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REPORT

REPORT TO: Mayor Bonnette and Members of Council

REPORT FROM: Damian Szybalski, Manager of Sustainability

DATE: August 22, 2014

REPORT NO.: PDS-2014-0041

RE: Mayor's Community Energy Plan (Project Update #6)
Draft Local Action Plan
File No.: D27-CO

RECOMMENDATION:

THAT Report No. PDS-2014-0041, dated August 22, 2014 regarding the draft Local Action Plan component of the broader Mayor's Community Energy Plan, be received;

AND FURTHER THAT the draft Local Action Plan, attached under separate cover to Report No. PDS-2014-0041, be approved;

AND FURTHER THAT the draft Local Action Plan be posted on the Town's website;

AND FURTHER THAT Town staff report to Council with the final consolidated Mayor's Community Energy Plan at the earliest possible date.

PURPOSE OF REPORT:

The purpose of this report is to provide an overview of the draft Local Action Plan component of the broader Mayor's Community Energy Plan.

For ease of reading, this report is organized into sections which explain the (i) content of the Local Action Plan; (ii) the computer model which underpins the Plan; (iii) the three scenarios that were generated; and (iv) the recommended actions to reduce community greenhouse gas emissions and energy use.

BACKGROUND:

As detailed in Report No. PDS-2014-0021 (dated April 17, 2014), the Local Action Plan, hereafter referred to as the "LAP", is one of two key components which will make up the broader Mayor's Community Energy Plan.

As a long-time member of the Federation of Canadian Municipalities' Partners for Climate Protection program[1], the Town's LAP delivers on the program's first three milestones, specifically:

- Creation of a community-wide greenhouse gas emissions inventory;
- Setting of a greenhouse gas emissions reduction target; and
- Development of a Local Action Plan (LAP) which outlines actions that can be taken to work towards achieving the selected greenhouse gas reduction target.

The remaining two milestones of the Partners for Climate Protection program pertain to the implementation of the LAP, and the monitoring of its implementation and reporting results. The LAP positions Halton Hills to be able to achieve the remaining two milestones.

The second component of the Mayor's Community Energy Plan is the Corporate Energy Plan which is focused on the efficiency of the Town's own facilities, and is required under the *Green Energy Act*. Recently, through Report No. PDS-2014-0037 (dated May 20, 2014) Council approved the final Corporate Energy Plan.

Town staff have provided prior updates on this project via:

- PDS-2014-0037: http://haltonhills.ca/calendars/2014/PDS-2014-0037.pdf
- PDS-2014-0021: http://haltonhills.ca/calendars/2014/PDS-2014-0021.pdf
- PDS-2014-0005: http://haltonhills.ca/calendars/2014/PDS-2014-0005.pdf
- PDS-2013-0053: http://haltonhills.ca/calendars/2013/PDS-2013-0053.pdf
- PDS-2013-0045: http://haltonhills.ca/calendars/2013/PDS-2013-0045.pdf

COMMENTS:

1. Energy and Climate Change

North American municipalities are increasingly focused on energy as a strategic priority to reduce operating costs, mitigate rising utility costs, and to demonstrate their commitment to long-term sustainability. To complement this, a growing number of

[1] The Town of Halton Hills is one of about 240 Canadian municipalities that have joined the Partners for Climate Protection program, committing to taking actions to reduce greenhouse gas emissions from corporate and community activities. In proximity to Halton Hills, Caledon, Oakville, Burlington, Halton Region, Guelph and Mississauga are also members (among others).

municipalities are taking steps to reduce community-wide energy use with the objective of reducing greenhouse gas emissions and addressing climate change.

Caused by rising global carbon dioxide emissions generated by human activity, climate change is projected to result in more frequent and more severe extreme weather conditions (e.g. 2013 ice storm), including heavy precipitation, flooding and heat waves. In turn, these events are anticipated to have significant economic and social impacts on communities, including on municipal infrastructure. A recent report by the Town's Environmental Advisory Committee on the subject of climate change highlighted some of the potential impacts of climate change on Halton Hills.

