County of Essex

Windsor-Essex Climate Change Collaborative

County of Essex Regional Energy Plan

Report #1

Rationale and Scope

County of Essex - Regional Energy Plan

Report 1 – Rationale and Scope

Contents

1. Rationale

This section provides the rationale and context behind the development of the Regional Energy Plan for the County of Essex including climate change, the energy transition and rural sustainability.

1.1 Climate change

Increasing levels of atmospheric greenhouse gases (GHG) are warming the planet. As global temperatures rise, climate patterns around the world are changing.

> *What are greenhouse gases?*
>
> A greenhouse gas is any gas that absorbs thermal radiation from the sun and emits it back into the earth's atmosphere. Without them, the average temperature at the surface of our planet would be around minus 18 degrees Celsius rather than 15 degrees Celsius. Greenhouse gases include water vapour, carbon dioxide, methane, nitrous oxide, and ozone.

Human activities since the first industrial revolution have caused a 40% increase in carbon dioxide concentrations in the atmosphere. This increase in carbon dioxide emissions is primarily from burning fossil fuels for energy to heat our homes, drive our cars and run our factories (Figure 1). Other contributors include deforestation, changes in land use, soil erosion and agriculture. Energy production and use account for over 80% of Canada's GHGs.

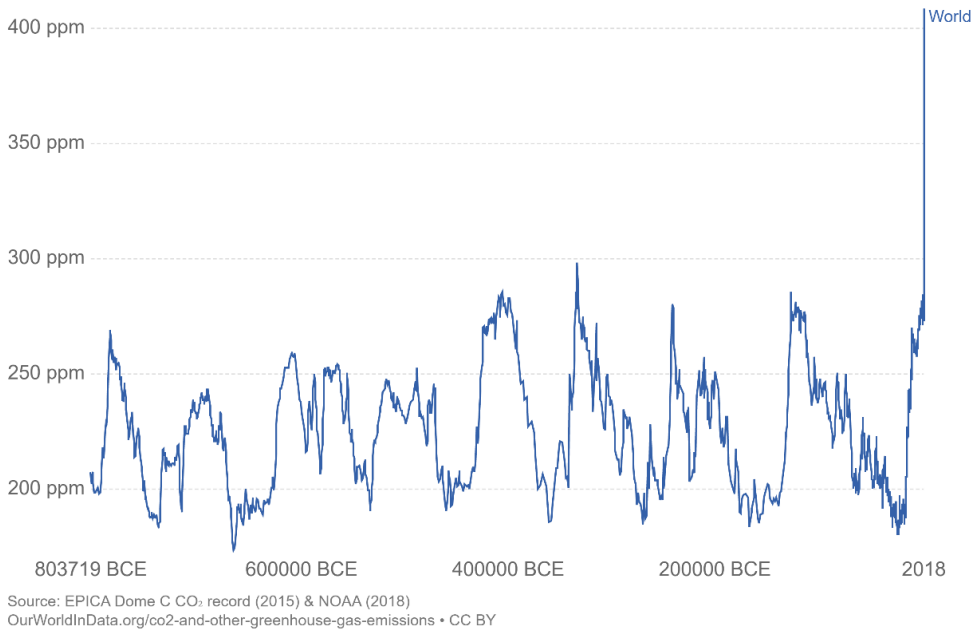

Figure 1: Global average long-term atmospheric concentrations of carbon dioxide (CO2) measured in parts per million (ppm) [1]

[1] Source: https://ourworldindata.org, accessed May 2020.

The unprecedented rise in carbon dioxide levels is warming the planet (Figure 2). Global average temperatures are currently 1 degree Celsius warmer than the pre-industrial average.[2] Temperature increases are more pronounced in higher latitudes, such as in Canada where temperature increases are up to twice the global average. Canadians are already feeling the costs of a changing climate with an increase in the frequency and severity of floods, drought, wildfires, disease, and heatwaves.

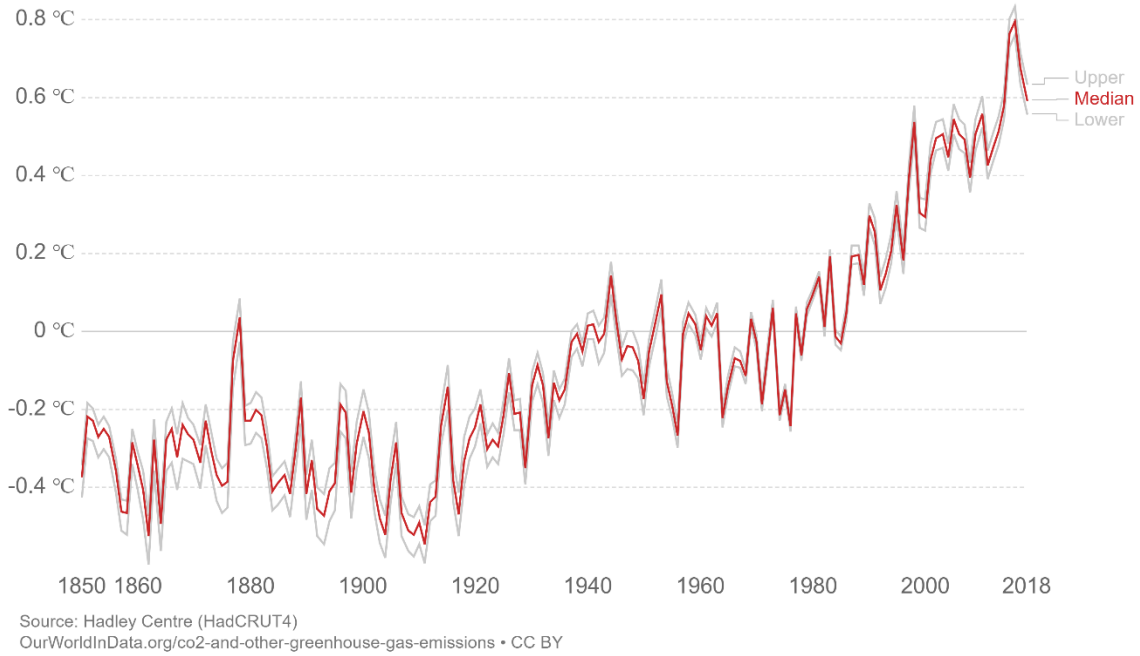

Figure 2: Global average land-sea temperature anomaly relative the 1961 to 1990 average temperature in degrees Celsius. The red lines represent the median average temperature change, and grey lines represent the upper and lower 95% confidence intervals

Climate change is a fundamental threat to all life on the planet and people's livelihoods. Scientists warn that the consequences of climate change for humans, animals and plants will become more severe if the average global temperature continues to rise. Carbon emissions would need to be cut by at least 45% by 2030, and be lowered to zero by mid-century, to keep temperatures within a 1.5 degrees Celsius increase.[3]

In 2015, a historic agreement was signed in Paris by 195 countries to hold "the increase in the global average temperature to well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5 degrees Celsius above pre-industrial levels, recognizing that this would significantly reduce the risks and impacts of climate change". The Paris Agreement is a call to action to all sectors of society – government, business, civil society, and individuals.

