

City of Barrie: Conservation & Demand Management Plan 2020-2024

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June 2019

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Preamble

Ontario Regulation 507/18 requires municipalities to report annually on their energy usage and greenhouse gas emissions. The regulation also requires municipalities to update their energy conservation and demand management (CDM) plan every five years. This CDM fulfills the regulatory requirement and presents a path forward to achieving a full optimized energy management program within the City of Barrie. The City Energy Management Branch (EMB) is mandated to optimize the energy performance of all City owned and operated infrastructure with a goal to reduce utility consumption and the corresponding costs.

Executive Summary

The City of Barrie's corporate energy management plan requires updating as outlined in Ontario Regulation 507/18. The original plan, crafted in 2012, presented a framework to establish an energy management program within the City and targeted an energy reduction of 40,000 gigajoules (GJ), while outlining a number of priority objectives to achieve. During the implementation period of 2014 to 2018, all of the priority objectives were achieved and energy consumption (excluding growth impact) was reduced by 31,538 GJ or 79% of the target. Furthermore, the energy management program produced a cost avoidance of \$6,647,184, exceeding the original plan estimates and generated a return on investment of 12% through these conservation efforts.

Moving forward, the energy management program must mature and build upon the foundation and success established during the tenure of the original plan timeframe. This new plan utilizes the Natural Resource of Canada (NRCAN) guidance model to evaluate and optimize the current energy management program by targeting eight key elements of best practices for top performing energy programs. The plan prioritizes system optimization aiming for continuous improvement.

The plan establishes three targets that capture the energy impact for operations at all facilities, water and wastewater infrastructure. These are intensity-based targets, which allow for benchmarking against other facilities and are an effective means of measuring performance for process based operations such as water and wastewater. These targets include:

- Facility Target:
 - o Reduce the energy intensity of facility operations by 24%, representing an annual operating cost savings of over \$700,000.
- Water & Wastewater Target:
 - o Reduce the energy intensity required to produce drinking water and process wastewater effluent by 10%, representing an annual operating cost savings of \$220,000.

Combined, these targets represent 85% of the City's energy use and cost. Realising these targets will reduce current overall energy consumption by 18% and generate an annual cost avoidance exceeding \$900,000. Achieving these targets will involve implementing key priority actions targeted within eight elements of an energy management program, including:

- Commitment
- Planning
- Organization
- Projects
- Financing
- Monitoring, Tracking & Reporting
- Training

Background

In 2012 City staff initiated the development of a Conservation and Demand Management Plan to lay out the path for the establishment of a permanent energy management program at the City. Through the development of this plan a SWOT (strength, weakness, opportunities, threat) analysis was conducted to chart a path forward. The chief recommendations and objectives of the plan, which outlined the basic fundamental requirements of an energy management program, included:

- Reach out to Council to facilitate its understanding of energy significance through the development of compelling business cases;
- Ensure energy efficiency across City buildings;
- Create a sustainability / energy management structure;
- Take advantage of all available resources to successfully undertake energy projects;
- Monitor and verify return on investment to enable re-investment;
- Better analyze energy use and cost with City facilities and operations.

The plan established an absolute energy reduction target of 40,000 GJ over a six year period from 2012 to 2018.

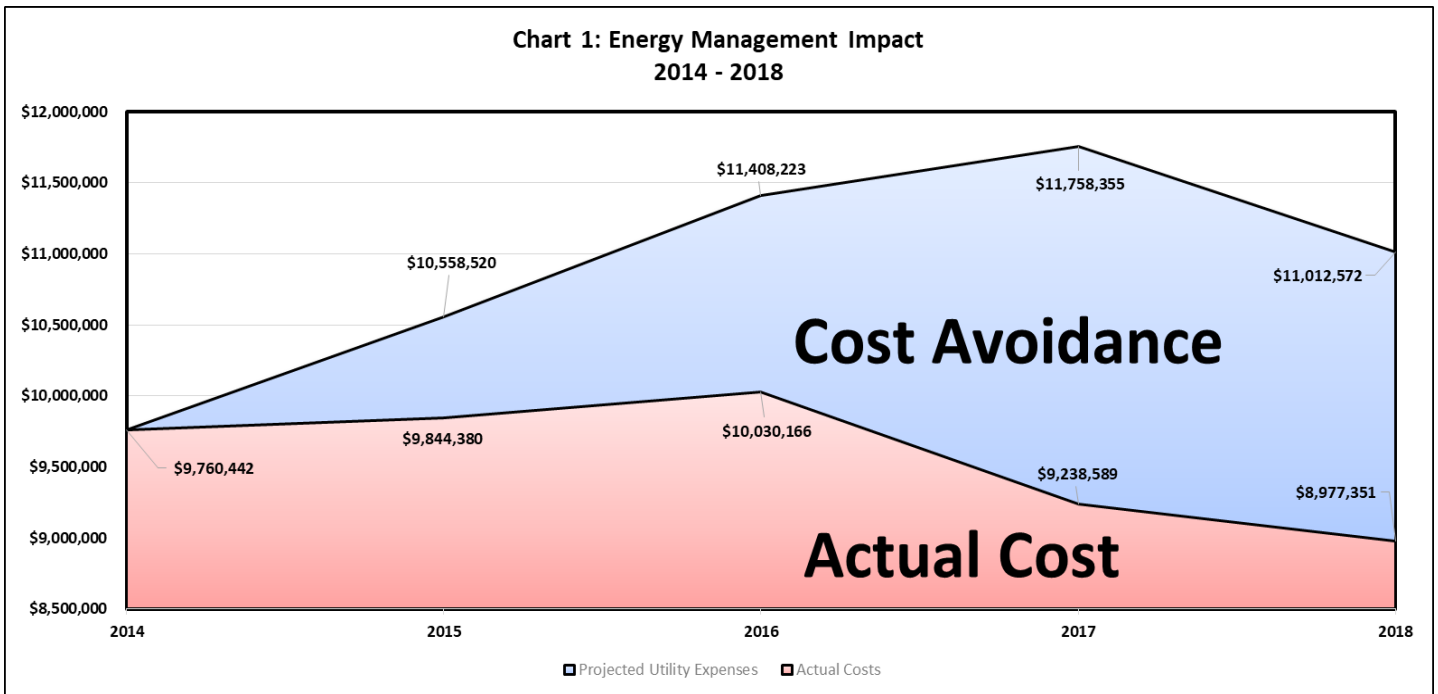
How did we do? Program Success: 2013 – 2018

Energy management benefits manifest in many different ways – occupant behavioural change, equipment optimization and efficiency renewal, utility billing savings, enhance capital planning, and facility operator awareness, to name of few. All of these actions support a corporate culture of energy conservation that ultimately save money.

Energy Management Impact

The EMB was established on a pilot basis in June 2013 and was fully staffed by the year end. With this consideration, 2014 has been selected as the baseline year to track energy savings against.

