

Energy Management Plan (EMP)

Town of Hanover

From: 2019-01-01 to: 2023-12-31

Commitment

Declaration of Commitment

The Council of the Town of Hanover will consider allocating the necessary resources to the development and implementation of a strategic energy management plan that will assist with the reduction of the Town's energy consumption and its related environmental impact.

Vision

The Town of Hanover exercises stewardship in our use of energy resources to demonstrate leadership, optimize our delivery of services and enhance the overall quality of life in our community.

Policy

The Town of Hanover will incorporate energy efficiency initiatives into the Corporation's operations including but not limited to organizational and other related management procedures, fiscal management and investment and facility operations and maintenance.

Goal

To research, consider and implement initiatives that improve the energy efficiency of our facilities, operations and processes in order to realize potential reduction in our operating costs, our energy consumption and our greenhouse gas emissions.

Overall Target

The Town of Hanover will strive to reduce our consumption of fuels and electricity in the Corporation's municipal operations between now and 2023.

Objectives

1. To continue to strive to reduce energy consumption.
2. To continue to consider energy efficiency opportunities that are cost effective or show cost recovery in a reasonable amount of time.
3. To develop and implement a staff engagement program related to the identification and implementation of energy efficiency strategies by 2021.
4. To consider and host an LAS In-House Dollars to Sense Municipal Workshop to increase employee engagement.
5. To identify an energy champion(s) within the municipal staff structure.
6. To implement energy efficiency measures with any new builds, renovations or refurbishments.

Organizational Understanding

Our Municipal Energy Needs

The Town of Hanover recognizes that we need reliable and financially responsible energy sources and delivery to Town owned and operated facilities, as well as energy related technology systems where feasible.

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Stakeholder Needs

Internal stakeholders (Council, CAO, staff) will strive to clearly communicate the corporate commitment to energy efficiency, and to develop the skills and knowledge required to implement energy management practices and measures. External stakeholders (the Province, community residents and facility users) expect the municipality to be accountable for energy performance and to minimize the energy component of the costs of municipal services.

Municipal Energy Situation

Our assessment of organizational capacity for energy management with respect to energy policy, organizational structure, employee awareness, skills and knowledge, energy information management, communications, and investment practices indicates the following high, medium and low priorities for development.

1. Research, consider, develop and implement an employee engagement process relative to energy management and awareness. (High Priority)
2. To identify an energy champion(s) within the municipal staff structure. (High Priority)
3. To consider renewable energy initiatives that would benefit the Town of Hanover in a positive manner including revenue generation or energy consumption reduction. (Medium Priority)
4. To consider and implement energy efficiency measures with any new builds, renovations or refurbishments. (High Priority)

How We Manage Energy Today

The management of energy consumption and the energy performance of our facilities is the collaborative responsibilities of all municipal departments and staff. Corporate Services (cost management, operations and maintenance), Public Works (operations and maintenance), and Parks, Recreation and Culture (operations and maintenance) Departments are the lead proponents of the municipality's EMP.

Summary of Current Energy Consumption, Cost and GHGs

Based on 2016 data, the total annual energy consumption in municipal operations is 5,069,544 kwh of electricity and 397,924 m³ of natural gas at a cost of \$1,138,744.87 per year and GHG emissions of 932,538 kg/year. The following is a summary of our consumption since reporting requirements were implemented.

Year	Electricity		Natural Gas		GHG Emissions (kg)
	Energy Consumption in kwh	Cost/year	Energy Consumption in m ³	Cost/year	
2011	7,167,584	751,613.15	642,960	138,116.47	1,789,004.256
2012	5,991,975	817,929.80	387,751	123,970.09	1,308,561.789

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Year	Electricity		Natural Gas		GHG Emissions (kg)
	Energy Consumption in kwh	Cost/year	Energy Consumption in m ³	Cost/year	
2013	5,517,206	842,946.69	421,497	122,543.50	1,216,268.666
2014	5,490,882	855,064.94	396,947	108,442.48	767,648.573
2015	5,899,269	1,020,368.65	377,479	101,146.91	952,875.715
2016	5,069,544	1,031,801.90	397,924	106,942.97	932,538.447

Renewable Energy Utilized or Planned

The Town of Hanover aspires to show leadership in the development of renewable energy systems that are compatible with our asset management and land use planning objectives. As a result, the Town will continue to investigate the potential to develop renewable energy systems in facilities and operations that support renewable energy initiatives.