[2] International Panel on Climate Change, Summary Report for Policymakers, 2018, https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf
[3] International Panel on Climate Change, Summary Report for Policymakers, 2018, https://report.ipcc.ch/sr15/pdf/sr15_spm_final.pdf

Internationally, 1,490 jurisdictions in 30 countries have declared a climate emergency. In September 2019, the Windsor Essex Environment Committee approved a recommendation to declare a climate emergency for the area. Since then, the City of Windsor, the County of Essex, the Town of Amherstburg, and the Town of Tecumseh have joined over 500 Canadian municipalities in declaring a climate emergency.[4]

Since 60% of energy consumption and over half of all GHGs in Canada are influenced by communities – for instance, the transportation of people, goods, and services, the powering of local industry and the heating, cooling and lighting of homes and buildings – all levels of government are enabling local action on climate change. In response, more than 400 Canadian communities have developed community energy plans to establish local priorities for reducing energy use and energy-related emissions.[5] The Regional Energy Plan will support the County of Essex and its member municipalities take a leadership role in reducing GHG emissions that arise within its geographic boundary from energy use.

1.1.1 Federal Climate Policy

As a signatory to the Paris Climate Agreement, the Federal Government set a target to reduce emissions 80% below 1990 levels by 2050. In 2016, the Pan-Canadian Framework on Clean Growth and Climate was approved. Putting a price on carbon has been an important part of the Government of Canada's climate action plan. Federal funding has also been allocated to support local and municipal action on climate change including funding for the Municipalities for Climate Innovation Program administered by the Federation of Canadian Municipalities. The Federal Government has signalled that climate will play a strong role in its COVID-19 economic stimulus program.[6]

Canada has the highest GHG emissions per capita of several regions (Table 1). Canada's economy is also significantly more carbon intense than global best practice e.g., European Union and Japan (Table 1) indicating an opportunity to use energy more efficiently as well as increase the supply of renewable energy sources.

Table 1: Regional carbon intensity (CO_2) per capita and per Gross Domestic Product (GDP) relative to the United States of America.

Region	CO_2/Capita	CO_2/GDP
USA	100	100
Canada	103	107
European Union	43	62
Japan	61	67
China	46	332
India	11	299
World	30	149

[4] https://climateemergencydeclaration.org/climate-emergency-declarations-cover-15-million-citizens/, posted May 20, 2020.
[5] Source: https://questcanada.org/, accessed May 2020.
[6] Globe and Mail, 2020. https://www.theglobeandmail.com/canada/article-climate-clean-tech-could-take-centre-stage-in-federal-economic-2/

1.1.2 Provincial Climate Policy

The Province of Ontario has also committed to reducing GHG emissions to 30% below 2005 levels by 2030 and has released the Made-in-Ontario Environment Plan. For several years, changes in Provincial legislation have been mainstreaming energy and climate policymaking at the municipal level. These key enabling legislative and policy provisions remain intact.[7]

Provincial Policy Statement

In 2014, the Provincial Policy Statement on Land Use was updated to give direction on energy efficiency, renewable energy systems, alternative energy systems and climate change. This was reaffirmed in the 2020 Provincial Policy Statement.

Growth Plan for the Greater Golden Horseshoe

In 2017, the Growth Plan for the Greater Golden Horseshoe was updated to require upper-tier municipalities to include climate change targets, policies, and strategies in their official plans. The updated Growth Plan encourages the development of official plan policies to encourage energy conservation and efficiency, integrated waste management, renewable energy, alternative energy, and district energy systems.

Made-in-Ontario Environment Plan

The current government's December 2018 Made in Ontario Environment Plan makes references to community led distributed energy resource development and the need to address the impacts of climate change.

Municipal Act and Planning Act

Changes to the Municipal Act and Planning Act in 2017 provided more authority to municipalities on climate change.

Ontario's Long-Term Energy Plan

The 2017 Long-Term Energy Plan acknowledges the role of regional and community energy plans in meeting energy conservation targets and sustaining a reliable and secure supply for Ontario's energy customers.

Municipal Energy Plan Program

The Ministry of Energy, Northern Development and Mines Municipal Energy Plan Program provides funds to municipal governments to complete or update a Municipal Energy Plan.[8]

1.1.3 Federation of Canadian Municipalities (FCM)

FCM's Municipal Climate Innovation Program supports municipal level planning and action on climate change. The five-year, $75 million program supports more than 600 municipalities to update your infrastructure and address climate change.

FCM's Green Municipal Fund recently launched the Community Efficiency Financing (CEF) initiative, a new $300M initiative to help municipalities and their partners design, implement and

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[7] Winfield, M, Harbinson, S; and Morrissey Wyse, S. Enabling community energy planning? Polycentricity, governance frameworks, and community energy planning in Canada, 2020.https://sei.info.yorku.ca/files/2020/01/Community-Energy-Planning-paper-January-15-2020-for-Posting-1-1.pdf?x46177

[8] A Municipal Energy Plan is the equivalent of a Community Energy Plan or a Community Energy and Emissions Reduction Plan.

scale-up innovative financing programs that help residents improve the energy performance of their homes, save money on energy bills and reduce GHG emissions. Property Assessed Clean Energy (PACE), Local Improvement Charge (LIC) financing and utility on-bill financing are some examples of financing models that can be supported through this initiative.

1.1.4 Windsor-Essex Climate Emergency Resolution

In 2019, Essex County and the City of Windsor passed resolutions declaring a climate emergency recognizing the need for robust and permanent changes, that the future climate performance must be a high priority in all decisions, and called for cooperation in reducing emission in the wider region including greater Detroit.

1.2 Energy Transitions[9]

While addressing climate change is an important reason to develop a Regional Energy Plan, it is not the only one. Another consideration is ensuring the County of Essex is positioned to manage the economic risks and opportunities associated with the modern energy transition.

What is an energy transition?

An energy transition is a long-term structural change in an energy system.

1.2.1 History of Energy Transitions in Ontario

Energy transitions are not new, and Ontario has experienced two major energy transitions since European settlement.

Pre-industrial energy system

Early European settlers in Upper Canada relied on a pre-industrial system for their energy, comprised primarily of burning wood for heat, using work animals, and harnessing the movement of water to grind grain and saw logs.

First energy transition to coal and steam power

The first transition was fueled by the introduction of coal-fired steam engines in the mid-1800s. By the end of the 1800s, U.S. coal and local steam engines powered most of Ontario's industrial growth. However, by the turn of the century, rising coal prices and coal shortages threatened local prosperity. Municipal politicians and boards of trade began to turn their attention to the promise of a new energy technology - electricity.

Second energy transition to centralized electricity and fossil fuels

The first time the movement of water was used to produce electricity in Canada was at Chaudière Falls in 1881; it was used to power streetlights and local mills in Ottawa. Electricity companies sprung up across Ontario. By the early 1900s, most Ontario electrical systems were owned by municipal governments eager to expand service to more homes and businesses. To meet increasing demand, 14 Ontario towns formed the "Power for the People" movement. Local leaders were instrumental in the formation of the Hydro-Electric Power Commission of Ontario. Sir Adam Beck, the commission's first chairman, was an early champion of centralized power as the mayor of London, Ontario.

