste and it must be managed.

Why you should care

Why do we care if we produce a lot of waste in the first place? The earth is a big place and we have lots of space in Canada – right? Actually, no, it takes huge amounts of energy to produce new products, including food or conveniences to make our lives easier. If we bought less, then less would have to be produced to replace the items we already own. Many things are designed to break down over (sometimes) short periods of time. Innovative products, particularly electronic ones, change at an alarming rate to feed the insatiable appetite of modern consumers. That means that millions of useful phones, TVs and tablets are thrown away annually, not because they're broken, but because the new model is slightly better. Not only do we use energy to make new things, we also use energy to carry away and dispose of old items too. Even if it goes to recycling centres, energy will still be used to recycle what we can. The energy for all these activities is primarily fossil-fuel based, which releases carbon into the environment. When the material gets to the landfill for final disposal, more greenhouse gases will be released into the atmosphere over time.

Did you know?

The Region donates used Regional mobile devices to the Canadian National Institute for the Blind (CNIB) for use by persons with visual impairment.

The Region also takes steps to ensure other used IT equipment is disposed securely in an environmentally conscious manner.

The Paris Agreement is an international treaty on climate change adopted by 195 countries—including Canada—on December 12, 2015. Its goal is to limit global warming to well below 2°C, preferably to 1.5°C, compared to pre-industrial levels. The Paris Agreement also aims to foster climate resilience and lower greenhouse gas development, as well as to make climate flows consistent with a pathway toward a lower carbon future.¹²

Under the agreement, countries are required to take action on both climate mitigation and adaptation by implementing their nationally determined climate actions.¹³

What to expect in the next 20 years

At the rate the western world is developing and the desire for better, faster, and more innovative products increases, our impact on the environment will continue to grow. Even in the past one to two years, despite our best efforts, more mega-tonnes of carbon were produced in Canada than before the Paris Agreement. We must do better!

To achieve this long-term temperature goal, countries aim to reach global peaking of greenhouse gas emissions as soon as possible to achieve a climate neutral world by mid-century.



What you can do about it

- **Consciously think about every new purchase.** Do you need a new TV or is the old one okay for now? Is that new cell phone really worth the harmful impacts that will arise from its manufacture and delivery to your door?
- **Insist on less packaging when you decide to buy a new product.** If you think something is over packaged, contact the manufacturer and insist they use less packaging in their products. Support stores that consciously use suppliers with a smaller carbon footprint.
- **When shopping, always bring your own reusable bags,** even if the store doesn't charge for disposable ones.
- **Think of your own innovative solutions to reuse packaging material.** For example, use cardboard as a weed retardant in your garden or use shipping 'peanuts' to package valuables for storage or shipping. Empty yogurt containers can ►
be used to store leftovers in the fridge or freezer, or painted and used for plants or storage around the house.
- **Recycle as much as you can,** even when you travel. When at a fast food restaurant, before disposing of leftovers and packaging in the trash, ask if they offer recycling and compost options. Ask the store if they plan to offer recycling and compost options; and let them know about competitors who do. Work with your municipality to find new markets and uses for often wasted materials, such as Styrofoam and plastic bags.
- **Support sharing and donation opportunities for used products.** Visit and donate to ReStores, thrift stores, and Freecycle sites where ►

White Elephant sales refer to sales that are organized by social or community groups, typically for the purpose of fundraising towards a social or community-related cause.



people can gift used items, or to White Elephant sales in your area.

- **Don't forget to manage your own yard waste.** Save yourself an afternoon of work and use a mulching mower instead of raking your leaves or grass clippings. Leaving them in place naturally builds more fertile soil and avoids the need to buy unfriendly carbon-generating synthetic fertilizers for your lawn. Take advantage of your municipality's yard waste collection program as they will use it to provide nutrient-rich compost for others to use.
- **Think of other easy solutions for waste reduction**, such as:
 - Use newspaper or used egg cartons to line your green bin. See Durham Region's [webpage on Garbage, Recycling, Green Bin, and Other Collection](#) for more information on how to safely dispose of your waste.
 - Use reusable and clearly labelled open-top containers to put out your yard waste, ►

rather than manufactured single use yard waste bags. The energy it took to produce containers is minimal compared to the annual saving their use will create.

- Do you really need a straw for your drink? Bring your own coffee mug to the coffee shop and have it refilled. You can also carry your own water bottle and reusable straw everywhere.
- When dining in at a fast food store, ask for glass or china plates and cups rather than disposable ones, where available.
- Share a newspaper or magazine with your neighbour, doctor's office, or school – multiple readers mean less waste.

This is just an introduction to the many things you can do to reduce your waste footprint. There are great books and resources available with more ideas (included in the Suggested Readings section of this guide). We know you can think of lots more!



health and wellness

The physical and mental health consequences of climate change can impact healthy people and exacerbate illnesses in people with pre-existing health conditions. It is important to know about the health risks associated with climate change so that we can be proactive in being resilient and staying healthy.

Why you should care

Many human health issues are influenced by weather and climate conditions; so the more we know about the risks a changing climate poses to our well-being, the better we can look after ourselves. The information below describes what we can expect in the next 20 years in terms of climate change in Durham, as well as what you can do to help increase your resilience to climate-related health risks.

What to expect in the next 20 years

Over the next two decades, we can plan on several climatic changes to occur in Durham's climate. Key changes include hotter summers, shorter winters, increased precipitation, and more extreme weather events over time. Some of the changes mean greater frequency of heat waves, higher risk of wildfires, and greater number and duration of air pollution events. The consequences include increased incidences of heat exhaustion, heat stroke, respiratory conditions, cardiovascular disorders, and fire-related injuries.

In addition to the damage to our infrastructure, more extreme weather events such as rainstorms and tornadoes put us at a greater risk of injuries and illnesses associated with mudslides, floods, fallen trees and structures, contaminated drinking water, and spoiled food supplies.

The changes in climate are also expected to alter our ecology, which, in turn, impacts the presence and persistence of pathogens and diseases in our environment. We face greater risks of new pathogens emerging and more outbreaks in diseases occurring, which have the potential to greatly impact water quality, food availability, and overall human health.

Fortunately, you can do something about it. Taking action, as described below, can help you to strengthen the overall capacity and resilience needed to meet the health challenges ahead.

What you can do about it

- **Take care of yourself.** Maintaining your health as best as you can on a regular basis is priceless when it comes to being resilient. The healthier you are, the more capable you will be to endure unexpected, difficult events. Good health enables you to recover from injury or illness and it puts you in a position to be able to help others around you who cannot help themselves.
- **Plan to be cool when it's hot.** With the risk of hotter summers and more heat waves, it is important to ensure you have a way to stay out of the heat and keep cool.
 - Having air conditioning (A/C) in your home is ideal, especially if it is central A/C generated from an energy efficient unit. If home A/C is not feasible, plan to have access to a local cooling centre or even a nearby shopping centre in times of extreme temperature highs to reduce the risk of heat related illnesses such as heat stroke and heat exhaustion.
 - Avoid being outdoors during peak temperature times of the day, especially while gardening, exercising, or doing outdoor activities. It's also important to stay hydrated.
 - Consider planting trees around your home that will eventually form a canopy cover and shade for an overall cooling effect on your home. Read more in the "Your Home" section of this guide.
- **Beware of your wildfire risks.** In Ontario, fire season spans April to October. Stay informed of local alerts, municipal fire bans, and restricted fire zones if you live in an area prone to wildfires. The Province of Ontario has an [interactive fire map](#) that shows areas of high fire danger. Online resources such as [FireSmart Canada](#) and the [Canadian Red Cross](#) provide detailed information on precautions you can take to be prepared and protected. If you plan to burn wood, brush, leaves, and grass during fire season, make sure you obtain the necessary fire permit from your municipality and know how to burn safely.
- **Minimize your exposure to pathogens.** Climate change is expected to place us at greater risk of disease and illness caused by ►

pathogens in our environment. Because of increased potential in the frequency and type of disease outbreaks projected, it is prudent to do what we can to minimize our exposure.