Through 2018, excluding the impact of growth, the City achieved an energy reduction of 31,538 GJ or 79% of the target set forth in the plan from 2014 consumption levels. This corresponds to an 11% energy decrease over that period. Including growth impacts, a cost avoidance of \$6,647,184 was realized over this same time frame. In 2018, City wide utility costs were *lower* than the baseline year of 2014, a cost savings of \$783,091 despite escalating hydro and water rates and growth in the number of facilities, parks, streetlights and traffic signals over that period. Chart 1 visualizes the cost avoidance trends from 2014 through 2018.



Note: Projected utility costs are determined by applying the annual actual utility rate increase to previous year’s baseline projected expense

Staff prioritized electrical conservation measures due to the relatively high cost of electricity and shorter payback periods. This focus limited the City from fully achieving the consumption reduction target set in the initial CDM plan. Energy efficiency measures that target natural gas reductions generally have longer paybacks due to the relative low cost of the commodity, but result in larger energy savings. Due to this, cost avoidance exceeded the original plan targets.

Energy Management Branch Value

The Energy Management Branch is comprised of the Manager of Energy and the Energy Management Coordinator. Resourcing for the EMB is provided through the annual operating budget and within the capital planning process. Furthermore, Energy Management generates revenue from grant and utility incentives that support for the implementation of conservation projects.

Council has dedicated resources for the EMB with an expectation to improve efficiencies and reduce the burden to the taxpayer through a return on this investment. Considering all of the operating and capital costs, cost avoidance benefits and incentive revenue, the EMB has provided a 12% return on investment over the five year period, from 2014 to 2018. Table 1 provides the details of this analysis.

What does cost avoidance mean?

This refers to any action that avoids having to incur costs in the future. They represent potential costs that are averted through specific preemptive actions. For energy management purposes, reducing utility consumption means not having to pay for that energy in the future. However, actual costs can still increase because of inflation impact. This was seen in 2016 when utility prices increased 8% but only a 2% cost increase was realized

What are cost savings?

When there is an absolute reduction in costs over a period of time regardless of inflationary pressures.

Table 1: Energy Management Value		2014	2015	2016	2017	2018	Total
Costs	Operating Costs	\$ 284,039	\$ 298,947	\$ 342,158	\$ 439,420	\$ 410,737	\$ 1,775,301
	Capital Costs	\$ 94,706	\$ 171,744	\$ 4,968,555	\$ 162,315	\$ 231,447	\$ 5,628,767
	Subtotal	\$ 378,745	\$ 470,691	\$ 5,310,713	\$ 601,735	\$ 642,185	\$ 7,404,068
Revenue / Cost Avoidance	Incentive	\$ 43,119	\$ 124,542	\$ 1,134,067	\$ 185,658	\$ 154,007	\$ 1,641,392
	Cost Avoidance	\$ -	\$ 714,140	\$ 1,378,057	\$ 2,519,766	\$ 2,035,221	\$ 6,647,184
	Subtotal	\$ 43,119	\$ 838,682	\$ 2,512,124	\$ 2,705,424	\$ 2,189,228	\$ 8,288,576
Value Analysis	Net Savings	\$ (335,625)	\$ 367,991	\$ (2,798,589)	\$ 2,103,689	\$ 1,547,043	\$ 884,509
	Return on Investment	-89%	78%	-53%	350%	241%	12%

To summarize, from 2014 through 2018, the Energy Management Branch has:

- Received over \$1.6 million in incentive revenue;
- Generated a utility operating cost avoidance of \$6.6 million;
- Invested \$5.6 million in energy efficiency capital works;
- Realized a utility cost savings of \$783,091, when comparing 2014 and 2018 utility expenses.

How did this happen?

There were numerous organizational, resourcing, technological and efficiency opportunities and ‘low hanging fruit’ to be realized during the early days of the energy management program. The following section highlights the chief milestones of the program that fulfilled the key objectives set forth in the original CDM plan:

Establishment of an Energy Management Branch

As part of the pilot initiative, Council approved the creation of an Energy Management Branch within the Corporate Facilities department. The main objective of the EMB was to demonstrate value for the corporation through realizing cost avoidance from conservation initiatives, building awareness and understanding of energy efficiency and optimizing facility operations. The mandate of the EMB focused on reducing utility consumption and expenses for all owned corporate assets, including facilities, water and wastewater infrastructure, street lights and traffic signals and parks operations. After two years of operation, Energy Management became a permanent entity through Council’s endorsement during the annual budgeting process. The establishment of the EMB is an obvious success from an Energy Management lens as Council’s resourcing commitment solidified the corporate focus on conservation within the City.

Additionally, Corporate Facilities serves as an ideal organizational location for the branch as this department works with all major energy consuming entities within the City, Water Operations, Wastewater Operations, Recreational Facilities and Roads, Parks and Fleet.

Establishing a permanent Energy Management entity fulfilled two key objectives outlined in the initial plan – creating an Energy Management structure and facilitating Council’s understanding of Energy Management by demonstrating the value of conservation.

Corporate Utility Budgeting Responsibility

Prior to the conception of the EMB, each individual department were responsible for budgeting their own utility costs. Operationally this was challenging as energy and water consumption were not tracked and escalations in utility rates were evaluated with different levels of scrutiny within City operations. In 2013,

the EMB was granted the responsibility to generate all of the corporate utility budgets. The initial year of budgeting was extremely successful, resulting in a \$500,000 budget to budget decrease.

Moving forward, responsibility for utility budgeting served as a catalyst for building relationships, trust and collaboration amongst the various department within the city. Utilizing consumption analytics as the basis for utility budgeting established credibility for the EMB and fostered accountability within the various operating groups. In some cases, managers identified specific consumption targets within performance plans to help aid in meeting budget expectations. Furthermore, this budgeting mechanism established an incentive for facility supervisors to conserve and operate efficiency, as their energy conservation successes were realized during the annual budgeting process. Facilities staff began to realize that reducing their utility budget impact had significant positive benefits on their operations.

Centralized utility budgeting raised the importance of utility costs within the corporation. Regular Council, finance and regulatory reporting on utility budget variances and impacts emphasized the influence of the EMB performance on the bottom line cost for the corporation.

This responsibility served to assist in fulfilling two other key objectives in the original plan – ensure energy efficiency across city buildings and analyzing use and cost of building operations.

Energy Management Software & Electronic Billing Implementation

In 2015 the City procured EnergyCap, energy management software which serves as the foundational basis for all energy analysis, reporting and conservation activity within the City. As part of the software deployment, Energy Management staff worked with utility representatives and the Accounts Payables department to convert from paper billing to electronic payment. Over a six month period Energy Management staff were able to collaboratively improve utility billing review, processing and payment activities through the implementation of a consolidated billing process. These efforts saved Finance and Accounts Receivables numerous hours individually reviewing and coding over 500+ utility bills per month. In addition, e-billing serves an important function within the energy management software as it allows for automatic uploading of bill data for review and analysis. Within the first year of utilizing the Energycap software, more than \$50,000 of utility billing credits were realized from billing errors and overcharges.