[9] Content for this section on Energy Transitions is largely drawn from the curriculum of the Energy Conscious Community: A Professional Development Course for Planners.

Abundant and cheap Niagara hydroelectric power arrived in Ontario homes for the first time in 1910.

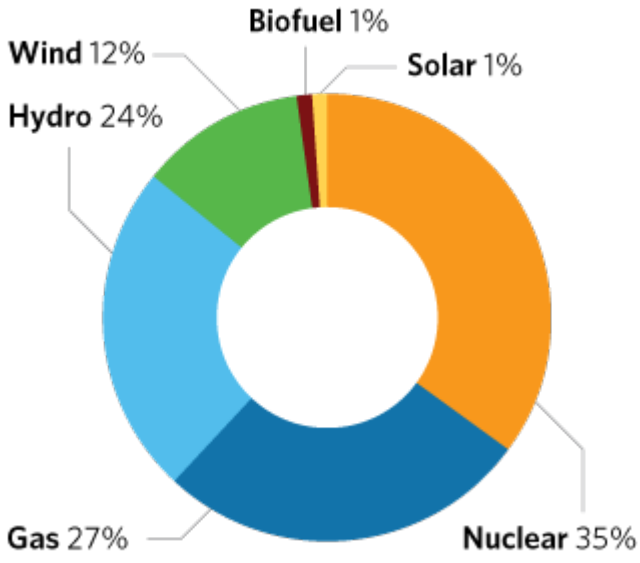
Fossil fuels also supported monumental growth in the use of the personal automobile during the 20th century which had a significant impact on urbanization, promoting the development of less dense suburban communities, the separation of residential, commercial and industrial uses and substantial investment in road and parking infrastructure.

1.2.2 Ontario's Current Energy System

Our current energy system has been built upon centralized electricity and the use of oil and gas. With each energy transition, communities have grown less aware of where their energy comes from and how it is produced; it simply arrives over wires as electricity, through pipes as natural gas and in tankers as gasoline and diesel. Today, Canada relies on fossil fuels to meet 80% of its energy needs which has dramatically increased the GHG emissions associated with our energy system.

Electricity

Ontario's electricity mix in 2019 was 35% nuclear, 27% natural gas, 24% hydro, 12% wind, 1% solar, and 1% biofuel.[10] Up until the 1950s, Ontario's electricity system was almost 100 percent renewable hydroelectric power.



Nuclear	13,009 MW or 35%
Gas/Oil	10,277 MW or 27%
Hydro	9,065 MW or 24%
Wind	4,486 MW or 12%
Biofuel	295 MW or 1%
Solar	424 MW or 1%

Figure 3: Ontario's current installed energy capacity by fuel type on Ontario's transmission system (IESO).

The introduction of non-renewable primary energy sources (i.e., fossil fuel and nuclear) to meet the power demands of increasing population, industrialization and urbanization has had two consequences: 1) the creation of waste by-products (i.e., the release of carbon

[10] IESO, 2020 http://www.ieso.ca/en/Learn/Ontario-Supply-Mix/Ontario-Energy-Capacity.

dioxide into the atmosphere from fossil fuel use and nuclear waste that must be managed for hundreds of thousands of years); and 2) increased system losses.

System losses include conversion losses which occur when energy is transformed from one form to another. For example, when natural gas is used to create electricity, more than 40% of the energy is lost as heat to the environment. In contrast, hydro-electric power is approximately 95% efficient. System losses also occur when energy is moved from location to another. For example, when electricity is conveyed from generating facilities to end-users over transmission lines energy is lost along the way as heat. These system losses reduce the efficiency of the system.

In 2014, Ontario completed the closure or conversion of all coal-fired power plants to natural gas delivering several environmental and health benefits, including the reduction of GHG emissions.[11]

Natural gas

Natural gas is a nonrenewable energy source which is used primarily for space heating, domestic water heating, and industrial steam and process heat, as well as electricity generation. Most of our natural gas comes from outside the province and has been delivered by interprovincial pipelines since 1958.

Gasoline and diesel

Gasoline and diesel are nonrenewable sources of energy that are primarily used as engine fuel for various types of transportation vehicles. They are mostly sourced from crude oil, almost all of which comes from outside Ontario and is imported from western Canada, the Atlantic offshore, and the United States.

1.2.3 The Modern Energy Transition

Growth in global primary energy consumption, and the contribution of fossil fuels to global energy consumption has been considerable in the last half century (Figure 4). Like many energy systems around the world, Canada's has become more centralized over the last century and more highly dependent on fossil fuels. Fossil fuels accounted for 87% of Canada's production of "primary" energy – i.e., energy found in nature before conversion or transformation.[12]

[11] Canadian Association of Physicians for the Environment, Ontario's Coal Plant Phase-out Produced Many Health and Environmental Benefits, 2017. https://cape.ca/ontarios-coal-plant-phase-out-produced-many-health-and-environmental-benefits/

[12] Source: Natural Resources Canada, accessed May 2020.

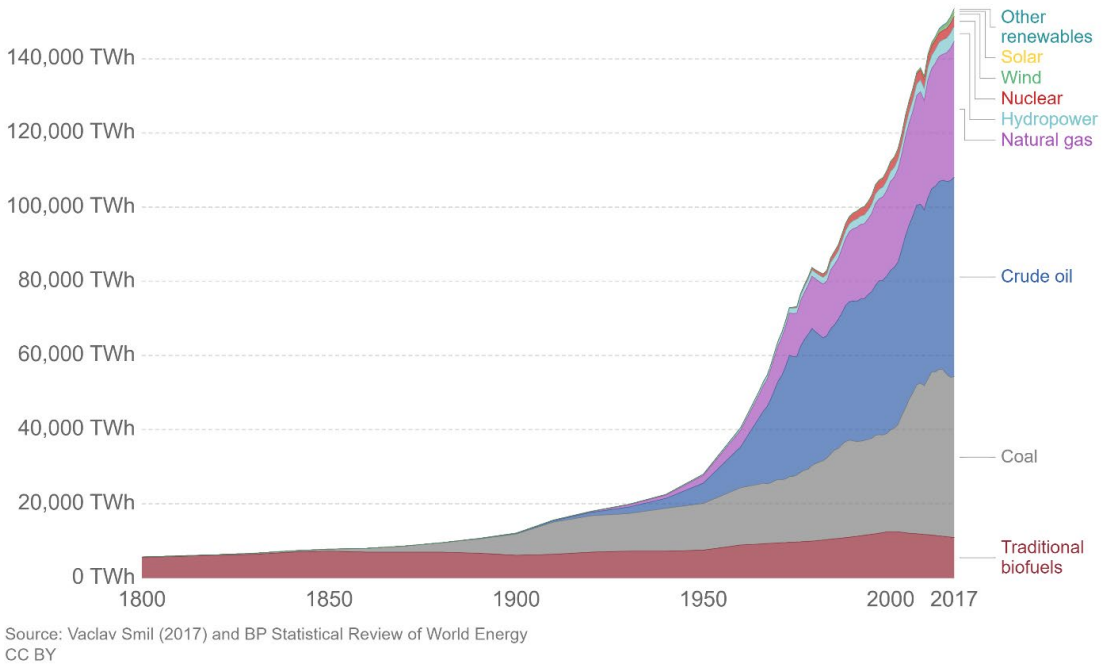


Figure 4: Growth in global primary energy consumption measured in terawatt-hours (TWh) per year from 1800 to 2017.[13]

Canada's energy use per Gross Domestic Product (GDP) is higher than the USA, European Union, and Japan, highlighting the opportunity to improve national energy productivity and to use energy more efficiently and realize significant economic and competitive advantages (Table 2).

