



Energy Conservation and Demand Management Plan

June 25, 2014

Background

The Green Energy Act

The *Green Energy Act, S.O. 2009*, outlines requirements for certain public sector agencies to report on their energy usage and to develop plans for future energy use reductions. These plans, known as Energy Conservation and Demand Management (CDM) Plans, will set objectives and targets to achieve reductions over the 5-year period prescribed by the Act. The act also requires certain organizations to report on greenhouse gas emissions; methodology approved by the Minister of Energy is used to convert energy usage into greenhouse gas emissions.

Energy Management Team

In early 2012, the County of Brant (County) created a staff team comprised of staff members from various departments to examine opportunities to save energy at County owned facilities. The team was sponsored by the General Manager of Corporate Services and co-chaired by the Capital Property Manager and the Senior Financial Analyst. As well as the representatives noted from various County departments, a representative from Brant County Power Inc. contributed to the team, as well as a representative from Brant Municipal Enterprises Inc. This team, as well as overseeing the development of the objectives noted in this plan, has participated in facility audits on a variety of County owned buildings and will help to oversee many of the initiatives outlined in this CDM plan.

Energy Conservation and Demand Management Plan Contents

The accompanying CDM plan contains the 6 following sections, as required by the *Green Energy Act*:

1. Summary of Energy Consumption and Greenhouse Gas Emissions
2. Objectives for Energy Conservation
3. Specific Measures for Achieving Energy Conservation Objectives
4. Measurement for Achieving Energy Conservation Objectives
5. Summary of Renewable Energy Initiatives
6. Approvals

These 6 sections are detailed in the following pages.

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Scope of CDM Plan

The table below indicates all of the municipal assets and facilities that are included and excluded in the scope of this plan:

“IN” Scope	“OUT” of Scope
County administrative facilities	County owned facilities that are operated by 3 rd parties through formal agreements
County operated community centers and arenas	County owned facilities that are rented to 3 rd parties through leases or other tenancy agreements
Facilities to support operational activities, including works yards, cemetery operations buildings, and storage buildings	Facilities owned and operated by independently managed corporate subsidiaries of the County
County operated water and wastewater treatment facilities	Social housing projects under joint ownership with the City of Brantford
	Facilities that are owned by the County but managed by joint boards (ie. John Noble Home)

A detailed listing of all facilities considered in this CDM plan is included as Appendix 1.

Timeline for CDM

This CDM plan is based on a 5-year horizon, starting on July 1, 2014 and ending on June 30, 2019.

Section 1 - Summary of Energy Consumption and Greenhouse Gas Emissions

As part of the *Green Energy Act*, certain public agencies are required to report their energy usage on an annual basis. For the purposes of this CDM plan, the reporting year of 2012 is utilized for the baseline for consumption reporting and for assessment of greenhouse gas emissions. Greenhouse gas emissions are calculated using the approved methodology outlined by the Ontario Ministry of Energy.

A summary of annual energy usage for the County is provided in the table below:

Energy Type	2012 Consumption	Greenhouse Gas Emissions
Electricity	9,226,626 kWh	738,130 Kg
Natural Gas	184,473 m ³	99,174 Kg
Propane	49,148 L	75,884 Kg
Furnace Oil	8,255 L	22,514 Kg

In total, energy usage at the County of Brant resulted in 935,702Kg of greenhouse gas in 2012. For the purposes of this CDM, these consumption and greenhouse gas emission figures will be used as the baseline for reduction targets over the next 5 years of the plan.

Section 2 - Objectives for Energy Conservation

Prior to completing this CDM plan, the County's Energy Management Team released an RFP for a consulting service to complete energy audits on 5 facilities that were considered to be broadly representative of the type and condition of a majority of County facilities. These audits have formed the framework for setting objectives in this CDM plan by taking the energy savings initiatives recommended in the audits and conservatively extrapolating these projected savings across the County's portfolio of buildings and facilities. Further, an assessment of converting the County's streetlighting assets to LED technology would add to the potential energy savings over the baseline year.