- West Nile virus is known to be transmitted from mosquitoes to humans; so it is important to eliminate stagnant pools of water in your yard where mosquitoes can breed, in order to reduce the risk of exposure to the virus. Puddles as small as a hockey puck can be used as breeding pools for mosquito larva.
- Lyme disease is caused by a pathogen that is transmitted from a very small wood tick to humans typically when people hike through forested areas known to harbour the pathogen. Find out if your area is identified at risk of Lyme disease using the Ontario Lyme Disease Map, updated annually on the [Public Health Ontario Lyme Disease webpage](#). Stay informed of local incidences or posted warnings that can help you to avoid contracting the disease. Reduce your overall exposure to the pathogen-carrying ticks when venturing into the woods by wearing long pants that are tucked tightly into socks, a long-sleeved shirt that is tucked into your pants, and wearing a hat. Extra precautions include spraying your clothing with DEET.
- In times when we're dealing with new, unknown diseases, the best we can do is be in the habit of good overall hygiene practices, including diligent hand washing, practicing safe coughing and sneezing etiquette, disinfecting high traffic germ surfaces, wearing a mask, and avoiding touching your face –especially in public places. You may also consider having a basic supply of personal protective equipment like face masks and sterile latex gloves in your home or car.





- **Strengthen emergency capabilities at home.** Maintaining your well-being is a priority, especially in crisis. With unprecedented times and more uncertainties ahead, help yourself and loved ones with overall emergency preparedness.
 - With more extreme weather events anticipated, there is an increased risk of system-wide power outages. Having a back-up home power generator, or an off-the-grid source of green energy, such as solar panels installed on your property, will help serve essential electricity needs at home in the event of a power outage. If this is not feasible, consider making plans in advance with nearby neighbours or family members as an alternative for safe shelter, if and when it becomes necessary.
 - Having emergency first aid and CPR training and a first aid kit can prepare you with the basic skills to help others in your household or neighbourhood in case someone is injured.
 - If you or your dependents have pre-existing health conditions that require medication, ensure you have a small, back-up supply of necessary prescriptions at home, if possible, in case you run out of medicine and cannot access more right away. Make sure to keep an eye on the expiry dates.
 - Keep an emergency supply of basic necessities at home that will help you during emergency situations when you may have to go without power, or access to amenities for an unknown length of time.

The most basic necessities to keep as an emergency supply at home include clean drinking water, non-perishable foods, a first aid kit, personal protective equipment, matches and candles, prescription drugs, battery- or manually-powered radio, and a means for communicating with people outside of your household (whether cell phone or walkie-talkie).



transportation

We make transportation-related decisions daily about how, where, and when we travel to work, school, for shopping, and other daily needs. The information provided in this section is intended to help you make transportation choices that reduce your carbon footprint and build resiliency into your everyday life.

Why you should care

In Ontario, road transportation makes up almost half of the province's carbon emissions – a large portion of which is caused by personal vehicles.

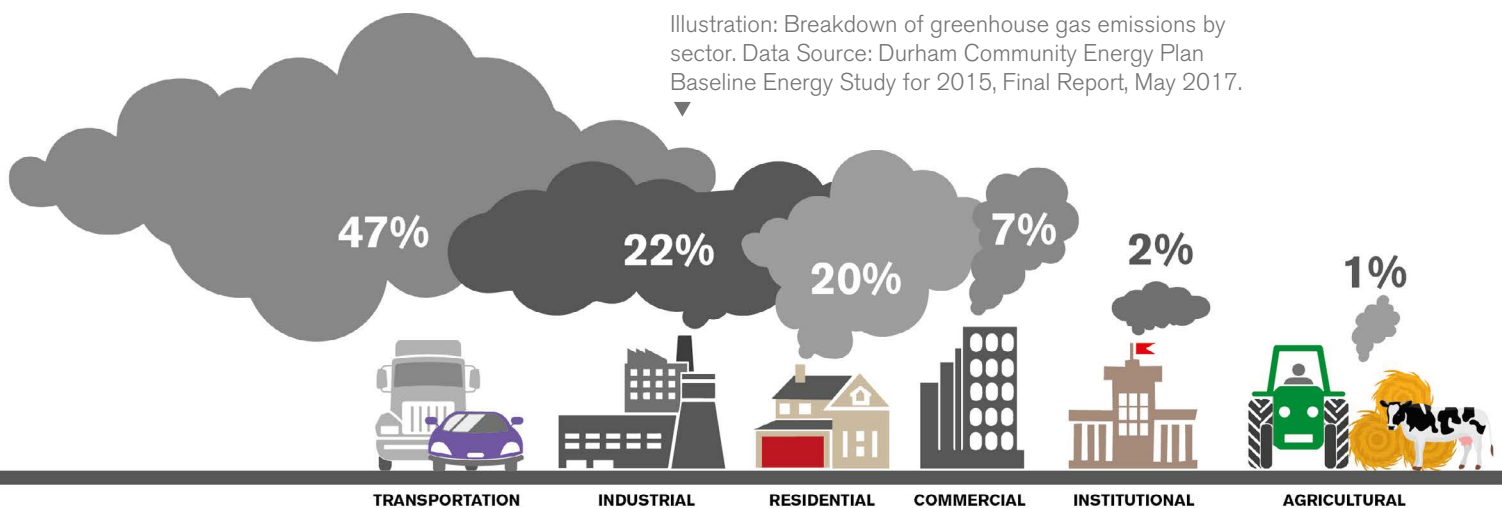
The greenhouse gas (GHG) emissions, for which we are responsible, have driven change in our climate and will continue to do so over the course of our lifetime. Taking steps to reduce our GHG emissions and broaden our transportation choices helps in lessening the expected impacts of climate change on ourselves and our loved ones. For example, in the Region of Durham, we can anticipate greater risks of tornadoes, violent storms, and the resulting flooding of roads and destruction of bridges that we rely on for daily transportation.

By choosing travel alternatives, like the ones described in this section, we can build resiliency that strengthens our capacity to meet our transportation needs in both the present and the future.

What to expect in the next 20 years

Durham is home to just over 704,000 residents based on 2020 reporting; and is expected to grow to 1.3 million people by the year 2051 according to the Growth Plan for the Greater Golden Horseshoe, placing more pressure than ever on our transportation system. Over this same time period, there are key changes to the Region's climate we can anticipate, including more extreme weather events, and increased amounts and intensity of precipitation. This means an increased risk of weather-related disruptions, such as tornadoes and floods, causing traffic congestion.