Table 2: Regional energy productivity - energy consumption per Gross Domestic Product (GDP)- relative to the United States of America.

Region	Energy/GDP
USA	100
Canada	124
European Union	69
Japan	57
China	243
India	270
World	140

Ontario is experiencing a third energy transition which is driving towards decarbonization, and more localized and renewable energy sources. While climate change is a key factor driving the modern energy transition, others include:

- a rise in cost-effective technologies for generating and distributing energy locally,
- the convergence of communication and energy technologies,

[13] Source: https://ourworldindata.org

- systemic inefficiencies that have grown over time in our current centralized energy system, and
- growing concerns about energy security which includes consumer issues of affordability, accessibility, and reliability.

This modern energy transition is at least 50 years old. The oil crises of the 1970s revealed how vulnerable world economies were to fluctuations in global oil supply. Many governments took steps to buffer their national economies from future supply shocks, including Canada which invested heavily in Alberta and Saskatchewan oil sands development.

In contrast – and out of necessity – countries with little or no domestic oil and gas turned to local and renewable energy solutions to secure their energy needs. Now, almost half a century later, these countries are leaders in the transition to a decarbonized global energy system, exporting their energy technologies and expertise around the world. Two lessons from these countries' journey to lower emissions are: 1) the instrumental role of municipal governments in accelerating the transition; and 2) the importance of engaging community stakeholders to build more energy conscious and resilient communities.

1.3 Rural Sustainability

Global urbanization is proceeding at an unprecedented rate and is impacting rural sustainability. More than half of the world's population now lives in urban centres.

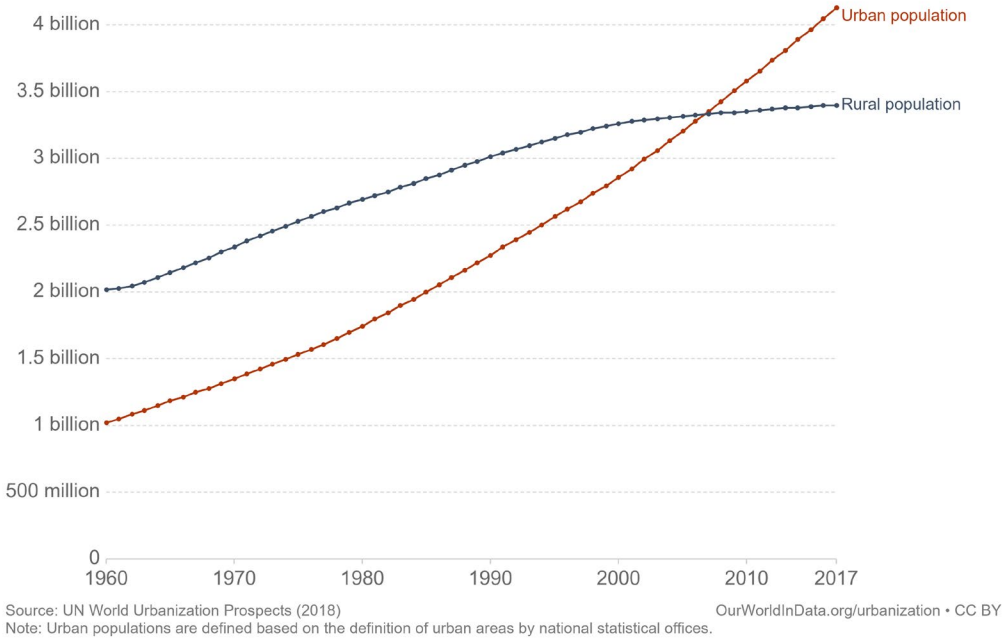


Figure 5: Number of people living in urban and rural areas, World, 1960 to 2017.

By 2050, urban population is expected to reach two thirds of total global population. By 2050, more urban areas and infrastructure will be built than currently exists. Nationally, more than 8 out of 10 Canadians live in urban and suburban areas and this is expected to increase as our population grows.

The energy transition has the potential to be a new source of rural jobs in addition to addressing environment and energy security concerns.[14] The Regional Energy Plan will provide a framework to balance these three objectives while ensuring clear benefits to local communities and engaging them in the process.

The Regional Energy Plan will support the County of Essex community to reap the economic benefits of the ongoing modern energy transition by ensuring reliable, cost-competitive energy services to residents and businesses. The opportunity to support local economic development is significant. Local job creation occurs in three ways: 1) direct jobs are created by businesses that support improvements to energy efficiency (e.g., construction trades) or design, build and/or operate local supply and distribution systems; 2) indirect jobs are created in supply chains that deliver goods and services to businesses in the direct job category; and 3) induced jobs are created when the newly-hired workers in direct or indirect jobs spend their new earnings on goods and services. The provision of competitive energy services also serves to attract and retain investment in a community.

1.4 The Coronavirus

The world is experiencing two global crises – climate and the coronavirus. The coronavirus recovery requires employment and sustained economic development. The climate crisis requires urgent restructuring of energy efficiency and supply as the community level to be carbon free by 2050. There is growing recognition of the value of bringing these two imperatives together. The Regional Energy Plan is a key first step in being prepared for potential alignment. Even before COVID-19, the economic stimulus opportunity of “Green New Deals” was increasingly being recognized. Global estimates to 2030 suggest a $26 trillion economic growth opportunity and the creation of millions of jobs.[15]

[14] Organisation for Economic Co-operation and Development, 2012: https://www.oecd.org/regional/regional-policy/Renewable-rural-energy-summary.pdf

[15] World Resources Institute, 2020https://www.wri.org/blog-series/the-26-trillion-opportunity

2. Scope of the Regional Energy Plan

This section provides an overview of community energy planning, the role of key stakeholders in community energy planning and why and how the Regional Energy Plan is being developed.

2.1 An Overview of Community Energy Planning

This section describes community energy planning from the perspective of energy use, energy related emissions and energy costs.

Why undertake community energy planning?

In addition to responding to the trends described above, community energy planning offers several positive economic, environmental, social, and cultural benefits including:

- reducing energy costs,
- creating green jobs,
- attracting new business,
  increasing energy efficiency,
- reducing greenhouse gas emissions,
- increasing energy security and
- enhancing resiliency to climate change.