Through this process, the responsibility for bill review and approval was shifted to the EMB. Centralizing this function has realized additional benefits, whereby all new billings and accounts are fully vetted and checked for accuracy. On a number of occasions the City has be sent bills from different entities and businesses or duplicate accounts that have been setup in error.

The implementation of the energy management software and subsequent expansion of the EMB role to manage all utility billing approval helped to achieve a number of objectives outlined in the initial plan including:

- Ensure energy efficiency across City buildings through facility benchmarking and key performance indicators (KPI) modules of Energycap;
- Monitor and verify return on investment to enable re-investment;
- Improve analyze of energy use and cost with City facilities and operations.

LED Streetlighting Conversion

Street lighting utility costs are a significant component of the annual corporate utility spend. In 2016, the EMB staff leveraged a partnership with the Local Authority Service, an arm’s-length entity of the Association of Municipalities of Ontario to deliver the retrofit of all traditional streetlights within a 6 month period - over 10,000 luminaires in total. Staff secured over \$900,000 in incentives from the local utility to support the initiative, and produced an annually cost avoidance of \$700,000 in value for the corporation.

Furthermore, the success of this significant infrastructure renewal project solidified the EMB reputation for success and demonstrated to Council the value and business case for energy efficiencies, a key objective in the original CDM plan. The incentive revenue received from the project fulfilled another plan objective, leveraging available resources for project implementation.

Moving Forward 2020 – 2024

This plan focuses on a holistic, systematic approach to Energy Management that aims to embed processes within the corporate operations that optimize the program over the long term. Natural Resource Canada provides a planning framework to evaluate an organization’s current performance based on eight key elements found in optimized Energy Management programs. Based on the evaluation, weaknesses may be identified and opportunities for improvement become evident. Using this framework, staff have completed an evaluation of the City’s key energy management elements and have outlined actions that will optimize the program. Each of these are discussed in detail later in the plan.

Energy Reduction Targets

Original Plan

The original CDM plan generated an absolute energy reduction target by compiling a list of energy efficiency and retrofit opportunities that were identified through facility energy audit activities. This was a great initial reduction target, but was imperfect as the many of recommended projects were dated and changes in energy costs and technology impacted to feasibility of some of the initiatives. In addition, using an absolute energy reduction target is problematic when accounting for growth in services. Any additional energy required from expanding services (ie parks, transit, recreation, etc,) must be factored into the original target, in effect adjusting the baseline for comparison.

New Plan

Due to the anticipated growth of services within the City, intensity-based conservation metrics have been generated to track energy management performance. Three targets have been developed that capture facility operational energy usage, water and wastewater usage. These metrics account for over 85% of the energy usage and cost for the entire corporation.

What are intensity based targets?

An intensity metric compares the quantity of an input versus the output variable. For example, the amount of gasoline (litres) consumed in a car versus the distance travelled (km) serves as an indicator of the vehicle’s efficiency.

Energy Metrics

Facilities

The facility intensity targets will compare energy usage to the footprint (ie square footage or square metre) of a building. This metric is widely used within the industry and allows for benchmarking of performance against other similar facilities.

The City partnered with Enerlife Consulting - a leader in performance based conservation for building operations - to establish a facility reduction target. The City’s building portfolio, excluding water and wastewater facilities, was examined and analysed. Every building was categorized into a particular operational type, such as administrative, library, fire hall, community centre and so forth. The facility performance is measured in equivalent kilowatt hours per square feet (ekWh / ft2) and benchmarked against other similar building types. This exercise ranks the relative efficiency of a particular building amongst its peer group. A top-quartile energy performance standard (i.e. target) was adopted for each of the facility types. The difference between the actual energy use intensity and the target represents potential annual savings.

Table 2 highlights the benchmarking results for the three multi-use recreation facilities, Allandale Recreation Centre (ARC), Holly Community Centre (HCC) and East Bayfield Community Centre (EBCC).

Table 2: Benchmarking Results for Multi-Use Recreation Facilities

Building Name	Building Type	Actual Energy Intensity (ekWh/ft2)	Target Energy Intensity (ekWh/ft2)	Energy Savings Potential		
				ekWh/sf	%	\$
East Bayfield CC	Multi-Use Recreation Centre	43.51	33.6	9.89	23%	\$37,865
Holly CC	Multi-Use Recreation Centre	45.65	36.4	9.30	20%	\$36,244
Allandale Rec. Centre	Multi-Use Recreation Centre	41.87	36.5	5.33	13%	\$18,810

Please note that targets are modified and individually tailored for each building to account for the differences in their design, use, occupancy and size. The differences in the target between the EBCC and HCC, which are very similar buildings in terms of size, amenities and service hours, is related to their mechanical equipment. The EBCC has geothermal heat pump system, a more energy-efficient system compared to the traditional mechanical system that services the HCC. Therefore, the energy intensity target is lower for the EBCC to account for this.

To generate a global metric for all facilities, all of the individual facilities targets and cost savings potential were rolled up into one figure. Table 3 summarizes these values:

Table 3: Facility Energy Conservation Target

Actual Energy Intensity (ekWh/ft2)	Target Energy Intensity (ekWh/ft2)	Energy Savings Potential		
		ekW/sf	%	\$
33.2	25.2	8.0	24%	\$700,273

Water Operations

The City’s Water operations provide drinking water to residents. Water is treated and supplied to the system through the surface water treatment plant and ground wells. A series of reservoirs and booster stations pump the water to residents, businesses, institutions and other entities within the City.

Water operations represent 20% of the City-wide energy consumption, and utility costs amounted to \$1.92 million in 2018. This service area represents a significant opportunity to impact the overall energy performance of the City.

The benchmarking methodology utilized to establish the facility energy reduction target does not translate easily to drinking water operations. There are so many variations and differences between the various drinking water supply systems within the province that fair benchmarking exercise cannot be completed. With this limitation in mind, staff are aiming for a continuous improvement efficiency intensity target for water operations. To measure the performance of the drinking water supply system, a target that considers total energy utilized (equivalent kilowatt hours – ekWh) compared to the total volume of drinking water supplied (megalitre – ML) is ideal.

The target for water operations selected aims for a 10% reduction in the energy consumed per megalitre of processed drinking water. This target will reduce energy usage by 7% and generate a cost avoidance of \$143,000 annually. Table 4 highlights these details:

Table 4: Water Conservation Target

Actual Energy Intensity (ekWh/ML)	Target Energy Intensity (ekWh/ML)	Energy Savings Potential		
		ekWh/ML	%	\$
1,212	1,097	116	10%	\$ 143,366

Wastewater Operations

The City provides wastewater treatment services to residential, commercial, institutional and industrial sectors within the city. Wastewater operation consume 12% of the total energy use for the City and for 2018 utilities costs amounted to \$1.15 million.

