

REPORT

REPORT TO: Chair and Members of Planning, Public Works & Transportation Committee

REPORT FROM: Michael Dean, Senior Sustainability Planner & Energy Coordinator

DATE: September 20, 2019

REPORT NO.: PLS- 2019- 0067

RE: 2020 Corporate Energy Plan Update Final Draft Report

RECOMMENDATION:

THAT Report No. PLS – 2019 – 0067, dated September 20, regarding the 2019 Corporate Energy Consumption and Activities Report and the 2020-2025 Corporate Energy Plan, be received;

AND FURTHER THAT the 2019 Corporate Energy Consumption and Activities Report and the 2020-2025 Corporate Energy Plan, attached under separate cover to Report No. PLS – 2019 – 0067, be approved;

AND FURTHER THAT Town staff be directed to submit the 2019 Corporate Energy Consumption and Activities Report and the 2020-2025 Corporate Energy Plan and the data to the Province and make it publically available, as per the *Electricity Act*;

AND FURTHER THAT the resources required to successfully implement the 2020-2025 Corporate Energy Plan on an on-going basis, be brought forward and considered as part of the annual capital and operating budgeting process.

BACKGROUND:

As detailed in Report No. PLS-2019-0002 (dated January 16, 2019) which was approved by Council on February 5, 2019, an update to the 2014 Corporate Energy Plan was undertaken in 2019 in order to fulfill the requirements of the *Electricity Act* and Milestones 4 and 5 of the Partners for Climate Protection Program. This update was to include two sections: a report on the current condition of energy management at the

Town and an updated plan of action for the 5 year period from 2020-2025. These sections are presented here as two separate documents:

1. The 2019 Corporate Energy Consumption and Activities Report
2. The 2020-2025 Corporate Energy Plan (CEP)

COMMENTS:

The 2020 Corporate Energy Plan Update includes two sections: the 2019 Corporate Energy Consumption and Activities Report which describes the current state of energy management in Halton Hills and the outcome of the 2014 Corporate Energy Plan, and; the 2020-2025 Corporate Energy Plan which provides a roadmap for reducing energy consumption, utility costs, and greenhouse gas emissions over the next five years. Both sections are provided as attachments to this report, and are summarized below.

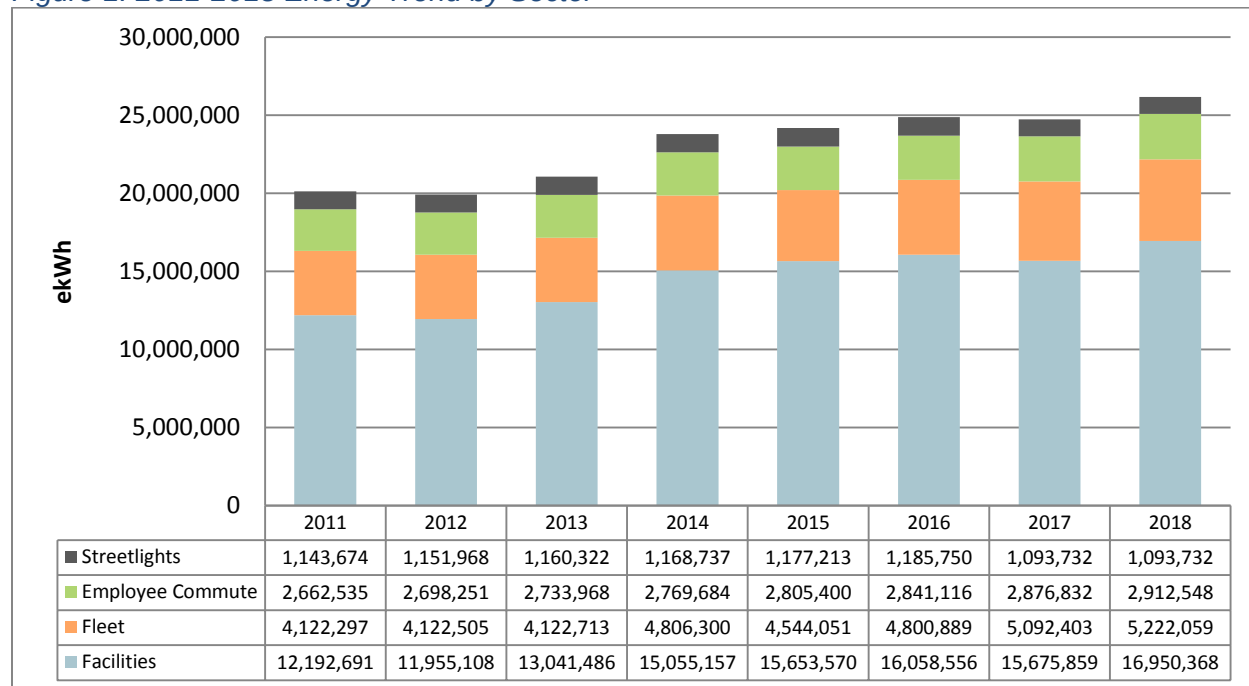
1. The 2019 Corporate Energy Consumption and Activities Report