2.1.1 Energy Use

Community energy planning helps establish local priorities for reducing energy use. The practice is based on the principles of the Trias Energetica which were developed by the Delft University of Technology. The Trias Energetica model was first developed to guide energy-efficient building design but has been adapted to address the overall energy productivity of a community and uses the following priorities:

1) Maximize end-use energy efficiency of homes, buildings, industry, and transportation.
2) Maximize the use of cogeneration, heat recovery and the use of renewable energy sources.
3) Optimize efficient teaming with traditional gas and electrical grids.

Community energy planning considers all local energy flows that impact activities within a community, from supply through distribution to its end use by consumers.

2.1.2 Energy Related Emissions

From an emissions perspective, community energy planning places an emphasis on reducing energy related emissions. Energy related emissions arise from the heating and cooling of our homes and buildings, the powering of industries and the movement of people and goods. Community energy planning may consider measures that address non-energy related sources of emissions, e.g., local opportunities for waste-to-energy or methane-to-energy.[16] However, the

[16] Non-energy related measures can include anaerobic composting, landfill gas capture and methane capture at wastewater treatment facilities.

scope of community energy planning does not include measures that sequester carbon dioxide to green infrastructure.[17]

2.1.3 Energy Costs

Community energy planning also identifies opportunities to keep energy dollars local by promoting energy conservation and efficiency as well as opportunities for local energy supply and distribution.

2.2 Roles in Community Energy Planning

The implementation of a community energy plan is a community-wide effort. Guided by an Engagement Plan, a wide variety of local stakeholders will be engaged in the development of Regional Energy Plan (see Section 2.3.1 – Regional Energy Plan Governance) to:

- earn community buy-in for the vision and goals,
- grow the capacity of the community to implement the plan, and
- motivate the public and community stakeholders to act.

2.2.1 What is the Municipal Role?

While implementation is a community-wide effort, municipal governments (including Counties and their member municipalities) are a key stakeholder and have 5 key roles:

Community facilitator

Municipal governments have the moral authority to convene stakeholders to establish a vision and goals for their community. An important success factor in the implementation of broad system-wide change is municipal endorsement and support of the vision and goals.

Municipal policy alignment

Municipal governments approve policies and by-laws that guide the growth and development of the community including housing and transportation systems. Consequently, they have an important role to ensure their policies and by-laws are aligned with the vision and goals of the plan. By doing so, they can establish a policy framework that enables local stakeholders and product and service providers in the transitioning energy market.

Economic development

Municipal governments, through their economic development departments and organizations, can play a key role in retaining existing businesses and attracting new businesses through the value-added opportunities identified by the plan.

[17] Carbon sequestration measures can include urban forestry, urban farming, green roofs, naturalization, and natural heritage protection. A co-benefit of sequestration measures can be the ambient climatic effects that shade, solar energy reflection, and transpiration have on energy use.

Corporate leadership

Municipal operations (e.g., facilities, fleet, transit) represent a small percentage of the energy use in a community. However, they have an important role to demonstrate corporate leadership in the community.

Education

Municipal governments have many opportunities to engage with residents and business owners to promote the benefits community energy planning and raise energy literacy.

2.2.2 What is the Community Role?

All sectors of the society – government, business, civil society, and individuals – have a role to play, whether it is reducing their energy consumption and GHG emissions through adopting new technologies or changing behaviour. The Regional Energy Plan will identify a strategy for the County of Essex to align stakeholder action for the greatest impact.

2.3 Regional Energy Plan Overview

In the past few years, climate change issues have become a greater priority for the Essex County Region. Over the past two years the community has been coming together to address climate concerns. The Climate Change Summit in 2018 resulted in the development of the Windsor Essex Climate Change Collaborative that brings together "community leaders, experts, regional stakeholders, and community members to move towards a low-carbon economy and improve our resilience to our changing climate". The regional collaborative is intended to build on the foundational work of local communities, including the City of Windsor's Climate Change Adaptation Plan and Community Energy Plan. The development of a Regional Energy Plan is the next step on this climate action journey.

2.3.1 Project Governance

A Project Working Team has been established and is comprised of representatives from the Essex Region Conservation Authority, the County of Essex, local utilities, and the consulting team. See Appendix 1 for details. The Project Working Team will lead the Regional Energy Plan's analytical and engagement processes and report their findings and recommendations to the Community Task Force.

A Community Task Force has been established and is comprised of a broad cross-section of local stakeholders and is responsible for approving the final Regional Energy Plan and recommending it to Essex County Council for endorsement (Appendix 2). The mandate and work of the Community Task Force is guided by a Charter (Appendix 3).

2.3.2 Project Methodology

The project methodology will follow the following key steps:

1. Establish a baseline for energy use, energy related emissions and energy costs for 2019.
2. Establish goals for energy use, energy related emissions and energy costs for 2041.
3. Model energy use, energy related emissions and energy costs in 2041 with no action.
4. Undertake efficiency simulations that consider global best practice and local opportunities.
5. Recommend a preferred strategy to achieve the 2041 goals.
6. Identify priority projects for the first five years.

2.3.3 Project Reporting

Project reporting to the Community Task Force has been designed to support implementation and consists of a set of five documents (Table 3).

Table 3: Regional Energy Plan Project Reporting

Report	Purpose
Rationale & Scope (this document)	• Summarizes the rationale and scope for the Regional Energy Plan
Analytical Summary	• Summarizes the 2019 baseline and 2041 base case • Provide energy mapping • Provides scenarios and options
Project Working Team Recommendations	• Provides the Project Working Team recommendations
Summary & Implementation Strategy	• Documents the Task Force recommended strategy based on the inputs from the Project Working Team
Engagement Summary	• Summarizes the Engagement Plan results

2.3.4 Strategic Framework

Figure 6 illustrates the strategic framework for the Regional Energy Plan and forms the backbone of the *Summary & Implementation Strategy Report*.

