

# Energy conservation and demand management plan

July 1, 2019

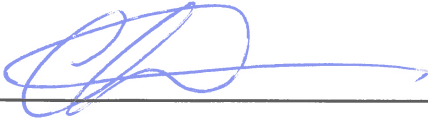


The Region of Peel Energy Conservation and Demand Management Plan in compliance with Ontario Regulation 507/18

## Approval

The Region of Peel's Energy Conservation and Demand Management Plan, July 1, 2019, has been completed in accordance with Electricity Act 1998, Ontario Regulation 507/18, Broader Public Sector Reporting: Energy Reporting and Conservation and Demand Management Plans and hereby meets all the requirements of the regulation.

Approved by:

A handwritten signature in blue ink, consisting of several loops and a long horizontal stroke extending to the right, positioned above a solid black horizontal line.

Name: Christine Tu-Parker

Title: Director, Office of Climate Change and Energy Management

Date: June 27, 2019

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## 1 Purpose Statement

This Energy Conservation and Demand Management Plan (ECDMP) is developed by the Region of Peel in compliance with Ontario Regulation (O. Reg) 507/18. In 2014 the Region developed its first ECDMP in compliance with Ontario Regulation 397/11.

With the repeal of the Green Energy Act, 2009, O. Reg. 397/11 (Energy Conservation and Demand Management Plans) was moved to the Electricity Act, 1998 and re-named as O. Reg. 507/18 (Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans). No changes were made to the regulation's requirements.

O. Reg 507/18 requires the Region to report on the following:

1. What are the achievements of the from the first ECDMP plan (1 July 2014 – 30 June 2019);
2. Report on current and proposed conservation measures for energy conservation and demand management, and;
3. The expected results from these future measures for the future five years (1 July 2019 – 30 June 2024).

These three requirements are addressed in detail in this ECDMP document. In addition, this ECDMP document outlines some of the steps the Region has taken to demonstrate its commitment to acting on climate change.

## 2 About the Region of Peel

The Region of Peel works with residents and partners to create a healthy, safe and connected Community for Life for more than 1.4 million people and 173,000 businesses in the cities of Brampton and Mississauga and the Town of Caledon. Peel's services touch the lives of residents every day. Recognized as a leader in management and service delivery, the Region of Peel is the only government organisation at any level to receive Excellence Canada's Platinum Award for Excellence, Innovation and Wellness.

The Region has been actively engaged in energy management since 2006, achieving significant energy savings through the implementation of the Region's first Energy Management Plan in 2006. This early plan set the foundation for integrating strong energy management principles into corporate practices. In 2013, the Region adopted the Energy and Environment Sustainability Strategy (EESS) and in July 2014 the Region published its first Energy Conservation and Demand Management Plan.

## 3 Climate change statement of commitment

In November 2017, Regional Council endorsed the Region's first Climate Change Statement of Commitment (Resolution 2017-891):

The Region is committed to leadership and action on the important societal issue of climate change, as concrete actions to mitigate and adapt to the effects of climate change will lead to a sustainable community for future generations.

This climate change statement of commitment conveys to the residents of Peel Region the strong commitment of Regional Council with respect to climate change governance and action. The

commitment is aligned to Regional Council's vision of a Community for Life for Peel residents and the 20-year strategic plan outcome to live in a community that is environmentally friendly.

Regional Council will ensure concrete action is taken to mitigate and adapt to the impacts of climate change, to provide tangible benefits for residents today, and ensuring future generations will have access to resources that support a healthy, safe and connected community.

The following principles are reflective of Council's commitment and oversight to ensure progress in addressing climate change:

- **Engagement:** Establishing a coordinated and collective approach to addressing climate change, since no one institution can solve this complex issue.
- **Balanced approach:** Strategies and actions will strike a balance between growth and environmental stewardship.
- **Transparency:** Ensuring that Peel residents are aware of the long-term outcomes expected by Council and receive regular reporting of progress.
- **Innovation:** Encouraging innovative approaches and technologies to have the maximum impact on climate change.

## 4 The Office of Climate Change and Energy Management

As a further demonstration of the commitment to taking action on climate change and to allocate the appropriate resources to this commitment, the Region established the Office of Climate Change and Energy Management (OCCEM).

The OCCEM has the lead role in enabling the Region to effectively respond to climate change and energy management needs. The OCCEM is working collaboratively with all Regional departments to provide expertise and strategic direction to integrate and implement climate change and energy management measures into policy, practice and decision-making.

### 4.1 OCCEM mandate

Working with you to create a low carbon, resilient community for life through principles of shared leadership, balance, transparency and innovation.

### 4.2 OCCEM role

To enable regional services and community partners to embed climate change and energy management principles into practice.

### 4.3 OCCEM responsibility

To provide the expertise, knowledge, strategy and tools to achieve divisional goals, climate change master plan and organisational outcomes.

### 4.4 Strategic goals for the OCCEM

The OCCEM has set the following five goals for the next five years:

1. Develop the guidance and tools needed to embed climate change principles into business as usual across the Region

2. Deliver value-added participation in coordinated strategic and capital planning and implementation with key partners
3. Engage, educate and inspire Council, Executive Leadership Team (ELT) and all staff to be shared leaders in addressing climate change and energy challenges
4. Ensure efficient and effective team operations that support the achievement of service and strategic outcomes

Coordinate with community partners, provide expertise and shape effective advocacy

## 5 Corporate Climate Change Master Plan

The OCCEM is developing the Region of Peel 10-year Climate Change Master Plan (the “Master Plan”). The Master Plan aims to achieve the following five outcomes by 2030, which were endorsed, in principle, by Regional Council (April 25, 2019) pending final Master Plan approval in fall 2019:

1. **Reduce emissions:** A sustainable community is provided through progressive leadership committed to reducing the organisation’s Greenhouse Gas (GHG) emissions\* to 45 per cent below 2010 levels by 2030; and a sustainable community for future generations is maintained
2. **Be prepared:** A safe, secure and connected community is provided by ensuring Regional services and assets are more resilient to extreme weather events and future climate conditions
3. **Build capacity:** Climate change is considered in all decision making through organisation-wide climate literacy, planning and accountability
4. **Invest:** Innovative and sustainable approaches that are used to finance action on climate change
5. **Monitor and report:** Progress on addressing regionally funded climate change work is consistently reported, available and widely understood

Regional staff will work towards finalizing the Master Plan, including seeking stakeholder engagement with partner members of Peel’s Community Climate Change Partnership, which has representation from all three lower municipalities and both conservation authorities.