The 2019 Corporate Energy Consumption and Activities Report provides a summary of the Town's 2018 annual energy consumption, GHG emissions, and all energy costs associated with the Town's operations. Key highlights include:

- **The Town consumed just over 26 million “equivalent” kilowatt-hours (ekWh) of energy in 2018**, an increase 6.1 million ekWh, or a 30% increase from 2011.
- **Total energy cost increased by approximately \$909,000, a 70% increase compared to 2011.** During this period increases in electricity, natural gas, and diesel prices have been slightly offset by a reduction in the price of gasoline.
- **Efficiency measures have saved the Town approximately \$171,000 per year in energy costs.** If Town facilities currently operated at the energy intensities of 2011, the Town would spend an additional \$171,000 on energy per year.
- **Despite significant increases in energy consumption, energy-related greenhouse gas emissions in 2018 were only 8% percent higher in 2018 than 2011.** This was a result of a combination of the energy efficiency measures implemented by the Town and the Provincial phase out of coal power generation.
- **If emissions offsets associated with renewable energy projects on Town facilities are included the Town's emissions are 4% lower than they were in 2011.** Additional actions will have to be undertaken in order to ensure that the Town meets its emissions targets in the future.

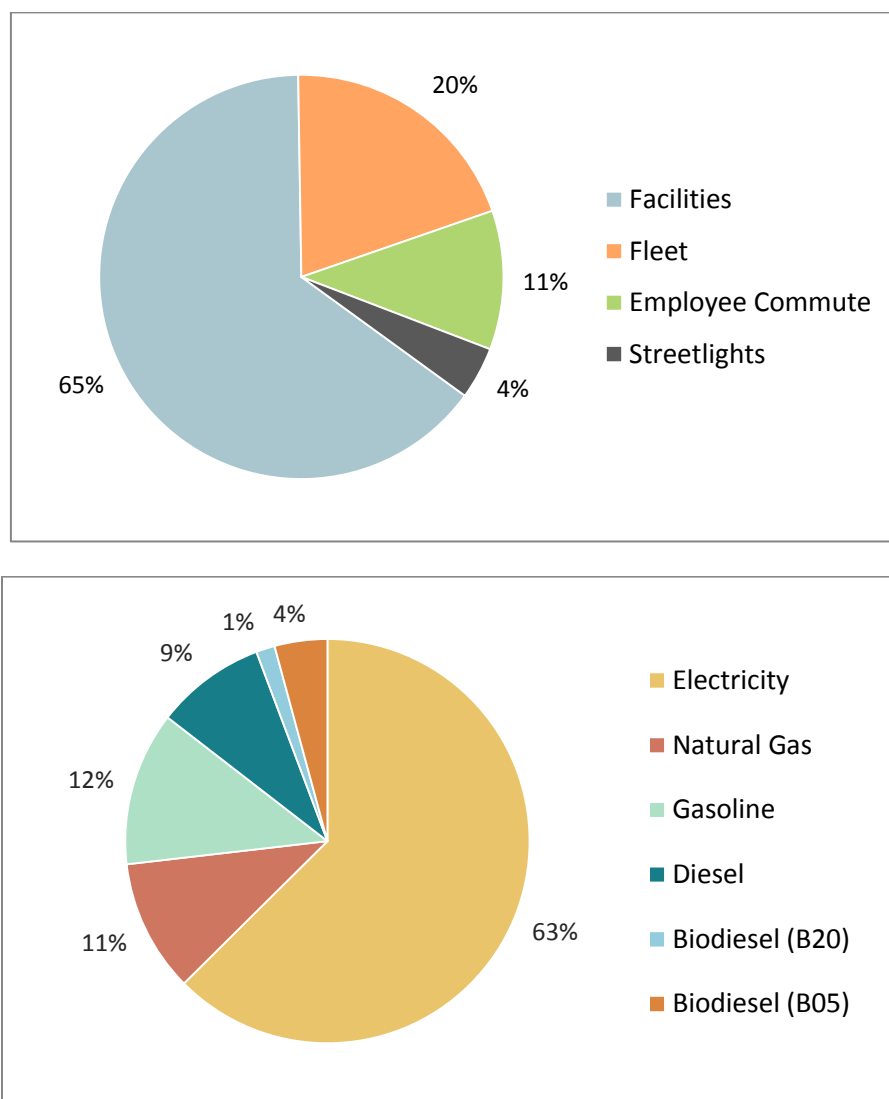
In the period from 2011-2018 there has been a 30% increase in total energy consumption (see Figure 1). This growth has been primarily driven by significant increases in the size of major Town facilities during this period.