Benchmarking of wastewater plants from an energy perspective faces the same challenges as outlined for the drinking water sector. Therefore, a continuous improvement approach that aims to reduce the total energy utilized (ekWh) to process effluent (per ML) will serve as the intensity metric for these operations.

The target for wastewater operations aims for a 10% reduction in the energy consumed per megalitre of processed wastewater effluent. This target will reduce energy usage by 7% and generate a cost avoidance of \$80,766 annually. Table 5 highlights these details:

Table 5: Wastewater Conservation Target

Actual Energy Intensity (ekWh/ML)	Target Energy Intensity (ekWh/ML)	Energy Savings Potential		
		ekWh/ML	%	\$
441	399	42	10%	\$ 80,766

Target Summary

Overall, the combined targets represent a corporate-wide energy consumption reduction of 18% that will generate an annual cost avoidance of \$924,407. The metrics encompass facilities and operations that account for 85% of the corporate energy consumption and utility costs.

The Facility Operations target was developed using the principles of performance based conservation that relies on benchmarked data to quantitatively evaluate the performance of individual buildings and consequently the corporate portfolio overall. The target aims to achieve a performance within the top quartile (or 75th percentile) of building performance. This target setting approach is evidence-based and can be continuously re-evaluated because as building operational efficiency improves the efficiency ‘goal posts’ are moved, requiring persistent efforts to be considered a top performing facility.

The water and wastewater operations targets aim to improve the efficiency in which drinking water and wastewater effluent are processed by 10%.

Table 6: Summary of Energy Conservation Targets

Target Operation	Actual Energy Intensity (ekWh/ft2) or (ekWh/ML)	Target Energy Intensity (ekWh/ft2) or (ekWh/ML)	Energy Savings Potential		
			(ekWh/ft2) or (ekWh/ML)	%	\$
Facility Operations	33.2	25.2	8.0	24%	\$700,273
Water Operations	1212	1097	116	10%	\$143,367
Wastewater Operations	441	399	42	10%	\$80,767
Total:					\$924,407

Sustainability & Community Engagement

This plan targets energy efficiency within corporate operations. Other interconnected stewardship opportunities such as greenhouse gas emission reduction initiatives, community energy planning or sustainable community development are important and critical moving forward. The EMB is leading a community energy planning and greenhouse gas emission reduction strategy commencing in the fall of 2019. The outcome of this planning and community engagement exercise will provide the foundation for sustainable action moving forward. Any proposed recommendations relating to corporate operations, such as greenhouse gas emissions reduction targets, can be integrated within this current energy plan, during the regular review and update of the plan.

Energy Management - Best Practice Scorecard

The NRCAN scorecard provides an objective framework to determine the current performance of an Energy Management program compared to the best practices in the field today. Utilizing this scorecard, an evaluation of the City’s Energy Management program has provided insight into the opportunities for improvement and serves as a mechanism for staff to identify targets for improvements. Eight key best practice elements are included in the scorecard and are examined in further detail as follows:

Energy Management Best Practice Scorecard

Ranking	Commitment	Planning	Organization	Project Development	Financing	Monitoring / Targeting / Reporting	Communication	Training
5	An energy policy exists that has clear targets, has the commitment of senior management and is communicated broadly.	In addition to a formal establish planning framework, EM is actively involved in all planning activities of the City.	Energy management is fully integrated into the management structure with clear delegation of responsibility for energy consumption.	Identification of capital, behavioural, operational and maintenance projects, development of business cases and implementation are ongoing.	Investment criteria, financing mechanisms and commitment to implement energy efficiency projects are clearly defined.	Energy Management sets targets, forecasts and monitors use against a baseline and identifies faults. Savings are tracked at a project/system level by using submeters. Performance is benchmarked with systematic reporting to operators, supervisors, management and Council. Staff have readily accessible real-time data and reports on performance.	The value of energy efficiency and the performance of energy management are reported and marketed, both within the organization and outside, continuously.	Senior management, building operators and staff or tenants are trained to fully support energy performance.
4	A formal strategy for energy exists but lacks active commitment from senior management.	A formal energy management planning process exists that delineates roles, responsibilities and expectations for utility budgeting, capital and operational planning.	An energy committee, green team of technical groups are used as the main channel of communications along with direct contact with major energy users.	There is formalized but infrequent identification of energy opportunities, basic business cases and implementation.	Life-cycle costing and/ or internal rate of return investment criteria are used.	Facility-level performance is monitored against a baseline and benchmarked by using key performance indicators. Major energy systems are submetered and results from major projects are measured.	An ongoing program of staff and tenant awareness exists, and progress is reported through regular publicity campaigns.	Senior management or staff and tenants have received ad hoc training. Building operators are fully trained to support energy performance.
3	The energy policy set by the energy manager, energy committee or equivalent has not been adopted.	Multiple planning activities are lead the EM team in collaboration with other department and staff.	An Energy Management Branch is established within a City department with a specified mandate.	Development of energy savings opportunities is ad hoc and infrequent. There is only selected implementation.	Investments are based on short-term or simple payback criteria only, with no consideration for life-cycle costing.	Facility-level performance is monitored against a baseline by using utility data with ad hoc use of findings. No benchmarking is done.	Staff and tenant awareness is occasional only and ad hoc.	Building operators are trained to maintain major energy-intensive systems.
2	An undocumented set of guidelines or procedures exists.	Informal ad hoc planning activities are implemented by an individual or small team.	An energy manager is a part-time responsibility that has limited authority.	Only informal assessments are made with ad hoc resources to identify energy-saving opportunities.	Only low cost measures considered for financing.	Utility meters and bills are the source of consumption data, which is tabulated and reviewed monthly.	Only informal contacts are used to promote energy efficiency.	Building operators receive ad hoc training in energy-efficient technologies and practices.
1	No guidelines or procedures exist.	No energy management planning activities occur.	No people actively focused on energy management.	There is no mechanism or resources to identify or develop energy-saving opportunities.	Energy efficiency investments are not pursued.	Energy consumption or performance is not tracked.	Energy efficiency is not promoted.	There is no energy management or operational training.

Note: Cells in highlighted in blue identify the current state of Energy Management within the City. Cells highlighted in green outline the preferred state of Energy Management and serve as the target goal of this plan. Yellow highlighted cells identify elements that must be achieved in order to meet the preferred state best practices for Energy Management.

Commitment

Commitment at the individual and corporate level is a key element to a successful Energy Management program. Commitment describes the quality or level of dedication to a cause, and within the context of Energy Management, it serves as the driving factor that moves people towards action.