Strategic Planning

Links with other municipal plans

As an integral component of the management structure, the EMP is coordinated with the municipality's budget planning process, preventative maintenance initiatives and the asset management plan

Structure Planning

Staffing requirements and duties

The Town will incorporate energy efficiency measures into new or revised standard operating procedures. The Town will ensure applicable staff are provided with relevant energy conservation knowledge information and training as appropriate for the position or operations.

Resources Planning

Energy Leader

The Town believes that overall responsibility for corporate energy management is a collaborative effort between all Town Departments with Public Works, Corporate Services and Parks, Recreation and Culture assuming a cooperative leadership role.

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Energy Team

Upon the implementation of an employee energy engagement initiative, all staff will assume a stewardship role related to energy efficiencies.

Internal Resources

The Town will consider energy projects on a case by case manner and determine the level of internal resources that will be directed to the initiative.

Energy Training

The Town of Hanover will consider the development and delivery of energy management training for relevant staff and other members of the Corporation (ie. Council) as a component of the employee energy engagement process.

Procurement Planning

Energy Purchasing

The Town will continue to negotiate energy purchase agreements that appropriately address our cost considerations, available energy services, energy quality and reliability, and other performance factors.

Consideration of energy efficiency for all projects

The Town recognizes that life cycle cost analysis is a consideration during the design phase for capital projects.

Consideration of energy efficiency of acquired equipment

The Town will consider updating our procurement procedures in an effort to incorporate energy efficiency into the criteria for the selection of materials and equipment.

Implementation Planning

Business Procedures

As deemed necessary, the Town will continuously review municipal operations and modify procedures as necessary in order to incorporate energy efficiency considerations.

Project Execution

Municipal Level

The Town will consider the development of Corporate energy related projects and communication programs and implement initiatives as per approved budgets.

Asset Level

The Town will continue to engage all levels of staff (front line, supervisor, management) in facilitating and implementing procedures and communication initiatives related to energy initiatives for all municipal assets.

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Review

Energy Plan Review

The Town will review and evaluate its EMP, revising and updating it as necessary, on a bi - annual basis within our corporate processes including but not limited to budget, strategic planning and performance appraisals.

Discussion of Progress

The Town of Hanover will correlate our progress towards corporate goals and objectives with respect to the EMP, and as required, update those goals and objectives.

Evaluation Progress

Energy Consumption

Note 2012 has been used as a consistent comparator as that was the first year for data for the Energy Intensity.

Our electrical energy consumption was reduced by approximately 15.4% from 5,991,975 kWh in 2012 to 5,069,544 kWh in 2016. From 2011 to 2016, our electrical energy consumption was reduced by approximately 29%. (See chart).

Our natural gas energy consumption increased slightly by approximately 2.62% from 387,751 m³ in 2012 to 397,924 m³ in 2016. From 2011 to 2016, our natural gas consumption was reduced by approximately 38%.

Year	Electricity		Natural Gas	
	Energy Consumption in kWh	% Change	Energy Consumption in m ³	% Change
2011	7,167,584		642,960	
2012	5,991,975	-16.40%	387,751	-39.69%
2013	5,517,206	-7.92%	421,497	8.70%
2014	5,490,882	-0.48%	396,947	-5.82%
2015	5,899,269	7.44%	377,479	-4.90%
2016	5,069,544	-14.06%	397,924	5.42%

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Greenhouse Gas Emissions

Our greenhouse gas emissions were reduced by approximately 28.7% from 1,308,562 kg/yr in 2012 to 932,538 kg/year in 2016. From 2011 to 2016, our greenhouse gas emissions consumption was reduced by approximately 46%.

Year	GHG Emissions	% Change
2011	1,789,004.256	
2012	1,308,561.789	-26.86%
2013	1,216,268.666	-7.05%
2014	767,648.573	-36.88%
2015	952,875.715	24.13%
2016	932,538.447	-2.13%

Energy Intensity

Our energy intensity was reduced by approximately 46% from 50,787 ekWh/sq ft in 2012 to 27,367 ekWh/sq. ft in 2016. LED Streetlighting started in 2016.