Figure 1. 2011-2018 Energy Trend by Sector



The Town spends just over \$2.2 million per year on energy. Despite being only 33% of energy use, electricity makes up 63% of energy costs (see Figure 2). Because natural gas has remained relatively inexpensive, it is the lowest cost energy source at present. The new federal carbon pricing system, introduced on April 1st, 2019 should lead to increases in the price of natural gas, diesel, and gasoline, while electricity will be less heavily impacted due to the low-carbon nature of the Ontario electricity grid.

Figure 2. 2018 Energy Cost by Sector and Commodity



Annual emissions associated with Town operations have increased by 8% during the period from 2011-2018, from 3,600 tCO₂e to 3,890 tCO₂e – an increase of 290 tCO₂e. Despite significantly increased energy use, emissions associated with Town facilities have increased by only 3% during this time – this is, in large part, due to the impact of the provincial coal phase out on emissions associated with the electricity grid, without which emissions in facilities would have increased by just over 30%.

In addition, significant additions to the Town's facility portfolio were offset by much more efficient construction and the implementation of energy efficiency measures. For example, the Robert C. Austin Operations Centre and Acton Arena respectively consume 37% and 29% less energy per unit of floor space compared to 2011. If the energy intensity of Town facilities was the same as in 2011, the Town would currently use 4 million more ekWh per year, or a 45% increase in energy use between 2011-2018.

Through the local distribution company, Halton Hills Hydro, the Town has installed three solar arrays on Town facilities (Mold-Masters SportsPlex, Acton Arena, and the Robert C. Austin Operations Centre). Because these panels generate carbon neutral energy during the day, when average carbon intensity for the Ontario grid is highest, they offset emissions at a higher rate than the grid average tCO₂e/kWh. As a result, they reduce emissions associated with energy production by approximately 427 tCO₂e per year. If these offsets are considered as part of the emissions reductions from Town activities, the Town has reduced emissions by 4% from 2011 levels. Figure 3 shows the trajectory of Town emissions over the 2011-2018 period with and without offsets from renewable energy generation. The reductions associated with energy efficient new construction, efficiency retrofits, and renewable energy projects are summarized in Table 1 below.