### 5.1 Climate Change Leadership Committee

The OCCEM chairs an organisation-wide Climate Change Leadership Committee (the “Committee”) with representative members from key departments across the organisation. The mandate of the Committee is to bring an organisational focus and to ensure the greatest impact with respect to adapting to and mitigating the effects of climate change.

This is possible through capital, operational, service improvements to clients that consider environmental impacts, financial accountability, sustainability and demonstrating that the Region is a government that is future-oriented and accountable.

*\* Gases that trap heat in the atmosphere are called greenhouse gases. Climate change is caused by the increase in emissions of greenhouse gases into the atmosphere. These increases are primarily due to human activities from use of fossil fuels. GHG emissions are mostly measured in equivalent Tonnes of Carbon Dioxide (TCO2e)*

## 6 Overview of energy consumption at the Region of Peel

The table below depicts the corporate energy consumption (electrical and natural gas) against Regional services for the year 2017. The Region reports on data from 2 years prior, as 2017 is the most recent year for available GHG conversion factors from the National Reporting Inventory.

Regional Services	Electricity [kWh]	Natural Gas [m <sup>3</sup> ]
Asset management	10,878,242	594,105
Child care	20,599	12,962
Infectious disease prevention	104,517	10,379
Early growth	52,258	5,190
Chronic disease prevention	52,258	5,190
Heritage, arts & culture	997,854	65,978
Housing support	75,032,381	7,696,606
Long term care	11,155,811	1,531,538
Paramedics	2,998,372	344,923
Police	13,642,606	1,031,845
Waste	9,126,040	501,753
TransHelp	387,881	41,671
Road and transportation	775,762	83,341
Wastewater	93,740,451	1,963,500
Water	189,198,600	1,113,664
<b>Totals</b>	<b>408,163,632</b>	<b>15,002,644.00</b>

*Table 1: Electricity and Natural Gas usage per regional service*

The Region's water services, which treat and supply water throughout the Region and to an extent, York Region, are the largest consumers of electricity, accounting for 46% of the Region's total electricity consumption.

Housing support is the highest consumer of natural gas, accounting for 51% of the total natural gas usage across the Region, due to the need to provide all residential units with sufficient heat.

Due to a cleaner electricity grid, GHG emissions from natural gas usage are almost 3.5 times greater than for electricity.



## 7 Region of Peel energy conservation and demand management results (2014 – 2019)

The following section contains highlights of some of the achievements of the Region in energy conservation and demand management during the previous ECDMP timeline (2014 – 2019).

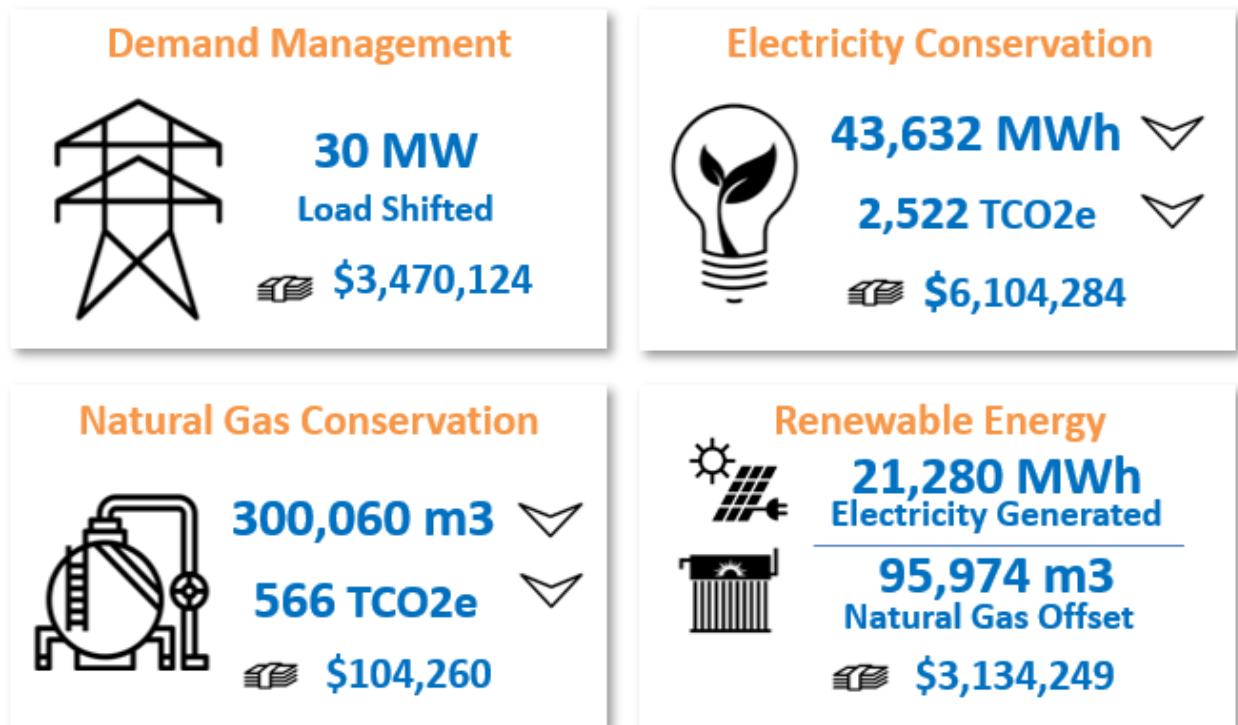


Figure 1: executive summary of ECDM results of the Region (2014 – 2019) \*

### 7.1 Electrical demand management, Industrial Conservation Initiative, 2017 – 2018

Through participation in the Industrial Conservation Initiative (ICI), the Region has derived cost benefit from billing optimization as well as load shifting. Load shifting in the ICI program requires the Region to reduce its peak demand coincidental with the 5 peaks of the Independent Electricity System Operator’s peaks. This results in a significant cost avoidance of utility peak demand. The Region first participated in the ICI program in 2017. Between 2017 and 2018 the Region was able to **shift 30 MW of peak load and incur cost avoidance of \$3,470,123**

In 2017, the Region’s GE Booth waste water treatment plant **shifted 7.4MW** of load and incurred **cost avoidance of \$876,692**.