Fortunately, we can do something about it. We can help ourselves and each other to be resilient and less vulnerable to the uncertainty of climate change while reducing the negative impact we have on our environment.



◀ Image taken on:
Multi-use pathway on
Garden Street, Whitby ON



What you can do about it

- **Walk.** In sunshine, rain or snow, most people have walked through all sorts of weather and arrived alive and well at their destination, whether it be school, work, the corner store, or a friend's house a few blocks away. On average, a person can walk one kilometre in 10 minutes. Although walking may not always be feasible for everyone all of the time, consider walking for shorter distance trips more often. Remember, you can probably cover three kilometres in just a half hour.
- **Ride your bike.** Cycling can be the fastest way to travel in the city, especially during rush hours. In 10 minutes, a person can bike approximately 3.5 kilometres on average. Anyone riding a bike can take advantage of roads that have bike lanes and multi-use paths, while also saving on fuel costs by not driving a car.
- **Ride on Durham Region Transit (DRT).** DRT provides transit services throughout the entire region and is your best alternative to a car. Trading in your car for a transit pass may put you outside of your comfort zone, especially if you are new to transit, or if it has been some time since your last trip. Instead of opting out entirely, start by making one trip each week. While one trip's worth may not seem like a big deal, it's the cumulative impact of trips over a year, a decade, and a lifetime that adds up to make a difference!

As a bonus, a trip on public transit always involves active transportation. Transit stops are easily accessible by walking and many stops also include bike racks. You may also consider taking your bike with you by using the bike rack on the front of the bus.

Visit the [Durham Region Transit website](#) or contact DRT'S customer service team at 1-866-247-0055 for help with trip planning, schedules, fare options, and other information to make your trip a success.

Plan your trip using [Transit \(app\)](#). Transit is DRT's official trip planning application for your travel needs in Durham Region, the Greater Toronto and Hamilton Area, and beyond. Use the app by entering your start and end locations and the time you want to travel. It will check nearby bus routes, On Demand services, walking routes, and more, to provide you with multiple options to serve your travel needs. Transit is available on [Google Play](#) and the [App Store](#).



- **Carpool.** Two or more people sharing a ride is better than one person driving a car alone because it helps alleviate traffic congestion on our roads and reduces the carbon footprint per person. Carpoolers can take advantage of High Occupancy Vehicle (HOV) lanes and the many commuter lots (e.g. park-and-ride lots) available around Durham Region that may be used as transit stops, transfer locations, or carpool parking lots for free. Visit the [Region of Durham's Carpooling page](#) for information and maps of available carpool parking lots.
- **Electric vehicles (EVs)** are powered 100 per cent by an electric motor and battery, and are charged using the power in Ontario's low carbon electrical grid through electric vehicle charging stations. EVs are significantly cheaper to fuel and maintain than internal combustion engines.¹⁴ Most EVs can travel 200-250 kilometres on a full charge, with some models capable of 400+ kilometre distances. When available, government rebates provide incentives to assist consumers in this choice. Learn more about incentives and find a map of existing public EV Charging stations in Canada on [Transport Canada's page on zero-emission vehicles.](#)
- **Hybrid vehicles.** Hybrid-electric vehicles (hybrids) use both a conventional gas-powered engine and an electric motor. Hybrids have battery packs that are charged with electricity generated by the vehicle. Hybrids run on zero-emission when in electric-only mode and they are more efficient than their conventional counterparts with fuel savings of 20 to 40 per cent compared to gas-only cars.

Choosing a hybrid or EV helps us with resiliency in terms of being able to meet our transportation needs in the present and the future. That is because gasoline and diesel are highly prone to unpredictable prices and major fuel producers are already looking to shift away from this non-renewable resource

toward alternative, low-carbon, renewable energy sources.

- **Telecommuting.** Working remotely from home, also known as telecommuting or teleworking, reduces the number of trips a person makes throughout the week. It is a trending option, especially after the start of the COVID-19 pandemic, which resulted in many employers shifting their staff to working from home in an effort to maintain business productivity while ensuring the safety of their staff.

Instead of physically commuting to your workplace, opt to work from home whenever you can, if feasible. If you do not have a teleworking program set up at work, talk to your team about joining the Smart Mobility Durham program. It builds resilience into your ability to work while helping reduce traffic issues and your carbon footprint.

- **Alternative work scheduling.** To help reduce peak period travel, more and more employers are open to alternative work hours for their employees. Instead of nine to five office hours and five day work weeks, where feasible, consider making arrangements to come into work at off peak times like seven to three or ten to six, or even to work a longer day but shorter work week (such as four days at work and three days off).

Smart Mobility Durham is a program offered by the Region of Durham that works with employers to help their staff travel to work in healthier and sustainable ways. Programs include promoting active transportation such as walking and cycling, and helping to setup teleworking and alternative work arrangements.



water

The possible impact of climate change is well documented with respect to runoff, river flows, lake levels, and extreme weather events. Less attention has been given to urban water use. Canadians have the second-highest water consumption rates in the world, and it's quickly becoming apparent that water isn't an unlimited resource.

Water Conservation

Climate change appears in the form of weather extremes involving too much or too little rain. It is therefore important to know how you can conserve water in the event of a drought induced by changes in climate.

The average Ontarian uses 225 litres of water daily per person which is nearly twice as much as people in Germany (120 litres per day) and 50 per cent more than residents of the United Kingdom (150 litres per day). Households account for nearly 60 per cent of municipal water use, with almost two thirds of that used in the bathroom for flushing toilets and bathing.

Why conserve water?

Conserving water helps prevent GHG emissions that occur when treating and distributing water. Clean drinking water is essential to our health, the environment, and economic well-being. Four great reasons to use less water are to:

1. Preserve water for future generations.
2. Fight climate change.
3. Save money.
4. Reduce energy use and costs for distribution.

Overloading municipal sewer systems can also cause untreated sewage to flow into lakes and rivers. In some communities, costly sewage system expansions have been avoided simply by community household water conservation and the wise use of our water resources.

What you can do about it

- **Leaks.** Stop leaks by replacing worn out washers on your faucets.
 - Toilet leaks: To determine if you have a leak in your toilet, put a few drops of food coloring in the tank and if the color shows up in the bowl after a few minutes, it may be time for a new flapper valve. If the toilet is leaking around the base, you may need to call a professional to repair the leak.
 - Remember that even tiny leaks can waste hundreds of litres of water. Tour your home monthly in search of dripping faucets, showerheads, hoses, and sprinklers. If you're on metered water, read the house water meter before and after a two-hour period when no water is being used. If the meter does not read exactly the same, there is a leak.
- **Water Flow.** Change the water flow coming out of the tap by installing an aerator which will reduce the flow by 25 to 50 per cent, without drastically affecting the performance of the faucet. Additionally, a low-flow showerhead will use about half the water as a standard showerhead.
- **Toilets.** Toilet flushing accounts for 30 per cent of water use in the home, second only to showers and baths. Replace your toilet with a low-flow toilet which averages six litres per flush compared to the standard 18 litres or more. Retrofitting your current toilet can be cheaply done by installing a water retention, displacement, or alternative flushing device. Install composting toilets, especially at cottages; they require no water at all and keep all the nutrients and pollutants out of waterways. Check zoning by-laws in your area first to be sure they are allowed.