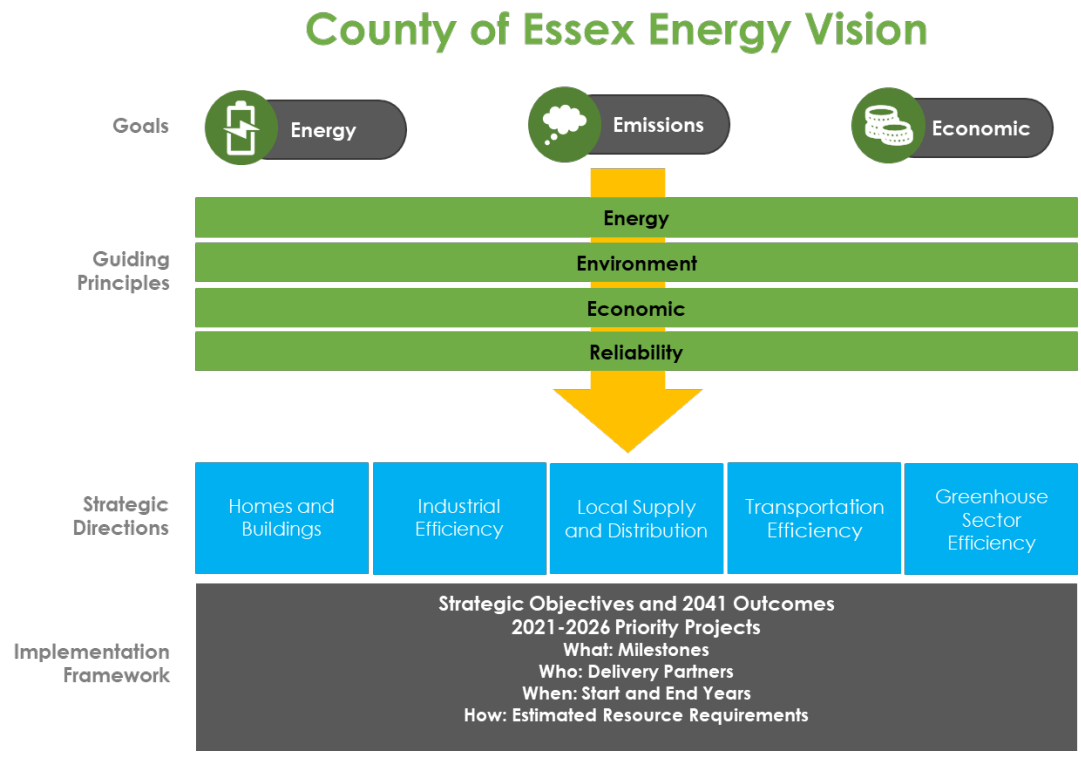


Figure 6: Strategic Framework for the Regional Energy Plan

Appendix 1 - Glossary of Terms

Base Case – a "business-as-usual" future projection of energy use, emissions and/or costs.

Baseline – energy use, emissions and/or costs at certain point in time.

Carbon Footprint – the amount of greenhouse gases released due to an activity, event, organization, person, etc., considering all relevant sources, sinks and storage, and expressed as carbon dioxide equivalent. An individual or organization's carbon footprint is the total amount of greenhouse gases released from supporting their needs, lifestyle, and daily life choices.

Carbon neutrality – achieving net zero carbon dioxide emission by balancing carbon dioxide emissions with carbon dioxide removal or eliminating carbon emissions altogether.

Carbon sinks and sequestration – the capture and storage of carbon dioxide, through means such as urban forestry, urban farming, green roofs, naturalization, and natural heritage conservation. This can result in other energy-related benefits like the ambient climatic effects that shade, solar energy reflection, and transpiration provide. Community energy planning often does not include measures that sequester carbon dioxide through green infrastructure.

Centralized energy systems – supply of energy through large-scale energy generation infrastructure that delivers energy via a vast distribution network, often far from the point of use.

Climate change – refers to changes in global climate patterns caused by increasing level of atmospheric greenhouse gases arising from human activities.

Climate mitigation – decreasing the human-induced sources of climate change to reduce future impacts, such as minimizing the amount of greenhouse gas emitting fossil fuels burned for energy or enhancing carbon sinks that store greenhouse gases.

Cogeneration or combined heat and power – is an energy efficient technology that generates electricity and captures the heat that would otherwise be wasted to provide useful thermal energy – such as steam or hot water – that can be used for space heating, cooling, domestic hot water and industrial processes. Combined heat and power systems produce electricity and thermal energy from a single fuel source (e.g. natural gas, biomass). When electricity is generated in large scale regional gas-fired power plants, as much as 60% of the energy value is lost (most as heat at the point of generation and the remainder during transmission). This systemic inefficiency can be addressed by generating electricity within the community and capturing the heat for use in a district energy system.

Community – in the context of community energy planning, the word "community" is meant to be inclusive of all citizens, groups and stakeholders that share the common attribute of being residents with a prescribed geographic boundary and direct and indirect consumers of energy.

Community energy plan(ning) – is a data-informed approach to understanding where and how energy is used and emissions released in a community to identify local opportunities and priorities for increasing energy efficiency, reducing greenhouse gas emissions and lowering energy costs.

Community Improvement Plan – is a land-use planning tool that allows a municipality to direct funds and implement policy initiatives toward a specifically defined project area.

Community Task Force – represents the team of community champions and principal advisors for a Community Energy Plan.

Conversion (energy transformation and losses) – the process of changing one type of energy to another (e.g. wind (mechanical energy) to electricity, electricity to heat (thermal energy). From energy source to site use, energy can undergo multiple transformations. During each energy conversion, an amount of energy is lost through heat (waste heat).

Decentralized/distributed energy systems – small-scale energy generation, operation, and/or energy storage used to provide an alternative to or an enhancement of the traditional electric power grid.

Deep decarbonization – measures to significantly reduce and/or sequester carbon dioxide emissions, with an ultimate objective of zero carbon dioxide emissions

District energy – district energy systems supply thermal energy (heating and/or cooling) to multiple buildings from a central plant or from several interconnected but distributed plants; thermal energy is conveyed with water through a close network of pre-insulated pipes to meet end users' need for cooling, heating and domestic hot water. Historically, steam networks have been used and are still used in some older systems. A district energy system is comprised of three sub-systems which include the collection and/or generation of thermal energy, the distribution of that thermal energy from the plant(s) to end-users and the transfer of the thermal energy to the energy consumer.

Efficiency Case – the Efficiency Case considers how different combinations of energy efficiency measures can impact the projection of a community's energy future.

End energy – the energy we use in our home and buildings and industrial processes and transportation.

Energy efficiency – using less energy to perform the same task and eliminating energy waste.

Energy Performance Labels – measure and display the energy efficiency and environmental impact (e.g. greenhouse gas emissions) of an item, such as a home, building, appliances, etc.

Energy security – maintaining an adequate and resilient supply of energy (electricity, liquid fuel, and gas) while also addressing issues of affordability, accessibility, and reliability.

Energy transition – a major and long-term structural change in energy systems, often including a significant transformation in how energy is sourced, distributed, and/or utilized.

Framing Goals – framing goals are established at the beginning of the analytical process and are used to evaluate the performance of the Base Case and Efficiency Case simulations.

Gigajoule (GJ) – the gigajoule is a unit of measurement of energy. A gigajoule is 1 billion joules.

Global Best Practice – method or technique that is generally accepted as superior to the alternatives because it produces results that are superior to those achieved by other means. For community energy planning, global best practice is achieved in Northern Europe/Nordic countries, where municipalities have taken the lead in developing and implementing community

energy plans that result in order of magnitude improvements in energy efficiency and over 50% reductions in per capita GHG emissions.

Greenfield – in an urban context, undeveloped land typically dominated by agriculture, open space, and/or natural heritage features.

Greenhouse gas – any gas that absorbs thermal radiation from the sun and emits it back into the earth's atmosphere, including water vapour, carbon dioxide, methane, nitrous oxide, and ozone. Without them, the average temperature at the surface of our planet would be around -18^{o}C rather than 15^{o}C.

Integrated Energy Master Plan (IEMP) – the equivalent of a Community Energy Plan but developed at the scale of a portfolio of properties, or a neighbourhood or subdivision.

Modern energy transition – the current energy transition underway being driven by the decarbonization and the localized distribution of energy.

Near-net zero (NNZ) neighbourhood – near net zero implies little or no energy is drawn from the electricity grid or from pipelines, and little or no greenhouse gas emissions are released.