Current State

Since the inception of the Energy Management program in 2013, the corporate commitment to conservation has grown considerably, from essentially having very little visible commitment to now having an informal strategy that is supported through the efforts of various different entities within the City. A number of actions have been taken to grow the commitment towards conservation and efficiency including:

- Establishing energy targets within individual performance plans, as is the practice within the Recreation Facilities Branch
- Committing to participate in the establishment of water and wastewater optimization teams, whereby Energy Management and operational staff meet regular to identify, plan and execute conservation initiatives
- Participating in regular touch-base meetings between the Energy Management group and the numerous operational groups (Water / Wastewater / Recreation / Corporate Facilities / Parks / Traffic / Engineering) that influence energy conservation within the City
- Shifting the annual operating utility budgeting responsibility to the EMB

Future Opportunity

Building upon previous success, the chief opportunity for enhancing the organization's commitment to energy management is to formalize a strategy and policy that aligns with the City's strategic plan. Furthermore, engaging the senior executive team for endorsement of the policy ensures commitment at all levels of the City. To achieve this commitment the following actions are planned:

Action: Develop a formal Energy Policy and Strategy.

- Conducting a review of the City's strategic business plan
- Develop a policy that align with the City's strategic plan
- Have senior management endorse the policy
- Communicate the policy broadly

Planning

Energy Management planning occurs on multiple levels within the City and considers long term, medium term, short term and immediate conservation activities. The chief planning mechanism lies within the development of the 5-year energy conservation and demand management plan that is mandated through provincial government regulation. However, there are other planning activities embedded within the City's operation that provide significant opportunity to improve the corporate energy performance. These include consultation on the annual operating, utility and capital planning work in addition to other strategic initiatives undertaken within the Corporation such as updating of the Official Plan.

Current State

The City's Energy Management program was established through the initial planning and implementation of the Energy Conservation and Demand Management Plan. This plan provided a framework and guidance for conservation during the past five years. Throughout this period the EMB has integrated into a number of planning processes, including:

- *Utility Budgeting:* Development of the annual utility budget for all corporate operations. This involves analyzing and forecasting utility consumption and rates for all facilities, water and wastewater infrastructure, parks, traffic signals and street lights.
- *Capital Planning:* The EMB reviews, consults and collaborates on all capital projects that impact energy. Staff focus on embedding energy efficiency into the design of projects, which provide an opportunity to research, investigate new technical solutions and identify and apply for any available grants or incentives. Further, integration within the capital planning process allows Energy Management staff to plan for utility impacts that are related to growth of City infrastructure (i.e. new facilities, pumping stations, etc.).
- *Operational Planning:* Energy Management staff work with the various client groups to identify planned operational changes and improvements (ie. small equipment replacement / lighting upgrades) allowing for partnership and collaboration opportunities.

Prior to the establishment of the EMB, there was limited planning effort put forth targeting energy conservation. From this starting point there has been significant growth within this energy management best practice element, whereby staff led and collaborate on planning activities with other departments.

Future Opportunity

Effective planning provides opportunities to investigate and consider new technologies, evaluate alternatives and life-cycle implications from an energy conservation lens. In addition, prudent planning allows staff to maximize incentives, grants and other funding mechanisms to support both energy and non-energy components of projects. Investing to improve planning efforts moving forward is a priority within the 2020 – 2024 ECDM framework.

As part of the five year plan, staff are planning the following activities:

- Capital Planning:
 - o **Action: Collaboratively work with all relevant departments to establish a policy and process to quantify and embed the net operating cost of utilities within the capital planning process.** These include:

- Facility Planning & Development
- Engineering Planning
- Engineering Construction
- Capital Asset Management
- Operational Planning:
 - **Action: Conduct annual review of client operational plans and collaboratively identify energy opportunities and / or future planning or study initiatives. This exercise will include the following operational branches – Wastewater / Water / Recreational Facilities / Corporate Facilities / Parks / Traffic & Parking / Transit.**
- Strategic Planning:
 - **Action: Conduct scan of internal municipal policy development and planning efforts to identify opportunities to enhance Energy Management participation and involvement throughout the corporation.** These efforts include:
 - Compiling and reviewing all significant policy and strategic plans for all City departments.
 - Identifying and ranking policies / plans that impact energy conservation.
 - Delineating renewal timelines of the prioritized items and including review efforts in staff workplans.
 - Reaching out and establishing relationships with key staff that are leading prioritized items.
- Energy Management Project Planning:
 - **Action: Develop a three year capital project plan that identifies larger scale energy conservation initiatives. Utilizing the best practices outlined in Element 4 – Projects, provide a framework for the identification and selection of these projects.**

Organization

Organizational hierarchy and structure have a significant influence on the effectiveness of an energy management program. Within the municipal sector, the Energy Management group typically operates within the Facilities department, but sometimes is situated with the finance, CAO or sustainability departments. Facilities (including the water and waste water plants) are the chief consumers of energy for City operations and represent the largest conservation potential. Establishing cross-departmental entities such as committees, green teams and technical groups serves as a best practice to provide an organizational mechanism for embedding energy management best practices across department within the City.

Current State

The initial steps of establishing the EMB in 2013 ideally situated the group within the Corporate Facilities department. The Corporate Facilities department has the largest building portfolio, directly managing twenty seven facilities. Working daily with the Facilities Operations Branch provides the opportunity to implement change and energy initiatives quickly and responsively. Furthermore, the Facility Planning & Development (FPD) branch, which is responsible for all facility renewal and capital improvements across the City, is also part of the Corporate Facilities department. Energy Management staff are able to work collaboratively and systematically with the FPD branch throughout the capital planning and implementation process. Again, operating side by side with FPD staff only enhances the success of embedding energy efficiency within facility capital projects.

Through the last five years the EMB has undertaken a number of activities to establish a role and function within the organizational structure of the City. These activities included the following:

- Formal establishment of an EMB with a mandate to reduce utility consumption for City owned infrastructure.
- Cultivation of a close working relationship with the Facility Planning & Development Branch and development of a process to review and comment on all capital projects that have energy implications.
- Founded optimization teams within the Water and Wastewater Departments between operational, supervisor and energy management staff to focus on the identification and implementation of conservation activities.
- Creation of a corporate-wide staff engagement program, the 'SaveAdam' Campaign, a cross departmental effort to raise awareness of energy conservation.

Future Opportunity

The EMB is well situated to become fully integrated within the management and organizational structure of the city. To achieve this goal, the following activities are planned:

- **Action: Establishment of a corporate-wide Green Team that is focused on continuous engagement and conservation awareness of staff.**
- **Action: Establishment of a Recreation Optimization Team to focus conservation opportunities specific to Recreational Facilities.**
- **Action: Revise job descriptions to include energy management responsibilities with an objective is to normalise energy management within day-to-day functions. Target facility management, supervisors, coordinators and technician positions.**

Project Development

Conservation projects are a foundational element of an effective Energy Management program. These projects provide the mechanism for Energy Management staff to initiate change within the organization and ultimately reduce utility consumption and cost. Energy management projects may include capital and retrofit measures, behavioural change initiatives, modifications to the operation of building systems, building maintenance activities and renewable energy generation.