In 2018, the Region’s two water treatment plants and four pumping stations were able to **shift a total of 23 MW of load** during the five coincidental peaks. The result was a **cost avoidance of \$2,593,431**.

Table 2 and Figure 2 below presents the total load reduced in 2018 and associated cost avoidance at the various water treatment plants (WTP) and pumping stations (PS)

Location	Load Reduced MW	Cost Avoidance
Lorne Park WTP	4.9	\$ 544,759
Lakeview WTP	7.0	\$ 775,119
Hanlan PS	4.3	\$ 476,953
Becket Sproule PS	3.4	\$ 377,156
Meadowvale PS	1.3	\$ 146,820
Airport PS	2.5	\$ 272,625
<b>Total</b>	<b>23.4</b>	<b>\$ 2,593,432</b>

Table 2: load shifted and cost avoidance for GA participation in 2018

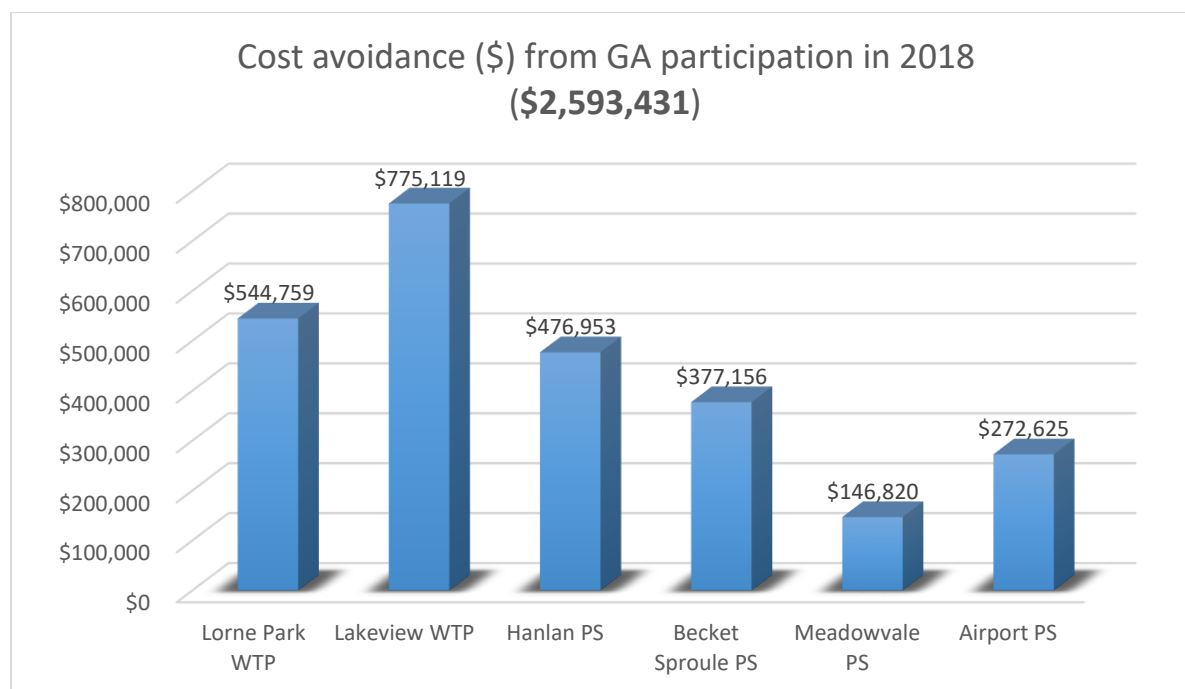


Figure 2: cost avoidance (\$) from GA participation by location

## 7.2 Electricity conservation projects over the past five years

The Region participates in the Independent Electricity Systems Operator (IESO) funded energy manager program. Through this program, over the five-year period between mid 2014 and mid 2019 the Region reported cumulative **electricity savings of the magnitude of 43,632 MWh**. This translates to **2,522 TCO<sub>2</sub>e emissions offset** and an **estimated cost saving of \$6,104,284**.

Table 3 below highlights the top five completed projects which have generated the largest electrical energy savings in MWh and the associated cost savings.

Select Projects with Large Electrical Energy Savings		
Project Title	MWh Savings	Cost saving (\$)
Peel Living LED lighting retrofit	5,201	\$632,680
Street lights upgrade from HPS to LED	4,086	\$612,900
Lighting retrofit at Integrated Waste Management Facility	471	\$70,582
Voltage Optimization Device at Lakeview Promenade - PILOT	139	\$22,920

Table 3: Selected projects with Large electrical energy savings

Below are some highlights from these projects:

#### 7.2.1 LED lighting retrofit at Peel Living

This project saw 49 Peel Living buildings across the Region went through an LED lighting retrofit, in which 16,515 lamps were retrofitted to LED.

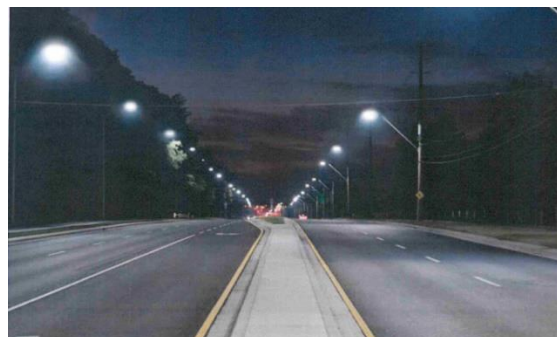
This resulted in a 50% reduction of lighting energy consumption and energy savings in the magnitude of **5,201 MWh and \$598,965 in cost savings**.