The County's objectives for energy conservation are outlined below:

Objective 1

Decrease overall energy usage by 15% from the baseline by the end of the CDM plan period

Objective 2

Decrease overall greenhouse gas emissions by 15% from the baseline by the end of the CDM plan period

Objective 3

For any new building projects, maximize energy efficiency by incorporating energy efficient building systems, innovative approaches to building envelope, and other feasible sustainability initiatives

Objective 4

Develop 1 megawatt of green energy generation technology by the end of the CDM plan period

The objectives outlined above are broad goals which can be achieved by implementing the specific measures outlined in Section 3 of this CDM plan.

Section 3 - Specific Measures for Achieving Energy Conservation Objectives

Below, a listing of broad measures are outlined that will help to achieve the County's energy conservation objectives. A more specific listing of projects is listed in Appendix 2. It is understood that this listing is incomplete, and that additional projects will be added as the facility audits contemplated below are undertaken.

Measure	Description
Energy Audits on Buildings and Facilities	Energy audits will be undertaken on all County facilities except for those considered to have nominal savings potential (ie. unheated storage buildings) or those considered to be surplus to the County's needs. The recommended projects from these audits will be analysed and added to Appendix 2 as they are deemed to be feasible. Audits will be conducted by consulting services, supporting organizations (ie. Ontario Clean Water Association), or by staff depending on the nature of the building.
Upgrade County Streetlights to LED Technology	County streetlight assets represent a significant portion of the County's annual electricity consumption. Conversion of these assets to energy efficient LED technology is expected to reduce this energy consumption by at least 50%. This conversion project is anticipated to be completed in 2014-2015, and is anticipated to generate savings that are adequate to fund the conversion project.
Light Fixture Upgrades	A number of new energy efficient lighting technologies are present in the marketplace. Conversion of existing fixtures to new lighting technologies can yield substantial savings. Conversion projects include replacing existing fluorescent T-12 fixtures to energy efficient T-8 fixtures, replacing internal incandescent fixtures with LED lamps, and replacing exterior metal halide fixtures with LED lamps or other newer technologies.
Heating, Ventilation and Air Conditioning (HVAC) Control Upgrades	The County's portfolio of buildings use a variety of heating systems, mostly controlled using programmable thermostats and mechanical / electrical time clocks. Conversion of these systems to direct digital control systems supported by occupancy sensors can improve both energy efficiency of the HVAC systems and also improve building comfort.

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Building Envelope Improvements	Most of the buildings in the County's portfolio are over 25 years old, with some exceeding 50 years. Many of these buildings have original building envelope features including windows, doors, insulation, and cladding. These features often result in inefficient building operation and higher energy use for heating and cooling. Capital improvements, ranging from window and door replacement to building insulation systems, can all help to decrease energy usage.
New Building Design	Facility renewal projects offer an excellent chance to achieve energy efficiency at the time of the build. Potential new facilities projected for the time period of this CDM include the following buildings: <ul style="list-style-type: none">– Ontario Provincial Police Detachment– Onondaga Fire Hall

These projects will be funded using one or a mix of the following options:

1. Through existing capital budgets;
2. Through new capital projects identified in future capital budgets;
3. Through financing plans whereby capital is raised through debt or from reserves and repaid by the future savings that accrue from the project (representing the difference between existing budgets and actual costs);
4. Through grants and incentives from Provincial or Federal programs aimed at conserving energy.

Specific project funding will be determined through business cases presented during the annual budget process.

