FROM VISION TO ACTION

Region of Durham
Community Climate Change
Local Action Plan 2012

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What is this document?

This document represents the results of a three-year process to develop a Community Climate Change Local Action Plan (LAP) for Durham. The Regional Municipality of Durham has led this process on behalf of the Durham community, under the direction of the Durham Region Roundtable on Climate Change (DRRCC). The Region of Durham is a member of the Federation of Canadian Municipalities' (FCM) Partners for Climate Protection (PCP) program, and with this report has completed milestone three of the five milestone PCP program—the production of a LAP on climate change.

The Region of Durham developed this plan in two phases. This document combines Phase 1 and Phase 2 into a Community LAP that was approved and recommended by the DRRCC and subsequently received by Regional Council on October 10, 2012.

That was the easy part. We must now move forward to further develop, approve and fully implement potential programs identified in this plan. Only then will the Region of Durham be achieving its vision of being a "carbon-neutral, sustainable, prosperous and resilient community with a high quality of life."

Terms and acronyms

Adaptation . . . . . the ability of a system to adjust to climate change to moderate potential damage

CO_2 . . . . . carbon dioxide

DPPG . . . . . .Durham Partners in Project Green

DRRCC . . . . . .Durham Region Roundtable on Climate Change

DSA . . . . . .Durham Sustain Ability

Durham Region/Region . . The Regional Municipality of Durham

Durham region/Durham . . .the geographic area

eCO_2 . . . . . .equivalent carbon dioxide

FCM . . . . . .Federation of Canadian Municipalities

FIT . . . . . .Ontario Power Authority's Feed-in-Tariff program

GHG. . . . . greenhouse gas

GJ . . . . . .gigajoules

IPCC. . . . . Intergovernmental Panel on Climate Change

ICI . . . . . .industrial, commercial and institutional (sectors of the economy)

LAP. . . . . .Local Action Plan

MW . . . . . .megawatt

Mitigation. . . . . .actions to decrease the emissions that cause climate change

OPA . . . . . .Ontario Power Authority

ppm . . . . . .parts per million

PCP . . . . . .Partners for Climate Protection

UOIT . . . . . .University of Ontario Institute of Technology

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Message from the Regional Chair and Chief Executive Officer

Municipalities around the world are being affected by extreme weather and other challenges resulting from climate change. As providers of infrastructure, drinking water, emergency services, snow ploughing and other community services, our facilities, operations and budgets are directly affected by these shifting patterns.

Durham recognized that it needed a plan to mitigate and adapt to the effects of climate change and extreme weather on our region. To this end, in 2009 The Regional Council of Durham established the Durham Region Roundtable on Climate Change (DRRCC) with direction "to position the Region of Durham as a leader in addressing climate change issues by preparing and recommending a comprehensive strategy with detailed actions that can be undertaken across the region to address climate change." The roles of DRRCC include education about climate change, input to policy development, setting goals, overseeing a corporate response, undertaking outreach and advocacy, creating a community plan and working collaboratively with area municipalities.

Over the past three years, the DRRCC has co-ordinated a process and consulted widely to create a practical, community-supported, citizen-driven action plan that is presented in this document. The DRRCC worked hard to advance a plan that is community-focused, and builds on activities and efforts being undertaken by area municipalities and other community partners.

The best way to tackle climate change is together. This plan recognizes that local residents, businesses, institutions and municipalities all have a role to play as we "think globally and act locally" to protect our environment and quality of life.

Yours truly,

Roger Anderson
Regional Chair and
Chief Executive Officer

Message from the Chair of the Durham Region Roundtable on Climate Change

Thinking globally means that we must be aware of the worldwide changes in climate that are underway, and their direct and indirect impacts on Durham. In 2009, Regional Council unanimously adopted the position that:

"Scientific evidence overwhelmingly supports the conclusion that human activities are fundamentally altering the conditions for life on earth. Climate change and associated global warming is recognized as a severe threat to global systems with the potential for catastrophic outcomes." [Joint Committee Report 2009-J-37]

Regional Council subsequently adopted as our targets the deep cuts in greenhouse gas emissions that the scientific community tells us are necessary to avoid runaway climate change.

Acting locally means that intellectual awareness and agreement are not enough. We all must act and lead. While local governments can influence greenhouse gas (GHG) emissions, we need the commitment and contribution of all residents and businesses to achieve our DRRCC vision.

Our children will thank us.

Don Mitchell

Regional Councillor
Chair of the Durham Region
Roundtable on Climate Change

The need for community action on climate change

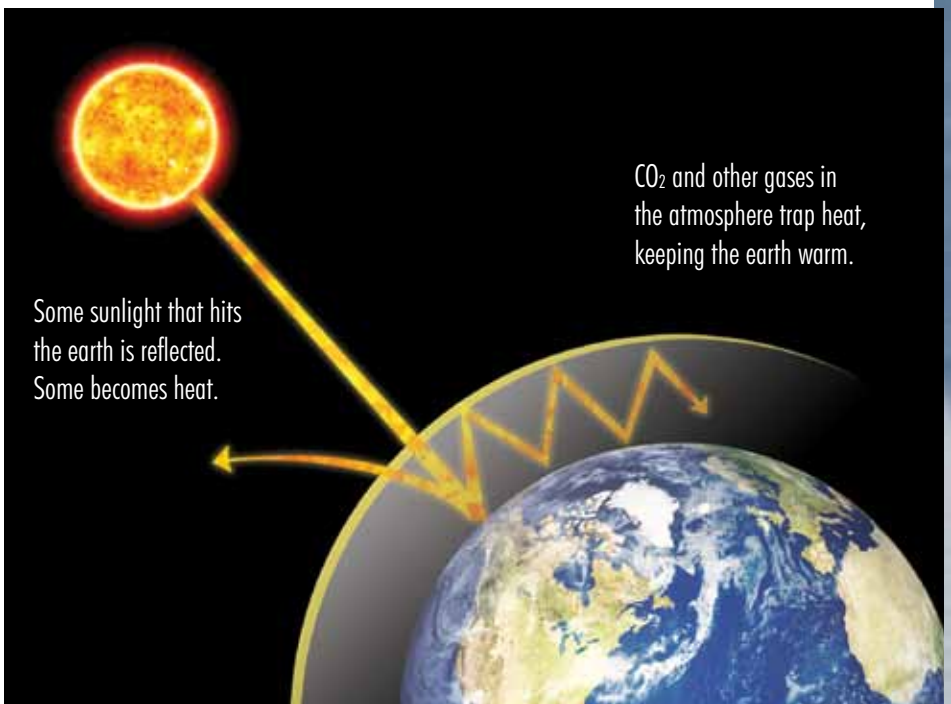
The climate is changing

Weather records confirm that temperatures around the world, and here in Durham, are getting warmer. Scientific sources state that the average global temperature has risen almost 1°C over the last 50 years, and in Canada it has risen 1.5°C over the last 64 years, with 2010 being 3°C above normal (source: Environment Canada).

While that may not seem like a big change given the daily and seasonal variations in weather, it is quite a significant change in average temperature. Along with the increase in temperatures, we have seen changes in precipitation, extreme weather, and more frequent and severe storms. According to the Intergovernmental Panel on Climate Change (IPCC), climate change is predicted to accelerate due to the increasing concentration of greenhouse gases (GHGs) in the atmosphere. Many scientists predict an average global temperature increase of 5 to 6°C in this century, which could cause significant damage to our environment, economy and society. The scientific community has established a goal of limiting global average temperature rise to no more than 2°C, in order to prevent the worst effects of climate change. Appendix C contains a summary of climate science and the recommendations of the IPCC that was endorsed by Durham Region Council on Sept. 23, 2009.

What is causing climate change?

The greatest contributor to human-caused climate change is carbon dioxide created by the burning of fossil fuels: coal, oil and natural gas (source: Intergovernmental Panel on Climate Change Fourth Assessment Report). Currently fossil fuels constitute about 85% of energy supply worldwide (source: United States Energy Information Administration). Other gases, such as methane, water vapour, ozone, nitrous oxide and chlorofluorocarbons, and other sources such as forest fires, deforestation, agricultural and industrial practices also contribute to the increase of GHGs in the atmosphere. These gases trap heat in the atmosphere through the Greenhouse Effect.



The Greenhouse Effect

What are the implications?

Most among us have enjoyed the recent mild winters in Durham. Unfortunately, we don't get to choose among the implications of climate change. It's a package deal. Together with the mild winters, we will have hotter, drier summers, droughts, extreme storms, more smog days, health impacts, and all manner of economic, environmental and social threats caused directly or indirectly by the global changes triggered by a warming climate. Many experts consider climate change the greatest threat to human society in the 21st century—and solving it the greatest economic opportunity of the century (The Stern Report).

What can be done?

Federally, provincially and locally, we have to reduce our GHG emissions by improving energy efficiency and conservation measures, and investing in alternative forms of energy. Other measures such as reforming agricultural and land-use practices, increasing forestation to capture carbon and reinventing industrial processes are also important. There are economic instruments, such as carbon charges and cap-and-trade programs that could be implemented to promote the decisions and behaviours necessary. In order to limit global average temperature increases to less than 2°C, global GHG emissions must be reduced by about 80% by 2050 (source: IPCC). This is the long-term target adopted by the Region of Durham.

What is the municipal role?

Cities, towns and regions in Canada have the jurisdiction to directly or indirectly influence activities accounting for 44% of GHG emissions in Canada, according to a study by the Federation of Canadian Municipalities (FCM). This includes management of their own activities that produce GHGs (energy consumption, waste management, etc.) plus policy direction; influence and funding over issues like public transit, roads, urban design, economic development and building design; and other factors that determine energy consumption and GHG emissions in the community. Cities around the world, such as London, Chicago, Boston and Portland have been among the leaders in climate protection and Vancouver and Toronto here in Canada have also been very dedicated. Departments in The Regional Municipality of Durham have embedded climate considerations in their business planning cycle.

What is the community role?

Of all the GHG emissions from Durham region, only four per cent come directly from The Regional Municipality of Durham (Regional facilities, bus and vehicle fleets, water and sewage treatment, traffic signals and landfill emissions). As shown in Figure 1, the other 96% of emissions result from the community (transportation, homes, industries, businesses and institutional buildings). In addition to managing its own GHG emissions, The Regional Municipality of Durham, through Council direction, is taking a leadership role in community action for climate protection.

