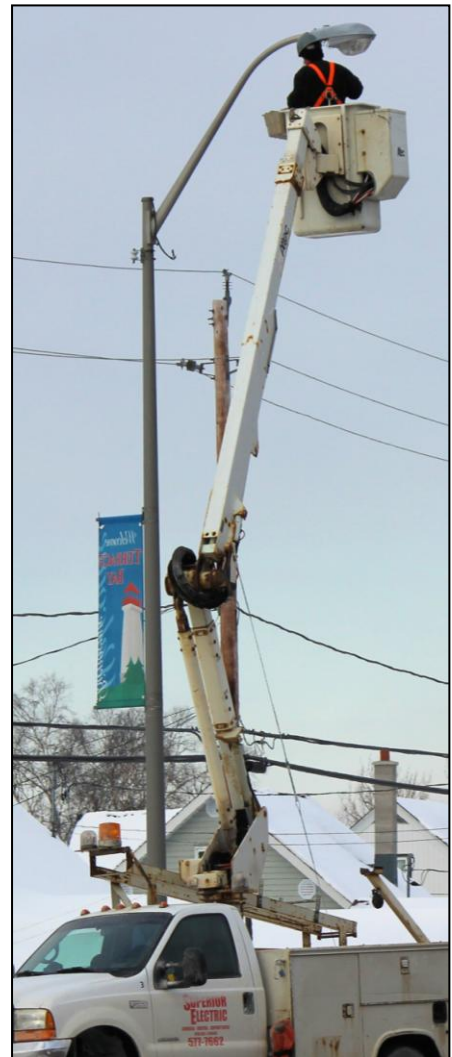




# Energy Conservation & Demand Management Plan 2014 - 2020



**Prepared by: the Township of Terrace Bay  
June 16, 2014**

## Introduction

To meet the Provincial Regulation 397/11 under the Green Energy Act, the Township of Terrace Bay has been inputting its energy consumption for use in the development of a document to guide Municipal efforts in improving energy efficiency. 2011 data was submitted on July 1, 2013 and now 2012 data and a five year Energy Conservation & Demand Management (ECDM) Plan will be completed by July 1, 2014. Within the ECDM Plan will be a summary of Township's annual energy consumption and greenhouse gas emissions for its operations as required by 397/11. Also required is a description of previous, current and proposed measures for conserving and otherwise reducing the amount of energy consumed by the public agency's operation and for managing the public agency's demand for energy, including a forecast of the expected results of current and proposed measures. As well, the Municipality has produced this plan to identify our goals for conserving and reducing energy, proposed energy conservation measures including estimated costs and savings, a description of renewable energy generation facility and the amount of energy produced, as well as how long each proposed measure will be in place for.

## History

Terrace Bay has been informally working towards becoming an innovator in utilizing renewable energy and energy efficient practices throughout its history. The Municipality was created by the forestry industry and with it the construction of the 51mW Aguasabon Hydro Generating Station to fuel the growth of the Township. At one time, a large portion of the Municipality was heated utilizing a centralized district heating system for a large boiler unit near the Highway that supplied waste heat to the Recreation Centre, schools, and downtown core. The Municipality undertook an energy audit in 1997 and implemented numerous measures to become more energy efficient in its building and operations. Terrace Bay has held training for its residents on energy efficiency through the EcoEnergy Retrofit program and has been a pioneer in Green Education through the conduct of the popular Green Tradeshow displaying different environmentally friendly products, services, and idea to the public.



*2009 Green Tradeshow Volunteers*

## Intent of the Plan

It is the intent of the Municipality that this plan will provide a structured and well defined strategy to focus our efforts towards energy efficiency. It has been written to meet the requirements of regulation 397/11 and will be a working document that will annually be reviewed during the budgeting process to add new projects or make changes if necessary. The plan will be used in cooperation with other plans including the Council Strategic Plan and the Assessment Management Plan.