Did you know that an automatic shut-off nozzle added to the end of your hose could save 20 litres of water per minute?



- **Smart gardening.** This involves watering your garden before 9 a.m. to reduce evaporation and prevent the growth of fungus. It is also the best defense against slugs and other garden pests.
 - **Fertilizing.** Fertilizers can be an important part of lawn maintenance and promoting plant growth. However, they also increase water consumption so you should only apply the minimum amount of fertilizer needed.
 - **Watering plants.** Where feasible, water plants with a watering can or use a soaker hose instead of a sprinkler so water reaches the roots directly. Avoid watering when it is hot or windy, because it will cause the water to both transpire and evaporate faster before it can absorb into your plants.
 - **Lawn.** Water conservation is easier with a well-maintained lawn. Add organic material to your soil to help increase absorption and assist with water retention. Control weeds to reduce competition for water in the garden.
 - **Watering your lawn.** Water your lawn, not your driveway. Only water your lawn when needed. Remember most lawns only need 2.5 centimetres of water a week. Letting your grass grow taller to about 7-8 centimetres will also aid in water retention in the soil.
 - **Plants.** A good layer of mulch around your plants helps conserve moisture and keeps weeds under control. Choose drought resistant plants and grass when possible, and encourage native plant species, which require less watering. Native plants also foster healthy soil and desirable insect life.
 - **Collecting rainwater.** Where possible, use a rain barrel to collect water from eavestroughs and use it for outdoor watering. Plant slopes with plants that will retain moisture and help reduce runoff and erosion.
 - **Trees.** In addition to making your house cooler, adding native shade trees helps store carbon and can lessen the need for watering by protecting plants and soil from the afternoon sun.
- **Laundry.** Water efficient appliances with an Energy Star rating, such as washing machines, dishwashers, showerheads, toilets, and irrigation products will save more than just energy. An energy efficient washing machine uses over 25,000 litres less water per year than a standard machine, and a dishwasher uses approximately 1,600 litres less water per year. Special cycles, such as the permanent-press cycle, tend to use extra water unnecessarily. For partial loads, adjust water levels to match the size of the load. Full loads are preferable to maximize efficiency. When replacing your washer and dryer, replace the hoses at the same time to avoid deterioration.
- **Take advantage of government programs and incentives.** Municipalities are improving water conservation by instituting various by-laws and rebate programs for appliances. Check with your municipality for currently available programs.





- **Use less water:**
 - **Cooling off in the summer.** Use a children's pool instead of a sprinkler to cool children off while minimizing water use.
 - **In the bathroom:**
 - **Showering.** Take shorter showers instead of baths! Long showers can use 20 to 30 litres for every unneeded minute. If you do plan to take a bath, fill the bathtub only halfway. Use soap instead of shower gels since gels require extra water for rinse-off.
 - **At the sink.** When washing your hands turn the water off while you lather. Turn off the water after you wet your toothbrush and fill a glass for mouth rinsing. When shaving, rinse your razor in the sink with a few inches of warm water instead of using running water.
 - **In the kitchen:**
 - **Minimize the use of kitchen garbage disposal units** which require lots of water to run properly and add to the volume of solids in septic tanks.
 - **When cooking, don't let the faucet run** while you wash vegetables.
 - **Use less water by using your dishwasher** rather than washing dishes by hand. Washing dishes manually uses 20,000 litres more water per year.
- **Other ways to conserve water:**
 - **Consider your water footprint.** Our diets account for roughly half of all the water we use. All food has a water footprint, but some are much larger than others. Eating less beef, one of the most water-intensive foods, is an easy way to start. Shifting away from animal products to a plant-based diet can shrink your water footprint significantly. See the Food section of this guide for more information.
 - **Buy less food and don't waste it unnecessarily** since consumer products account for up to a third of most water footprints. Buying less—from clothing and electronics to household goods—can dramatically reduce your water footprint.

Flooding

The impact expected from climate change may result in more extreme weather events such as increased rainfall and snowfall. This will be the new normal to which we must adapt. Durham Region has been fortunate compared to other more flood prone areas in Ontario. Municipalities are planning for increased water management impacts, but you can help if you follow the tips offered in this guide.

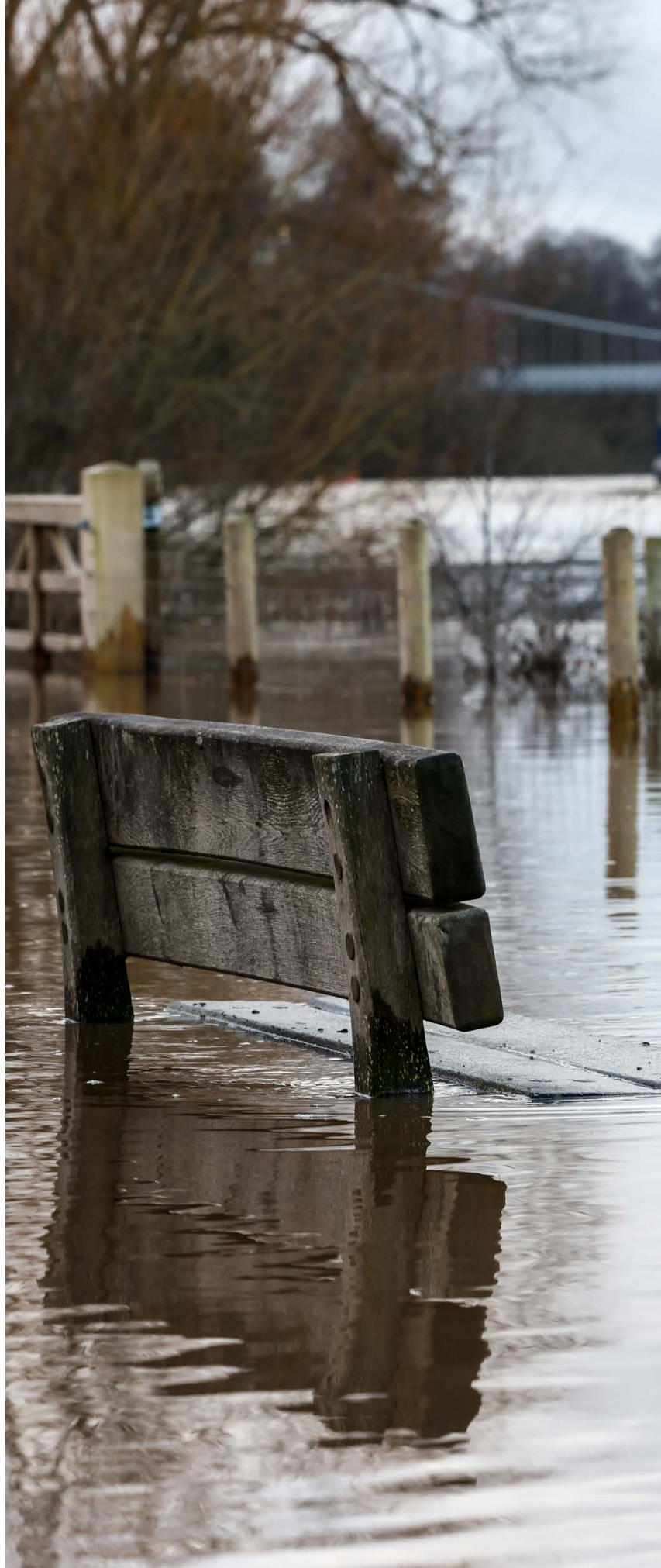
Why you should care:

With increasing temperatures, more evaporation adds moisture to the atmosphere. Extreme and possibly catastrophic weather events happen when increases in temperature and moisture seek to reach equilibrium. The risks from future floods are significant, given expanded and proposed development, urbanization, land use changes, and climate change caused by human activity. Water damage to a home is very costly and insurance policies do not typically cover all water-related claims.