A June 2012 report prepared for the Insurance Bureau of Canada by the Institute for Catastrophic Loss Reduction, estimated the financial impacts (i.e. insured losses) caused by severe weather to have ranged from $10 to $50 billion globally each year over the past decade. In 2011, these costs reached $100 billion. In Canada alone, between 2009 and 2011, losses reached about $3.6 billion.[2]

Municipalities directly or indirectly control about half of all greenhouse gas emissions in Canada.[3] As a member of the Partners for Climate Protection program, the Town of Halton Hills is taking proactive and meaningful steps to address climate change.

Local governments are strategically positioned to make a significant contribution to addressing climate change, and reducing energy use and greenhouse gas emissions. This is because local governments have the ability to work closely with community stakeholders, capitalize on social networks and to act quickly to implement effective measures.

2. Local Action Plan (LAP) - community-wide focus

2.1 LAP Objectives

Compared to the Corporate Energy Plan, the LAP is much broader in scope as it applies to the municipal boundaries of Halton Hills (i.e. the entire community) rather than being limited to the Town's own corporate operations. The LAP takes a comprehensive approach by addressing the three milestones of the Federation of Canadian Municipalities' (FCM) Partners for Climate Protection (PCP) program.

[2] *Telling the Weather Story*. June 2012. Institute for Catastrophic Loss Reduction. Prepared for the Insurance Bureau of Canada. Accessed June 11, 2014. Available at: www.ibc.ca/en/Natural_Disasters/documents/McBean_Report.pdf

[3] *Act Locally: The Municipal Role in Fighting Climate Change.* EnviroEconomics. Prepared for the Federation of Canadian Municipalities. December 8, 2009. Accessed August 25, 2014. Available at: www.fcm.ca/Documents/reports/Act_Locally_The_Municipal_Role_in_Fighting_Climate_Change_EN.pdf

2.2 LAP Content

The LAP is comprehensive and data-intensive. It contains a large volume of valuable data which has been illustrated in a series of tables, graphs and figures. Key sections of the LAP are:

- Executive Summary: Provides a brief overview of the LAP, including results for the baseline year of 2011 in terms of energy use and greenhouse gas emissions. The outcomes of three scenarios modelled to the year 2031 are summarized.

- Context: Highlights the international, national, provincial and local backdrop for the LAP. A key point noted here is that rising global carbon dioxide emissions and the associated rise in temperatures are projected to cause climate change which will lead to more frequent and more severe extreme weather conditions, including heavy precipitation, flooding and heat waves.

- Town of Halton Hills: Summary of relevant Halton Hills policies and plans, including the Strategic Plan and the Community Sustainability Strategy.

- Mayor's Community Energy Plan: Outline of the project's scope, objectives and methods used.

- Community Engagement: Summary of a variety of community engagement strategies and their results.

- Modeling: Description of the GHGProof computer model which was used to generate the scenarios for the LAP, as well as the importance of land-use planning as a dominant driver of community energy use and greenhouse gas emissions. Includes data for the 2011 baseline year.

- Modelled Scenarios: Details of the three scenarios prepared for the LAP, including the key changes that were modelled for each scenario, and the resulting greenhouse gas emissions, energy consumption, mode share and economic impacts.

- Discussion Items: Among other matters, highlights of the Social Cost of Carbon, being an approach to monetarily quantify the economic damages caused by climate change.

- Corporate Energy Plan: Overview of the corporate component of the LAP. This section complements the recommendations of the Corporate Energy Plan which has already been approved by Council.

- Recommendations: Presentation of 16 recommended actions that should be undertaken to work towards achieving the recommended greenhouse gas

emission targets for Halton Hills. The recommended greenhouse gas emission reduction targets are to be achieved by 2031.

- Conclusion: Concludes the LAP by underscoring that Halton Hills already has many of the ingredients necessary to move towards being a low carbon community – a community characterized by lower energy use and greenhouse gas emissions.

- Appendix 1: Review of best practices. Although not necessarily fully transferable to the Halton Hills context, the best practices provide context and inspiration.

- Appendix 2: Provides an overview of the data, methods and assumptions that were used to develop and 'run' the GHGProof computer model. This includes a description of how the scenarios were developed and the uncertainty involved.