#### LED Lighting Retrofits



#### 7.2.2 Street lights upgrade from HPS to LED

This project upgraded all street lighting on Regional roads in the City of Brampton from HPS (High Pressure Sodium) to LED. The project replaced 4300 lights and resulted in electrical energy savings of **4,086 MWh and cost savings of \$612,900**.



#### 7.2.3 Lighting retrofit at Integrated Waste Management Facility

The Region of Peel's Integrated Waste Management Facility includes a material recovery facility, a waste transfer station, and an organics processing facility.

The facility's lighting is provided by 279 high bay luminaires illuminating waste transfer and material recovery parts of the building. The installed lighting fixtures were metal halide lamps, which were upgraded to 100/ 200W LED lightings. As depicted in Figure 3 below, the project resulted in 10 times increased illumination for staff (as seen in the images below), electricity savings of **480,000 kWh**; 24 tonnes of CO2e emissions reduction and **\$77,000 cost avoidance**



**Before:** Light fixtures with 400W bulbs



**After:** Combination of 200W and 100W integrated LED light fixtures.  
**Illumination is 10 times brighter!**

Figure 3: before and after photos of the site with LED lighting upgrades

#### 7.2.4 Voltage Optimization at Lakeview Promenade (Peel Living: Affordable Housing Program) – Pilot Project

The Voltage Optimisation Device is installed in this facility’s parking garage, which is near the electrical room at the point where power enters the building and optimizes incoming voltage. By operating equipment at a reduced and controlled voltage level, equipment runs with greater efficiency, saving energy, while reducing costly premature equipment failure and extending a product’s life expectancy.

The project achieved **138 MWh of energy** and **cost savings of \$22,920**

#### 7.3 Incentivised natural gas conservation projects savings

The following Table 4 presents natural gas conservation projects for which the Region received incentives from Enbridge Gas. **The Region has offset 300,060 m<sup>3</sup> of natural gas usage.** This has resulted in **reduced emissions to the magnitude of 566 TCO<sub>2</sub>e** and **cost saving of \$104,260.**

Selected projects with large natural gas (NG) savings			
Location	Project Description	NG Savings (m3)	Enbridge Gas Incentive (\$)
Peel Manor Long Term Care (LTC)	Boiler retrofit	116,153	\$ 21,825
Gardenview Court, Peel Living	Heating boiler and Domestic Hot Water (DHW) boiler installation	52,794	\$ 35,410
Sheridan Villa LTC	Heating plant upgrade	41,000	\$ 20,923
Malton Village LTC	Ozone laundry	10,150	\$ 49,216

Table 4: Selected projects with Large Natural Gas savings

Below are highlights from some of these projects:

### 7.3.1 Boiler plant upgrade at Peel Manor

The boilers at Peel Manor LTC were at their end of life and were due for an upgrade. The boilers were upgraded to condensing boilers with high efficiency pumps and controls. This resulted in **offsetting 116,153 m<sup>3</sup> of natural gas usage** at the site which translates to **219 TCO<sub>2e</sub> offset from the site**.

### 7.3.2 Heating plant upgrade at Gardenview Court (Peel Living)

A capital retrofit project at Gardenview Court, completed in 2017, included system upgrades to both natural gas central hydronic heating and domestic hot water heating systems, including high efficiency condensing boilers, new main circulating pumps with variable speed drives, new system piping, DHW storage tanks and insulation operating on building automation system control.

This successful retrofit upgrade project **resulted in 52,794 m<sup>3</sup> of natural gas which resulted in 100 TCO<sub>2e</sub> offset** and helped the Region achieve strategic energy management and environmental outcomes and establish high performance energy efficiency equipment and system design standards for future projects implemented in the Peel Living affordable housing program.

### 7.3.3 Ozone laundry at Malton Village

At the Malton Village LTC Centre, the central laundry facility was retrofitted with ozone technology. As depicted in figure 4 below ozone gas is produced, this gas is injected into the washer and dryer. The use of natural ozone gas as a sanitary agent reduces washer and dryer runtime, thus resulting in a reduced **natural gas usage of 10,150 m<sup>3</sup> and 19 TCO<sub>2e</sub> offset**.

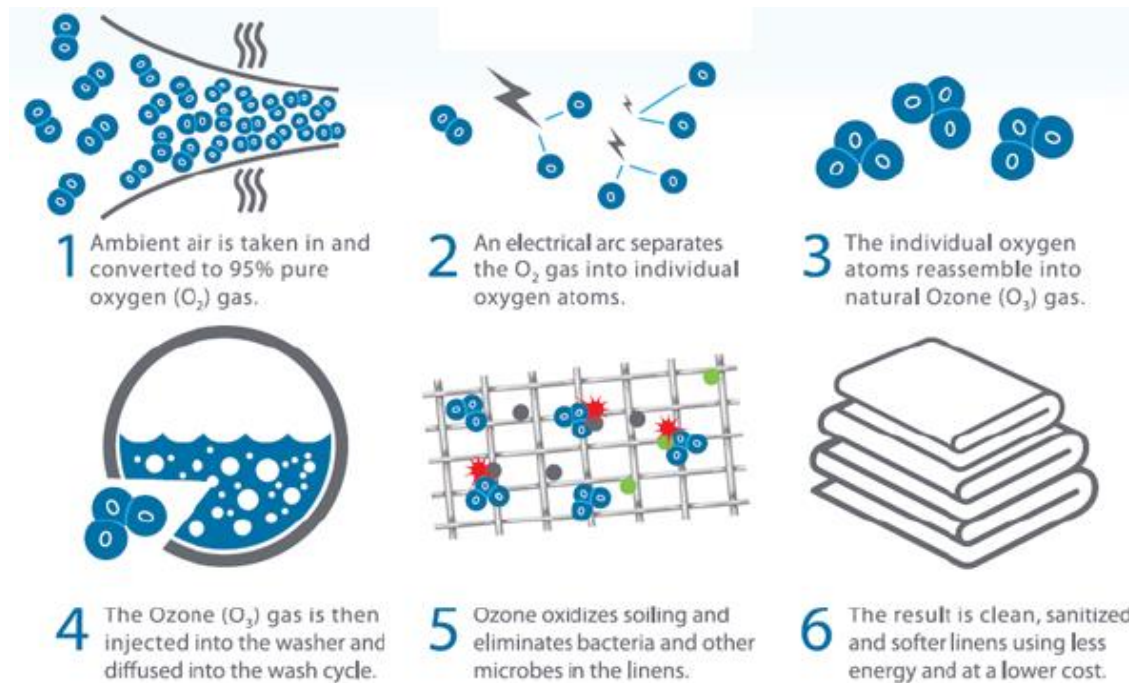


Figure 4: Ozone laundry process

## 7.4 Renewable energy generation projects

Over the past five years, the Region **generated more than 21,000 MWh of electricity**, that is enough electricity to power 380 households for five years. In addition, with the use of Solar Domestic hot Water