## Municipal Infrastructure

Terrace Bay had a 2011 population of 1,471 as identified by the 2011 Census. This is down significantly from a population high of 2,471 in 1991. This population decline has made it difficult to maintain the level of service that was developed for a greatly higher population; however the Municipality strives to provide as much service for the quality of life of its residents as possible.

### Municipal Buildings

- Community Centre (1954) – 4,800 sq meters
  - Outdoor Swimming Pool (1963) – connected to Community Centre
- Cultural Centre (1952) – 1,886 sq meters
- Water Treatment Plant (2005) – 1,848 sq meters
- Water Pumping Station (2009) – 96 sq meters
- Public Works Office (1990) – 104 sq meters
- Public Works Garage (1974) – 1,341 sq meters
- Terrace Bay Airport Office (1979) – 307 sq meters
- Terrace Bay Airport Garage (1980) – 487 sq meters
- Tourism Information Centre (1991) – 153 sq meters
- Fire Department Office – 402 sq meters
- Ski Hill Chalet – 110 sq meters, operated by volunteer Ski Hill Club
- Terrace Bay Lighthouse (2010) – 64 sq meters
- Sewage Treatment Building – 144 sq meters
- Landfill Building (2009) – 28 sq meters, no power, but heating requirements





## **Vision for Terrace Bay**

Terrace Bay will be known as a leader in implementing energy conservation initiatives with the reduction of energy and the production of renewable energy being high priorities for the Municipality.

## **Goals**

The goal of this plan is to achieve a 10% reduction in energy consumption, based on 2011 data, throughout the buildings & lighting of the Township of Terrace Bay by 2020.

## **Objectives**

- Organizational wide understanding of the importance of energy efficiency and a coordinated attack to reduce consumption
- Renovation of buildings to incorporate energy efficiency practices
- Striving for LEED certification in construction of new buildings
- Continuously seeking and evaluating energy efficiency and renewable energy projects for the Municipality

## **2011 & 2012 Energy Consumption Results** (see Appendix A for detailed breakdown)

\*Please note: there is no Natural Gas in Terrace Bay during this time.

### Renewable Energy (2013)

- 20kW installed solar power through two 10kW MicroFIT installations at the Recreation Centre and Michael King Hall

## **Previous Measures**

Some of the measures completed towards energy efficiency from 2008-2014 include:

- Replacement of lights in all municipal buildings with T8 fluorescent technology through the OPA Save on Energy program
- LED street light replacement – 281 fixtures for 60% energy savings
- Roof replacement at the Recreation Centre with added insulation
- Programmable thermostats installed for dressing rooms at the arena
- Replacement of the solar blanket at the outdoor swimming pool
- 2 x 10kW solar panel installations on Recreation Centre and Michael King Hall
- Energy efficiency upgrades in renovation of the Cultural Centre including less windows, more energy efficient windows, improved lighting, and more insulation
- Investigation of district heating with presentation from Finnish Experts
- Registration with the LAS Electricity Procurement Program
- New policy to contact Hydro One immediately if any estimated billings are received on major buildings and setup actuals
- Working with LAS to conduct an energy audit of Municipal Buildings



*2008 Recreation Centre Replacement Roof Project*

- Instituting a no idling policy for Municipal vehicles
- Installation of variable frequency drives at the low lift pumping station at the water treatment plant

### **Studies Undertaken by the Municipality**

- Energy audit by LAS on the Recreation Centre
- Energy audit by OCWA on the Water Treatment Plant
- Building Review on the Fire Department by FORM Architecture
- Review of the street lighting needs for the Township by Erth Corp

### **Future Measures**

Some of the Measures we are evaluating for the future:

#### Private Sector Cooperation

- Investigating the potential to receive natural gas from a third party supplier in cooperation with natural gas conversion plans by the local pulp mill
- Investigating the potential to utilize the electricity created from the cogeneration turbine by the local pulp mill for Municipal buildings (ex. water pumping station)
- Investigating bulk buying arrangement for fuels with the local pulp mill