What to expect in the next 20 years:

Urban flooding can be caused by short lived but heavy precipitation events, which are expected to increase over time. New development within Durham Region will result in an increase in hardscapes or impermeable surfaces, which pose a risk to local rivers, by way of increased siltation from erosion. This decreases the capacity of riverbeds to assimilate runoff from the extreme weather events and causes flooding.

River flooding occurs when surface water drained from a watershed into a stream or river exceeds channel capacity, overflows the banks, and overwhelms adjacent low-lying areas. River flooding depends on precipitation as well as other factors such as erosion, soil moisture conditions, and snowmelt. Water levels in lakes are also expected to rise; so if you live by a river or body of water, you will be more susceptible to flooding and precautions should be taken.



What you can do about it

Outside of your house:

- **Storm drains.** Make sure all storm drains in front of your home are clear of debris and/or ice and snow.
- **Eavestroughs and downspouts.** Ensure eavestroughs and downspouts are cleaned in the Spring and Fall, are not plugged, and are adequately moving water away from your house. This is especially important for preventing ice dams from forming in the winter, and causing melting snow to back up onto your roof under your shingles, and causing potential water damage inside your home.
- **Flood alarms.** Maintain and install flood alarms in your home to provide early warning of potential floods.

Visit your local conservation authority's flood warning page to view the current level of threat in real time.

- [Central Lake Ontario Conservation Area \(CLOCA\)](#)
- [Lake Simcoe Region Conservation Authority \(LSRCA\)](#)
- [Toronto Region Conservation Authority \(TRCA\)](#)
- [Ganaraska Region Conservation Authority \(GRCA\)](#)
- [Kawartha Region Conservation Authority \(KRCA\)](#)

- **Your foundation.** Work with a qualified home foundation specialist to address major issues that might be complicated by flooding.
- **Grading.** Correct grading of your lawn to direct water at least two metres away from your foundation.
- **Downspouts and pipes.** Extend downspouts and sump discharge pipes at least two metres from the foundation.
- **Cracks.** Apply sealants to any cracks in your home foundation.
- **Install a sump pump** (with battery backup above flood level in case of power failure) for crawl spaces and basements.
- **Window height.** Windows should sit higher than 10-15 centimetres above the ground. If your garage or entry door sits below ground level,

Rain gardens and larger bioswales can eliminate 80 per cent of bacteria and 60 per cent of chemical pollution from stormwater. Native plants and trees are better choices since they are better able to adapt to the prevailing climate. A medium size tree can absorb more than 9,000 litres of water a year.

keep exterior drains in good working order and ensure that doors, frames, and seals are in good condition to minimize water entry.

- **Green infrastructure.** Use plants, soil, and natural systems, known as “Green Infrastructure” or Low Impact Development (LID) to manage rainfall runoff and erosion.
- **Plants and trees.** Consider planting trees and shrubs that have large root systems to take up water instead of hardscaping your property with impervious surfaces.

Inside of your house:

- Remove any obstructions to basement floor drains. Ensure personal belongings and valuables are stored in waterproof boxes at least 30 centimetres off the floor.
- Keep all hazardous materials (e.g. paints) stored in sealed boxes and raised at least 30 centimetres off the floor.
- Check with your municipality to determine if installing a backflow, check valve or one-way valve is appropriate to prevent the backup of municipal sewage into your home during extreme rainfall events.
- Safeguard indoor utilities and outdoor equipment by elevating furnaces, water heaters, electrical systems (switches, sockets, circuit breakers, and wiring), generators, and air-conditioning units above flood levels.

Assess your home for flood risk using the [Home Flood Protection Check-up tool](#) created by the Intact Centre on Climate Adaptation in partnership with the University of Waterloo.

A close-up photograph of a hand holding a glowing, warm-white LED lightbulb. The bulb is connected to a black power cord. The background is blurred, showing what appears to be a ceiling with recessed lighting. In the lower-left corner, another hand is partially visible, holding a standard incandescent lightbulb.

energy

Our life today is intertwined with energy, whether it is electricity, natural gas, propane, or gasoline. Everything from the lights and heat in our homes, our morning coffee, the fossil fuel powered cars we drive, the technology we use, to the equipment and machinery that drive our economy, all rely on some form of energy. We know that energy use comes with a carbon footprint, and some forms of energy produce significantly more GHGs than others. Natural gas and gasoline produce more GHGs when consumed than electricity. This makes it significantly more important to reduce, conserve, or wherever possible, switch your fuel use to a greener source, such as electricity. We all must reduce our carbon footprint and conserving energy and changing the way we use it, is the simplest way.



Why you should care

Living in a society where electricity is available at the flick of a switch or push of a button can make it very easy to take our energy for granted. It is important to realize the benefits of reducing energy consumption which will result in better air quality, and help reduce global warming by keeping temperature rise within the 1.5°C threshold.

Changes in climate can result in higher demand for energy over time. For instance, a hot summer day yields greater air conditioning use region-wide, which places significant demand on our energy system. If the demand exceeds the supply of available energy, the result could mean power brown-outs or outages under the stress. Not only is this an inconvenience, but it also poses a threat to our health and safety. With hotter summers expected from our changing climate, we can expect a greater demand for energy needed for adequate cooling during extreme heat.

Adopting behaviours that foster energy conservation, therefore, not only help to reduce our GHG emissions and improve air quality, but also play an important role in maintaining adequate energy supply, especially during extreme weather when we need it the most. Not only does this reduce your utility costs, but it also ensures that we are taking the necessary steps towards a cleaner, greener future.

What to expect in the next 20 years

With Durham Region's population anticipated to double over the coming decades, we will all need to do our part to reduce our GHGs. New homes and buildings are being built to greener standards. Automakers are designing and producing more electric vehicles. Large and small corporations are pledging to become net zero by 2050. The technology is available, we just need to make it happen.

Net zero refers to a community that is highly energy efficient and fully powered from on-site and/or off-site renewable energy sources. Net zero buildings are designed and constructed to produce at least as much energy as they consume on an annual basis.