Section 4 - Measurement for Achieving Energy Conservation Objectives

One of the ongoing requirements for public agencies under the *Green Energy Act*, is to annually provide a summary of energy usage. To determine whether the conservation objectives (Objectives 1 and 2) of this CDM are being met, the following annual methodology will be utilized:

1. Each year during the CDM plan, an annual summary of energy usage will be compiled similar to the baseline summary from 2012;
2. Energy usage from any new facilities built following the end of 2012 will be subtracted from this annual summary, so that the current analysis is consistent with the baseline data;
3. Annual volumes for natural gas, heating oil, and propane will be converted to "equivalent kilowatt hours using appropriate methodology and added to the total annual kilowatt hours of electricity used;
4. The annual equivalent kilowatt hours from the baseline year will be subtracted from those of the current year to determine the quantum of energy savings achieved by the CDM plan to date;
5. Annual usage for electricity and volumes for natural gas, heating oil, and propane will be converted to greenhouse gas emissions using Ministry of Energy methodology;
6. The annual greenhouse gas emissions from the baseline year will be subtracted from that of the current year to determine the quantum of greenhouse gas emissions avoided by the CDM plan to date;
7. An annual report will be provided to Council to report on the status of the County's energy conservation objectives.

Section 5 - Summary of Renewable Energy Initiatives

The County of Brant has a strong background with renewable energy initiatives through its relationship with Brant Renewable Energy, which is a division of Brant Municipal Enterprises Inc. and was formerly a part of Brant County Power Inc. These projects have all been enabled through the Ontario Power Authority's (OPA) Feed-in Tariff (FIT) program.

Currently, the County has deployed the following solar voltaic generation facilities through the OPA's microFIT program:

Project Location	Project Size (kW)	Date of Deployment	Ground or Roof Mount	Energy Generated Since Deployment (kWh)
Paris Fire Hall	10KW	07-Mar-12	Ground	36210
St. George Fire Hall	10KW	27-Mar-12	Ground	32740
Mt. Pleasant Fire Hall	10KW	07-Mar-12	Ground	36210
Paris Downtown	8KW	27-Mar-12	Ground	29250
Oak Park Water Tower	10KW	01-May-12	Ground	29690
Records Building	10KW	12-Oct-12	Roof	19304
Burford Fire Hall	10KW	06-Mar-13	Roof	17953
Paris Community Pool	10KW	30-Apr-13	Roof	12770
Airport Community Hall	10KW	16-Apr-13	Roof	15549
Onondaga Fire Hall	10KW	29-May-13	Roof	12370
Mt. Vernon Yard	10KW	06-Dec-13	Roof	5988
South Dumfries Yard	10KW	23-Dec-13	Roof	5121

Further to this, the County has 4 projects approved through the small FIT program offered by the OPA for renewable energy projects under 500kW. As per the rules of the small FIT program, priority points were given to projects that involved partnerships with groups that included First Nations communities and community cooperatives. The following County small FIT projects have received OPA approval and are pending construction, in partnership with the Brant Sustainable Energy Community Cooperative (Co-op), BGI Retail (BGI), and Six Nations of the Grand River First Nations Community (Six Nations):

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Project Location	Project Size (kW)	Partner	Ownership %	Status and Projected Completion
Brant Sports Complex	250kW	County	70%	OPA Notice to Proceed Received - September of 2014
		Co-op	30%	
South Dumfries Community Centre	100kW	County	70%	OPA Notice to Proceed Received - November of 2014
		Co-op	30%	
BGI Retail - Brant 403 Business Park	250kW	BGI	55%	OPA Notice to Proceed Pending - November of 2014
		County	30%	
		Six Nations	15%	
Oneida Business Park - Six Nations	500kW	County	15%	OPA Notice to Proceed Pending - November of 2014
		Six Nations	85%	

During the original intake for the large FIT program (renewable energy projects in excess of 500kW) in 2011, several applications were made for County renewable energy projects. These projects included a hydro-electric turbine at the Paris Dam, a ground mount solar project at the site of the former Paris Landfill, and a ground mount solar project at the site of the former Peart Aggregate Site near Paris. These project may or may not be reconsidered if the FIT program launches another intake for large renewable energy projects in excess of 500kW.