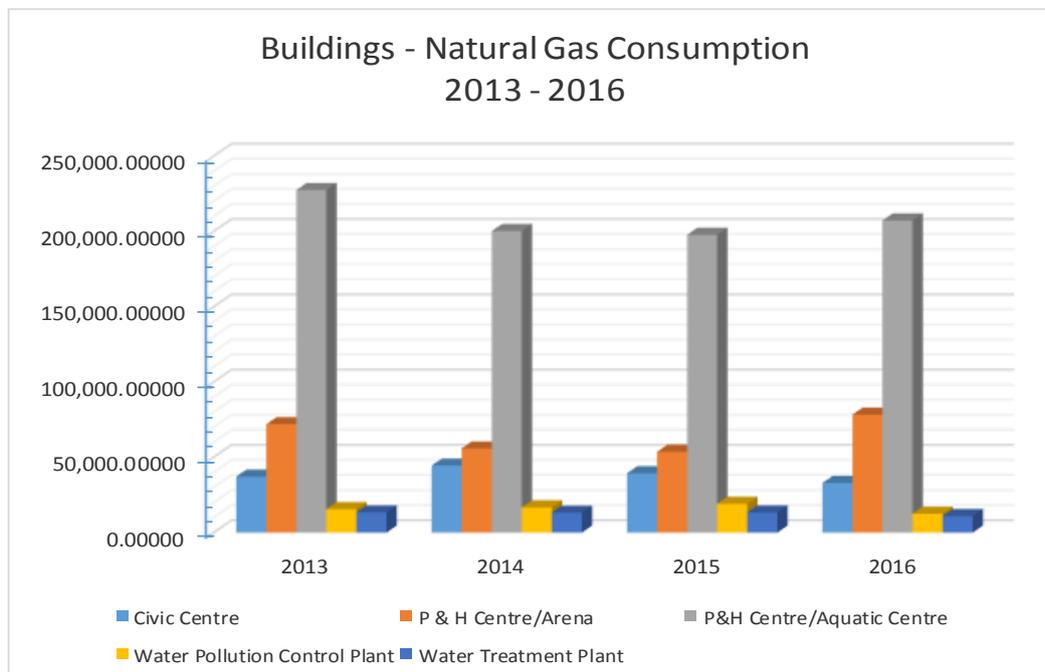
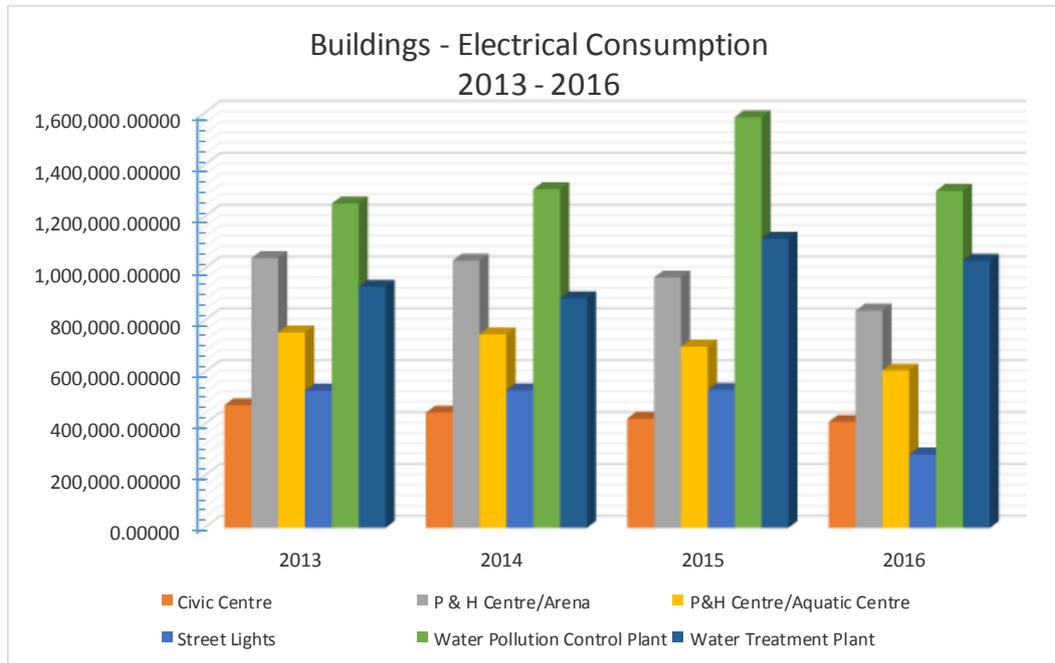
Year	Energy Intensity	% Change
2011	n/a	
2012	50,787.205	
2013	50,508.061	-0.55%
2014	50,687.075	0.35%
2015	49,800.609	-1.75%
2016	27,367.624	-45.05%