- Appendix 3: Summary of one of the community engagement sessions, focusing on the mapping of Halton Hills' green economy, and identifying opportunities for energy and greenhouse gas emission reductions.

- Appendix 4: Questions used to provide input into the modelled scenarios.

- Appendix 5: Overview of the concept of the Social Cost of Carbon.

2.3 Computer Modeling (GHGProof)

An important and unique aspect of the Halton Hills LAP is that it is based on a detailed computer model, referred to as 'GHGProof'. This computer model was used to analyze land-use patterns and transportation scenarios[4] to evaluate their impact on energy and greenhouse gas emissions, as well as cost savings and economic benefits. Although the model does not predict outcomes with certainty, it does illustrate the effects of different scenarios.

Rather than just basing Halton Hills recommendations on a review of best practices and/or setting arbitrary targets and recommendations, the use of the GHGProof computer model allowed for recommendations to be 'grounded' in analysis. In addition, rather than recommending a long list of recommendations, a relatively short list of 16 actions is identified that can help move Halton Hills towards achieving its greenhouse gas emission reduction targets.

Figure 1 illustrates the key issues considered by the GHGProof computer model. The computer model considers a variety of inputs, including:

- Movement of goods and people (e.g. average trip length in Halton Hills)
- Land use (e.g. number of dwellings by type, housing density)

[4] As part of the analysis, a transportation model was developed by identifying key destinations in Halton Hills. The number of trips was then generated for each destination based on assumptions as to the draw generated by a given land-use.

- Heat and electricity
- Liquid and solid waste
- Food production
- Area of forest

Figure 1: Issues Addressed by the GHGProof Model

2.4 Overview of Modelled Scenarios

To identify greenhouse gas emission reduction targets, the computer model is based on three scenarios:

- Scenario 1: Moderate Energy Efficiency
- Scenario 2: Towards a Low Carbon Community
- Scenario 3: Low Carbon Community

The scenarios represent different land-use patterns, levels of building efficiency and retrofits, transportation mode share, fuel mileage efficiency, and local agricultural food production – among other factors. Each model builds on 2011 as a baseline year and forecasts to 2031. Appendix 1 to this report provides a summary of each scenario.

Because population is a key driver in the model the scenarios should only be compared on a per capita basis rather than on total energy and greenhouse gas emission results.

Scenario 1 represents the lower level of intensification included in the Town's Intensification Opportunities Study, with Scenarios 2 and 3 representing the numbers found in the approved Intensification Strategy (Official Plan Amendment No. 9).

It is also critical to underscore that the purpose of the scenarios was to explore the impacts of 'pulling different levers' or to explore 'what ifs' in terms of community energy use and greenhouse gas emissions, rather than to define exactly what will happen in 2031. The assumptions underlying the scenarios are not intended to be interpreted as the conditions that will necessarily materialize by 2031. Because of the large number of inputs and assumptions, it is acknowledged that the model and its results contain some uncertainty and limitations.

Also, because the Town has already taken many proactive steps towards sustainable land-use planning, including the update of its Official Plan, completion of the Intensification Strategy (OPA No. 9), implementation of the Green Development Evaluation Checklist, completion of the Green Development Standards and the completion of the Community Sustainability Strategy, in the case of Halton Hills, land-use is not a critical driver underlying the modelled scenarios. The Town's planned land-use patterns are already compact and are anticipated to achieve optimal land-use patterns for the purpose of the modelled scenarios. Aside from land-use, however, there are other key factors at play, including assumptions related to the potential for district energy, modal split, local food production, and the energy efficiency of existing and new development.

Therefore, land-use patterns were held constant in Scenarios 2 and 3. Scenario 3 adds a higher degree of ambition in terms energy retrofits, mode share and transportation improvements – among other variables.