Project Working Team - comprised of municipal and utility representatives and the consulting team leading the analytical and engagement processes.

Provincial Growth Plan – the Growth Plan for the Great Golden Horseshoe established population and employment targets for 2041 for all municipalities within the region. Municipal official plans within this region must be in conformity with these targets.

Regional Energy Plan – the equivalent of a Community Energy Plan but developed at the scale of a region.

Resiliency - Resilient communities can absorb, recover, and prepare for future shocks (economic, environmental, social & institutional).

Site energy – considers the energy use of at the meter by end-users (e.g., homes, buildings, industry, and transportation).

Source energy – considers all energy flows from production to end-use.

Standardized retrofits – a consistent set of modifications to existing buildings designed to improve energy efficiency or decrease energy demand.

Thermal utility - A district energy network is typically run as a thermal utility by a company that operates all the plants and networks, ensures service quality, and manages the metering and billing of the heating and cooling services. The network allows for economies of scale since the generation of heat in a few larger plants is more efficient than having thousands of boilers each heating their individual building. It also enables valuable energy currently wasted in electricity generation, industrial and other processes to be cheaply captured and delivered to other consumers.

Tonne – a tonne is a metric tonne.

Transmission (of energy) – the movement or delivery of energy from its point of generation to point of consumer/site use, and usually referring to the transmission of electricity across specialized cables or structures.

Urban Centre – an urban area with high population density.

Appendix 2 - Community Task Force Charter

Purpose of Community Task Force Terms of Reference

This document outlines the role of the Community Task Force (CTF) for the Essex County Regional Energy Plan (ECREP). It also presents guidelines for how the CTF will operate, including how and when meetings will take place. This document may be amended as the Community Energy Plan progresses. Any amendments to this Charter and Terms of Reference will be done in consultation with the Project Working Team (PWT) and Community Task Force members. The Project Working Team includes representatives from Essex Region Conservation Authority and the County of Essex, and a team of consultants led by LURA Consulting and Garforth International.

Project Overview

In the past few years, climate change issues have become a greater priority for the Essex County Region. Over the past two years the community has been coming together to address climate concerns. The Climate Change Summit in 2018 resulted in the development of the Windsor Essex Climate Change Collaborative (WEC3) that brings together "community leaders, experts, regional stakeholders, and community members to move towards a low-carbon economy and improve our resilience to our changing climate". The regional collaborative is intended to build on the foundational work of local communities, including the City of Windsor's Climate Change Adaptation Plan and Community Energy Plan. Most recently in September 2019, the Windsor Essex County Environment Committee (WECEC) approved a recommendation to declare a climate emergency for the area. Since then, the City of Windsor, the County of Essex, the Town of Amherstburg, and the Town of Tecumseh have joined over 500 Canadian municipalities in declaring a climate emergency.[18]

The next step of the WEC3 is the development of the ECREP that will help the community to better understand current energy consumption, identify opportunities for improved energy performance while realizing positive economic, environmental, social and cultural action including:

- Reducing energy costs
- Creating green jobs.
- Attracting new business.
- Increasing energy efficiency.
- Reducing greenhouse gas (GHG) emissions.
- Increasing energy security.
- Enhancing resiliency to climate change.

Purpose

The Community Task Force (CTF) is a team of community champions and advisors for the ECREP. With guidance from the County o Essex and the Essex Region Conservation Authority, the CTF will be the champion of ECREP implementation, involving community stakeholders and the public to:

[18] https://climateemergencydeclaration.org/climate-emergency-declarations-cover-15-million-citizens/

- Earn community buy-in for the goals and strategies of the ECREP, including approval by County Council.
- Grow the capacity of the community to implement the ECREP.
- Motivate the public and community stakeholders to act.

Members will be the public voice of the ECREP development process, communicating the plan's economic, environmental, social and technical energy merits to their existing networks, community groups and the public with meaningful and relatable messaging.

At the same time CTF members will act as listeners to ensure full integration of the ECREP's analytical outcomes with the community's values and perspective. Based on that engagement, and with the member's collective expertise and influence, the CTF will establish the ECREP's vision for Essex County. The CTF will then help shape the implementable strategies to achieve that vision.

The nature and scope of the strategies will require action that extends well-beyond government and include business owners, homeowners, and community leaders. Rooted in the community, the CTF will help ensure non-governmental action is taken and hold the municipality accountable, leading a combined effort in the successful implementation of the ECREP.

Mandate

The Community Task Force is a non-political advisory committee guided by this Charter. It provides an opportunity for key stakeholders representing different perspectives to discuss development of the ECREP, including vision, goals, strategies, targets, and implementation.

The mandate of the CTF is to provide an ongoing mechanism for input and advice to the Project Working Team (PWT) on key points in the development of the ECREP. The CTF will participate in the development of each step of the work and will also deliberate on and review input received from public and other stakeholders engaged in the process.

The role of a CTF member includes:

- Acting as a sounding board for the PWT to share and discuss ideas and findings at meetings.
- Providing guidance, critiques and suggestions on proposed concepts, and potential strategies.
- Sharing technical advice and knowledge to help provide context and a well-informed planning process.
- Actively participating and sharing knowledge during discussions on energy strategies and implementation.
- Identifying potential issues or concerns and how these might be addressed.
- Participating in two-way communication between members' constituencies and the PWT.
- Attending all the CTF meetings whenever possible.
- Coming prepared to meetings by reviewing any reports or materials prior to the meetings and having comments, questions and concerns previously identified.
- Providing active support for final Council approval.
- Serve as an ongoing champion for ECREP implementation.

Work Plan

It is proposed that the CTF meet up to six times over the course of the development of the ECREP, between Spring 2020 and Winter 2021. Meetings will be convened in-person or online

as appropriate.

The table below includes a general work plan to illustrate the topics proposed for CTF meetings. It may be amended as the ECREP progresses. The work plan anticipates that the CTF will provide input and feedback on the topics discussed at each meeting. It is important that the meeting topics are adhered to in order to ensure the onward development of the project. If a member of the CTF is unable to attend a meeting, they will be encouraged to send any feedback and concerns to the PWT prior to the scheduled meeting. All meetings are assumed to occur virtually until further notice.

Meeting	Meeting Topics & Purpose	Tentative Timing
#1	• Understand project scope. • Understand and agree to the CTF role. • Understand the benefits and co-benefits of community energy planning. • Understand framing goals. • Identify areas for further analysis or clarification. • Discuss engagement activities.	**Jun. 16th, 2020**
#2	• Review baseline and base case and energy maps. • Develop vision and goals. • Discuss potential scenarios and energy conservation options. • Identify areas for further analysis or clarification. • Appoint Chair and Co-Chair. • Discuss engagement activities.	**Jul./Aug. 2020**
#3	• Receive results of analysis (baseline, based case and energy maps) • Confirm scenarios and options. • Identify areas for further analysis or clarification. • Discuss engagement activities.	**Sept. 2020**
#4	• Understand preliminary recommendations. • Identify areas for further analysis or clarification. • Discuss engagement activities.	**Oct./ Nov. 2020**
#5	• Review and confirm that all public and stakeholder feedback has been addressed appropriately. • Understand final recommendations • Understanding implementation considerations. • Discuss final engagement activities. • Confirm the future role of CTF.	**Dec. 2020**
#6	• Approve Implementation Strategy with Project Working Team • Approve engagement summary	**Feb. 2021**

Membership

CTF membership is included in **Appendix 3**.