Figure 3. Emissions trend 2011-2018 with Renewable Energy Offsets

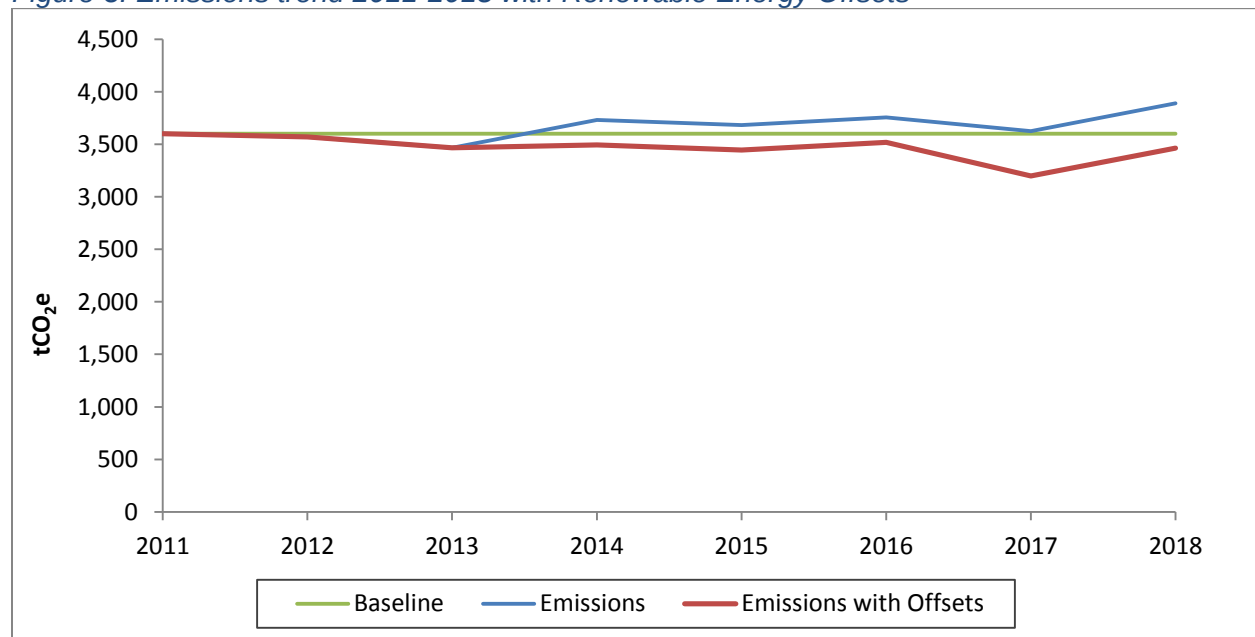


Table 1. Energy use reduction, emissions reduction, and utility cost avoidance by action type

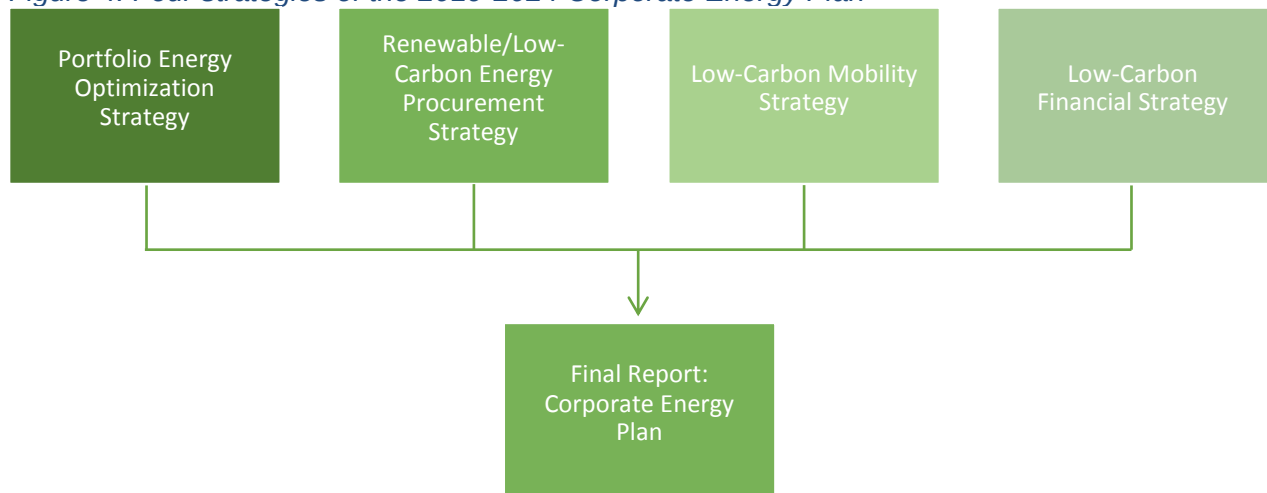
Action Type	Energy (ekWh)	Emissions (tCO ₂ e)	Cost (\$)
Energy Efficient New Construction	-2,480,025	-37	-48,192
Efficiency measures in existing buildings	-390,077	-398	-130,144
Renewable energy projects	-1,212,160	-478	na
Total	-4,082,262	-913	-178,337