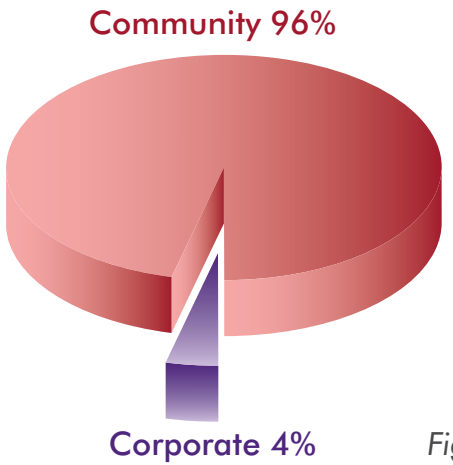
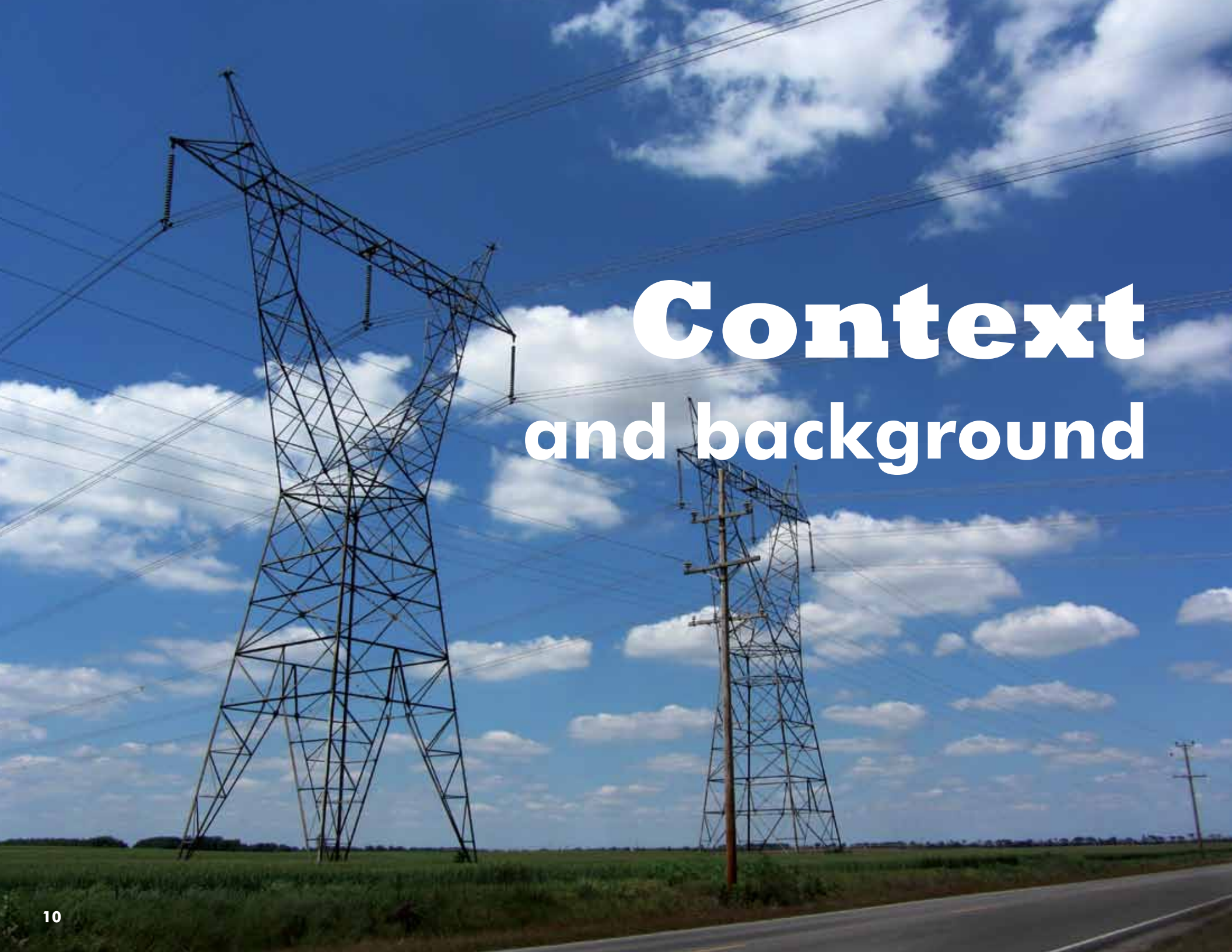


Figure 1: GHG Emissions

Why should the Durham community act?

By positioning Durham as a leader in tackling climate change, we have the opportunity to influence other municipalities to do the same. The implementation of the potential programs in this report would also increase economic activity, create new businesses and enhance our quality of life in the region. It is important to have collaboration with, and collective and co-ordinated effort by the community and government.

Durham aims to be a contributor to reducing global climate change. We urge our federal, provincial and municipal partners, who also have key roles to play, to follow our example.



Context
and background

What are Durham's GHG emissions?

In 2009, the Region of Durham commissioned an inventory of community GHG emissions, which estimated emissions for four years (2005 to 2008) and projected emissions to 2020, based on a business-as-usual (BAU) scenario (refer to Figure 2). The year 2007 was selected as the base year for setting targets and measuring progress because it was relatively representative in terms of economic activity. The energy costs for this period are on average $1.3 billion per year, and could be as high as $1.8 billion in a BAU scenario.

Where do the emissions come from?

Most of the GHG emissions in Durham result directly from energy consumption (e.g. natural gas, gasoline and diesel) or indirectly through the generation of electricity. A small portion of local GHG emissions come from methane released by landfill sites and from sewage treatment. Other minor sources of GHGs in Durham come from agricultural and industrial sources. The sources of energy consumption are shown in Figure 3. The sources of GHG emissions by sector are shown in Figure 4, and by source in Figure 5.

Figure 2: Summary of energy consumption and eCO_2 emissions

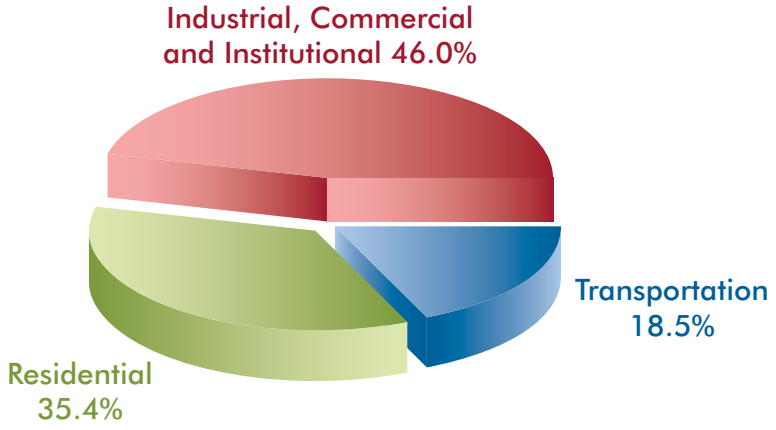


Figure 3: 2007 Energy consumption by source

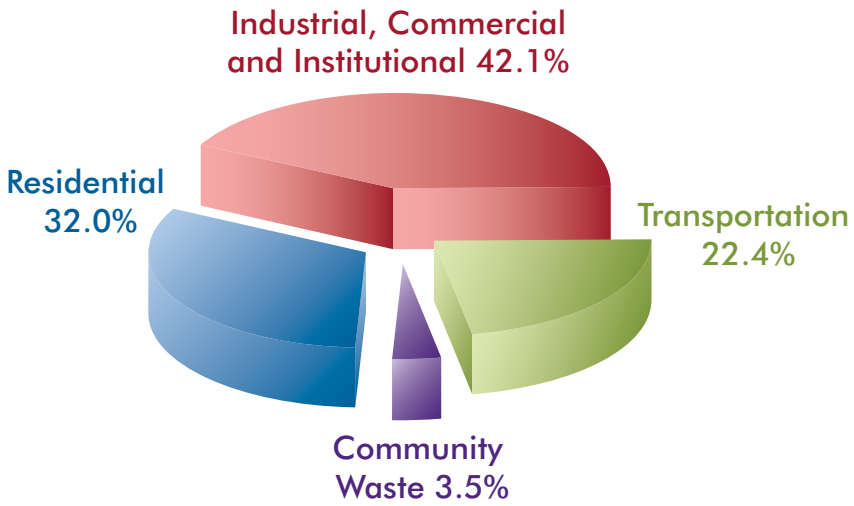


Figure 4: 2007 eCO_2 emissions by sector

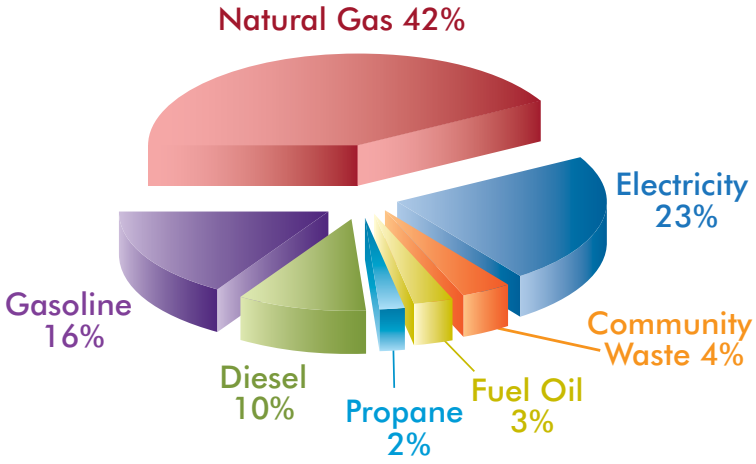


Figure 4: 2007 eCO_2 emissions by source

How can emissions be reduced?

We can reduce emissions by:

- Substituting non-carbon forms of energy (renewable energy and nuclear) for fossil fuels.
- Reducing energy consumption through energy conservation and efficiency.

Possible energy strategies include:

- Stimulating the retrofit of buildings and processes to conserve energy.
- Promoting energy-efficient, new construction of buildings.
- Promoting energy-efficient modes of transportation together with energy-efficient and alternative fuel vehicles.
- Promoting and installing renewable forms of energy generation.
- Designing our communities to reduce energy consumption and increasingly using community energy systems.

Possible non-energy strategies include:

- Reducing emissions from solid waste through further diversion and alternative treatment of residual waste (including energy from waste).
- Planting trees and reforming agricultural practices to sequester carbon.
- Increasing local food production and use.

What has been the process to produce a LAP?

The Durham Region Roundtable on Climate Change (DRRCC)

The DRRCC was established in 2008 as a committee of Durham Region Council with the goal:

> *"To position the Region of Durham as a leader in addressing climate change issues by preparing and recommending a comprehensive strategy with detailed actions that can be undertaken across the region to address climate change."*

The DRRCC is composed of the Regional Chair and Chief Executive Officer, the Chief Administrative Officer, four Regional Councillors and a number of community representatives (refer to Appendix A).

The DRRCC began work in 2009, and its early efforts focused on the establishment of a vision, mission and targets.

Vision

> *"Durham Region is a carbon-neutral, sustainable, prosperous and resilient community with a high quality of life"*

This vision statement establishes carbon neutrality as an aggressive, long-term goal (meaning that all GHG emissions generated directly or indirectly by Durham less those sequestered in forests, stored or offset in other ways sum to zero). This goal is balanced by the simultaneous objectives of making Durham region sustainable (environmentally, economically and socially), prosperous (implying a diversified and high-performance economy), resilient to future pressures and shocks (both climate-related and otherwise) while maintaining a high quality of life for its residents.

Mission

"To work with our community to develop and advocate innovative policies, strategies and actions that address the threat of climate change."

The implication in this mission is that the Durham community (not just Regional government) should develop, promote and deliver, through partnerships, a set of strategic and high-leverage interventions and programs that will have significant impact on both mitigation (reducing our GHG emissions) and adaptation to the effects of climate change.