Establishing a systematic, on-going program for project identification, evaluation and implementation ensures that short, medium and long term conservation opportunities are considered. Best practices require the use of a variety of analytical tools that include life-cycle analysis, auditing activities, market research, feasibility and engineering studies. These activities allow for fluidity and flexibility when selecting projects for implementation as changes to regulatory requirements, utility rates, grants and incentives can have dramatic impacts on the feasibility of an initiative.

Current State

Conservation project selection has evolved since the branch conception in 2013. Initially, specific projects outlined in the original CDM plan served as the resource for project selection and implementation. The actions were compiled from the various energy audits that had taken place in the previous 10 years. As the program matured the EMB began conducting regular energy audit and feasibility studies to identify low cost and capital intensive measures. More recently, project opportunities have arisen from a variety of activities:

- Regular collaboration meetings with various client groups and departments;
- Prioritization efforts identified through the efforts of the Water and Wastewater Optimization Teams;
- Integration of energy conservation within the capital planning and review process;
- Review of asset management planning such as Facility Condition Assessment Studies;
- Technological advances in HVAC, lighting and controls equipment.

There are a variety of paths taken to evaluate potential projects. Once a preliminary listing is compiled, an analysis of the technical and economic viability of each project is undertaken to assist in the prioritization of each. These analyses typically involve a life-cycle costing analysis, grant and incentive funding investigations and, in some cases, soliciting third party expertise for engineering and design services.

Future Opportunity

Currently, there are numerous mechanisms by which energy efficiency projects are identified, proposed and implemented. Moving forward there are a number of processes to be implemented that will enhance the project selection and prioritization process. These include:

- Benchmarking:
 - o Benchmarking exercises identify facilities with the greatest energy savings potential. This allows Energy Management staff to direct resources to investigate opportunities at these locations such as energy audits, recommissioning efforts and building controls examination.
 - o **Action: Energy Management staff will complete a benchmarking analysis bi-annually to support project selection and implementation efforts.**

- Facility Base Load Analysis:
 - Base load refers to the minimum energy required to operate a facility. Typically, there are opportunities to reduce the base load energy consumption of a facility by auditing equipment that runs during un-occupied building hours.
 - **Action: Energy Management staff will conduct facility base load studies of the top ten energy consuming facilities. Study results will be utilized to identify and prioritize potential conservation projects for implementation.**

- Recommissioning & Energy Audit Studies:
 - These exercises involve the solicitation of third-party expert consultants to conduct an assessment and review of facility operations. Historically these efforts have been effective at identifying high-level opportunities and low or no-cost actions. As the EMB enhances its understanding and expertise of City facility and operations, there is greater benefit in conducting studies in-house that target energy intensive systems and equipment (ie. refrigeration plants, chillers, boiler systems).
 - **Action: Establish an internal commissioning and recommissioning team by providing essential tools, resourcing and training. Lead the development of an internal recommissioning standard and adopt a schedule of facility system audits to perform.**

- Enhance Energy Management Project Planning:
 - **Utilizing the findings of the benchmarking, base load analysis, recommissioning studies, and renewables assessment, develop a three year capital project plan that identifies larger-scale energy conservation initiatives.**

- Renewable Energy Generation Assessment:
 - Achieving the facility intensity targets will require the continual deployment of on-site renewable energy initiatives. On-site energy generation offsets facility energy usage, utility costs and reduced greenhouse gas emissions.
 - Two major renewable energy resources, solar and renewable natural gas are potentially available for utilization within the City’s facility portfolio.

Solar Energy

The City has previously partnered with Alectra Utilities (formerly Powerstream) to lease rooftop space at six facilities, whereby the City reviews annual revenue (\$50,000) for electricity generated from rooftop solar PV installations. Alectra is responsible for maintenance and operation of the equipment. This partnership was established during the provincial feed-in tariff program that is no longer available.

Current regulations allow for a net-metering solar PV installation option. This allows participants to generate electricity on-site to offset usage by the facility. The generated electricity is subtracted from the utility bill producing a cost benefit for the participant.

Action: Complete a portfolio analysis of potential roof and ground-mounted solar PV deployments for all City-owned infrastructure. Identify ideal locations and complete preliminary feasibility analyses for implementation opportunities.

Action: Include ‘solar ready’ design considerations when constructing all new facilities and infrastructure. This includes all new facilities and major retrofits, and other infrastructure projects such as water and wastewater pumping stations.

Renewable Natural Gas

Renewable natural gas is generated at the Environmental Centre and the Wastewater Treatment Facility (WWtF). Biogas is currently collected and utilized at the WWtF within a cogeneration unit, which burns the biogas to generate electricity and heat. In 2018, the co-gen system generated 20% of the electricity consumed at the WWtF, offsetting hydro costs by \$200,000. The City has initiated a study to examine opportunities for future uses of the biogas, with a final report to be issued in the fall of 2019. Preliminary analysis has identified potential economic and logistically feasible opportunities.

Biogas is generated from the Environmental Centre landfill through the breakdown of deposited organic matter. A 2019 study identified opportunities of use of landfill gas for the next 25 years. The study concluded that there are no financially feasible options for use of the landfill gas.

Actions:

- **Maximize use of biogas generated from the WWtF. Prioritize the implementation of recommended solutions outlined in the forthcoming study.**
- **Annually review findings of the Environmental Centre landfill gas study to determine if any of the identified opportunities become feasible due to potential changes in regulation, utility prices or site operations.**

Financing

Funding Energy Management activities is crucial to improving the energy performance of the corporation. There are variety of models that may be utilized to harness funding for energy conservation measures. These include:

- Grant and incentive funding to fund specific projects
- Utilizing energy performance contracts that engage third-party energy service providers to fund capital improvements and recover cost via energy savings
- Funding projects from anticipated energy savings utilizing operational funding
- Project specific capital funds
- Dedicated conservation capital funds
- Funding from a self-sustaining energy reserve that is funded based on realized operational savings and / or received incentive revenue
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Furthermore, differing methodologies are used to prioritize and evaluate potential conservation initiatives, such as simple payback calculations, life-cycle costing considerations, return on investment and net-present value. These are used to varying degrees when considering project viability at a minimum, or when comparing potential projects and assigning resources to more impactful projects.

Current State

Funding of conservation initiatives has evolved since the establishment the Energy Management program in 2013. Initially, projects were funded with a modest minor capital budget and very specific capital lighting projects that targeted individual facility lighting. These projects were identified through energy audits supported through payback analysis.