projects the Region and **offset 95,947 m<sup>3</sup> of natural gas use** from renewable sources. **The total cost savings from both streams is \$3,134,249.** Figure 3 below highlight specific projects and their renewable energy generation.

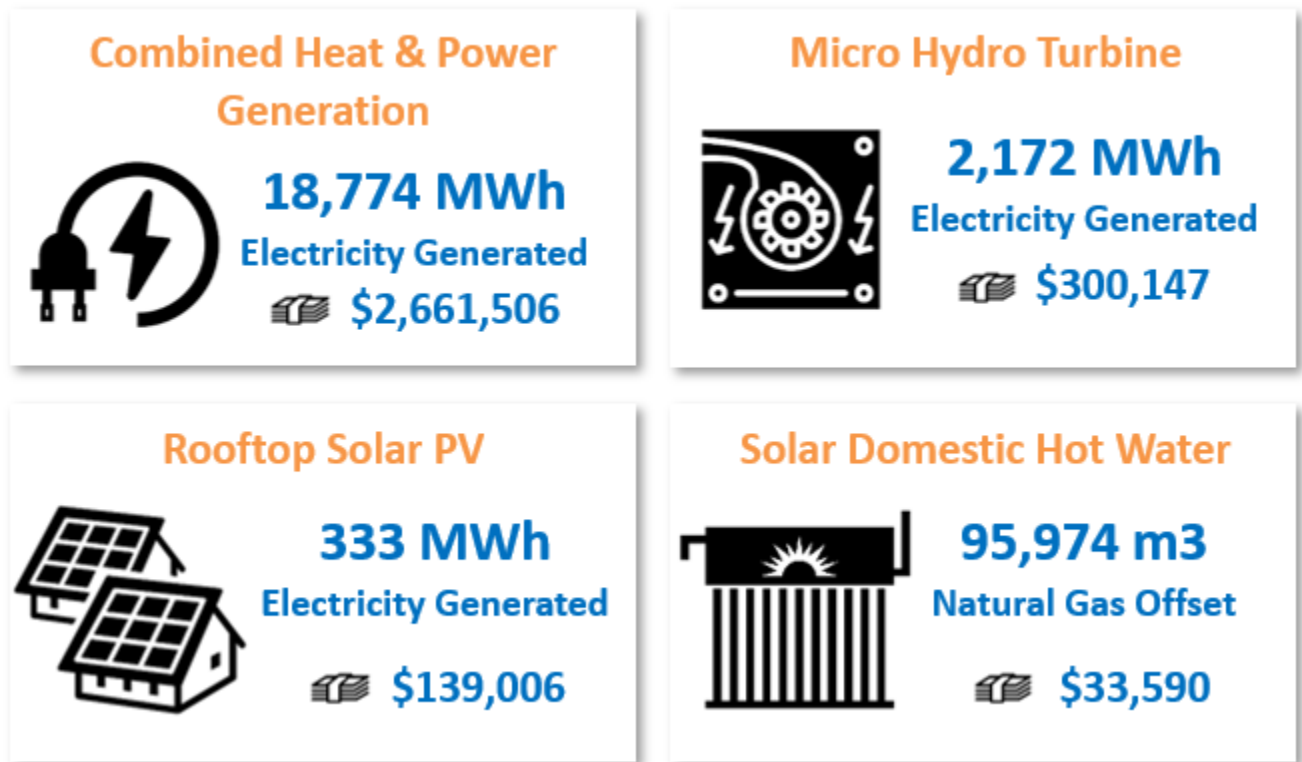


Figure 5: executive summary of Renewable energy generation by the Region

#### 7.4.1 Combined heat and power generation

In August 2015, the Region installed a 1.4MW Bio Digester Gas fuelled Combined Heat and Power (CHP) plant at the Clarkson Wastewater Treatment Plant in Mississauga.

The plant generates renewable energy from biogas produced from the wastewater treatment process. The biogas runs a generator which generates electricity for use at the plant.

Since in-service date, the CHP plant has **produced 18,774 MWh of electricity and cost savings of \$2,661,506.**



#### 7.4.2 Micro Hydro Turbine

In April 2015, the Region installed a 225 kW Micro Hydro Turbine at the Clarkson Wastewater Treatment Plant in Mississauga.

At the plant, before the effluent is released into Lake Ontario, the effluent is conveyed by an open channel to a drop shaft which disperses the effluent under the surface of the lake 2.2 km away from the

shore. The effluent falls by gravity approximately five metres into the drop shaft, where the water surface level is slightly higher than the level of the lake. This provided an opportunity to install the turbine to capture the kinetic energy of the water and generate electricity. The generated electricity is used at the plant.

Since its inception, the Micro Hydro Turbine has **generated 2,172 MWh of electricity and cost savings of \$300,147.**

#### 7.4.3 Roof top solar photovoltaic

The Region has Solar Photovoltaic (PV) of sizes ranging from 10kW to 30kW installed at several locations. Some of these installations were part of the IESO Feed-in Tariff (FIT) Program. Solar PVs convert the sun's radiation into electrical energy.

Over the past five years these **roof top Solar PV installations have generated nearly 333 MWh of electricity and received FIT (Feed-in-tariff) contract payouts of \$139,600.**



#### 7.4.4 Solar Domestic Hot Water

Solar Domestic Hot Water (SDHW) captures the thermal energy of solar radiation and transfers that heat to domestic hot water usage, thus reducing the need to heat water through natural gas fired water heaters.