2. 2020-2025 Corporate Energy Plan

This 2020-2025 Corporate Energy Plan (the Plan) constitutes the Town's second ECDM plan. It updates the 2014 Plan and reaffirms the Town's commitment to energy management and efficiency with an emphasis on deep greenhouse gas (GHG) emissions reductions. It reports on achievements to date and outlines the approach to managing energy in Town facilities over the next five years. As set out in Figure 4, the 2020-2025 Plan goes beyond the regulatory requirement in outlining the approach to achieving a low-carbon vision by developing four connected foundational strategies:

1. Portfolio Energy Optimization to minimize facility energy consumption while upgrading buildings and maintaining or improving occupant comfort;
2. Renewable/Low-Carbon Energy Procurement to increase the Town's use of renewable energy;
3. Low-Carbon Mobility to address emissions resulting from the Town's vehicle fleet and employee commuting; and
4. Low-Carbon Financial Strategy aimed at developing a comprehensive funding approach to fully enable the Plan's implementation.

Figure 4. Four strategies of the 2019-2024 Corporate Energy Plan



2.1 Recommendations

The approach of the 2020-2025 Corporate Energy Plan can be summarized in the following key recommendations:

- Take a systematic, evidence-based approach to developing low-carbon facilities, operations and organizational capacity. Develop low-carbon standards, practices and management systems through currently planned capital projects and targeted high-potential retrofits before committing to major capital investments.
- Focus first on understanding and making the most of existing facilities and operations. Testing and analysis of individual building systems, effective

documentation, staff training, and performance-based service contracts can bring them to optimal performance and keep them running efficiently in future. Applying this approach to ventilation, ice plants and other systems is recommended as part of the Corporate Asset Management Program.

- Continue and conclude the investigation into the operation of the Town's 4 existing geothermal installations to get them operating at their full potential while informing the Town standard for future installations as an essential element of the carbon reduction goal.
- Halton Hills has an exemplary Corporate Asset Management Program that takes a whole lifecycle approach to realizing value in each of the Town's service areas. Integration of low-carbon considerations and procedures is recommended, particularly during the Needs Identification and Assessment stage and in monitoring performance and costs throughout the physical asset life cycle from initial planning to final disposal.
- New buildings and major renovations should be designed for climate change adaptation and a low-carbon future, taking into consideration:
 - a. High-performance energy efficiency and net-zero carbon design and operations
 - b. Renewable energy
 - c. Low-carbon transportation opportunities
 - d. Climate resilience and survivability, including high-performance building envelopes, protecting or enhancing natural drainage systems, infrastructure (particularly water storage), flood defences and standalone energy supply based on renewables and bio-fuel generators
- Investment in upgrading existing facilities should prioritize those with high emissions reduction potential and returns on investment while extending the application of building automation technology and developing standardized approaches to operations and maintenance.
- Make the best use of the current fleet and resources by collecting data on current fleet practices. Prepare for technological advances in new vehicles and fleet management and expand electric vehicle adoption as these become available.

2.2 Capital Investments and Savings

The Plan presents a three-part approach to the progression towards the goal of deep reductions in carbon emissions. The first part is investment in energy efficiency retrofits and operational improvements to corporate facilities which provides a good return on investment. As detailed in Section 3, the Plan proposes an investment of \$2,676,000 in energy efficiency upgrades to Town facilities over the 5-year period, including addition of building automation technology across all buildings. This investment would be offset by over \$250,000 in forecast utility company incentives (rebates). When the measures

are fully implemented, the reduced energy and water consumption will generate utility cost savings estimated at more than \$400,000 per year at current rates (see Table 2).