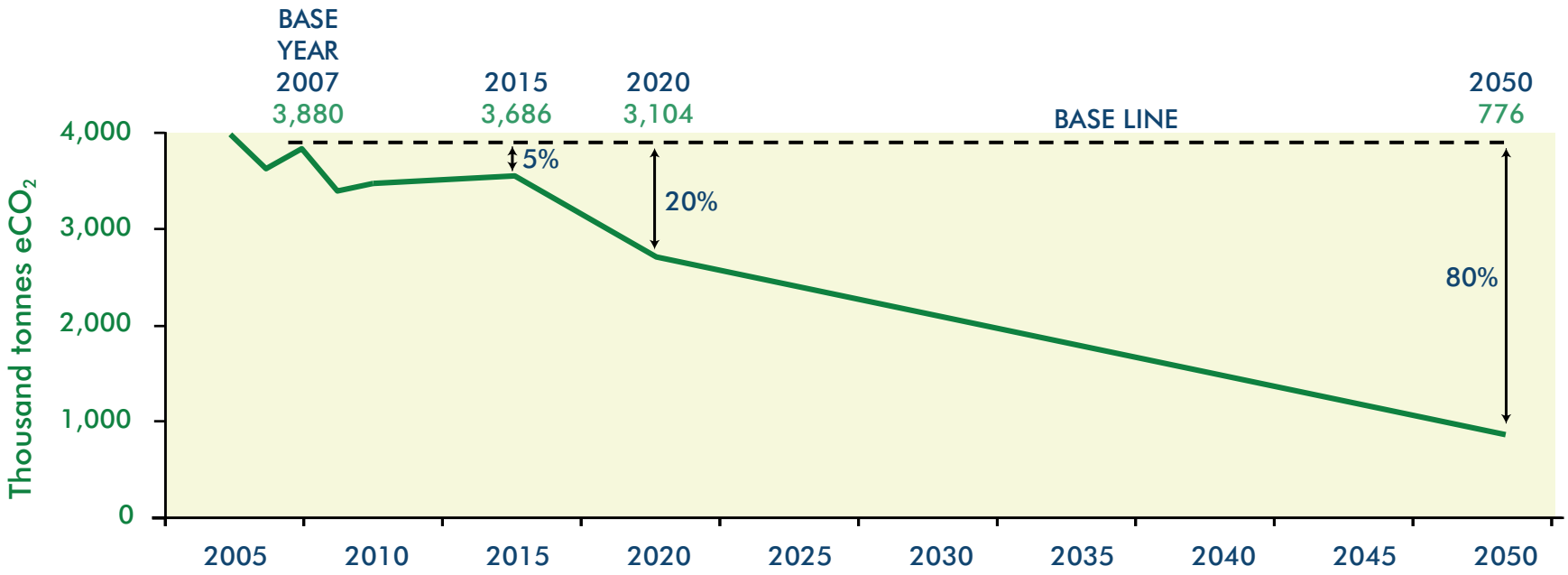
Targets

(Adopted by Regional Council on June 2, 2010)

- ***5% reduction by 2015***
- ***20% reduction by 2020***
- ***80% reduction by 2050***

These are absolute targets (not intensity-based targets) and are measured against 2007 baseline emissions. These targets are consistent with the levels of GHG emission reduction that the international scientific community (through the Intergovernmental Panel on Climate Change) maintains are necessary to limit global warming to 2°C and prevent catastrophic climate change. For Durham, they are milestones on the path to carbon neutrality.

Figure 5: Current projections and future targets

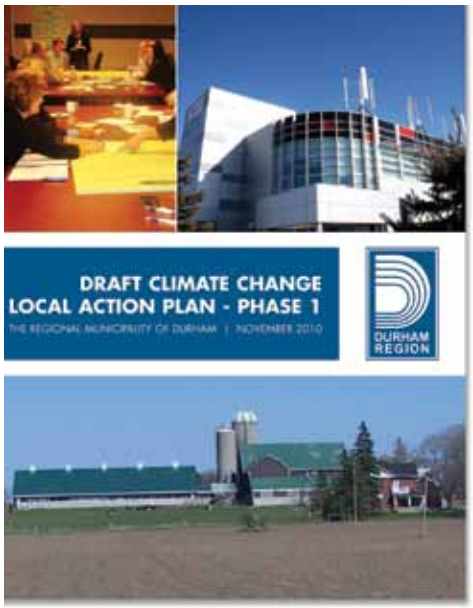


Local Action Plan - Phase 1

During summer 2010, community stakeholders were engaged in a consultation process, which endorsed the vision, targets and identified themes, sectors, goals and objectives. Contributors to Phase 1 are listed in Appendix B.

The Climate Change Local Action Plan – Phase 1 was adopted by Regional Council on March 9, 2011, and is available at:

http://www.durham.ca/community/climate_change/reports/DurhamLAP.pdf



Local Action Plan - Phase 2

The focus in Phase 2 during summer 2011 was on potential programs for implementation to achieve the vision and targets. Contributors to Phase 2 are listed in Appendix B.

The Progress Report on Phase 2 (as of July 29, 2011) is available on the Region of Durham website at:

http://www.durham.ca/community/climate_change/reports/DurhamLAP2.pdf

The Draft LAP was reviewed by Phase 1 and 2 stakeholders during summer 2012 for accuracy, completeness and community appeal. Relevant comments received were incorporated into this version of the LAP.

The timeline for Phase 1, Phase 2 and future program approvals is represented in Figure 6: Process diagram for Region of Durham Community Climate Change Local Action Plan.

Potential programs

Introduction

This set of potential programs represents initiatives identified and endorsed by stakeholders and community representatives across the region. Together, these 18 potential programs constitute a Climate Change Local Action Plan (LAP) that can be characterized as:

- Ambitious
- Strategic
- High-leverage
- Effective in reducing GHG emissions
- Attractive to the Durham community by producing environmental, economic and social co-benefits

It is important to recognize that each program within the plan will require subsequent development and individual approval by Regional Council before being implemented in the years ahead. Not all of these potential programs will necessarily be approved and launched.

The 18 programs presented here are organized by the six themes identified in Phase 1 of the LAP, with the addition of a seventh general theme.

Built environment theme

Goal:

Support a sustainable built environment in ways that reduce GHG emissions through design, technology, education and stewardship.

Objectives:

- Facilitate implementation of compact urban form and, by extension, sustainable transportation through methods and approaches such as policy development, increased density, infill development, brownfield development and urban design.
- Encourage sustainable building technologies in new projects and retrofits.
- Engage and educate the community on the benefits of sustainable built environment.

Current building programs:

- Regional Revitalization Program

Potential programs:

BE1: Durham Partners in Project Green (DPPG)

DURHAM Partners in Project Green
DURHAM ECO-BUSINESS PROGRAM

Develop a Durham version of Partners in Project Green (PPG) for the industrial and commercial business community in Durham. This program will initially offer:

- Referral services to utility energy efficiency assessments and financial incentives.
- Procurement assistance (e.g. the Green Purchasing Alliance).
- Training courses.
- Networking opportunities.
- Access to PPG database and case studies.

The emphasis with local companies will begin on energy efficiency, and DPPG will make a significant contribution to lower GHG emissions and increase business profitability. Over time, the menu of available services may expand to cover other PPG services such as water efficiency,

transportation (goods and employees), solid waste reduction, by-product synergies, renewable energy production, green procurement, green parking lots and district energy facilities. The program will be supported by local electrical and gas utilities, municipal governments and business associations, and will be managed and delivered by a local community organization, Durham Sustain Ability (DSA).

This program was launched in April 2012.

BE2: Comprehensive Residential Retrofit

Develop a comprehensive residential energy retrofit program for Durham involving four key elements of:

- Energy audit and investment plan covering a wide range of building envelope, heating, ventilation and air conditioning, appliance, lighting, water heating and renewable energy retrofits.
- Financing plan combining any remaining federal/provincial grant programs together with long-term, low-interest loans designed to produce positive cash flow from the outset (thus eliminating the barrier of a payback period).
- Assistance with contractor selection criteria and project management (thus reducing the complexity factor).
- A home energy label to identify residences that have been significantly retrofitted and their new utility costs (to assist in the eventual resale of the home).

Such a comprehensive program would overcome most of the barriers inhibiting extensive energy retrofitting of residential buildings in Durham, and result in major energy and GHG savings. For this voluntary program to be successful, extensive homeowner education and engagement must take place. Homeowners who are informed about the measurable benefits of the program will be much more likely to participate.

BE3: Green Affordable Housing

In partnership with the Region of Durham Social Services Department's Housing Services Division and other stakeholders, develop a customized and targeted program for the retrofit of the Region's approximately 6,300 social housing units. While this program may be similar to, or a subset of, the Comprehensive Residential Retrofit program, the ownership, financing, rental and utility bill arrangements for these social housing units are complex and highly varied, and will likely require special approaches to address the energy conservation potential that they represent. Once retrofitted, these buildings will have lower operating and maintenance costs, more stable utility costs and higher levels of indoor environmental quality than previously.

BE4: Durham Green Building Guideline

Develop and adopt a Durham Green Building Guideline for all new construction in Durham (both residential and ICI), which promotes a higher level of energy efficiency for new buildings than the current Ontario Building Code and increases that standard over time.

Municipalities have no authority to set and enforce building codes, therefore this program will be voluntary for developers and builders. It will rely on marketing mechanisms to promote energy efficient, new buildings in Durham. An example of such a program is the City of Toronto's "Green Standard."

This program could encourage a significant portion of new building stock in Durham to move towards the goal of energy neutrality,

and significantly reduce carbon emissions and other impacts on the environment. It has been demonstrated that the incremental

costs of such upgrades have proven to be modest and to pay for themselves in a few years, given current and projected energy costs. The marketing mechanisms for the residential sector might include "Durham Eco-Home" designation and label, which is promoted to new home buyers and applied to all qualifying new homes.

The program should be created in collaboration with progressive developers and builders because those who have had the opportunity to shape the program will be much more willing to support it and actively participate.

Energy theme

Goal:

Reduce GHG emissions to sustainable levels through judicious production, generation, transmission, delivery and use of energy.

Objectives:

- Replace the need for energy consumption through smart design and planning.
- Encourage, support and promote energy conservation in a sustainable manner.
- Maximize local, renewable and low GHG emission energy generation sources to promote resiliency, security and self sufficiency.

Potential programs:

E1: Smart Grid Initiative

Create a Durham Smart Grid Initiative to develop and demonstrate the key components of smart grid technology, namely:

- Integration of dispersed local sources of renewable and low-GHG generation.
- Improved end-use management of electrical loads through information technology.
- Optimized scheduling of sources, end-uses and storage.
- Integration of electric vehicles (EV) and charging systems.

Durham has the potential to become the smart grid and EV leader in Ontario, thus reducing GHG emissions and stimulating economic development in the community.

E2: Offshore Wind Power Generation

Create an offshore wind farm in Lake Ontario with the capacity to generate 100 megawatt (MW) of electricity (50 x 2 MW wind turbines),

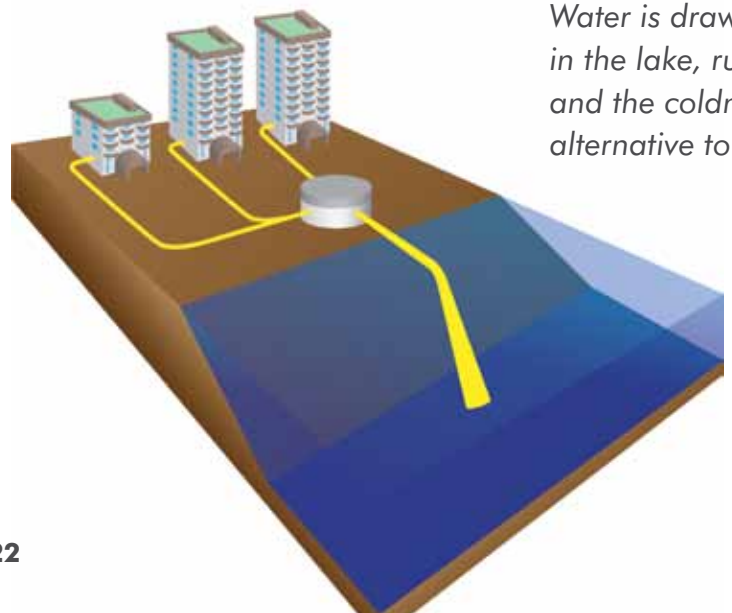
funded through private partnerships. This action has the potential to be supported by the Ontario Power Authority's (OPA) Feed-in Tariff (FIT) program, and to position Durham as the staging area (harbour) for a future offshore wind industry. This initial wind farm would be located at least five kilometres offshore of Durham.