#### Municipal Operations

- Replacement of the building ventilation system at the Recreation Centre from the current pneumatic controlled system to an electronic computer controlled system
- Investigating the renewable energy potential of installing a geothermal system at the Recreation Centre and/or the Cultural Centre
- Investigating the installation of interval meters to replace out-dated demand management power system at the larger Municipal buildings, especially the water pumping station
- Schedule the operation of the ice plant for the arena and curling club around the billing cycle and current demand management system for electricity
- Evaluate installing a heat recovery system at the arena and other energy efficiency upgrades as part of the arena floor replacement project
- Investigate the installation of a solar hot water system for the Terrace Bay outdoor swimming pool and possibly also the recreation centre
- Investigate installing more solar power systems throughout the Municipality (ex. water treatment plant and airport garage)
- Replace the Cultural Centre roof with additional insulation to decrease heat loss
- Energy efficiency training and awareness for all Municipal staff and signage to promote energy efficiency throughout Municipal Buildings
- Explore alternative heating sources for the boiler at the Cultural Centre, Recreation Centre, and Public Works to include propane or others
- Replace the lighting at the Arena and Michael King Hall with energy efficient LED technology
- Renovate the Fire Department Building with energy efficiency improvements
- Install variable drive motors at the Water Treatment Plant

- Evaluate ways to use less watering in the maintenance of the green spaces in Simcoe Plaza including a rain water system for the plants and shrubbery
- Evaluate the installation of electronic, real-time monitoring systems at Municipal buildings to better understand the use of electricity in zones and times
- Installation of more energy efficient lighting in the downtown under the canopy
- Investigate reducing lighting or installing more lighting options for some lights to be turned down when not required during daylight hours
- Conduct a thorough review of the hot water needs at the Cultural Centre and evaluate down grading the hot water heater system
- Conduct building envelope assessments to identify insulation opportunities
- Develop a consistent policy for computer and technology use in regards to standard automatic power savings options

#### Community Capacity Building

- Work with our business community to provide education on identifying energy savings for the business sector
- Education for users of Municipal buildings on importance of energy efficiency
- Launching a no unnecessary idling awareness campaign for residents
- Advertise energy efficiency ideas to the public through use of the Municipal Facebook page and website

### **Scheduling & Priority of Improvements**

#### 2014

- Energy efficiency training and awareness for all Municipal staff and user groups to promote energy efficiency throughout Municipal Buildings
- Improved signage throughout Municipal buildings about importance of turning things off when not in use – Save Energy, Save \$\$\$ to be the message
- Develop a power savings plan for all computer and IT infrastructure
- Evaluation and planning of new building ventilation system for installation in the Recreation Centre in 2015
- Continue to work with the local pulp mill to evaluate partnerships in Natural Gas conversion, utilizing the electricity cogeneration capacity of a new turbine, and working together on bulk buying initiatives to save energy costs
- Launch a no unnecessary idling awareness campaign for our residents
- Awareness estimates versus actuals in billing
- Investigate propane and heating oil potential for fixed rate contracts and other ways to achieve savings and
- Develop an idea system for staff and community groups to bring forward suggestions for improving energy efficiency in Municipal operations
- Incorporate energy efficiency into the regular management meetings by making it a scheduled agenda item for the first meeting of every month
- Begin the process of applying for the OPA rebate program for the conversion of the lighting at the arena and Michael King Hall to LED technology as well as the lighting under the canopy in Simcoe Plaza