Table 2 Summary of recommended energy efficiency measures by measure type

Measure type	Estimated Cost (\$)	Electricity Savings (kWh/year)	Gas Savings (m3/year)	Estimated Savings (\$/year)	Incentives (\$)	Payback (years)	GHG emissions reduction (tonnes CO2e)
Lighting	353,387	340,669	0	57,914	34,067	5.5	7
HVAC & Controls Retrofits	2,082,243	1,277,223	258,688	283,947	179,460	6.8	521
Operations	110,478	175,200	102,499	56,259	38,020	1.3	200
Building Envelope	105,728	64,366	14,068	14,576	9,250	6.6	28
Training	24,000	0	0	0	0	0	0
TOTAL	2,675,836	1,857,459	375,255	412,696	260,797	6.4	756

Second, all new buildings, major renovations and equipment replacements should be planned and implemented to achieve low or no-carbon performance. The Town's Corporate Asset Management program and sustainable building policies will support comprehensive high-performance, low-carbon targets and design, with every capital project subject to these requirements. Additional time and capital to incorporate low carbon design will be included in each project. The proposed retrofit of Gellert Community Centre is an ideal pilot for developing and testing the overall approach, applied to the whole facility, not just the expansion, to create integrated low-carbon design and operations. Similarly, the fleet management strategy will progressively incorporate carbon reduction practices and programs to support low-carbon vehicles, operations and commuting.

The third part of the overall strategy is proactive, long-term investment in geothermal, advanced heat recovery, and renewable energy installations designed to minimize natural gas consumption and associated emissions. Section 4 of the CEP provides details of this approach. Where such investments do not yet meet the Town's economic criteria, capital renewal and replacement projects should be designed to be ready for future installations as technology continues to advance and economics improve. Grants from senior levels of government will be pursued to help fund these projects.

In order to fully fund the plan, the Town should establish a Green Revolving Fund (GRF) as a means of establishing a predictable and accountable financing source for implementation of the Plan. The GRF also has benefits of positive public perception while driving the early realization of the greatest utility cost savings, alternative funding sources and rigorous monitoring of ongoing performance and savings. The GRF will require dedicated staff time to manage the accounting, communicate results and also actively search and apply for additional sources of funding such grants and incentives. The GRF should scale up over time, allowing staff to develop management and monitoring processes and become familiar with the opportunities and challenges.

Further details on establishing a Green Revolving Fund are provided in Appendix G of the CEP.

2.3 Management and Organizational Alignment

The transition to a low-carbon future affects every aspect of society – how we live, what we buy, how we move around, the decisions we make every day. For the Town of Halton Hills, this transition will build on a well-established foundation of effective management and a deep commitment to sustainability. In addition to rethinking how buildings work, integrating new technology, and changing the purchasing criteria for vehicles, equipment and products, a successful transition will require additional alignment of management systems and processes and organizational capacity-building.

2.3.1 Corporate Asset Management Program

The Town's sector-leading Corporate Asset Management program provides the management platform for ensuring that Town assets meet the minimum low-carbon requirements throughout their lifecycle, from planning and acquisition through operations and maintenance to end-of-life decommissioning and disposal. As outlined in Section 6 of the CEP, the Needs Assessment project review will also include fuel efficiency, furthering low-carbon readiness and meeting low-carbon goals. The lifecycle assessment approach already integrated in the program is a pivotal component of success of low-carbon strategies.

2.3.2 Corporate Sustainable Building Policy and Green Development Standard

The Town's Corporate Sustainable Building Policy provides guidance on new municipal building design and construction. It should incorporate low-carbon energy and mobility considerations including heat recovery, geothermal, renewable energy generation (solar readiness at minimum), and EV parking and charging station requirements.

Low-carbon considerations should also be incorporated in the Green Development Standard, which guides the construction of all buildings within the Town of Halton Hills. As the Green Development Standard is to be updated starting in 2019, it would be efficient to have it also apply to public and municipal new building design. Municipal buildings could be subject to mandatory requirements, particularly in relation to lifecycle costs, high efficiency and low-carbon energy and mobility considerations.

2.3.3 New Construction and Capital Improvements

As outlined in Section 6 of the CEP, an integrated design process is a collaborative process bringing together designers, architects, engineers, building managers, operators and users to ensure all design, construction, operation and use considerations over the lifetime of the building are taken into account. Beginning this process early will define the requirements for the Low-Carbon Design Brief that guides the desired end point.