Following this initial approach, Energy Management focused on larger-scale deployments of lighting retrofits including street lighting and T8 fluorescent conversions to LED technology. These efforts were supported through life-cycle analysis considerations.

Most recently, by working collaboratively with Finance and those involved in the capital budgeting process, the EMB has requested and received annual capital funding of \$300,000 to target measures that have a minimum return of investment of 10%. This innovative funding approach provides flexibility to maximize capital funding dollars for any initiative that can achieve savings. For example, the EMB can fund the incremental expense associated with adding an energy efficiency improvement within a capital project. Furthermore, if favourable pricing is realized during procurement - which is often the case with LED lighting - the unused funding can be targeted towards additional measures.

Funding support is also realized through partnerships with various departments. Often, small operational renewal projects present energy conservation opportunities. In these cases, project costs can be shared between the EMB and the operating group, benefitting both parties.

In summary, funding and financing of Energy Management activities is tackled using the following methods:

- Conducting project feasibility analysis through the use of simple pay-back, life-cycle costing, return on investment and net present value assessments
- Partnering with client operational groups to share cost for project implementation

- Utilization of capital funding to target projects that have a minimum return on investment of 10%
- Leveraging incentive and grant funding to enhance project feasibility and shorten payback periods

Future Opportunity

The Energy Management program has incorporated many best practices from a financing and funding perspective. Additional improvement lies within the larger project planning activities. In particular, the future growth of City services provide a tremendous opportunity to design and build innovative and efficient infrastructure. Upfront investment during the planning and construction of new facilities, water and waste water infrastructure that target aggressive, efficient design standards significantly reduce utility operational expenditures over the life of the asset. Additionally, other environmental benefits are realized through these efforts, such as reduced greenhouse gas emissions, water consumption and improved storm water management.

Improving the capital planning process by enhancing business case development and communicating the benefits of energy efficiency investment is the key next step for improvement of the Energy Management program. Also, in conjunction with the business case planning, additional efforts to maximize grant and funding sources that support innovative energy efficiency project are needed.

Action: Communicate the benefit of large scale energy efficiency investment, particularly for new building design and construction, to senior management, capital planning staff and Council.

Action: As part of the capital planning process, work with FPD and Engineering staff to identify funding streams to support feasibility studies, design work and energy efficient initiatives. At a minimum, successfully apply and receive funding to support a progressive, innovative and energy efficient capital project.

Action: Investigate the potential value and benefit of developing an energy efficiency reserve to support capital and operational expenditures of the EMB.

Monitoring, Targeting & Reporting

Energy Management action is driven by data analytics, measurement and reporting that serves as the fundamental underpinning of all conservation decisions. Understanding facility operations, equipment operating parameters, utility billing, energy consumption data and metrics are key to establishing baseline conditions when identifying, implementing and measuring the effectiveness of efficiency initiatives.

Energy monitoring, tracking and reporting is performed through a variety of activities at differing levels of sophistication. These include:

- Utility billing monitoring and analysis
- Energy management software
- Real-time facility level utility metering
- Equipment specific submetering
- Permanent and temporary data logging
- Building automation and SCADA software
- Baseline and benchmarking activities
- Key performance indicator development
- Regular client touch base meetings
- Council reporting & presentations
- Financial reporting on KPI and budget impacts
- Regulatory reporting requirements outlined in Regulation 507/18

Additionally there are more formal monitoring and verification processes that are utilized to assess the performance on project specific energy efficiency projects which involve equipment specific testing, whole facility level monitoring or calibrated simulation models.

Current State

The EMB has embraced a number of monitoring, tracking and reporting best practices. These are described in detail as follows:

Utility Bill Monitoring & Tracking

A primary objective during the launch of the Energy Management program was the implementation of an energy management software system to centralize and track all utility billing for the corporation. In 2015 the City procured a cloud based software solution, Energycap. Through the implementation of this software solution, the City converted to electronic utility billing. This significantly reduced the number of individual bills (over 500) requiring processing by accounts payable and allowed for automated uploading of data within the Energycap software.

Utilization of the energy management software has resulted in significant operational savings through the identification of consumption spikes at facilities and billing irregularities from the utility companies. Within the first full year of operation, the City uncovered over \$50,000 in billing errors that were subsequently recovered.

Facility & Equipment Submetering

There have been significant advances in submetering technology that provide improved access, monitoring, alarming and reporting functionality. The influence of the internet-of-things has reduced the costs of these activities, but has also ballooned the marketplace and variety of products available.

Considering these factors, Energy Management staff have deployed a number of submeters to gain experience and understanding of the potential submeter solutions available. The following details the deployment of submeters to date:

- Circle at the Centre: Installation of a traditional submeter utilized to track consumption of the outdoor ice rink
- Holly Community Centre: installation of a permanent real-time metering system on the refrigeration plant
- Holly Community Centre: installation of a portable real-time meter to measure the impact of the installation of a variable frequency drive on the large pool pump
- Wastewater Treatment Plant: installation of SCADA-compatible power meters at all of the major pumps and equipment within the WWTP
- Electric Vehicle Charge Stations: installation of a permanent real-time metering system at four locations to monitor consumption
- Building Automation Systems: Energy Management has added a requirement that all new or replaced building automation systems include facility level metering of electricity, natural gas and water

Benchmarking, Targets & Key Performance Indicators

The EMB utilizes benchmarking, targets and key performance indicators (KPI) in a variety of ways. For example, benchmarking is utilized to prioritize the sequencing of recommissioning studies, energy audits and capital lighting retrofits. Benchmarking also serves as the basis for the City’s annual utility budgeting process and monitoring and verifying savings against baseline operating conditions.

The EMB also has established key performance indicators to track facility operations, water operations and wastewater operations. More recently another performance indicator, *cost avoidance*, has been added to quantify the financial benefit associated with reduced consumption trends for electricity, natural gas and propane. The table below summarize the KPI’s from 2015 – 2019.

Energy Management Key Performance Indicators 2015 – 2019

Indicator	2015	2016	2017	2018	2019
Facility Energy Consumption / Square foot	34.1	34.5	32.2	31.2	30.1
Cost Avoidance / year	n/a	n/a	\$552,210	\$346,061	\$241,435
Wastewater Energy Consumption / mL	537	396	391	382	371
Water Energy Consumption / mL	1242	1063	1121	1208	1089

Targets are deployed in conjunction with the key performance indicators. Starting in 2018 a 4% reduction target has been incorporated within the annual performance plan for the EMB, based on the KPI trends.

Another component of monitoring and tracking is the verification of savings from conservation initiatives. Energy Management staff typically conduct monitoring and verification activities in partnership with the local utilities (Alectra / Enbridge) during the processing of incentives and grants.