## 2015

- Propose the installation of a new building ventilation system for the Recreation Centre with a cost of \$120,000-\$150,000 and a payback period of 5-7 years.
- Evaluate and implement upgrades at the Water treatment plant upgrades
- Ensure payback period analysis on energy efficiency projects is integrated into the annual budgeting process
- Develop a list of projects for implementation as funding becomes available
- Continue to work with the local pulp mill to evaluate partnerships in Natural Gas conversion, utilizing the electricity cogeneration capacity of a new turbine, and working together on bulk buying initiatives to save energy costs
- Evaluate the installation of electronic, real-time monitoring systems at Municipal buildings to better understand the use of electricity in zones and times
- Annually conduct energy efficiency training and awareness for all Municipal staff and user groups to promote energy efficiency throughout Municipal Buildings
- Investigate and plan for LED replacement

## 2016 - 2020

- Conduct a thorough review of potential projects not completed
- Conduct town wide energy audits on Municipal buildings
- Replacement of the roof for the Cultural Centre
- Convert Municipal heating systems to Natural Gas (if mill conversion takes place) or further study Geothermal for the Recreation Centre and Cultural Centre
- Install capability to tap into the electricity generated by the cogeneration turbine from the local mill as the water pumping station
- Evaluation of ongoing efforts for energy conservation for adjustment of programs

## **Conclusion**

The Township of Terrace Bay is placing a high importance on energy efficiency and utilizing renewable energy. By utilizing the ideas of our staff for evaluation by experts in various fields, the Township will work towards reducing its carbon footprint and decreasing what we pay to consume energy. This plan will continue to evolve over the next five years as projects are completed and new initiatives are considered. As part of the annual budgeting process funds will be allocated towards making the Community more energy efficient and ensuring we reaching our goal of a 10% reduction in overall energy consumption in Municipal buildings.