Each of the scenarios is highlighted below:

- *Scenario 1: Moderate Energy Efficiency*

  The key elements modelled for Scenario 1 between 2011 and 2031, include:

  - 11,080 additional dwellings located as per the conservative scenario of the Intensification Opportunities Study and greenfield development.
  - Increasing the number of dwellings within 500 meters of a commercial core from 9,200 to 11,071.
  - Increasing the number of dwellings within 500 metres of frequent (i.e. hourly) GO Transit service from 0 to 900.
  - Attaching 502 dwellings to a district energy system by 2031.
  - Increasing fleet fuel efficiency from 9.5km/L to 15.9km/L.
  - Decreasing the share of all trips taken by a vehicle from 84% to 82%.
  - Increasing walking and cycling.
  - Increasing the amount of food that is sourced (produced) locally from 5% to 20%.[5]
  - Increasing new dwelling energy efficiency by 25% over 2011 building stock.

[5] For the purpose of this LAP, locally-produced food is food grown in Ontario.

- *Scenario 2: Towards a Low Carbon Community*

  The key elements modelled for Scenario 2 between 2011 and 2031, include:

  - 13,740 additional dwellings are added as per Council's approved Growth Strategy.
  - Increasing the number dwellings within 500 meters of a commercial core from 9,200 to 12,230.
  - Increasing the number of dwellings within 500 metres of frequent (i.e. hourly) GO Transit service from 0 to 5,988.
  - Attaching 2,713 dwellings to a district energy system by 2031.
  - Increasing the share of electricity (a cleaner energy source) as an energy source from 52% to 61%.
  - Increasing fleet fuel efficiency from 9.5km/L to 15.9km/L.
  - Decreasing the share of all trips taken by a vehicle from 84% to 71%.
  - Increasing walking and cycling
  - Decreasing per capita solid waste production from 0.5 to 0.46 tonnes.
  - Increasing the amount of food that is sourced (produced) locally from 5% to 20%.
  - Increasing new dwelling energy efficiency by 50% over 2011 building stock.
  - Retrofitting 5% of the existing building stock each year, resulting in a 25% energy savings by 2031.

- *Scenario 3: Low Carbon Community*

  The key elements modelled for Scenario 3 between 2011 and 2031, include:

  - 13,740 additional dwellings are added as per Council's approved Growth Strategy.
  - Increasing the number of dwellings within 500 meters of a commercial core area from 9,200 to 12,230.
  - Increasing the number of dwellings within 500 metres of frequent (i.e. hourly) GO Transit and regional bus service from 0 to 9,187.
  - Attaching 2,713 dwellings to a district energy system by 2031.
  - Increasing the share of electricity as an energy source from 52% to 73%.
  - Increasing fleet fuel efficiency from 9.5km/L to 15.9km/L.
  - Decreasing the share of all trips taken by a vehicle from 84% to 54%.
  - Increasing walking and cycling.
  - Decreasing per capita solid waste production from 0.5 to 0.24 tonnes.
  - Increasing the amount of food that is sourced (produced) locally from 5% to 20%.
  - Increasing new dwelling energy efficiency by 60% over 2011 building stock.
  - Retrofitting 8% of the existing building stock each year, resulting in a 40% energy savings by 2031.
  - Hourly (daily) GO Train service available in Georgetown and Acton.
  - Access to a shuttle service for residents of the Vision Georgetown lands to access the Georgetown GO station.

- Regional transportation service (bus) between Acton and Georgetown to Milton.

Each of the scenarios is based on a large number of assumptions, as well as input from a scenario-planning workshop and existing Town policies (especially the Halton Hills Intensification Strategy), among other inputs.
Appendix 1 of this report summarizes the key differences between the Baseline scenario and the three future scenarios.

2.5 Scenarios and Recommended Greenhouse Gas Reduction Targets

Scenario 3 (Low Carbon Community) is the most ambitious of the three scenarios. Although, among other factors, achieving all three scenarios will require changes in human behaviour (especially related to how we commute) and greater energy efficiency of new development, given the current stage of the Town's evolution as a community, Scenarios 2 and 3 will require the most transformative change. That is, today, Halton Hills is a relatively low-density community, characterized by travel patterns that are dominated by the car. Although meaningful change is starting to take place as new development becomes more efficient, as more intensification occurs, as alternative modes of transportation become more widely used, and as more people realize the benefits of energy conservation, it will take time and resources over the long-term to achieve significant change.