While this concept was created in the context of wind energy, the strategy could be expanded to consider other forms of renewable energy, such as solar, and could be adapted to include on-shore energy projects (where appropriate).

Pond biofuels project, St Marys Cement

E3: Durham Mini-Deep Lake Water Cooling

GHG emissions could be reduced through creative use of local resources such as cold water from Lake Ontario. Deep lake water cooling is a system that uses cold lake water to air condition commercial or industrial buildings. In Toronto, the Enwave system works by drawing cold water (4°C) from five kilometres off the shore of Lake Ontario and from a depth of 83 metres. This cold water is transferred to the City's pumping station; there, heat exchangers facilitate the energy transfer between the cold lake water and the Enwave closed chilled water supply loop. The water that is drawn from the lake is used for the regular water supply. The cool aspect of the lake water, not the actual water, provides the alternative to conventional air conditioning (source: City of Toronto, 2011). Smaller-scale versions of this initiative could reduce the electricity use (and GHG emissions) by the commercial and industrial sectors within the Durham community, in locations where there is, or will be, sufficient building density and cooling load.Feasibility studies would be needed to establish potential sites for further investigation.



Water is drawn from deep in the lake, run through a heat exchanger and the coldness of the water provides an alternative to conventional air-conditioning.

E4: Durham Biofuels Program

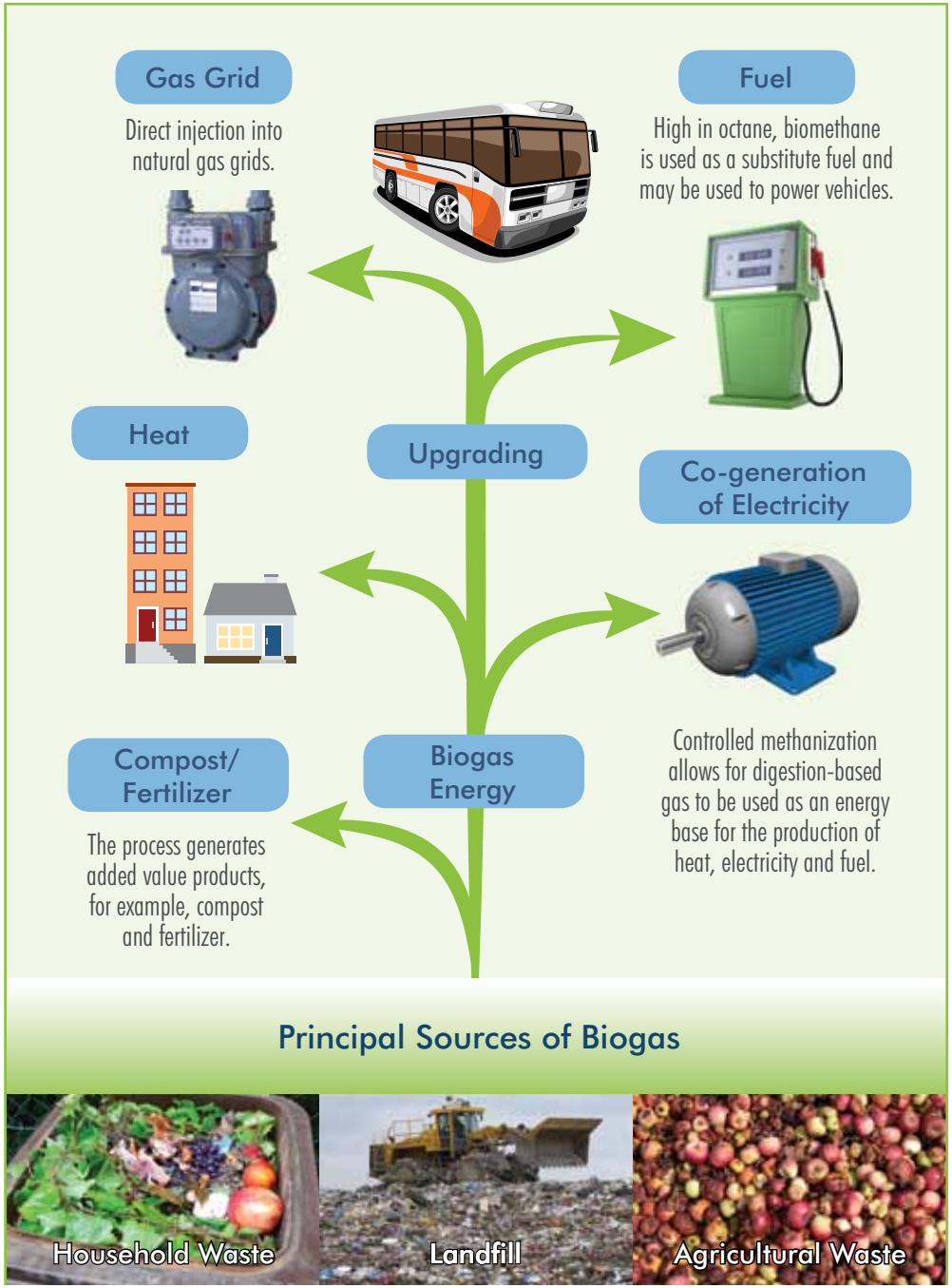
Create a program to encourage businesses to develop industry clusters for the refining of second-generation ethanol and bio-diesel fuels (and biochemical feedstocks and byproducts). The bio-fuels would be fed into the gasoline and diesel fuel supply systems in Durham and Ontario to displace gasoline and diesel fuel, and thereby reduce net GHG emissions.

The program might also encompass the possibility of algae-based bio-fuel production on farms or in industrial and aquatic environments.

A life cycle analysis would be completed to ensure sustainability and avoid impact on the food supply.

E5: Bio-methane Production and Use

Bio-methane can be generated from a variety of sources which are plentiful in Durham: landfill gas, green bin waste, sewage and agricultural waste. Methane gas can be generated from these sources using anaerobic digesters and then used for co-generation of electricity and heat, burned directly for heat, or upgraded for use as a fuel for heavy vehicles and injected into the natural gas distribution system for use as "green gas" (by displacement) at various end-use sites. Simply burning methane which would otherwise escape to the atmosphere, is a major contribution to GHG reduction, but converting organic waste into bio-methane can also deal with a waste-disposal problem and produce a useful carbon-neutral fuel.



Food system theme

Goal:

To support a sustainable food system in ways that reduce GHG emissions and increase food supply.

Objectives:

- Prioritize and support food system practices that improve water consumption, delivery and recapture, reduce GHG emissions, improve energy efficiencies and increase carbon sequestration.
- Provide education about the relationship between GHG emissions, and food choice and consumption.
- Implement key objectives of the food charter by increasing community access to local food, and facilitating the participation of distributors and retailers.

Current local food programs:

Currently the Region of Durham or its partners co-ordinate the following programs to support the food sector:

- Durham Farm Fresh - A program to promote local purchase of Durham farm produce.
- Savour the Season - A promotional program supporting restaurants featuring local produce.
- Durham Farm Connections - An educational program focused on school curriculum.
- Weekly outdoor farmers' markets in various locations.
- Durham Food Charter - A community strategic plan for food security in Durham.

Potential programs:

FS1: Local Food Hub

Develop a Local Food Hub that will serve local farmers, restaurants and consumers in Durham and Toronto. The local food hub would initially offer:

- A permanent, year-round, indoor market space where farmers can store/sell their produce and meats (wholesale or retail).
- A processing facility with public-health inspected kitchens for canning and other value-added food preparation.
- Services such as education, community outreach and marketing.

The Local Food Hub would give small farmers a chance to channel their produce and meats into new markets by combining their crops and connecting them with larger purchasers. Thus, it will save farmers time and money by allowing them to move beyond direct sales. This is also an opportunity to use and implement the Durham Food Charter.

The Local Food Hub should also be used as the co-ordination and administrative centre for other local food initiatives including, but not limited to: Urban Agriculture Programs, backyard composting and education on local food initiatives.

FS2: Urban Agriculture Program

Develop a thriving urban agriculture community within Durham with an emphasis on garden plots, community gardens, backyard gardening, sustainable agriculture, education and community engagement. The Urban Agriculture Program would initially offer:

- Educational farming fields located onsite at partner elementary schools, secondary schools, community centres, other community institutions and interested residents' backyards.
- Urban farming internships, workshops and volunteer opportunities.
- A local compost program.
- The opportunity to buy shares in the harvest.
- Harvest Festivals, Open Farm Days and other opportunities for broad community engagement.

The Urban Agriculture Program would also increase the carbon sequestration capacity of Durham's built environment, reduce food miles and implement key provisions of the Food Charter.

FS3: Farm Friendly Regulations

Develop a clear, concise, one-window document containing a set of guidelines that bring together existing pieces of legislation, regulation and policy that affect farmers. The initiative could also propose new measures to streamline the process for farmers to continue their current practices and expand their business by staying on the land and passing family farms onto the next generation. Such an initiative could strengthen the agricultural sector in Durham and contribute to increased crop production, with resulting climate and financial benefits. This program would work in co-operation with the Golden Horseshoe Agriculture and Agri-Food Strategy Action Plan and the Region of Durham's Planning and Economic Development Department in facilitating growth in the agricultural sector.

Natural systems and resources theme

Goal:

Protect, enhance, conserve and/or manage natural resources in ways that reduce GHG emissions and promote wise use of resources.

Objectives:

- Increase local net carbon sequestration capacity in natural and built environment by creating, restoring and remediating degraded natural and built environments.
- Promote local and sustainable use and reuse of indigenous natural resources.
- Promote source water protection, conservation and reuse.

Current initiatives:

- Region of Durham staff actively participate on several source water protection committees.

Potential program:

NS1: Durham Five Million Trees

Create a made-in-Durham version of Million Trees New York City through a variety of public-private partnerships throughout the community. The goal of the program is to plant five million trees (increased from the original one million) throughout the Durham community over a period of 10 years, in an effort to reforest parkland as well as residential and commercial areas, open spaces, marginal land and streetscapes, which can sequester CO_2 and contribute to the greenhouse gas emissions target of 80% reduction by 2050. Tree planting will also assist in adaptation efforts by providing a cooling effect.

Currently, Trees Ontario is committed to planting 50 million trees in Ontario by 2020, a program which itself will result in planting an estimated 1.75 million trees in Durham. Therefore, the target for Durham has been increased to plant and maintain an additional five million trees in Durham over a 10-year period from 2013 to 2022 (as a possible timeline) or, 0.5 million trees per year on average. Many of these trees will be planted and maintained through partnerships with provincial agencies, local conservation authorities, municipal governments, local volunteer organizations and service clubs. Care will need to be taken to select species that are hardy and adapted to our changing climate.

Transportation theme

Goal:

Reduce GHG emissions from transportation in Durham region.

Objectives:

- Promote low-GHG emission transportation options that are appealing to the public.
- Improve/increase the frequency and integration of public transit services.
- Promote the adoption of innovative and intermodal transportation technologies, best practices and policies.