These SDHW systems have provided enough thermal energy over the past five years to off set natural gas usage by **95,974 m<sup>3</sup> which resulted in cost savings of \$33,590.**



## 7.5 Electric vehicle charging stations

The Region has installed 45 electric vehicle (EV) charging stations across 12 locations that are accessible to staff and visitors, these include two Level-3 DC fast charging stations. Since the launch of the EV infrastructure at the Region, more than 16,100 charging sessions have taken place which have resulted in 204,728 kWh of energy delivered to EVs. As a result, EVs on Regional roads have offset 194 TCO<sub>2e</sub> emissions as compared to fossil fuel vehicles as summarised in Figure 4 above.

The Region was able to garner incentives and funding for the EV infrastructure of more than \$300,000.

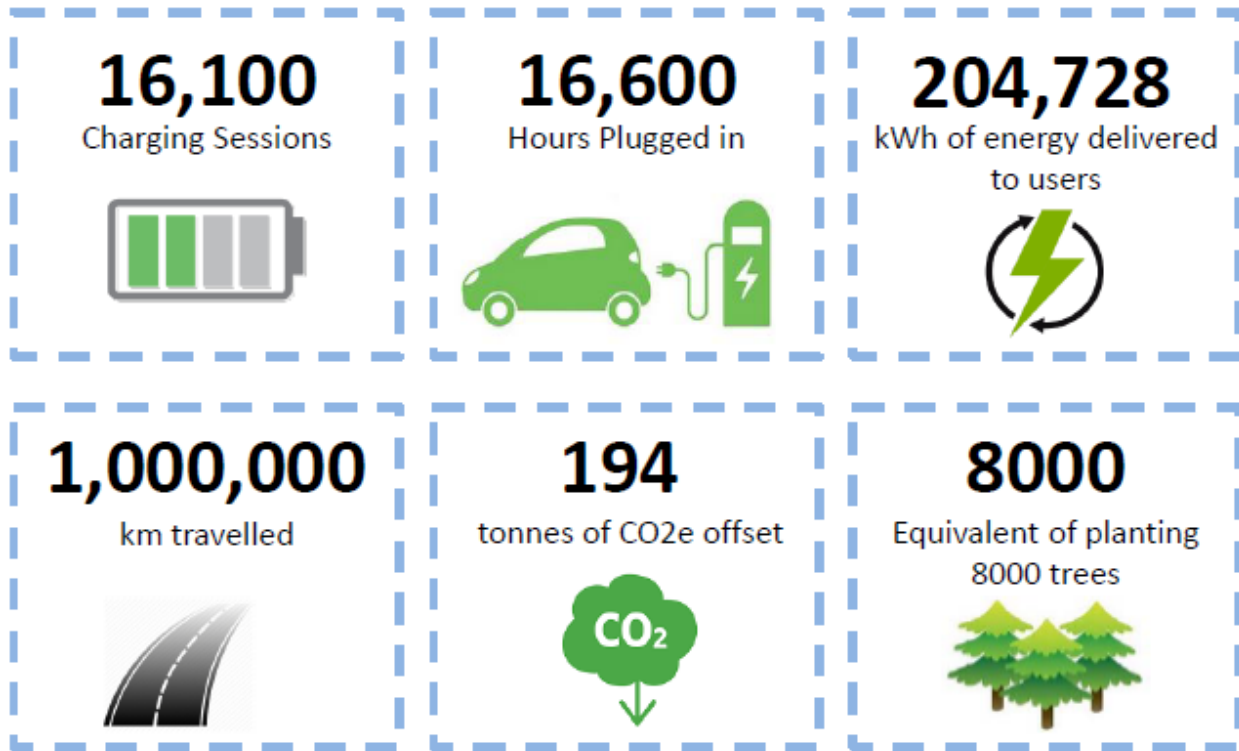


Figure 6: Summary of EV charging station energy data from launch (June 2017 to May 2019)



## 7.6 Education and raising awareness on climate change

As part of efforts to educate Regional staff and members of the community and to raise awareness on the issues of climate change, the OCCEM hosted or supported several events, which included:

- **Climate Control Rooms:** these staff engagement events generated greater awareness in staff on future climate projections and vulnerabilities in Peel.
- **Earth Hour and Earth day:** The purpose of these events include building staff knowledge on the organisation’s climate change and energy management risks and vulnerabilities, and how the Region of Peel is addressing them. Held annually in March and April.
- **Work of Wind:** Community art installation event co-hosted by University of Toronto Mississauga and Blackwood Gallery to raise awareness about climate change impacts and actions that residents can take to reduce their impacts and become more resilient.
- **Peel Art Gallery Museum + Archives (PAMA) Family Sunday Fun Day:** Climate change exhibit for families held at PAMA to learn about their carbon footprint and what they can do to counter climate change.
- **PAMA Exhibit – Peel in a Changing Climate:** An exhibit showcasing climate change issues within the context of Peel Region and highlighting the positive action being taken by the Region of Peel, area municipalities and environmental partners including Toronto and Region Conservation Authority (TRCA) and Credit Valley Conservation (CVC).
- **Tenant engagement with affordable housing:** In collaboration with Peel’s Housing Services Corporation (HSC), several tenant engagement events were held at select affordable housing locations to raise awareness of energy conservation with the tenants.



Figure 7: picture to the left is a tenant engagement session. Picture on the right is of a climate control room at the Region

## 8 A description of planned and proposed measures for managing energy

The Region shall continue to build upon its efforts and successes of energy conservation and demand management through feasibility studies, detail design analysis, enhanced standards and specifications. The Region will continue to explore energy conservation and demand management opportunities in the following areas:

### 8.1.1 Planned measures: state of good repair (SoGR)

Through proactive maintenance, assets are renewed and maintained. At end of life equipment is upgraded with newer, more energy efficient technologies. Over the next five years, nearly 40% of all SoGR work will have an energy reduction impact (See Figure 5). This translates to 168 individual energy related projects.