What you can do about it

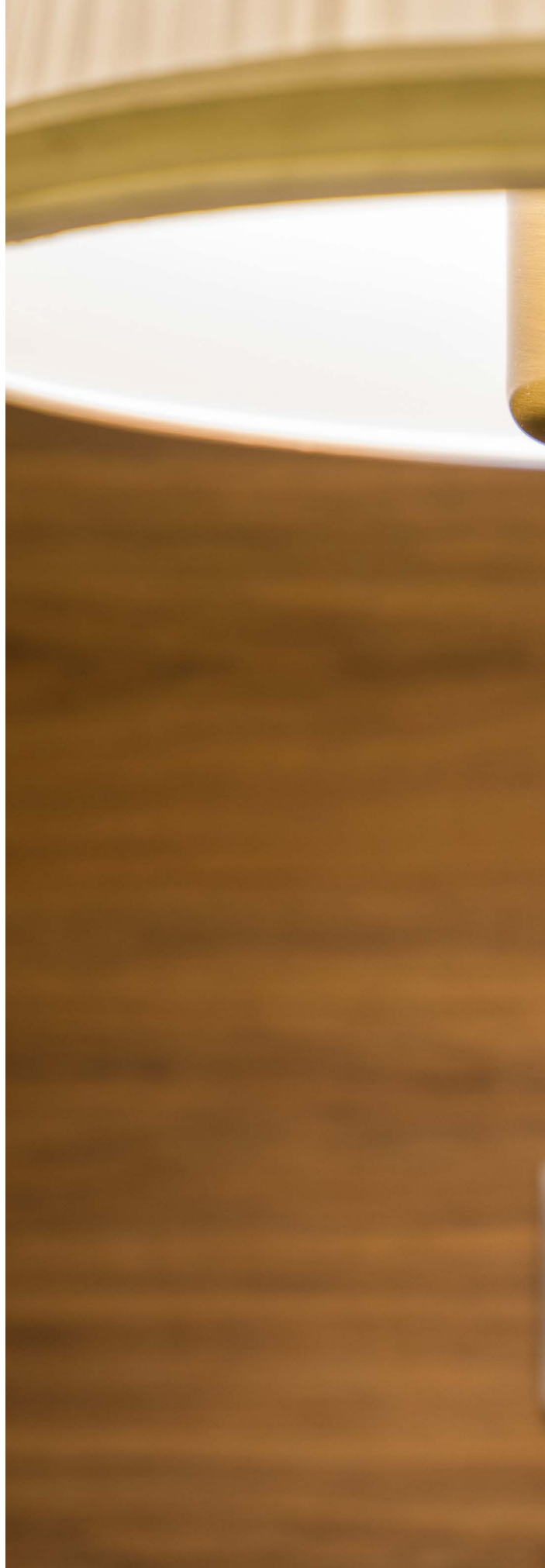
There are many steps that you can take to minimize your energy footprint and foster clean energy:

- **The [Durham Home Energy Savings Program](#)** is a program the Region will launch in 2021 that provides a one-stop shop for home energy retrofit projects. An energy coach will be available, free of charge to residents, to assist in guiding them through the retrofit process, providing assistance on energy savings, hiring contractors, sourcing rebates and incentives, and much more.
- **Only purchase energy efficient appliances and systems in your home.** Appliances and technology with an "Energy Star" certification that is designed to consume less energy and result in lower operating costs, as discussed in the home and water sections of this guide.
- **Program your home thermostat to turn the heat down at night or when you are away.** Smart home technology can help you reduce your home's energy consumption through heating and cooling.



The passive house standard is an internationally recognized energy-based standard that aims to reduce energy consumption from heating and cooling by up to 90 per cent through the use of low energy construction.¹⁵

- **When buying your home** – new homes are being designed and constructed to minimize energy use associated with heating and cooling. Factors such as ground source heat pumps, higher insulation ratings, more efficient windows and doors, less use of natural gas, rooftop solar PV ready, EV charger ready are environmental design features that increase a home's overall energy efficiency. Like appliances, homes are also given an "Energy Star" rating, which you can ask about when buying a new home. The Government of Canada has an [EnerGuide](#) program to monitor energy efficiency. More impressively, the passive house standard achieves an ultra-high performance through intelligent design and consumes only 10 per cent of the energy a normal home would.
- **Consider installing innovative technologies.** One of the best ways to ensure that your energy is obtained from a clean source is to install a solar roof. Although it may seem expensive at first, you will certainly benefit in the long term. Your power bill will decrease over time, and you will also help the renewable energy industry by creating jobs in that sector and doing your part to decrease CO₂ emissions.
- **Take steps to counter phantom energy.** On average, each home has 40 appliances that are plugged in. These appliances continue to draw power even if they aren't directly in use, a phenomenon called phantom energy, which can account for up to 10 per cent of your overall energy consumption. Some ways to tackle this include the use smart power strips, which automatically recognize when an appliance is not in use and reduce the power that is drawn by it.





Did you know?

In 2019, Regional Council endorsed the corporate [Energy Conservation and Demand Management \(CDM\) Plan, 2019-2024](#). Municipalities are required through Ontario Regulation 507/18 to develop and implement a CDM Plan for their internal operations and facilities every five years. This plan provides an overview of the accomplishments achieved from the 2014-2018 CDM plan, tracks energy use and conservation for Regional facilities, as well as proposes action for further conservation to 2024.



businesses

Small businesses have a tremendous impact on communities. As the source of livelihood for almost 70 per cent of employees in the Canadian private sector, they create jobs and economic development, and bring growth and innovation to the areas in which they are located. Their personal connection to consumers renders them integral to most communities. The following steps can help business owners make their businesses more resilient.



Why you should care

Small businesses are one of the groups most vulnerable to the effects of climate change. As weather becomes increasingly unpredictable, undesired outcomes such as floods, wildfires, and droughts can have catastrophic impacts on business operations. Implementing various measures and safeguards to increase climate resilience could make the difference between averting or falling victim to disaster.

Small businesses also have the power to take concrete steps to alleviate the effects of climate change. Factors such as heating and air conditioning, plastic-based resources, or wastepaper contribute to millions of tonnes of carbon emissions every year. By adopting easy-to-implement, low-cost policies that decrease your environmental footprint, you can do your part in the struggle against climate change.