Current transportation initiatives:

Currently the following programs, plans and proposals are underway by Regional and provincial agencies:

- Smart Commute Durham
- GO Train extension from Oshawa through to Bowmanville.
- Highway 407 extension and possible transit corridor/ transitway stations
- Durham Rapid Transit
- Regional Cycling Plan
- Transportation Master Plan

Potential program:

T1: Active Transportation and Transit

Build upon various existing initiatives aimed at developing a connected and balanced mobility system for all modes of transportation – walking, cycling, transit and commercial/ private automobiles, with a priority on active transportation.

The program could consist of the following elements:

- Community planning and design guidelines that promote transit use, cycling and walking.
- Outreach to residents and other stakeholders.
- Advocacy at inter-municipal and provincial level to encourage additional links between Regional transit system, and GO bus/train and VIA Rail systems.

Benefits from the program would include:

- Reduced single-occupancy vehicle trips.
- Increased mobility choices, including accessible transit systems, walking and cycling, especially for those that cannot, or choose not, to drive (such as youth and seniors).
- Healthier lifestyle by making it easier to walk, bike or take transit.
- Increased transit ridership.
- Improved air quality due to lessening of traffic congestion.
- Alternative transportation options for residents and an increase in active transportation.

Waste theme

Goal:

Support a sustainable integrated waste-management system that reduces GHG emissions through prevention, reduction, reuse, recycling, recovering and disposal.

Objectives:

- Encourage prevention through support of extended producer responsibility.
- Expand and improve recycling and recovery opportunities.
- Promote the reuse of materials through programs and partnerships.
- Improve and enhance waste-management systems.

Current waste management program:

Durham Region is currently achieving a high rate of diversion from landfill (53% in 2011) due to the following programs:

- Blue Box recycling
- Green Bin composting program
- Waste-management education

Plans have now been approved for an Energy from Waste facility in Clarington that would burn much of our residual waste to produce electricity and heat, and thereby divert this waste from landfill.

Potential program:

W1: Durham Freecycle Program

Expand opportunities for reusing and recycling products/materials through a three-pronged approach:

- Expand present programs:
  - The Regional Municipality of Durham already has programs to deal with electronic waste, household hazardous waste and tires.
  - The Regional Municipality of Durham could engage more businesses to be drop-off locations, and advertise the programs more thoroughly.
- Freecycle days and freecycle centres:
  - Residents could leave their unwanted items on the curb on freecycle days, which could be the first Saturday of every month (or alternate timing).
  - If nobody takes their items from the curb, the residents must drop their items off at conveniently located freecycle centres (could be located in recycling centres, schools and community centres, for example).
- Freecycle online:
  - User-friendly website/database that co-ordinates those who wish to dispose of items with those who wish to reuse, and connects everyone with repair services.
  - Also gives do-it-yourself ideas for repairing or reusing something you were going to throw out.
  - This would be similar to online trading sites, only with an educational component and is Durham-centric.

The climate rationale for such a program rests on the objectives of keeping materials (especially materials that can decompose) out of landfill and on reducing energy consumption of manufacturing new products (mostly outside of Durham) by replacing their purchase with reused products.

General theme

This General theme was not identified in the Phase 1 process but is created here to cover three general programs.

Potential programs:

G1: Durham Green Procurement Guide

Representatives from the Region, area municipalities and the ICI sector could draft and adopt green procurement criteria for the community that:

- Eliminate excess packaging
- Specify materials that can be composted or reused/recycled
- Source food locally
- Source other products locally, where possible
- Increase the amount of post-consumer material
- Identify the most energy-efficient option
- Consider product life cycle and promote the lowest GHG option

This initiative would promote the voluntary purchase of green products and services but avoid any implication of preferred supplier lists. It could also leverage the DPPG program by increasing the local market for green products and services, and sharing best practices for green purchasing.

G2: Community Climate Fund

Create a community fund that disburses small amounts of funding for climate and environmental initiatives. For example, the fund could be valued at $100,000 annually and distributed in sums ranging from $1,000 to $5,000 per project. Groups would apply quarterly and be judged according to a set of criteria (including leverage on Regional contributions, creativity, replicability, links to the LAP, etc.). Successful projects would be publicized and shared with the community through an appropriate website.

G3: Climate Education Program

In order to improve the receptivity, market penetration and ultimate success for the other proposed climate programs, The Regional Municipality of Durham, together with community partners such as local school boards,

Durham College, University of Ontario Institute of Technology (UOIT), municipal governments, service clubs, energy utilities and others could design and deliver a co-ordinated climate education program to various target groups in Durham. This program should initially deal with climate science, climate impacts and mitigation actions but should, over time, also cover climate adaptation measures. It could, for example, include a web-based self-assessment tool for residents to calculate their carbon footprint and identify possible next steps in reducing their personal GHG emissions.

Impacts
and co-benefits

Analysis identifies impacts and co-benefits

The Durham Community Climate Change LAP at this time consists of:

- A vision
- A mission
- A set of targets
- Six themes, each with a goal and a set of objectives
- 18 potential programs (of which one has been approved to date)

To assess the projected impacts and implications of the LAP, each of the 18 potential programs should be analyzed and the assumption made that they are developed, approved and fully implemented over reasonable time periods (in most cases over a 10-year time frame from 2013 to 2022). To undertake quantitative analysis of program impacts, there has to be reasonable and detailed assumptions concerning factors such as participation rates, equipment and material costs, labour costs, energy production and savings, energy rates, financing costs, etc.

Preliminary assessment of the impacts and co-benefits of the potential programs has been undertaken and is presented in a qualitative manner in Table 1: Estimated Impacts of the Community Climate Change Local Action Plan.

Based on the analysis to date, it appears that four of the potential programs offer the greatest contribution to GHG reductions and to economic and social co-benefits. These programs are:

- BE1: Durham Partners in Project Green
- BE2: Comprehensive Residential Retrofit
- BE4: Durham Green Building Guideline
- E4: Durham Biofuels Program.

Further work will extend these preliminary analysis results as programs are developed for individual approval.

Types of impacts

A. Environmental impacts

The set of 18 potential programs are designed variously to:

- Directly or indirectly reduce energy consumption and thus GHG emissions associated with the production and use of that energy.
- Produce renewable energy that will displace fossil fuels from current uses.
- Sequester carbon dioxide by removing it from the atmosphere.

Where possible, quantitative estimates were made of the expected reductions in GHG emissions resulting from each program in the target year of 2020. However, some programs are very difficult to quantify and can best be characterized qualitatively as a positive contribution (or otherwise) to GHG reduction. The relative magnitude of the GHG reductions is presented in Table 1 by down arrows (↓).

To date, the analysis indicates that implementation of the potential programs in the LAP can achieve the 2020 target of a 20% reduction in GHG emissions from Durham region.

Beyond GHG emission reductions, there are a number of other environmental co-benefits which result from various programs to address climate change. These impacts are more local in nature and include:

- Reductions in local air pollutants like carbon monoxide, particulates, sulphur oxides, nitrogen oxides, methane, mercury and other chemicals that are produced when fossil fuels are burned.
- Increases in vegetation cover resulting from tree planting and agricultural programs, which in turn improve biodiversity, aesthetics and reduce summer heating.

The value of these environmental impacts has been assessed qualitatively and is represented by a plus sign (+) in Table 1.

Reducing GHG emissions in Durham can also result in improved local air quality and a “greener”, cooler local landscape.

TABLE 1 - ESTIMATED IMPACTS OF THE COMMUNITY CLIMATE CHANGE LOCAL ACTION PLAN

Potential programs		Environmental			Economic		Social		
		GHG emissions	Local air quality	Vegetation cover	Capital investment in Durham	Value added to Durham economy	Employment	Household & business utility savings	Health
BE1	Durham Partners in Project Green	↓↓↓↓	+		$$$$	$$$$	🧍🧍🧍	+ [2]	+
BE2	Comprehensive Residential Retrofit	↓↓↓↓↓	+		$$$$$	$$$$$	🧍🧍🧍🧍🧍	+ [3]	+
BE3	Green Affordable Housing [1]		+		$$	$$	🧍	+	+
BE4	Durham Green Building Guideline	↓↓	+		$$$$	$$$$	🧍🧍🧍	+ [4]	+
E1	Smart Grid Initiative		+					+	+
E2	Offshore Wind Power Generation	↓↓	+		$$$	$$	🧍		
E3	Durham Deep Lake Water Cooling		+					+	
E4	Durham Biofuels Program	↓↓↓	+		$$$	$$$$	🧍🧍🧍		+
E5	Bio-methane Production and Use	↓			$$	$$	🧍		
FS1	Local Food Hub	↕		+	$	$$$	🧍🧍		+
FS2	Urban Agriculture Program	↕		+					
FS3	Farm-Friendly Regulations	↕		+		$$	🧍		
NS1	Durham Five Million Trees	.	+	+	$$	$$	🧍		+
T1	Active Transportation and Transit	↓	+	+	$	$$	🧍		+
W1	Durham Freecycle Program	↓							
G1	Durham Green Procurement Guide	↓							
G2	Community Climate Fund	↓				$	🧍		
G3	Climate Education Program	↓							

KEY

- = **amount of GHG reduction**
- ↓ = **small GHG reduction**
- ↕ = **undetermined GHG impact**
- 🌲 = **significant GHG reduction beyond 2020**
- \+ = **positive environmental or social impact**
- $ = **amount of positive economic impact**
- 🧍 = **amount of employment increase**
- ▭ = **not analyzed or not applicable**

FOOTNOTES

1 - A subset of Comprehensive Residential Retrofit
2 - Average annual energy savings of $10,800 per participating business
3 - Average annual energy savings of $865 per participating household
4 - Average annual energy and water savings of $760 per participating new household

B. Economic impacts

The set of 18 potential programs will stimulate capital investment in energy efficiency technologies and retrofits, renewable energy development, new agricultural production, tree planting and other forms of economic activity. Most of the labour for installation and operation and some of the equipment and materials for these activities, will be sourced in Durham region and will thus have economic and employment impacts on the region and also on the Ontario economy. Furthermore, the money saved by consumers and business through energy efficiency measures is spent mostly in the local economy and stimulates further economic activity.

The relative value of the capital investment associated with each program is indicated by dollar signs (**$**) in Table 1. Similarly, the value added to the Durham economy that results from the initial capital investment, the operation of the facilities and the respending of energy savings is represented by dollar signs (**$**) in Table 1.

C. Social impacts

Social cohesion and the quality of life in Durham can also be impacted by the programs proposed in the LAP in the following ways:

- Providing more employment in Durham.
- Putting more disposable income in the pockets of residents through energy efficiency in their homes.
- Reducing business expenses through energy savings, thus increasing profits and re-investment.

- Improving indoor air quality in homes and businesses through energy retrofits.
- Improving health through better outdoor air quality and a more physically active population.
- Increasing local food production and food security.
- More pleasant, people-oriented communities.

Two major programs (DPPG and Comprehensive Residential Retrofit) are designed to stimulate energy efficiency investments by home owners and business managers through provision of information/audits, access to grants/financing and other support services. The financial magnitude of these savings will be estimated as these programs are developed. Other social impacts, such as health impacts, are more difficult to estimate and will be characterized qualitatively for decision-makers.

At this point employment impacts of the various programs are represented by person symbols (🧍) in Table 1. Impacts on utility bill savings and health are indicated where applicable by a plus sign (+).

In summary, financial and social resiliency and the quality of life in Durham can be enhanced through climate protection measures.

LAP
implementation strategies

Introduction

As the Durham community moves forward to develop and implement programs in this LAP, there are strategies which can maximize the positive environmental, economic and social impacts on Durham, while minimizing costs. These implementation strategies are presented below with brief examples of how they can apply to potential programs.