Existing capital plan budget allocations will drive these projects, the end result will be both electricity and natural gas conservation. These will have a cost saving and will reduce the Region's greenhouse gas emissions. These projects will be implemented at various facilities including Peel Living, Waste Operations, and Long-Term Care. Additionally, these projects are aligned with the Region's asset management planning cycle.

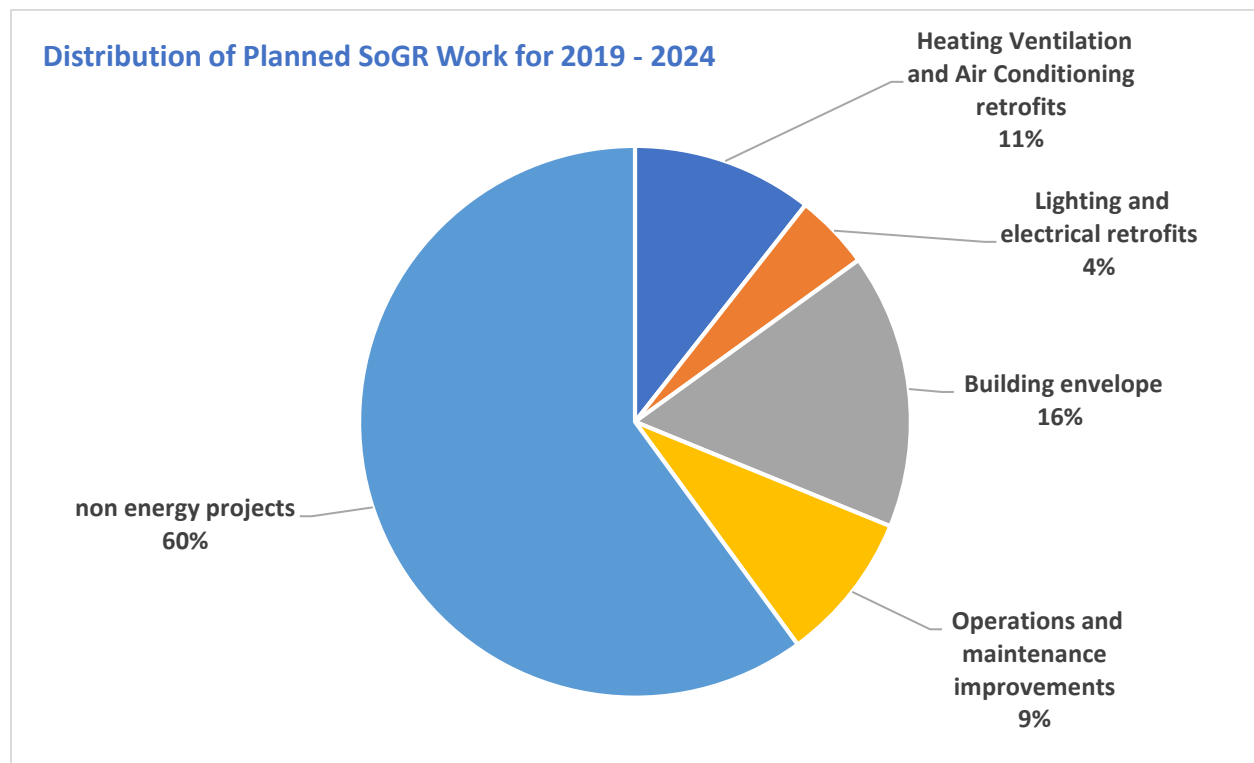


Figure 8: Distribution of Planned SoGR work from 2019 to 2024 related to energy and non-energy projects

The SoGR projects related energy reduction and can be categorized based on the following measures:

- i. **Lighting retrofits** – such as LED lighting, occupancy sensors and lighting controls.

- ii. **Operations and maintenance improvements** – such as upgrading equipment for producing hot water with more efficient technology, including controls.
- iii. **Heating, Ventilation and Air Conditioning (HVAC) retrofits** – such as upgrades to HVAC equipment with more efficient technology (ex. heat pumps).
- iv. **Building envelope improvements** – such as upgrades to glazing, roofing, wall assemblies that improve thermal (heat) efficiency of the building.

It is estimated that these projects, once successfully implemented over the five-year time frame, will save 31,000 MWh of electricity and 1,500,000 m<sup>3</sup> of natural gas which will result in estimated cost savings of \$4,400,000. The cumulative effect is estimated to reduce greenhouse gas emissions by 2,900 TCO<sub>2</sub>e. The savings are from only state of good repair work.

#### 8.1.2 Future measures for energy management

In addition to this planned state of good repair work, through the Independent Electricity Systems Operator's Energy Manager program, the 2019 Energy Conservation and Demand Management Plan provides direction to explore a series of other electricity conservation projects that have a strong business case and could result in an additional 7,000 MWh electricity reduction. These projects are being explored outside of traditional state of good repair capital planning and will therefore require additional budget. These projects range from lighting upgrade and controls to HVAC as well as advanced heating controls in residential buildings.

#### 8.1.3 Build capacity

The Region will continue its efforts around capacity building through awareness raising and education sessions with staff, LTC residents and housing tenants, through days such as Earth Hour and Earth Day, training sessions and workshops.

In addition, the Region will proactively develop in-house, Region of Peel specific standards and guidelines that facilitate the achievement of stated climate change commitments.

The Region shall also explore opportunities for training related to new technology developments such as geo-exchange, building automation systems, energy analytics and net zero emissions.

#### 8.1.4 Renewable energy generation

The Region will further explore opportunities for renewable energy generation in the following areas:

- a. **Solar PV and solar thermal projects**
- b. **Energy storage:** this can be done through a wide array of technology systems (batteries, thermal, fly wheels etc.) facilitating cost reduction and helping to create a more resilient energy infrastructure.
- c. **Energy from waste process:** generates energy from waste systems through waste incineration and generating renewable natural gas from aerobic waste processing.

The Region is also exploring the needs of various stakeholders for developing a **Renewable Energy Strategy**, which captures specific energy needs and alignment with opportunities to meet those energy needs through renewable sources.