*2014 Municipal Council and CAO Jon Hall*

## APPENDIX A – ENERGY CONSUMPTION 2011 & 2012

### Energy Consumption and GHG Emissions

From: 2011-01-01 To: 2011-12-31

Facility Name	Address	Total Area (m2)	Average Hours/Day	Fuel Types	Consumption	Cost (\$)	Energy (ekWh/yr)	GHG Emissions (kg CO2e/yr)	GHG Intensity (kg CO2e/m2)	Energy Intensity
<b>Facility Primary Type: Office</b>										
Airport Station	1520 Airport Rd	307	1.43	Elect.	20496.00 kWh	3382.60	20496.00	2009.43	6.55	66.76 (ekWh/m2)
Public Works Office	21 South Camp Rd Unit 2	375	5.71	Elect.	18932.00 kWh	2334.47	18932.00	1856.09	4.95	50.49 (ekWh/m2)
<b>Facility Type Total:</b>						<b>5717.07</b>	<b>39428.00</b>	<b>3865.52</b>		
<b>Facility Primary Type: Fire</b>										
Fire Station	8 Radisson Avenue	1915	24.00	Propane	10485.00 L	8091.28	73715.37	16157.22	8.44	38.49 (ekWh/m2)
				Elect.	21241.00 kWh	2343.69	21241.00	2082.47	1.09	11.09 (ekWh/m2)
<b>Facility Type Total:</b>						<b>10434.97</b>	<b>94956.37</b>	<b>18239.68</b>		
<b>Facility Primary Type: Community Centre</b>										
Cultural Centre	13 Selkirk	1886	6.85	Elect.	233760.00 kWh	39782.95	233760.00	22917.83	12.15	123.94 (ekWh/m2)
				Heavy Fuel	30323.00 L	33256.59	357979.84	95366.96	50.57	189.81 (ekWh/m2)
<b>Facility Type Total:</b>						<b>73039.54</b>	<b>591739.84</b>	<b>118284.79</b>		
<b>Facility Primary Type: Recreation Complex</b>										
Community Centre Lights	1 Selkirk Avenue	1	10.85	Elect.	293880.00 kWh	42211.68	293880.00	28812.00	28812.00	293880.00 (ekWh/m2)
Community Centre Power	1 Selkirk Avenue	4800	10.85	Propane	21450.00 L	16596.23	150805.40	33054.11	6.89	31.42 (ekWh/m2)
				Elect.	206600.00 kWh	52907.38	206600.00	20255.06	4.22	43.04 (ekWh/m2)
				Heavy Fuel	116683.00 L	121245.92	1377507.57	366972.35	76.45	286.98 (ekWh/m2)
<b>Facility Type Total:</b>						<b>232961.21</b>	<b>2028792.98</b>	<b>449093.52</b>		
<b>Facility Primary Type: Public Works</b>										
Public Works	21 South Camp Rd	1341	5.71	Elect.	46183.00 kWh	6980.11	46183.00	4527.78	3.38	34.44 (ekWh/m2)
Garage Office				Heavy Fuel	17521.00 L	18095.80	206845.13	55104.19	41.09	154.25 (ekWh/m2)
<b>Facility Type Total:</b>						<b>25075.91</b>	<b>253028.13</b>	<b>59631.97</b>		
<b>Facility Primary Type: Other</b>										
Water Pumping	17A Ridgewood Drive	234	24.00	Elect.	479760.00 kWh	64786.76	479760.00	47035.67	201.01	693.29 (ekWh/ML)
Airport Maintenance	1520 Airport Rd	487	1.43	Elect.	2430.00 kWh	788.26	2430.00	238.24	0.49	4.99 (ekWh/m2)
Tourism Info Centre	1008 Highway 17	153	4.93	Elect.	39838.00 kWh	6088.02	39838.00	3905.72	25.53	260.38 (ekWh/m2)
Sewage Treatment Plant	17 Ridgewood	1000	24.00	Elect.	60659.00 kWh	8549.89	60659.00	5947.01	5.95	94.44 (ekWh/ML)
<b>Facility Type Total:</b>						<b>80212.93</b>	<b>582687.00</b>	<b>57126.63</b>		
<b>Facility Primary Type: Tower</b>										
Lighthouse	1100 Hwy 17	64	24.00	Elect.	710.00 kWh	316.04	710.00	69.61	1.09	11.09 (ekWh/m2)
<b>Facility Type Total:</b>						<b>316.04</b>	<b>710.00</b>	<b>69.61</b>		
<b>Facility Primary Type: Water Treatment Facility</b>										
Water Treatment	11 Beaver Creek Rd	5002	24.00	Propane	65139.00 L	50836.96	457963.32	100378.16	20.07	786.88 (ekWh/ML)
				Elect.	375590.00 kWh	54960.48	375590.00	36822.84	7.36	645.34 (ekWh/ML)
<b>Facility Type Total:</b>						<b>105797.44</b>	<b>833553.32</b>	<b>137201.00</b>		
<b>Grand Total:</b>						<b>533555.11</b>	<b>4424895.64</b>	<b>843512.73</b>		