Leverage

The idea of leverage is to achieve the maximum result with the minimum input of resources. If we can combine Regional resources with resources from other public and private partners, we can achieve large outcomes. Resources should be viewed in several ways:

- Relevant program experience (e.g. Partners in Project Green from the Pearson Eco-Business Zone operated by Toronto Region Conservation Authority (TRCA)).
- Existing standards (e.g. the R2000 and EnergyStar standards for new homes, the RenoMark program).
- Existing information and databases (e.g. Regional housing databases, federal home retrofit databases, business directories).
- Existing analysis tools (e.g. the EnerGuide rating program for the energy efficiency of housing).
- Existing training programs and certifications (e.g. the Canadian Industry Program for Energy Conservation seminars and training programs, training programs for home energy auditors).

- Existing financial incentive programs (e.g. the OPA saveONenergy grants, Enbridge's energy efficiency grants).
- Pilot programs and demonstrations (e.g. the OPA's Conservation Fund, Natural Resources Canada's ecoENERGY for Biofuels Program)
- Existing operational funding (e.g. the FCM's Green Municipal Fund, the Region of Durham's solid waste management programs).

DPPG demonstrates the strategy of leverage by:

- Drawing on the successful PPG program model that has been developed over the last four years by TRCA in the Pearson Airport Eco-Business Zone, including proven services, databases, case studies and the PPG website.
- Combining operational funding from all the region's electrical and gas utilities and several of the municipalities.
- Providing streamlined access for business to financial incentive programs from these utilities.
- Supporting DSA to grow its existing Eco-Business Program into the more comprehensive DPPG program.
- Utilizing business associations such as local chambers of commerce and boards of trade in Durham to support and market DPPG to their members.

As individual programs are developed for approval, a thorough analysis will be undertaken of available program experience and funding that can strengthen these programs and provide maximum leverage.

Facilitation

Local and regional governments can facilitate activities among their residents and businesses that contribute substantially to climate protection. Local governments can provide a range of services including the following:

- Development standards and guidelines: Local governments control land use and the design of our cities, neighbourhoods and buildings, which significantly impacts our energy use and GHG emissions. Official plans, strategic plans, development controls, development charges, and local planning criteria and guidelines have major impacts on the liveability and viability of our community. They can facilitate sprawl or more compact and efficient community design.
- Information: Municipal governments can play key roles in providing locally relevant information to residents and business when they are making major purchase decisions that will affect future energy consumption and GHG emissions. For example, a home energy efficiency standard, information on affordability and a list of home builders offering high-efficiency homes would be highly effective at the point of new home

purchase. Key information at the right time can facilitate informed investments and make optimum use of market mechanisms.

- Public transit: Efficient and convenient bus services can reduce car dependence and support active transportation (cycling) and use of GO Transit and Durham Region Transit. Integration of transit into community design is key to facilitating increased transit use by residents and commuters.
- Economic development: Climate protection in Durham also offers opportunities to strengthen our economy, provide local jobs and build future prosperity. By investing in our own energy efficiency, we will reduce our future energy costs for residents and businesses, produce and protect local jobs, and make Durham more attractive as a place to live, work and invest. By focusing on renewable energy development in Durham, we can attract corporate investment and grow the energy companies of the future. Climate protection can be an engine of economic development for Durham.

As LAP programs are further developed, we should be seeking those low-cost facilitation opportunities where local governments can reduce barriers, exploit market mechanisms and achieve multiple benefits for the region.

Private sector investment

Many of the initiatives proposed in the LAP will require private sector investments in energy efficiency and renewable energy opportunities in Durham. Wind energy, bio-fuel production, solar energy projects, vehicles of the future, business energy efficiency and residential energy retrofits will be funded by private investment, not tax dollars. If local governments offer attractive, stable and long-term opportunities for private capital, investment will flow into Durham. The creation of business clusters is facilitated by local governments fostering the right environment for investment. Water,

wind, sun, development land, agricultural production, research and education institutions, technology, a skilled workforce, a high quality of life and a regional sustainability vision are the key ingredients to attracting the sort of private investment that will lead to a diversified economy and local prosperity.

Sequencing of programs

Of the 18 potential programs in the LAP, it will be important to establish an optimum sequence for development, approval and implementation of the programs. The initial program to be approved, BE1: DPPG, is already in the implementation phase. Other programs, especially the infrastructure-type programs, will require long lead times to address regulatory issues, land-use approvals and private sector investment before implementation can begin. Still other programs, such as DPPG and Comprehensive Residential Retrofits, will take many years to reach the numerous decision-makers in their large target markets and therefore need to commence early. There are also windows of opportunity associated with some projects (such as those under the FIT program) which will affect program timing. Lastly, the desire for early progress, the setting of program priorities by DRRCC and the capacity of staff to develop program concepts to the point of approval will also affect the sequence in which programs are brought forward for implementation.

Community delivery agents

One of the key implementation strategies for the LAP is to deliver climate change programs wherever possible through community delivery agents and partnerships rather than just through local government. The LAP does not aim to create "big government." Rather it aims to mobilize the Durham community and to benefit from the efficiency, cost-effectiveness and credibility of existing community organizations to shape and deliver programs that are beneficial to Durham.

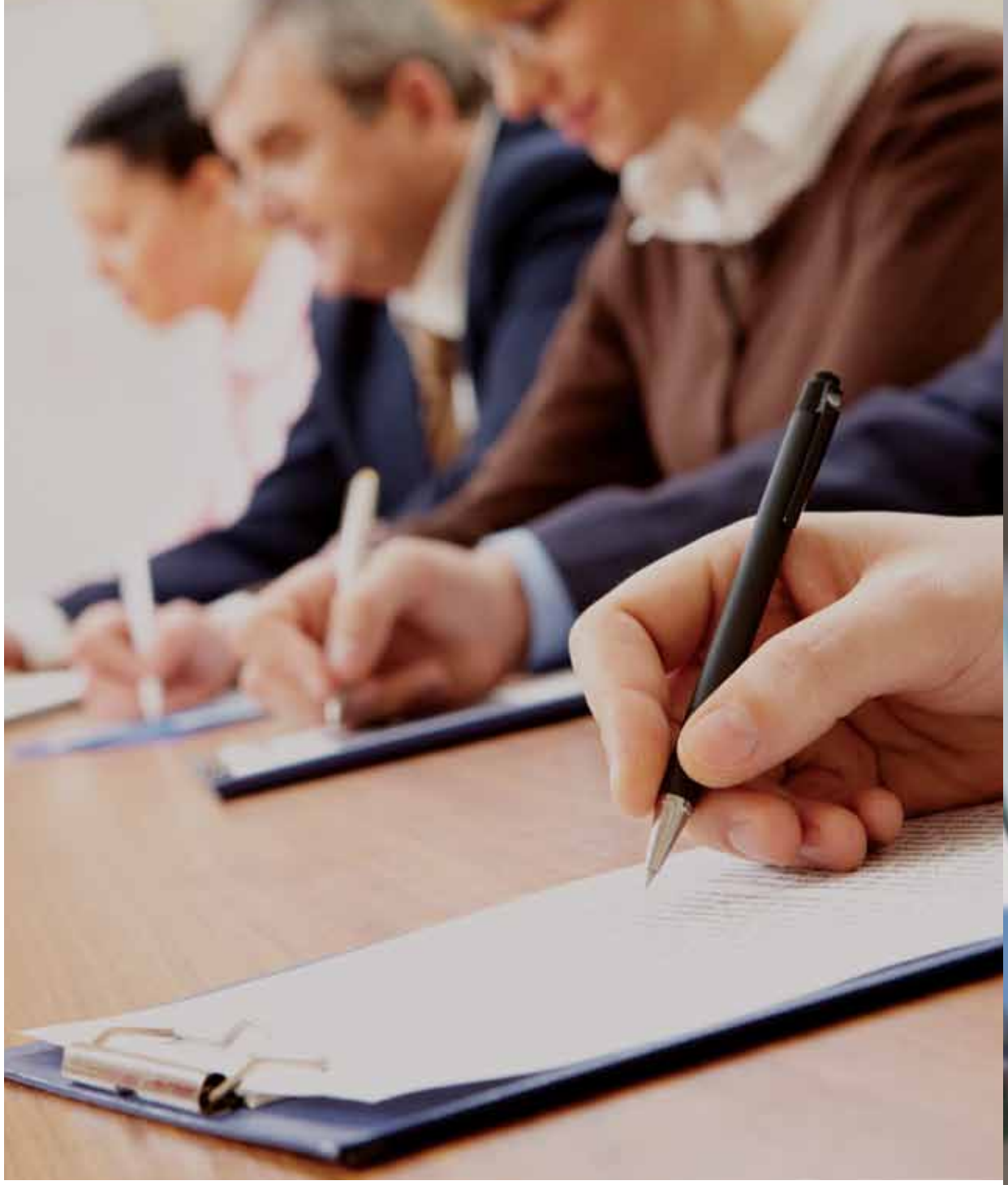
The ongoing roles of the DRRCC will be to:

- Advocate and educate on behalf of the LAP.
- Promote and coordinate the implementation efforts.
- Empower and support community agents.
- Monitor and report on progress.
- Propose new measures and programs, as appropriate.
- Review for new opportunities.

Delivery agents and partners may include:

- Community not-for-profit organizations (like DSA)
- Municipal governments
- Service clubs
- Resident and rate-payer organizations
- Business associations
- Educational institutions (e.g. school boards, Durham College, UOIT, Trent University)
- Private companies
- Energy utilities
- Conservation Authorities
- Public-private partnerships

As each program in the LAP is developed for approval, community partners and delivery agents will be sought, identified and confirmed.



Adaptation
to climate change

Inevitable climate change

Current and future concentrations of GHGs in the atmosphere mean that a certain amount of global warming is now "locked in." So, even if we succeed in achieving the optimistic scenario of levelling off global GHG emissions in the near term and reducing them in the medium term, we will inevitably experience some degree of global warming—together with the extreme weather, droughts, sea level rise, ecosystem damage and other impacts that this will produce.

Here in Durham, we can expect to experience higher temperatures, heat waves, droughts, heavy rains and storms. This will in turn overwhelm and/or damage our physical infrastructure (buildings, roads, water systems, electricity and fuel distribution), vital services (health care, food supply, security etc.) and our social and economic systems. It is prudent for us to undertake adaptation measures at the same time as we strive to limit future climate change through mitigation measures.

A national study of the sectors of Canadian society most vulnerable to climate change recently identified urban infrastructure as the most important sector out of 24 sectors or systems assessed (University of Waterloo, Climate Change Adaptation Project: Canada).

Washout of Finch Avenue in Toronto, August 19, 2005. (Photos courtesy of Jane-Finch.com)

Durham Region corporate adaptation measures

The Regional Municipality of Durham has begun work on climate adaptation through specific program planning processes and long-standing corporate risk and asset management programs. Climate change considerations are embedded in the Region's business management cycle. The Region of Durham currently maintains a system of infrastructure estimated at a replacement value of more than $9 billion. In addition to the ongoing asset management program, and considering both short and long term impacts, Regional staff are currently developing a wholistic multi-year adaptation strategy.