### 8.1.5 Demand management

Demand management involves shifting / reducing peak demand at times coincidental with the electricity grid's peak load, which results in significant cost avoidance of utility peak demand. The Region shall continue participating in the Industrial Conservation Initiative (ICI), Global Adjustment (GA) program. The ICI is a form of demand response that allows participating customers to manage their GA costs by reducing demand during peak periods.

Customers who participate in the ICI pay GA based on their percentage contribution to the top five peak Ontario demand hours (i.e., peak demand factor) over a 12-month base period.

The Region is investigating the possible inclusion of sites in addition to the water treatment plants and the pumping stations to qualify for ICI and participate in the GA program. The replicability of historical ICI results may be limited due to future construction and process constraints at the Region's wastewater treatment facilities

## 9 Pilot performance-based conservation

The Region is exploring the potential of a performance-based conservation pilot for setting targets and forecasting energy conservation results across the organisation. Using a database of similar buildings within a similar geographic area, pilot will compare Regional buildings against those buildings that have better energy performance and propose measures to enhance energy performance of Regional buildings.

As a pilot, the Region will be considering two service outcomes:

- i. Asset Management (two administrative buildings)
- ii. Housing Support (five residential buildings)

The targets shall represent a level of energy performance that could be achieved through implementing best energy management practice and maintenance of facilities.

## 10 Alignment to the Climate Change Master Plan

As noted in Section 4.3, the Region is developing a 10-year Climate Change Master Plan, the Master Plan will provide the roadmap and targets for bold climate change mitigation and adaptation actions that will enable the Region to meet stated climate change commitments.

Once the Master Plan is approved and adopted by Regional Council, amendments to this ECDMP will be made available, including:

1. more details on current and proposed measures for energy conservation and demand management;
2. forecast of expected results (energy savings and GHG reductions) using a comprehensive list of current and proposed measures



## 11 Glossary of Terms

**BAP:** Business-as-Planned.

**Biogas:** Gases produced during the breakdown of organic materials (e.g.: methane).

**Carbon dioxide (CO<sub>2</sub>):** A gas found in the Earth's atmosphere and is a result of many natural and human activities. Carbon dioxide is a notable greenhouse gas.

**CHP:** Combined Heat and Power. A process where electricity is generated using a fuel source (e.g.: RNG) and any useful heat energy resulting from this step is captured and used (i.e.: for heating). This allows for more efficient use of the fuel source.

**CVC:** Credit Valley Conservation. A conservation authority within Ontario and an environmental partner with the Region of Peel.

**DHW:** Domestic Hot Water. Any potable water used for domestic purposes (i.e.: consumption and hygiene), excluding heating and commercial practices.

**ECDMP:** Energy Conservation and Demand Management Plan.

**EESS:** Energy and Environment Sustainability Strategy.

**ELT:** Executive Leadership Team.

**FIT:** Feed-in Tariff. A policy mechanism that aims to encourage investment in renewable energies.

**GA:** Global Adjustment.

**GHG:** Greenhouse Gas. These gases absorb and radiate heat energy easily and help maintain the Earth's temperature. If emitted in excess quantities, they can have negative impacts to the Earth's climate.

**HPS:** High Pressure Sodium lights. Typically used in street lighting and outdoor area lighting applications.

**HSC:** Housing Services Corporation.

**HVAC:** Heating, Ventilation, and Air Conditioning.

**IESO:** Independent Electricity System Operator.

**IWMF:** Integrated Waste Management Facility. A facility which can process multiple waste streams.

**Kinetic Energy:** The energy associated with something in motion. This can then be captured and used to generate electricity (e.g.: using flowing water to drive a turbine).

**kW:** Kilowatt. A unit of electrical power.

**kWh:** Kilowatt hour. A unit of electrical energy.

**LED:** Light-emitting diodes. Consume considerably less energy than most conventional light sources, while achieving similar or better lighting performance.

**M&V:** Measurement and Verification.

**Methane:** A flammable gas which results from many natural and human activities and is an important source of fuel. Methane is a potent greenhouse gas.

**MW:** Megawatt (equal to 1,000 kilowatts). A unit of electrical power.

**MWh:** Megawatt hour (equal to 1,000 kilowatt hours). A unit of electrical energy.

**MRF:** Materials Recovery Facility. A plant which processes and recovers useful materials from recyclable wastes. These materials are prepared and sold as input (“raw”) materials to manufacturers.

**NG:** Natural gas. A fossil fuel which consists primarily of methane.

**OCCEM:** Office of Climate Change and Energy Management.

**OPF:** Organics Processing Facility. A plant which processes green bin wastes (organics).

**Ozone:** A gas found naturally higher up in the Earth’s atmosphere. Ozone absorbs UV radiation and has good sanitizing properties.

**PAMA:** Peel Art Gallery, Museum and Archives.

**PS:** Pumping station. Infrastructure used to pump water to and from users. These stations also help maintain the water pressure in the pipes, allowing water to be transported over longer distances.

**(Solar) PV:** (Solar) Photovoltaics. A system which captures energy from sunlight to generate electricity.

**RNG:** Renewable natural gas. Derived from purifying and concentrating the methane found in biogas, yielding a product similar to natural gas.

**SDHW:** Solar Domestic Hot Water. A system which utilizes heat energy from the sun to heat water for domestic hot water use.

**SOGR:** State of Good Repair.

**TCO<sub>2e</sub>:** Greenhouse gas emissions expressed as equivalent tons of carbon dioxide (CO<sub>2</sub>) emissions.

**TRCA:** Toronto and Region Conservation Authority. A conservation authority within Ontario and an environmental partner with the Region of Peel.

**UV:** Ultraviolet. A component of the radiation from the sun.

**Wastewater:** Any water that has been exposed to human activity. This includes water from the sanitary sewers, storm sewers, surface runoff, etc. and requires treatment at an appropriate facility.

**WTP:** Water treatment plant. A facility which improves the quality of water to specifications for its intended use.

**WTS:** Waste transfer station. A building which temporarily houses wastes from collection vehicles before being transported to their appropriate treatment facility.