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The following graphs indicate the buildings with the largest consumption of energy from 2013 - 2016



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Appendix A What Have We Done – What Are We Doing – What are we Proposing To Do

Public Works Department

1. Public Works Garage (70 14th Avenue)

Completed Energy Efficiency Projects

- a. Replaced overhead metal halide lighting with fluorescent T8 fixtures (2012).
- b. Replaced office/storage areas lighting from T12 to T8 fluorescent (2012).
- c. Replaced exit signage with LED lighting (2012).
- d. Solar Panels installed (2013).
- e. Completed energy audit by LAS (2013).
- f. Replaced office/storage areas lighting from T8 to LED (2019).

Proposed Energy Efficiency Projects

- a. Install timer on six (6) overhead fans to shut the fans off outside of regular hours
- b. Install programmable thermostat for electric heating in office to set back temperature outside of regular hours
- c. Install programmable thermostat for gas fired unit heaters to set back temperature outside of regular hours
- d. Install occupancy sensors to turn off lights when not in use

2. Water Treatment Plant (36 Airport Road)

Completed Energy Efficiency Projects

- a. Plant expansion utilized T8 fluorescent lighting fixtures (2011).
- b. Outside lighting on plant expansion utilized LED lighting (2011).
- c. Completed energy audit by LAS (2013).
- d. Replaced existing T12 office lighting with T8 Fluorescent fixtures. (2014)
- e. Replaced overhead mercury vapour lighting with fluorescent T8 fixtures. (2014)
- f. Replaced overhead T8 fixtures with LED fixtures (2019).
- g. Replaced exterior lighting from high pressure sodium to LED lighting (2019).
- h. Replaced T8 fluorescent lighting fixtures with LED (2019).
- i. Replaced existing T8 office lighting with LED fixtures (2019).

Proposed Energy Efficiency Projects

- a. When motors require replacement utilize energy efficient motors and incorporate soft start technology.

3. Waste Water Treatment Plant (718 7th Avenue)

Completed Energy Efficiency Projects

- a. Four (4) sludge pumps replaced with new 10 horsepower motors and pumps (2012 – 2013).
- b. Installed gravity trunk sanitary sewer to eliminate pumps at three (3) sewage pumping stations (2013).
- c. Completed energy audit by LAS (2013).
- d. Replacement of airline piping for east plant aeration tanks resulting in only utilizing one of two 60 horsepower compressors due to reduced air loss (2013 – 2014).
- e. Installed motion sensors in lab room, lunch room, washroom and generator room (2014).
- f. Replaced interior fluorescent lighting with T8 fixtures (2014).
- g. Completed Optimization Study by Ainley Group (2017).

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- h. Replaced interior T8 lighting with LED fixtures (2019).
- i. Replaced exterior metal halide lighting on buildings with LED lighting (2019).

Proposed Energy Efficiency Projects

- a. Install frequency drive on east plant two (2) Hoffman air blowers.
- b. When Hoffman air blower require replacement consider installing a more energy efficient turbo blower.
- c. Investigate heat exchanger on methane gas piping in Digester Control Building to heat main control building.

4. Street Lights

Completed Energy Efficiency Projects

- a. Replaced 700 street lights from high pressure sodium to LED fixtures (2015).
- b. Retrofitted 26 decorative street lights from high pressure sodium to LED fixtures (2016).