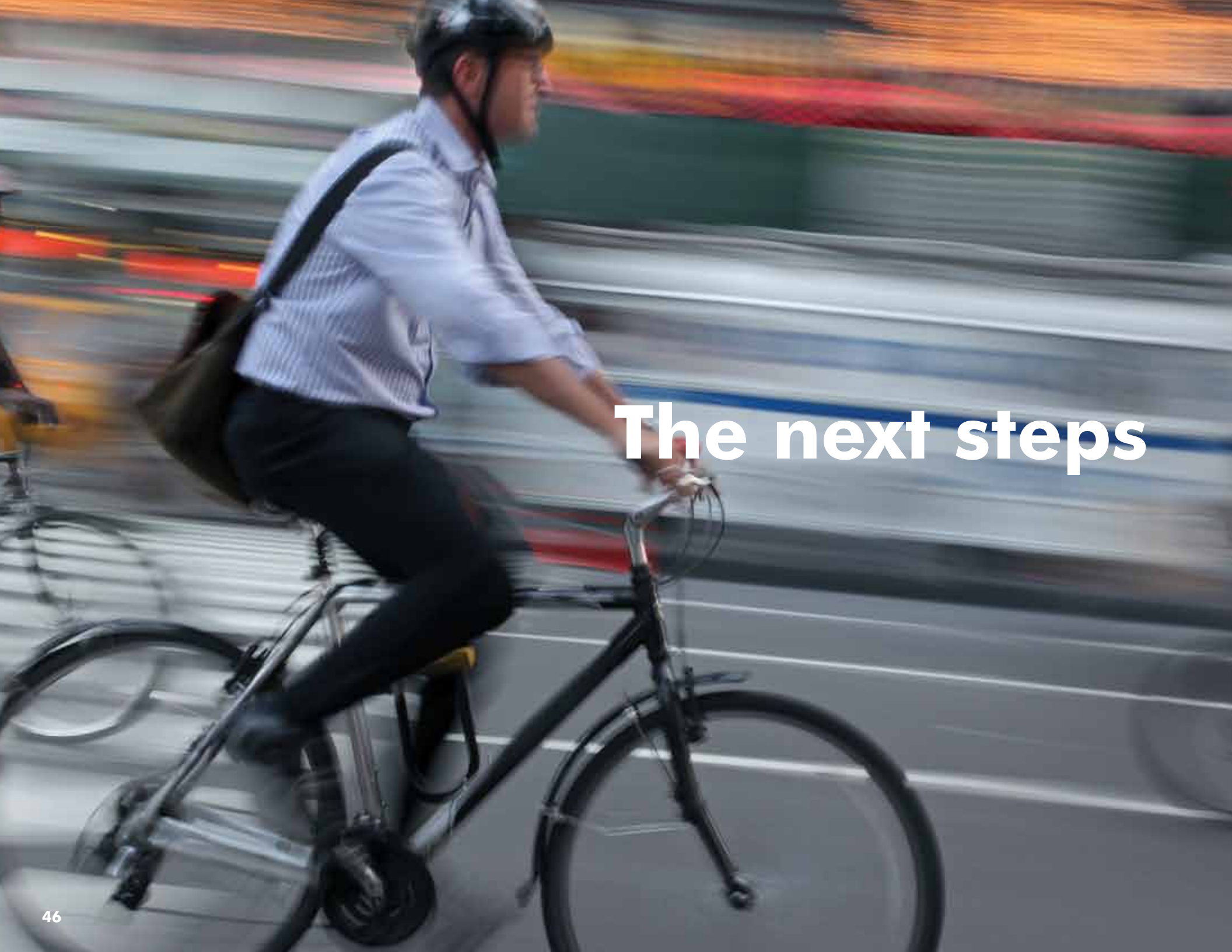
Ongoing research, initiatives and strategies to mitigate climate risks include: Research studies, including collaborative studies, to investigate and develop measures to mitigate risks; development of waste water and potable water servicing strategies; enhanced design and construction

of new facilities and upgrades; procedures, protocols, contingency and business continuity planning to ensure service delivery in the event of service disruption; maintenance of adequate and reliable back-up power for critical corporate systems; development of procedures for extreme weather events; and staff and resident education and training programs. A full life-cycle approach will continue to ensure a sustainable strategy and funding related to climate change adaptation initiatives.

Community climate adaptation

The damage to property, critical infrastructure and business continuity will not be limited to Regional property in the event of extreme weather like floods, tornadoes and heat waves. Private property, vital services (such as electricity supply) an public health and safety will all be at risk. We need to engage the Durham community at large in assessing the risk, planning defensive actions and undertaking key investments. In addition to continuing work on the mitigation plan and programs, the Region of Durham intends to initiate a community adaptation planning process.

We can think of climate mitigation as protecting the climate from us, and climate adaptation as protecting us from the climate.



The next steps

With receipt of this Community Climate Change LAP by Durham Regional Council on October 10, 2012, the Durham community now has a plan that can be described as comprehensive, effective, bold and visionary.

But it's only a plan, a roadmap. It's not yet a set of programs that are on the ground being implemented. It's potential—not reality. Vision—not yet action.

Implementation plans

We now need to focus our efforts on converting the potential programs into real programs. For each program concept, we now need to:

- Research and further develop the program ideas.
- Consult widely on program design across Regional departments, municipal partners and community institutions.
- Test technical, financial and legal feasibility and community support.
- Find and engage community partners.
- Identify community and/or private sector delivery agents.
- Identify leverage opportunities.
- Prepare business plans and financial analyses, as part of the Region's business planning processes, where applicable.

- Identify the necessary financial resources and other forms of support.
- Prepare a business case and seek approval of Regional Council and other supporters, as necessary.
- Formalize partnerships with supporters, delivery agents and others.
- Launch and roll out the programs.
- Monitor and modify program operations, as necessary.
- Evaluate and report on progress and success in all three areas of expected impacts—environmental, economic and social.

These activities will take time to compete. Some potential programs may take only a matter of months to fine-tune and launch; others may take several years to fully develop and reach the point of approval. Once launched, some programs will take years to fully implement. This process is represented by the "Program Development & Approvals" block in Figure 6.

Maintaining flexibility

As the Durham community is developing and implementing these potential programs, we need to also be scanning other best practices for additional program concepts that could be added to our plan. Technologies, policies, economic/legal drivers and climate conditions will all be changing in the years ahead. This landscape of change may raise new opportunities (and obligations) to refresh our current climate protection programs in the short term and create a "second generation" of programs in the longer term.

Adaptation planning

As outlined in the previous section, the Durham community also needs to address climate adaptation by preparing a region-wide Climate Adaptation Plan with programs and actions. The Adaptation Plan will complement the mitigation programs proposed in this LAP.

Summary

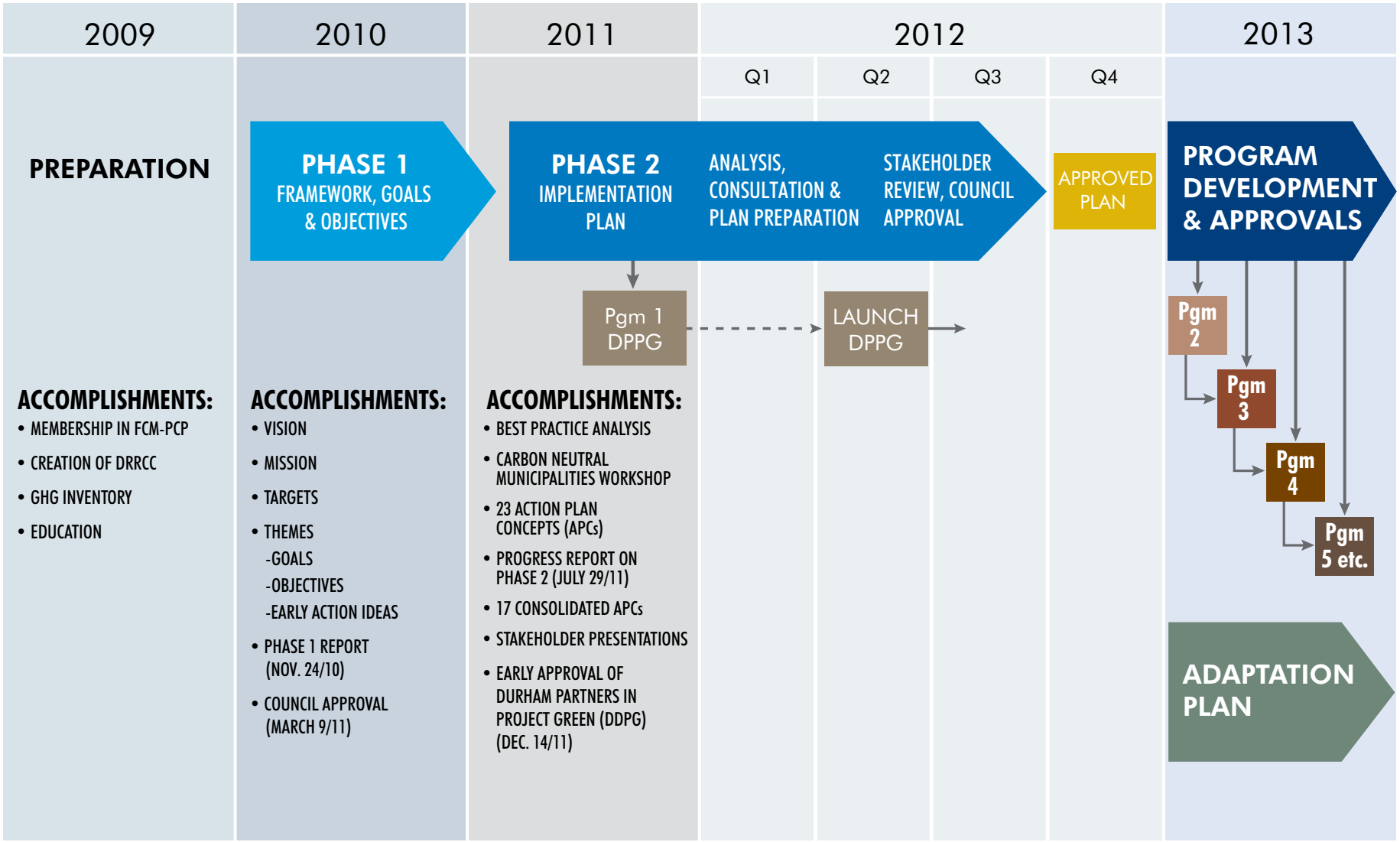
We have a clear future vision:

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

We have a current reality which is far from the vision in a number of aspects, but also affords us certain advantages in pursuing the vision.

What we need is a set of effective, strategic and high-leverage programs to move us from current reality to the vision. This plan is a good start!