What to expect in the next 20 years

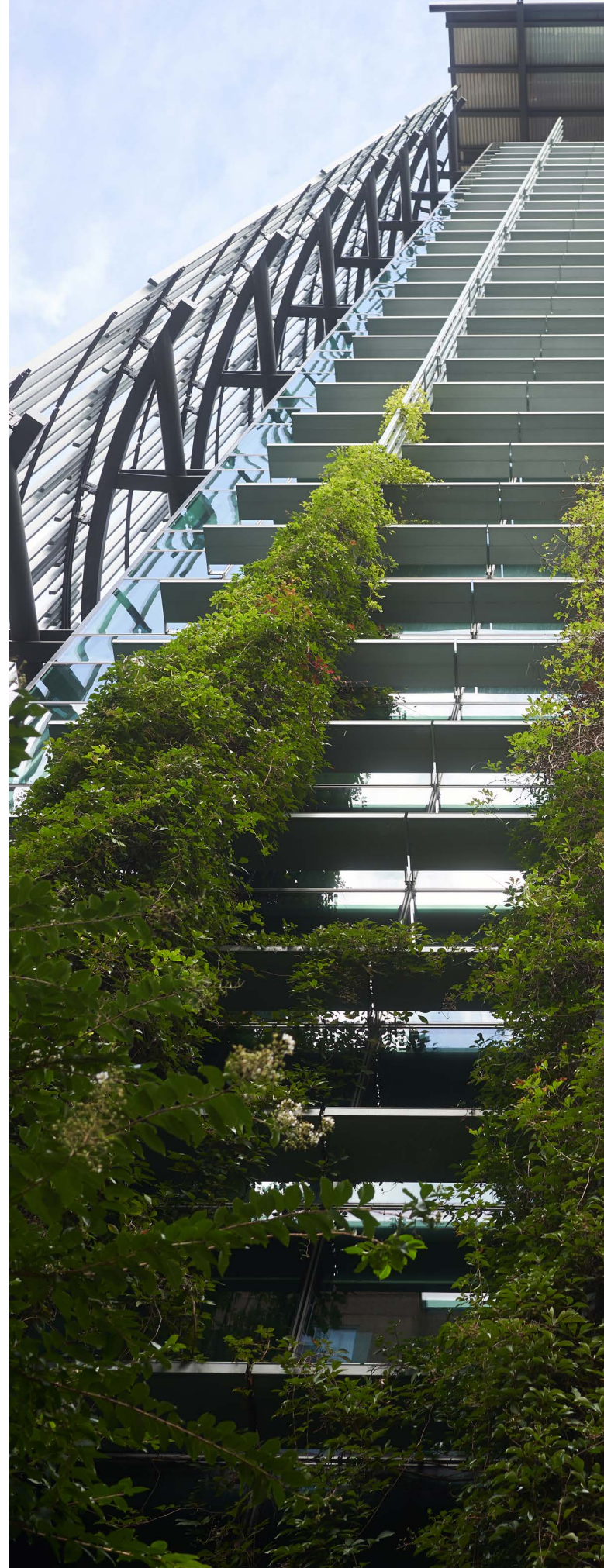
As Durham Region continues to grow, the outlook for businesses is quite positive. With the growing influence of educational institutions such as Ontario Tech University, Trent University, and Durham College, the number of startups and enterprises are expected to increase. Durham is on track to be an economic hub, and businesses will continue to play an imperative role in the region's socio-economic constructs.

◀ Image taken in:
Downtown Uxbridge

What you can do about it

There are many steps that business owners can take to increase resiliency and decrease their environmental impact:

- **Conduct audits.** By conducting audits and analyzing factors hindering energy efficiency such as running heating or A/C with the windows open, leaving computers on overnight, or excessive usage of overhead lights, you can get an effective idea of how much electricity you are consuming unnecessarily.
- **Overhaul obsolete appliances.** You can increase your energy efficiency by replacing appliances and equipment. For example, replacing incandescent light bulbs with LED lights, unplugging unused appliances to reduce phantom energy loss, or installing low-flow toilets and automatic restroom sinks will save you in the long term through reduced utility bills.
- **Explore alternative energy sources.** You can use alternative energy sources such as solar energy to power your operations which will not only help reduce the carbon footprint, but also qualify your business for solar rebates, where available. Ultimately, the initial cost of installation will be outdone by the overall benefits to you and the environment.
- **Initiate effective corporate recycling and programs.** Recycle materials that often end up in landfills, such as scrap metal and electronics (also known as e-waste). In the past few years, e-waste has been the largest growing waste stream in the world, with 45.8 million tonnes being produced in 2018. Many companies have trade-in programs for e-waste, which sometimes provide payment as well. Consider donating your obsolete yet functional corporate electronic devices to local schools or libraries, which will benefit your local community while reducing waste from entering landfills. Implementing effective practices will help keep recyclable material out of landfills, and can also heighten your business's corporate social responsibility.
- **Leverage technology.** In the information age, traditional methods of communication, such as physical meetings and print-based communication, have been replaced by virtual chats and cloud-based sharing services.





Encouraging the use of technology, such as the cloud, will help your employees cohesively share and access information, allowing you to reduce printing costs, while reducing your organization's carbon emissions, paper waste, and overall ecological footprint.

- **Green your premises.** One of the best ways to contribute to climate resilience is to green your business location landscaping using “green” infrastructure and low impact design where possible. By planting native species of trees or using permeable surfaces for your parking lot, you can significantly reduce the urban heat island effect caused by paved, impermeable surfaces. Planting trees will also prevent erosion by providing a path for rainwater to be absorbed into the ground, while offering natural shade and cooling. Something as simple as planting a pollinator-friendly garden near your building can also make a difference in offsetting the overall environmental footprint of your business. Check municipal, provincial, and federal websites for information on available grants that provide the required funds to green your premises.
- **Encourage eco-friendly behaviour from your employees.** Technology allows for easy communication even when separated over a large distance. Platforms such as Microsoft Teams and Zoom facilitate remote communication, making working from home an easy alternative. This reduces CO₂ emissions caused by transportation. The recent COVID-19 pandemic demonstrated how a rapid reduction in vehicles on the road can positively affect the state of pollution and improve air quality. Allowing employees to work from home can preserve that state. Refer to the Smart Mobility Durham program highlighted on page 26 for help on how to get started.

LEED (Leadership in Energy and Environmental Design) is an internationally recognized green building certification system that provides third-party verification that a building was designed and built using strategies aimed at achieving high performance in key areas of human and environmental health, including: location and transportation, sustainable site development, water savings, energy efficiency, materials selection, and indoor environmental quality.

A person is sitting on a wooden dock, looking out over a body of water at sunset. The sky is filled with soft, colorful clouds in shades of orange, pink, and blue. The sun is low on the horizon, creating a bright glow that reflects on the water. The person's silhouette is visible against the bright background.

looking ahead

We hear that we can make a difference. That every little action matters. That there is hope, and that everyone can make a difference. But is this true?

What you can do about it

Rarely do we have the opportunity to measure in real time what profound impacts our actions might or might not have on our environment. These are not normal times, because during the writing of this publication we are living through a global pandemic. As a result, everyone's life changed dramatically and more importantly our behavior changed as well. We stayed home more and drove less; we appreciated life, family, and friends more; we were more introspective; we cared about things we were too busy to bother with before; we appreciated our environment; and, we made dramatic changes in our lifestyles. The observable outcomes were rapid and profound, not only on our lives, but also on the environment. The positive outcomes—including the reduction of emissions from entering the atmosphere—were realized across the globe, and will undoubtedly contribute towards our fight against climate change. Here are but a few examples that offer environmental hope for our future.

- Air pollution has declined dramatically across the globe. Blue skies are seen over Beijing, and Mount Everest is visible from Nepal for the first time in modern memory. Respiratory health globally has improved significantly in many areas as air pollution declined.¹⁶
- In China, emissions fell 25 per cent at the start of 2020 as people were instructed to stay at home, factories shuttered, and coal use fell by 40 per cent at China's six largest power plants since the last quarter of 2019. The proportion of days with "good quality air" was up 11.4 per cent compared with the same time in 2019 in 337 cities across ►

China, according to its Ministry of Ecology and Environment.^{17, 18}

- Water quality has improved exponentially. The canals of Venice are clear for the first time in decades, and both fish and plants are thriving.¹⁹
- Air and automobile travel plummeted and as a result, tens of thousands of tonnes of CO₂ are not being released, thereby reducing the negative impacts on the climate. Reports out of China, the US, Italy, and other parts of Europe show that airborne pollutants, particularly nitrous oxide (NO₂) have declined by approximately 50 per cent. The European Environmental Agency published numbers that show NO₂ levels in one province of Italy have declined by 47 per cent versus the same time one year earlier. In Rome, these levels are down by about 30 per cent.²⁰
- GHG emissions have declined by an average of 17 per cent globally compared to pre-pandemic levels.²¹
- Fewer cars on the roads²² have saved millions (billions) of insects and other animals that otherwise would have died on our windshields or under our tires.²³

Although, for most of us, these lifestyle changes were involuntary, the outcomes are real and measurable. We need to want to make a difference, because if we really want to – we will! There have been many ideas presented to you in this publication that DEAC hopes you found interesting and useful. Please take a minute to see how you have made a difference. You may be only one person, but you are the one who can change the world.



suggested
readings &
works cited

Suggested Reading

Your Home

- Thompson, B. (2019). *Designing for Disaster: Domestic Architecture in the Era of Climate Change*. Schiffer, 1st edition.