Future Opportunity

Although the EMB utilizes a number of best practices within the monitoring, targeting and reporting element, there is significant room to improve and optimize these activities. These include:

Action: Develop an encompassing plan for the deployment of submetering within City operations. This will include the following actions:

- Including facility level metering of electricity, natural gas and water for all BAS systems. This requires:
 - o Standardization of building automation system specifications (for new construction or renewal projects) outlining requirements of utility metering needs.
 - o Target the following, existing BAS to add these meters over the next five years:
 - City Hall
 - Surface Water Treatment Facility
 - Wastewater Treatment Facility
 - Barrie Molson Centre
 - Allandale Recreation Centre
 - Fire HQ
 - Painswick Library
 - Transit Terminal
 - Environmental Centre
- Deploy permanent submeters on all major energy-intensive mechanical systems throughout the City's portfolio. Including:
 - o All recreation ice refrigeration plants
 - o All of the major boiler and chillers system
 - o HVAC equipment serving natatorium spaces
 - o Large pumps serving water and wastewater infrastructure
- Add energy submetering functionality to all major pumps at the surface water treatment plant, low lift pump station and wastewater treatment facility
- Establish in-house expertise to deploy portable submeters and data loggers
- Ensure operations staff have access to real-time data and are trained in the use of the software

Action: Update current KPIs with targets set forth in this CDM plan. Establish secondary KPIs to be tracked internally for Energy Management purposes

Action: Target improved building efficiency by establishing new minimum construction building efficiency standards

Action: Establish a measurement and verification protocol for projects led by the EMB

Communications

Communicating the benefits, impacts and results of energy efficiency measures creates awareness, celebrates success and reinforces positive conservation behaviours. Further, systematic reporting and personal meetings with staff builds relationships, entrenches energy conservation ideals and encourages responsiveness when there is a decline in operational performance.

Current State

The EMB employs a number of communications and engagement strategies. These include:

- Regular personal meetings with client groups that utilize energy. In total, Energy Management staff meet quarterly with thirteen different groups within the following departments:
 - o Wastewater Operations
 - o Water Operations
 - o Recreational Facilities
 - o Corporate Facilities
 - o Traffic and Parking Services
 - o Parks Operations
 - o Transit Operations
- Engagement with Facility Planning & Development and Engineering to provide input, recommendations and feedback on current capital projects and forecasted capital works
- Periodic staff engagement initiatives, including the SaveAdam campaign which raised behaviour awareness of day-to-day opportunities to encourage conservation action
- Friendly energy competitions amongst recreational staff to achieve the greatest energy savings reductions
- Regular communications and presentations to Council outlining the progress and successes of the Energy Management program
- Working collaboratively with Communications to highlight positive action to the media and greater public
- Semi-regular communications with senior management outlining workplan ambitions and successes.

Future Opportunity

The natural evolution of the Energy Management program saw the embedding of many of communication best-practices within the regular day-to-day operations. There is an opportunity to optimize these efforts by establishing a more systemic approach to staff and stakeholder engagement. Furthermore, enhancing awareness of the benefits of investing in new ultra-efficient building design and incorporating renewables within new builds serves as the largest avenue for improving communication practices.

Action: Improve communications throughout the corporation, by establishing regular reporting meetings with the following entities:

- Executive Management Team (EMT)
- Senior Leadership Team (SLT)
- Department Management Teams (DMT)

Action: Standardize reporting to client groups by developing a newsletter-type format that is circulated on a regular basis (ie. Quarterly or monthly)

Action: Establish a new engagement campaign to target occupant behaviour

Action: Establish a Facilities Award program to celebrate the success of outstanding facility conservation performance

Training

Training is typically not a focus within energy management programs. This element is closely linked to communications activities that focus on staff engagement, raising awareness and behaviour change action. Training serves as a specific form of engagement which targets an audience's awareness of energy conservation, and focuses on the individuals' sphere of influence within the corporation. This is evident in the differences in approach when engaging facility operators versus office staff.

Current State

Staff training efforts have been implemented on an ad hoc basis. These activities have included direct engagement with all City staff in addition to targeted training with specific operators, supervisors and managers. The major actions are outlined as follows:

- Multi-Use Recreation Facility Challenge

As part of the Recreation facility conservation challenge, Energy Management staff engaged each participating facility (Allandale Recreation Facility, Holly Community Centre, East Bayfield Community Centre) staff to outline the nature of the competition and the basics of energy conservation. This served as an initial introduction of energy fundamentals to these operations staff. Training efforts focused on equipment setpoint and scheduling optimization.

- SaveAdam Campaign

The initial launch of the energy management program included a staff engagement behavioural change program aimed at all City staff. Simple conservation actions were promoted and encouraged. Promotional pamphlets, communications, stickers served as communication mechanisms.

- Recreational Operational Staff Energy Efficiency Training

Energy Management staff partnered with the Local Authority Service (an operational branch of the Association of Ontario Municipalities) to organize training sessions for recreational facility operators, coordinators and supervisors. Over twenty five staff participated in the initiative. This training focused on optimization and best practice operations for recreational facilities, particularly pool and rink spaces.

- Energy Management Staff Training

During the first five years of the Energy Management program Energy Management staff achieved:

- Certified Energy Manager (CEM) designation
- Certified Energy Auditor (CEA) designation
- Certified Measurement and Verification Professional (CMVP) designation

Future Opportunity

To optimize training efforts a more holistic focus targeting all staff within the corporation is required. This includes senior management, front line staff, facility operators, supervisor and managers. Furthermore, enhancing the expertise within the EMB will improve the services offered to other entities within the corporation.

Action: Coordinate with Human Resources to conduct a training needs assessment that targets key personnel that have significant impact on energy consumption.

Action: Enhance Energy Management capacities.

- Obtain Certified Building Commissioning Professional (CBCP) designation within EMB
- Develop an internal 'Energy Management 101' training program to be delivered to staff

Action: Provide specialized awareness training targeting building operators, coordinators and supervisors, to augment 'Energy Management 101' training. Provide this training on a semi-regular basis to key departments including Corporate Facilities, Recreational Facilities, Water and Wastewater Operations.

Action: Establish a building automation system training program that provides vendor-specific training package for operational staff that utilize that software and controls system.

Conclusion & Acknowledgements

This CDM plan has provided an overview of the success of the Energy Management program and establishes conservation targets that aims to improve the energy performance of the Corporation moving forward. To achieve these targets, the plan identifies action to optimize eight key energy management best practice elements within the City. These actions focus on the implementation of continuous improvement initiatives to build a sustained culture of conservation throughout the City of Barrie.

The EMB acknowledges the efforts of Wastewater, Recreation, Corporate Facilities and Water operations staff in achieving the successes realized to date. Energy Management staff have enjoyed the benefits of working collaboratively with these dedicated, knowledgeable, hardworking colleagues and will continue to leverage these partnerships in the future.