FIGURE 6: PROCESS DIAGRAM
REGION OF DURHAM COMMUNITY CLIMATE CHANGE LOCAL ACTION PLAN



Appendices

Appendix A Membership of the Durham Region Roundtable on Climate Change

Membership 2011/2012

Anderson, Roger
Regional Chair and CEO

Buckles, Brian
Citizen Member,
Regional Environment Sector

Cubitt, Garry
Chief Administrative Officer

Gauder, Richard
Citizen Member,
Small Business Sector

Georgieff, Alex
Commissioner of Planning and Economic Development, Alternate

Hall, Todd
Citizen Member, Energy Sector

Holdway, Douglas
Citizen Member, Educational Sector

Neil, Barry
Citizen Member, Health Sector

Solly, Jeff
Citizen Member,
Land Development Sector

Vroegh, Martin
Citizen Member,
Large Industry Sector

Willard, Bob
Citizen Member, Representative of Durham Sustain Ability

Councillor John Aker
Planning Committee

Councillor Jack Ballinger
Works Committee

Councillor Bobbie Drew
Finance & Administration Committee Alternate

Councillor Joe Drumm
Planning Committee Alternate

Councillor Amy England (Vice-Chair)
Health & Social Services Committee

Councillor Tito-Dante Marimpietri
Works Committee Alternate

Councillor Don Mitchell (Chair)
Finance & Administration Committee

Councillor Peter Rodrigues
Health & Social Services Committee Alternate

Membership 2009/2010

Anderson, Roger
Regional Chair and CEO

Buckles, Brian (Vice-Chair)
Citizen Member,
Regional Environment Sector

Cohoon, Zac
Citizen Member, Agriculture Sector

Cubitt, Garry
Chief Administrative Officer

Georgieff, Alex
Commissioner of Planning, Alternate

Holdway, Douglas
Citizen Member, Educational Sector

McNeil, Patrick
Citizen Member, Energy Sector

Neil, Barry
Citizen Member, Health Sector

Solly, Jeff
Citizen Member,
Land Development Sector

Willard, Bob
Citizen Member, Representative of Durham Sustain Ability

Councillor Gerry Emm
Works Committee

Councillor John Henry
Finance & Administration Committee Alternate

Councillor Bonnie Littley
Health & Social Services Committee

Councillor Colleen Jordan
Health & Social Services Committee Alternate

Councillor Jim McMillen
Planning Committee Alternate

Councillor Don Mitchell (Chair)
Finance & Administration Committee

Councillor Bob Shepherd
Planning Committee

Councillor Charlie Trim
Works Committee Alternate

Appendix B List of contibutors to the LAP

Phase 1

Adamson, Tim
Enbridge Gas Distribution Inc.

Anderson, Natalie
Township of Scugog

Anello, Gio
Regional Municipality of Durham

Bridgeman, Brian
Regional Municipality of Durham

Chala, Tracey
Town of Ajax

Chornobay, Nestor
Regional Municipality of Durham

Clayton, Sarah
Regional Municipality of Durham

Cramer, Meg
CDCD

Curtis, Tracey
Regional Municipality of Durham

Davies, Ernie
City of Oshawa

Dejan, Christine
Regional Municipality of Durham

DiPietro, Anthony
Regional Municipality of Durham

Edmonds, Anne
Town of Whitby

Elston, Suzanne
City of Oshawa

England, Amy
City of Oshawa, Councillor

Evans, Rebecca
Durham Region Home Builders Association

Fortin, Rebecca
Community Development Council Durham

Goodchild, Colleen
Regional Municipality of Durham

Grieve, Scott
Durham Catholic District School Board

Ho, Doris
Regional Municipality of Durham

Hutzul, Larry
Enbridge Gas Distribution Inc.

Kelly, Brian
Eco Pathways Consulting

Kelly, Jonah
Regional Municipality of Durham

Kilbourne, Kristy
City of Pickering

Koke, John
Rouge Valley Properties

Lancaster, Pam
Ganaraska Region Conservation Authority

Larose, Paul-André
Oshawa Citizen

Lindeblom, Doug
Durham Strategic Energy Alliance

Lindell, Natalie
Township of Scugog

Littley, Bonnie
City of Pickering

Lovisa, Don
Durham College

Manns, Hida
Durham Environmental Advisory

Marceau, Richard
University of Ontario Institute of Technology

McMullen, Brianne
City of Oshawa (co-op Student)

Mitchell, Don
Regional Councillor, Regional Municipality of Durham

Mueller, Jessica
VIRCA

Neil, Barry
Health sector representative (DRRCC member)

O'Connor, Larry
Township of Brock

Paquette, Joanne
Regional Municipality of Durham

Peacock, Mark
Ganaraska Region Conservation Authority

Pongracz, Michelle
City of Pickering

Reid, Pauline
Regional Municipality of Durham

Richards, Paul
Regional Municipality of Durham

Robins, Tim
Durham Catholic District School Board

Ross, Andrew
Green Diamond Industries

Salazar, Carlos
Municipality of Clarington

Samardzic, Mara
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All names and organizations accurate at the time of consultation.

Appendix C Climate change science and the Intergovernmental Panel on Climate Change (IPCC)

The following information is drawn from Report 2009-J-37, endorsed by Durham Region Council on Sept. 23, 2009.

1. Background

Scientific evidence overwhelmingly supports the conclusion that human activities are fundamentally altering the conditions for life on earth. Climate change and associated global warming is recognized as a severe threat to global systems with the potential for catastrophic outcomes. International, national and provincial/state efforts are being developed and enhanced to find solutions to this growing problem.

A key step towards controlling and ultimately stopping the rate of global temperature increase is to significantly reduce the emission GHG into the Earth's atmosphere. Two market-based programs-cap-and-trade and carbon taxation-are emerging as significant elements of the solution to reduce the North American production of GHGs. There is continuing debate about the efficacy of these programs and each one has individual strengths and weaknesses.

2. Climate change science: the IPCC

The IPCC is a scientific body made up of thousands of leading climate change experts. It was established by the United Nations (UN) and the World Meteorological Organization with a mandate to provide a clear scientific view on climate change and its potential impacts, particularly to policy-makers. The most recent IPCC report (Fourth Assessment Report or AR4) was published in 2007. This report summarized the scientific findings previous to 2007.

The report projected future climate conditions based on six scenarios ranging from a BAU fossil fuel intensive global society to a non-fossil fuel-based global society focused on economic, social and environmental sustainability. Ranges of projected impacts are based on the upper and lower limits defined by these scenarios.

The IPCC AR4 findings present a grim view of the future:

- Warming of the climate system is unequivocal. Continued GHG emissions at or above current rates will cause further warming and induce many changes in the global climate system.

- Future global temperatures are likely to rise 1.8 to 4°C.
- Future sea levels are likely to rise 18 to 59cm (7 to 23 inches).
- Projected climate change-related exposures are likely to negatively affect the health of millions of people (increased death, disease, injury due to heat waves, floods, storms, fires and droughts; increases in malnutrition; etc.)
- Cities that currently experience heat waves are expected to face an increased number, intensity and duration of heat waves.
- Global water stress (decrease in freshwater availability) is expected, with an increasing competition for over-allocated water resources.
- 20 to 30% of species will be at increased risk of extinction if the rise in global temperatures exceed 1.5 to 2.5°C.
- The resilience of ecosystems is likely to be exceeded this century by climate change, associated disturbances (flood, drought, wildfire, insects, ocean acidification, etc) and other global change drivers (land-use change, pollution, etc.).
- Continued warming could lead to some impacts that are abrupt or irreversible (e.g. loss of ice sheets could result in metres of sea level rise, etc.).

3. Current scientific evidence

It is widely acknowledged that the data used by the IPCC in AR4 is at least five years out of date. This is a result of accommodating the peer-review process in order to meet the 2007 publish date for the report. A significant amount of new scientific research exists, and it indicates that global climate change is happening at a faster rate than that predicted by the AR4.

Since 2007, direct scientific observations show some climate change indicators measuring near the upper end of the range of projections indicated by the IPCC AR4. In the case of sea level rise, the direct observations show changes above even the worst case scenario projected by the IPCC. Findings include:

- Ocean warming is about 50% greater than had been stated in the IPCC AR4.
- Possible sea-level rise of greater than a metre by 2100 (compared to 18 to 59 cm projected by AR4).
- The rapid reduction in Arctic sea ice in summer in both 2007 and 2008 was significantly greater than projected by the IPCC. This is very important, as ice coverage is critical for climate control. Ice reflects the energy from the sun back out to the atmosphere, rather than allowing it to be absorbed into the ocean where it has an increased warming effect on global temperatures. This creates a positive feedback loop—sea ice melts -> less ice -> more ocean warming -> sea ice melts.

- Research is starting to quantify the amplifying effects (the likely increase in rate of warming) of positive feedback loops. Results show the amplification factor could exceed 50%. Positive feedback loops include:
  - Sea ice melts -> oceans warm up -> sea ice melts.
  - Increased atmospheric temperature -> increase in atmospheric water vapour (the most abundant greenhouse gas, not human-induced) -> increased atmospheric temperature.
  - Increasing climate change effects (ocean acidification, increased global temperature etc.) -> reduction in natural CO_2 sinks (the oceans, the forests, the Arctic permafrost) -> increasing climate change effects.
  - Increased atmospheric temperature -> release of methane (a potent greenhouse gas) from melting permafrost -> increased atmospheric temperature.
- Atmospheric concentrations of carbon dioxide, methane and nitrous oxide (all greenhouse gases) are now higher than they have been since before modern humans evolved (ice core data). Atmospheric CO_2 concentrations are the highest they have been for approximately 20 million years (sediment and other paleoclimatic records).
- Observed increase in the number and intensity of extreme events—heat waves, storms, and floods.
- Regional climates are changing—shifts in monsoon seasons, shifts in regional-scale precipitation patterns (e.g. Australian drought). This has significant negative effects on human societies that depend on regular, long-term patterns of temperature and precipitation.

The IPCC is currently working on the fifth assessment report, scheduled for publication in 2013. However it is important to recognize that the vast majority of the scientific community is steadfastly maintaining that the dangers posed by a changing climate cannot be overstated, the danger is immediate, and the implications for human society are truly catastrophic.

The only means to address the root cause of current human-induced climate change is to reduce the concentration of greenhouse gases in the atmosphere.

4. GHG emission reduction targets

The recent Group of Eight (G8) declaration (July 2009) with respect to climate change states that:

First and foremost, in the light of the recommendations of the international scientific community, the G8 has recognized the importance of limiting the rise in global temperature to 2°C (above pre-industrial levels), in order to avoid the risk of serious economic consequences and irreversible damage to the environment and the climatic system.

Based on the IPCC AR4, to stabilize the average global temperature at this 2°C level (over pre-industrial temperatures) the concentration of eCO_2 must be limited to 450 parts per million (ppm) in the atmosphere. This translates to global reductions of CO_2e emissions of 50 to 80% below 1990 levels by 2050. Industrialized nations must make larger reductions, given their larger share of emissions so the IPCC targets for industrialized nations are:

- ***25 to 40% below 1990 levels by 2020***
- ***80 to 95% below 1990 levels by 2050***

The IPCC notes that in order to stabilize the concentration of GHGs in the atmosphere at 450 ppm, emissions will have to peak before 2015 and subsequently continue to decline. While the G8 supports this long term goal of "developed countries reducing emissions of GHG in aggregate by 80% or more by 2050 compared to 1990 or more recent years", failing to specify a mid-term target makes the likelihood of emissions peaking before 2015 improbable.

5. The need for more aggressive targets

There is a call from some highly reputable climate experts (including Jim Hansen, who heads the National Aeronautics and Space Administration Goddard Institute for Space Studies; and Rajendra Pachauri, the UN's top climate scientist, who leads IPCC for even deeper emissions reductions), in order to keep the CO_2e concentrations below 350 ppm.

This number of 350 ppm is based on paleo-climatic data showing that the last time the planet was thought to be 2°C warmer, when CO_2 concentrations were 450 ppm, the world was largely ice-free and sea levels were 60 metres (200 feet) higher. Others call for cutting net CO_2 emissions 80% by 2020 (source: Brown et al., 2008).

Given the changes that have already occurred to global systems when the average global temperature is 0.8°C higher than pre-industrial levels, and when scientists agree that the planet is locked into at least another 0.6°C due to current emissions levels, a 2°C threshold appears to be too high. At the moment, however, a 2°C limit is the agreed-upon target by world political leaders, and as such, strategies to achieve this target must be at least planned and implemented as a starting point for any future mitigation actions.

Notes:

More information:

For background information on the Durham Region community LAP, and its development, please visit: www.durham.ca/climatechange.

To comment on the LAP or seek further information, contact:

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