2.3.4 Performance Monitoring and Reporting

The Town is already using energy data to report on energy performance and meet regularly through Corporate Energy Team meetings to review performance. This reporting, together with additional data that is recommended to be collected, will inform progress towards low-carbon goals. A review of reporting should be included in the Corporate Energy Team meetings to ensure continuous improvement.

2.3.5 Staff Training and Support

Enhancing staff capability in energy management and building automation will be achieved by defining job-specific expectations, providing on-the-job training opportunities and working with service providers to provide necessary training and support.

2.3.6 Procurement

Energy and emissions performance is substantially dependent on the products and services of external providers, and some modified procurement practices will help to obtain high-performance outcomes. Some new processes are recommended which rely on continuity and consistency, including major system testing and additional building automation. These require architects, engineers and contractors who are experienced in and have proven track records with the low-carbon design methods, systems and equipment required to meet the goals.

2.3.7 Occupant Engagement

Staff and visitors play a significant role in the energy performance of Town facilities and the Town's overall environmental footprint. The Town has an opportunity to clearly communicate their goals, why they are important to all parties and how everyone can play their part in meeting them.

RELATIONSHIP TO STRATEGIC PLAN:

Sustainability is one of the Council priorities identified in the Town's Strategic Action Plan. The completion of the CEP will better enable the Town to fulfill its many sustainability objectives, including those directly related to energy.

FINANCIAL IMPACT:

Implementation of the CEP will involve significant new capital investments as outlined in this report and the attached document. The energy efficiency measures recommended in the CEP call for \$2.6 million in capital investments over the 2020-2025 period. Each recommended project will be assessed and included in the budget review process separately. These measures are anticipated to save the Town \$412,696 annually in utility costs.

CONSULTATION:

As part of the Plan development process the Town convened a project management team and a steering committee. The steering committee was comprised of members of the existing Corporate Energy Management Team and other important stakeholders. This body met at key points throughout the development process to provide input, subject matter expertise and feedback.

In addition to bi-weekly project management meetings, consultation with department representatives gathered their input and advice. These focused, strategy-specific meetings included two with fleet operations, one with asset management and finance, and one with Halton Hills Hydro to discuss electric vehicle charging stations and other collaboration opportunities. A Corporate Energy Plan update workshop, which included the Corporate Energy Team as well as Corporate Services representatives, was held on June 18, 2019.

PUBLIC ENGAGEMENT:

Because it primarily addresses the Town's internal operations, no public engagement was undertaken as part of the development of this plan.

SUSTAINABILITY IMPLICATIONS:

The Town is committed to implementing our Community Sustainability Strategy, Imagine Halton Hills. Doing so will lead to a higher quality of life.

The recommendation outlined in this report advances the Strategy's implementation.

This report supports the environment and economy pillars of Sustainability and the alignment of this report with the Community Sustainability Strategy is excellent.

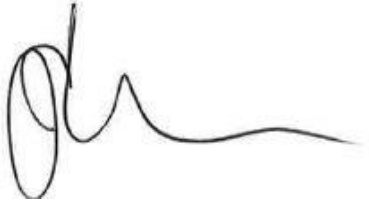
COMMUNICATIONS:

Both sections of the CEP, the 2019 Corporate Energy Consumption and Activities Report and the 2020-2024 Corporate Energy Plan will be made available to the public and staff through the Town's website. Specific projects recommended in the CEP may have additional communications requirements to be determined at a later date.

CONCLUSION:

Building on the Town's past successes and many existing efforts, the CEP is anticipated to realize improved efficiencies, utility cost savings, improved energy management, future cost avoidance, lower greenhouse gas emissions and continued municipal leadership. The Plan also positions the Town in compliance with the *Electricity Act* and completes the requirements of the Partners for Climate Protection program for corporate activities.

Reviewed and Approved by,

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John Linhardt, Commissioner of Planning and Sustainability

A handwritten signature in black ink, appearing to be 'Brent Marshall', with a stylized, flowing script.

Brent Marshall, Chief Administrative Officer