Waste

- Johnson, B. (2013). *Zero Waste Home: The Ultimate Guide to Simplifying Your Life by Reducing Your Waste*. Scribner: Simon & Schuster, Inc.
- Weldon, M. (2020). *An Almost Zero-Waste Life: Learning How to Embrace Less to Live More*. Rock Point.

Water

- Canadian Living. [Water Conservation: 10 ways to conserve water in your home](#).
- Eartheasy. [45+ Ways to Conserve Water in the Home and Yard](#).
- Insurance Bureau of Canada. [Home Flooding Mitigation Techniques](#).
- Intact Centre on Climate Adaptation. [Home Flood Protection Program](#).
- Natural Resources Defense Council. (2016). [9 Tricks That Save Tons of Water](#).
- Wai Water. [100 ways to conserve water](#).

Energy

- International Passive House Association. (2014). [Active for more comfort: Passive House](#).

Works cited in this guide

1 Environment and Climate Change Canada. (2019). Causes of climate change. Retrieved from: <https://www.canada.ca/en/environment-climate-change/services/climate-change/causes.html>

2 David Suzuki Foundation. What is Climate Change? Retrieved from: <https://david Suzuki.org/what-you-can-do/what-is-climate-change/>

3 Kakenmaster, B. (2018). What is Climate Resilience? Impakter Platform and Magazine. Retrieved from: <https://impakter.com/what-is-climate-resilience/>

4 Lavell, A., M. Oppenheimer, C. Diop, J. Hess, R. Lempert, J. Li, R. Muir-Wood, and S. Myeong. (2012). Climate change: new dimensions in disaster risk, exposure, vulnerability, and resilience. In: *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation* [Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley (eds.)]. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC). Cambridge University Press, Cambridge, UK, and New York, NY, USA, pp. 25-64. Retrieved from: https://www.ipcc.ch/site/assets/uploads/2018/03/SREX-Chap1_FINAL-1.pdf

5 Natural Resources Canada. (2020) What is adaptation? Retrieved from: <https://natural-resources.canada.ca/climate-change/climate-change-adaptation>

6 United Nations Framework Convention on Climate Change. What do adaptation to climate change and climate resilience mean? Retrieved from: <https://unfccc.int/topics/adaptation-and-resilience/the-big-picture/what-do-adaptation-to-climate-change-and-climate-resilience-mean>

7 Public Safety Canada. (2015). About Disaster Mitigation. Retrieved from: <https://www.publicsafety.gc.ca/cnt/mrgnc-mngmnt/dsstr-prvntn-mtgtn/bt-dsstr-mtgtn-en.aspx>

- 8 Greenblatt, A. (2013). Mississippi Blues: When the River Doesn't Run. National Public Radio. Retrieved from: <https://www.npr.org/2013/01/10/168950808/mississippi-blues-when-the-river-doesnt-run>
- 9 Gosnell, H., Charnley, S., and Stanley, P. (August 2020). Climate change mitigation as a co-benefit of regenerative ranching: insights from Australia and the United States. *Interface Focus*, Vol 10:20200027. Retrieved from: <https://doi.org/10.1098/rsfs.2020.0027>
- 10 Peters, A. (2019). Is it possible to raise a carbon-neutral cow? Retrieved from: <https://www.fastcompany.com/90368127/is-it-possible-to-raise-a-carbon-neutral-cow>
- 11 Thorbecke, M. and Dettling, J. (2019). Carbon footprint evaluation of regenerative grazing at White Oak Pastures: Results Presentation. Retrieved from: <https://blog.whiteoakpastures.com/hubfs/WOP-LCA-Quantis-2019.pdf>
- 12 Environment and Climate Change Canada. (2016). The Paris Agreement. Retrieved from: <https://www.canada.ca/en/environment-climate-change/services/climate-change/paris-agreement.html>
- 13 United Nations. The Paris Agreement – Frequently Asked Questions. Retrieved from: <https://www.un.org/sustainabledevelopment/blog/2016/09/the-paris-agreement-faqs/#:~:text=The%20Paris%20Agreement%20aims%20to,low%2Demission%2C%20climate%2Dresilient>
- 14 Plug 'n Drive. Electric Car Benefits. Retrieved from: <https://www.plugndrive.ca/electric-vehicle-benefits/>
- 15 Passive House Canada. Passive House Basics. Retrieved from: <https://www.passivehousecanada.com/passive-house-basics/>
- 16 Child, D. (April 2020). The positive impacts on the environment since the coronavirus lockdown began. *Evening Standard*, UK. Retrieved from: <https://www.standard.co.uk/news/world/positive-impact-environment-coronavirus-lockdown-a4404751.html>
- 17 Wang, Q, & Su, M. (August 2020). A preliminary assessment of the impact of COVID-19 on environment – A case study of China. *Science of the Total Environment*, Vol. 728:138915. Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7195154/>
- 18 Ministry of Ecology and Environment. (April 2020). Ministry of Ecology and Environment of China Report on the State of Surface Water and Ambient Air Quality Nationwide in March and January–March. Retrieved from: http://www.mee.gov.cn/xxgk2018/xxgk/xxgk15/202004/t20200414_774254.html
- 19 Child, D. (April, 2020). The positive impacts on the environment since the coronavirus lockdown began. *Evening Standard*, UK. Retrieved from: <https://www.standard.co.uk/news/world/positive-impact-environment-coronavirus-lockdown-a4404751.html>
- 20 European Environmental Agency. (November 2020). COVID-19 and Europe's environment: impacts of a global pandemic. Retrieved from: <https://www.eea.europa.eu/publications/covid-19-and-europe-s>
- 21 Le Quéré, C., Jackson, R.B., Jones, M.W. et al. (July 2020). Temporary reduction in daily global CO2 emissions during the COVID-19 forced confinement. *Nature Climate Change* (10)647-653. Retrieved from: <https://www.nature.com/articles/s41558-020-0797-x>
- 22 Shilling, F. and Waetjen, D. (April 2020). Special Report (Update): Impact of COVID19 Mitigation on Numbers and Costs of California Traffic Crashes. University of California, Davis. Retrieved from: https://roadecology.ucdavis.edu/sites/g/files/dgvnsk8611/files/files/COVID_CHIPs_Impacts_report2.pdf
- 23 Carpentier, G. (2016). There are no bugs on my windshield. *The Standard Newspaper*.







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