# Energy Consumption and GHG Emmissions

From: 2012-01-01 To: 2012-12-31

Facility Name	Address	Total Area (m2)	Average Hours/Day	Fuel Types	Consumption	Cost (\$)	Energy (ekWh/yr)	GHG Emissions (kg CO2e/yr)	GHG Intensity (kg CO2e/m2)	Energy Intensity
<b>Facility Primary Type: Office</b>										
Airport Station	1520 Airport Rd	307	1.43	Elect.	19080.00 kWh	3366.25	19080.00	1870.60	6.09	62.15 (ekWh/m2)
Public Works Office	21 South Camp Rd Unit 2	375	5.71	Elect.	13557.00 kWh	2524.61	13557.00	1329.13	3.54	36.15 (ekWh/m2)
<b>Facility Type Total:</b>						<b>5890.86</b>	<b>32637.00</b>	<b>3199.73</b>		
<b>Facility Primary Type: Fire</b>										
Fire Station	8 Radisson Avenue	1915	24.00	Propane	10961.00 L	7998.76	76358.86	16736.63	8.74	39.87 (ekWh/m2)
				Elect.	12362.00 kWh	2296.94	12362.00	1211.97	0.63	6.46 (ekWh/m2)
<b>Facility Type Total:</b>						<b>10195.70</b>	<b>88720.86</b>	<b>17948.60</b>		
<b>Facility Primary Type: Community Centre</b>										
Cultural Centre	13 Selkirk	1886	6.85	Elect.	203360.00 kWh	35734.68	203360.00	19937.41	10.57	107.83 (ekWh/m2)
				Heavy Fuel	23207.00 L	25341.08	273971.51	72986.87	38.70	145.27 (ekWh/m2)
<b>Facility Type Total:</b>						<b>61075.76</b>	<b>477331.51</b>	<b>92924.29</b>		
<b>Facility Primary Type: Recreation Complex</b>										
Community Centre Lights	1 Selkirk Avenue	1	10.85	Elect.	243960.00 kWh	43969.47	243960.00	23917.84	23917.84	243960.00 (ekWh/m2)
Community Centre Power	1 Selkirk Avenue	4800	10.85	Propane	22233.00 L	16184.17	156310.33	34260.70	7.14	32.56 (ekWh/m2)
				Elect.	383400.00 kWh	71171.93	383400.00	37588.54	7.83	79.88 (ekWh/m2)
				Heavy Fuel	64713.00 L	68579.74	763972.88	203524.78	42.40	159.16 (ekWh/m2)
<b>Facility Type Total:</b>						<b>199905.31</b>	<b>1547643.21</b>	<b>299291.85</b>		
<b>Facility Primary Type: Public Works</b>										
Public Works Garage Office	21 South Camp Rd	1341	5.71	Elect.	39783.00 kWh	6502.84	39783.00	3900.33	2.91	29.67 (ekWh/m2)
				Heavy Fuel	8576.00 L	9430.20	101244.44	26971.84	20.11	75.50 (ekWh/m2)
<b>Facility Type Total:</b>						<b>15933.04</b>	<b>141027.44</b>	<b>30872.16</b>		
<b>Facility Primary Type: Other</b>										
Water Pumping	17A Ridgewood Drive	234	24.00	Elect.	444798.00 kWh	60913.34	444798.00	43608.00	186.36	444798.00 (ekWh/ML)
Airport Maintenance	1520 Airport Rd	487	1.43	Elect.	2335.00 kWh	782.67	2335.00	228.92	0.47	4.79 (ekWh/m2)
Tourism Info Centre	1008 Highway 17	153	4.93	Elect.	36353.00 kWh	5936.31	36353.00	3564.05	23.29	237.60 (ekWh/m2)
Sewage Treatment Plant	17 Ridgewood	1000	24.00	Elect.	8040.00 kWh	1454.95	8040.00	788.24	0.79	8040.00 (ekWh/ML)
<b>Facility Type Total:</b>						<b>69087.27</b>	<b>491526.00</b>	<b>48189.21</b>		
<b>Facility Primary Type: Tower</b>										
Lighthouse	1100 Hwy 17	64	24.00	Elect.	3596.00 kWh	768.23	3596.00	352.55	5.51	56.19 (ekWh/m2)
<b>Facility Type Total:</b>						<b>768.23</b>	<b>3596.00</b>	<b>352.55</b>		
<b>Facility Primary Type: Water Treatment Facility</b>										
Water Treatment	11 Beaver Creek Rd	5002	24.00	Propane	43267.00 L	30908.51	304191.02	66673.75	13.33	506.14 (ekWh/ML)
				Elect.	342720.00 kWh	52760.14	342720.00	33600.27	6.72	570.25 (ekWh/ML)
<b>Facility Type Total:</b>						<b>83668.65</b>	<b>646911.02</b>	<b>100274.02</b>		
<b>Grand Total:</b>						<b>446524.82</b>	<b>3429393.05</b>	<b>593052.42</b>		