Section 6 - Approvals

This CDM plan received the following approvals:

County of Brant Energy Management Team	June 24, 2014
County of Brant Senior Management Team	June 18, 2014
County of Brant Council	June 24, 2014

APPENDIX 1 - Listing of Facilities Included in CDM Plan

Administrative Facilities

Paris Customer Service Office
Community Services Office
County Administration Centre - Burford
Records Storage Building
Oakland Customer Service Office
Onondaga Customer Service

Ambulance Stations

Ambulance Station - Henry St
Ambulance Station - Francis St
Ambulance Station - Alexander Ave

Community Centres

Oakland Community Centre
Airport Community Centre

Wastewater Pumping Facilities

MacPherson Dr Sewage Pumping Station
Paris Links Rd Sewage Pumping Station
Grandville Sewage Pumping Station
Willow Street Sewage Pumping Station
Grand River St N Sewage Pumping Station

Wastewater Treatment Facilities

Paris Sewage Treatment
St. George Waste Water Treatment Plant
Cainsville Lagoons
Airport Clarigester

Water Pumping Facilities

Mt. Pleasant Water-well/reservoir/pump station
Airport Water - well/reservoir/pump station
Paris Water - Gilbert wells & pump station
Paris Water - Parkhill Booster Pump Station
Paris Water - Sharpe Reservoir & Pump Station

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Water Treatment Facilities

St. George Water treatment
Paris Water - Telfer wells

Fire Stations

Paris Fire Admin Building
Paris Fire storage/training building
Airport Fire Hall
Cainsville Fire Hall
Burford Fire Hall
Scotland Fire Hall
Mt. Pleasant Fire Hall
St. George Fire Hall
Onondaga Fire Hall

Arenas

Burford Arena
Brant Sports Complex
South Dumfries Arena
Syl Apps Arena

Police Stations

OPP Station

Works Facilities

Paris Roads Building
Mt. Vernon Roads Building
Mt. Vernon Roads - Shed
Onondaga Roads
South Dumfries Roads Building
Mt. Pleasant Roads Building
Paris Water - storage building

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Appendix 2 - Listing of Specific Projects

County Facility	Energy Efficiency Project	Annual Energy Savings (kWh)	Annual Cost Savings (\$)	Est. Constr. Cost (\$)	Incentives / Grants (\$)	Net Cost (\$)	Simple Payback (years)
Burford Admin Office	Replace exterior lighting with new LED wall packs and canopy fixtures	9,980	1,165	6,290	500	5,790	4.9
Burford Admin Office	Replace 32W T8 lamps and ballasts with 28W T8 and ES-HE ballasts	19,990	2,325	16,870	2,360	14,510	6.2
Burford Admin Office	Upgrade to Direct Digital Controls	10,950	2,050	35,560	1,095	34,465	16.8
Mt. Vernon Public Works Garage	Upgrade High Bay fixtures to T5 High-bay & replace remaining T12 lamps and magnetic ballasts with 28W T8 and ES-HE ballasts	27,240	4,080	22,810	5,370	17,440	4.3
Mt. Vernon Public Works Garage	Replace exterior lighting with new LED wall packs	1,120	170	2,080	60	2,020	11.9
Sharpe Reservoir	Water Source HP Heating System	42,017	4,910	62,040	25,040	37,000	7.5
Sharpe Reservoir	Exterior - new LED wall packs	1,536	180	1,850	75	1,775	9.9
Sharpe Reservoir	Replace T8 fluor lamps and ballasts with 25W T8 and ES-HE ballasts	382	45	1,170	125	1,045	23.2
St. George Waste Water Plant	Aerator Control + VFD	64,100	7,600	83,420	6,410	77,010	10.1

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St. George Waste Water Plant	Water Source HP Heating System	39,425	4,605	161,180	22,800	138,380	30.0
Syl Apps CC	Sports Field Lighting Upgrades	18,870	2,630	10,640	2,520	8,120	3.1
Syl Apps CC	Interior Lighting Upgrades	19,660	2,750	14,070	3,200	10,870	3.9
Syl Apps CC	New direct digital control system	9,610	2,610	25,480	960	24,520	9.4
Syl Apps CC	Exterior Lighting Upgrades	2,050	290	3,230	100	3,130	10.8
County wide	Streetlight LED Conversion	1,410,000	327,775	2,500,000	50,000	2,450,000	7.5