Parks, Recreation & Culture Department

5. P & H Centre (269 7th Avenue)

Arena, indoor pool, walking track, administration office, meeting rooms.

Completed Energy Efficiency Projects

- a. New arena constructed replacing a 1963 facility with outdated systems. The following energy efficiencies were incorporated into the design. (2010)
 - i. T5 florescent lighting throughout.
 - ii. Occupancy sensors control lighting throughout the facility.
 - iii. Low flow washroom fixtures with automatic sensors for sinks, toilets and urinals.
 - iv. In floor bleacher heating utilizes a heat recovery system with existing swimming pool.
 - v. Walls utilize a freezer board insulation system utilized for enhanced R values.
 - vi. Exterior spaces insulated with 2" rigid insulation boards and poly spray.
 - vii. Under floor heating utilizes surplus warm water from the refrigeration process.
 - viii. Energy efficient electrical motors with variable speed capabilities.
 - ix. Refrigeration system recycles cooling water and utilizes surplus hot water for snow melt and heating.
 - x. Building automated system for entire facility.
- b. LAS audit completed (2013).
- c. Installed float and water levellers to control water levels based on bather loads, reducing water consumption and heating costs (2013).
- d. Replace exit door weather stripping (2014).
- e. Light switches installed in pool mechanical room, Lions Den kitchen, Olympia / refrigeration room (2015).
- f. Installation of user controls for water mushroom and swirlpool (2016).
- g. Installation of electrical switch in Olympia / refrigeration room (2016).
- h. Sauna replacement and upgrade with consideration for energy efficiency opportunities (2016).
- i. Aquatic Centre lighting upgrade (2016).
- j. Installed soft starts on pool pumps for slide, water mushroom and swirlpool (2016).
- k. Replaced 2 water heaters on arena side (2017).
- l. Installed LED fixtures on exterior wall lights at P & H Centre and parking lot lights (2017).
- m. Re-insulated boilers serving pool heat, arena seating, offices and exterior sidewalk with 2 efficiency modulating units (2017).

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- n. Replaced 4 hot water heaters serving pool changerooms with 1 hot water heater (connected to boiler) and storage tank (2017).
- o. Installed arena floor fans to alleviate humidity and assist with enhancing heating and cooling systems (2018).
- p. Replaced pool rooftop exhaust fans (2018).

Proposed Energy Efficiency Projects

- a. Investigate replacing exits signs with LED fixtures.
- b. HVAC soft start installation.
- c. Replace boilers serving pool heat, arena seating, offices and exterior sidewalk with 2 efficiency modulating units.
- d. Install timers on recirculation pumps for arena and pool.
- e. Investigate LED lighting for arena.
- f. Building Automation System – Investigate effectiveness of system operation to maximize our use advantages.
- g. Implement training on our refrigeration system software to maximize use efficiencies.

6. Outdoor and Parks Areas

Completed Energy Efficiency Projects

- a. Installed LED fixtures for parks lighting at Heritage Square and dam lighting. (2017).
- b. Installed new light fixtures at Kinsmen Ball Park on 2 ball diamonds. (2018)

7. Civic Centre (341 10th Street)

Municipal Office, Civic Theatre, firehall, meeting rooms.

Completed Energy Efficiency Projects

- a. Replaced server room fan coil to an energy efficient unit (2014).
- b. Replaced track lighting in Library. (2015)
- c. Replaced pot lights with LED, interior and exterior lighting upgrade (2016-2017).
- d. Theatre lighting replacement and upgrades (2018).

Proposed Energy Efficiency Projects

- a. Investigate air conditioning condensers at firehall.
- b. Investigate elevator upgrade with solid state starter.
- c. Mechanical system (HVAC / chiller) upgrade and replacement (2019).

8. Medical Clinic (118 7th Avenue)

Medical clinic, locum apartments, three leased spaces.

Completed Energy Efficiency Projects

- a. Lighting fixtures replaced with LED fixtures (2017).

Proposed Energy Efficiency Projects

- a. Light and wall transformer replacement as equipment fails.

9. 140 7th Avenue

Workshop bays, two leased spaces.

Completed Energy Efficiency Projects

- a. Lighting fixtures replaced with LED fixtures (2017).