The following are the key terms and conditions of CTF membership:

- Members understand, accept and agree to abide by this Charter.
- Members are willing to commit to participate on the CTF throughout the duration of the ECREP process (six meetings over approximately eighteen months).
- Members agree to attend as many CTF meetings as possible.
- Members will strive to complete work in a timely fashion and be prepared for all CTF meetings.
- Through their participation on the CTF, members agree to ensure a two-way flow of information between the organizations they represent and the Project Working Team (PWT).

Term of Membership

Membership in the CTF is for the duration of the project – starting in late Spring 2020 and concluding not later than Fall 2021.

Contacts

The main points of contact for all CTF correspondence are:

Claire Sanders

Climate Change Specialist

Essex Region Conservation Authority

CSanders@erca.org

Susan Hall

VP, Partner

LURA Consulting

shall@lura.ca

Decision Making

It is envisioned that a consensus-based approach – where members seek general agreement on advice and recommendations to the Project Team – will be the operating mode for the CTF. If consensus is not achieved, differing perspectives and viewpoints will be recorded and noted in the CTF meeting summaries.

Meeting Management, Agendas and Reporting

The following procedures will be used in convening meetings of the CTF:

- Meetings will be scheduled approximately one month in advance, and subject to confirmation based on the project schedule.
- LURA will prepare and distribute agendas and any materials to CTF members in advance of each meeting.
- The CTF co-chairs will be consulted on agenda items of each meeting.
- LURA will prepare summaries noting action items and key points from each CTF meeting. Summaries are circulated to the CTF members following each meeting for review and are approved at the following meeting.
- CTF members will receive project information made available to the public.
- CTF members will be encouraged to support, attend and participate in community engagement.

CTF Meeting Co-Chairs

- CTF members select co-chairs at their second meeting.
- Supported by LURA, the co-chairs approve final meeting agendas, preside over meetings and coordinate the activities of the CTF.
- The co-chairs will support LURA to develop and approve meeting process rules and other procedures related to committee effectiveness, as required.
- Assist ERCA in drafting and sharing communiques (public) following meetings.
- The co-chairs are the spokespersons for the CTF.
- The co-chairs will be selected from different sectors.

Advisors and Experts

The CTF may wish to invite or request additional advisors or experts (i.e. County staff) to attend at various points during the project. Considerations will be given to each request by the PWT and will be subject to timing, availability and budget considerations.

Reporting Relationship

The CTF is acting in an advisory capacity to the Project Working Team (PWT), and is not responsible for the decisions made by the PWT. Consequently, it will be asked only to receive the outputs of their work. However, in view of their mandate, they will be asked to approve the final ECREP strategy including vision, goals, strategic directions and objectives and priority projects. By participating as members of the CTF, members are not expected to waive their rights to participate in the democratic process and may continue to avail themselves of participation opportunities through other channels.

Appendix 3 - Membership

Community Task Force

Stakeholder	Contact Name
Atlas Tube	Thomas Boutros
Bonduelle	David April
Caldwell First Nation	Nikki Orosz
Citizens Environment Alliance	Derek Coronado
City of Windsor	Kyle Bassett (on leave) Karina Richters
County-wide Active Transportation System	Katherine Wilson
Diageo	Erica Whitehead
Elected official, County of Essex	Warden McNamara
ELK Energy	Mark Danelon
Enbridge	Chris Hamilton Carolyn Suter Brian Lennie
Erie Shores Health Care (Leamington Hospital)	Jason Keane
Essex Powerlines	Joe Barile Marco Calibani
Essex Soil & Crop Improvement Association / Agris	Alex Michinski
Great Essex District School Board	Kathleen Quenneville
Green Sun Rising	Klaus Dohring
Greenhouses – Mucci & Aphria	TBC
Hanson Consulting	Dan Hanson
Harrow Research & Development Station	Terry Attewell Cathy Bakes
Hydro One	Gillian Lind
IESO	Rouselle Gratela
Leamington Chamber of Commerce	Wendy Parson
Libro Credit Union	Audrey Pillon

Stakeholder	Contact Name
Ministry of Energy	Josh Shook
Municipal Representatives	Chad Jeffery (Tecumseh) Frank Garardo (Amherstburg) Larry Silani (LaSalle) Niharika Bandaru (Essex) Sahar Jamshidi (Leamington) Shaun Martinho (Kingsville) Truper McBride (Lakeshore)
Ontario Greenhouse and Vegetable Growers Association	Dr. Fereshteh Arab
St Clair College	Peter Panzica
Transit Windsor (LaSalle, Leamington)	Jason Scott
University of Windsor	Dr. Paul Henshaw
Walpole First Nation	Janet MacBeth
Windsor Construction Association	Jim Lyons
Windsor Essex Chamber of Commerce	Rakesh Naidu
Windsor Essex Community Housing Corporation	Obaid Shah
Windsor Essex County Environment Committee	Meraal Yared
Windsor-Essex Catholic School Board	Julie DiDomenico

Project Work Team – County of Essex / Essex Region Conservation Authority

Group	Name
Project Manager	Claire Sanders, Climate Change Specialist, ERCA
CEP Strategy	Richard Wyma, General Manager, ERCA
Policy & Planning	Rebecca Belanger, Manager of Planning Services, CoE
GIS Data & Mapping	Cathy Paduch, GIS Technician, CoE
Finance	Sandra Zwiers, Director of Finance, CoE
Communications	Renee Trombley, Manager of Corporate Communications and Accessibility Danielle Stuebing, Director of Communications and Outreach Services, ERCA
Economic Development	Marion Fantetti, Windsor Essex Economic Development Corporation
Transportation	Krystal Kalbol, Manager, Transportation Planning & Development
County Engineering	Jane Mustac, Director of Infrastructure Services, CoE
Enbridge	Chris Hamilton Brian Lennie
Hydro One	Gillian Lind
Essex Power	Joe Barile Marco Calibani
E.L.K.	Mark Danelon
Ontario Greenhouse and Vegetable Growers Association	Dr. Fereshteh Arab

Project Work Team – Consultants

Group (Consulting team)	Name
Project Manager	Katie Rinas, Sheridan College
CEP Strategy	Susan Hall, LURA Consulting Peter Garforth, Garforth International llc
Buildings Energy	Ajit Naik, Baumann Consulting Oliver Baumann, Baumann Consulting
Transportation Energy	Peter Garforth, Garforth International llc
Energy Supply & Distribution **CEP Integration**	Gerd Fleischhammer, Ingenieurbüro Gerd Fleischhammer
Engagement	Susan Hall, LURA Consulting Karen Farbridge, Karen Farbridge and Associates Melissa Gallina, LURA Consulting
Municipal Policy	Rob Kerr, *Robert* J. *Kerr* and Associates
Administration	Cindy Palmatier, Garforth International llc