Recognizing this and in-keeping with the PAREE Principle (Practical, Affordable, Reasonable, Educational and Enforceable), at this time, it is recommended that Scenario 2 (Towards a Low Carbon Community) be the basis for establishing greenhouse gas emission reduction targets for Halton Hills.

Scenario 2 will move Halton Hills towards being a low carbon community. Scenario 2 achieves a 35% reduction in per capita greenhouse gas emissions. Although there is an overall increase in total greenhouse gas emissions over the baseline year (2011), Scenario 2 does achieve a 14% decrease in total emissions compared to Scenario 1.

Basing the targets on Scenario 2 will allow the Town the time needed to start implementing the Plan's recommendations and to assess progress. The outcomes of the recommended district energy feasibility study will be particularly important as all the scenarios, but especially Scenarios 2 and 3, are premised on Halton Hills having a district energy system in place by 2031. Once the results of the feasibility study are known and the Plan's implementation is underway, the greenhouse gas model can be revisited and adjusted as appropriate. It is recommended that this be done every two years. A comprehensive review of the LAP would be completed every five years, and take into account development trends and technological improvements.

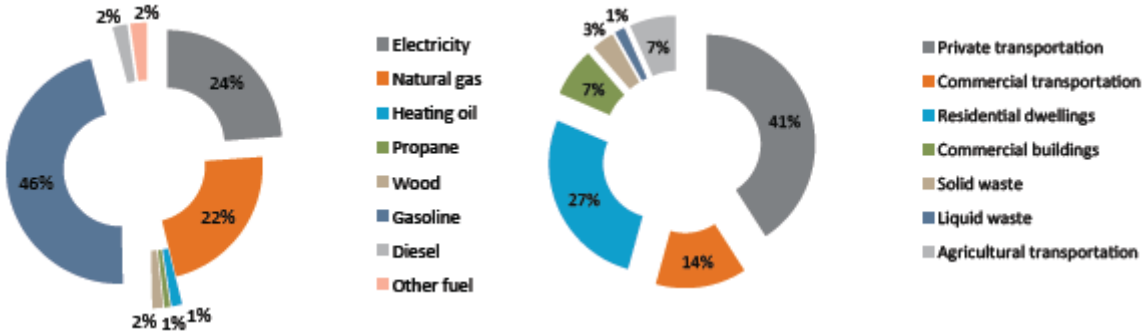
2.6 Result Highlights

The computer model generated a large number of detailed outputs. Some of the key results are briefly highlighted below.

2.6.1 Baseline (2011)

Side by side, Figure 2 shows the community's energy consumption by fuel type and greenhouse gas emissions by source. Shown on the left, the main source of energy in Halton Hills is gasoline at 46%, more than electricity (24%) and natural gas (22%). On the right, the main source of community greenhouse gas emissions is private transportation (41%). Emissions from residential dwellings account for 27% of the emissions, with commercial transportation accounting for 14%.

Figure 2: Halton Hills Energy Consumption and Greenhouse Gas Emissions



Using GIS mapping and utility data, the model generated valuable "heat maps" of electricity and natural gas consumption for Halton Hills (Figures 3 and 4). These maps illustrate where energy is being used and the intensity at which it is being used relative to other areas. The 'warmer' the colour on the map, the more significant the energy consumption. The 'cooler' the colour, the less energy consumption there is in that area.

Results of the GIS analysis provide a basis for targeting energy conservation programs in specific areas of the Town. Figure 3 shows electricity consumption in baseline year of 2011. Figure 4 shows the natural gas consumption in 2011.

In Georgetown, electricity consumption is generally concentrated along the commercial Guelph Street corridor, in a pocket south of Argyll Road in Georgetown South, in a pocket on Armstrong Avenue, and in the downtown area. In Acton, electricity consumption is concentrated in parts of the downtown. A direct comparison between the electricity and natural gas data is not possible as the data have been provided at different resolutions.

In terms of natural gas use across the Town, the highest concentration is visible west of Ninth Line and north of Argyll Road in Georgetown South.

Figure 3: Electricity Consumption (kWh/hectare/year)

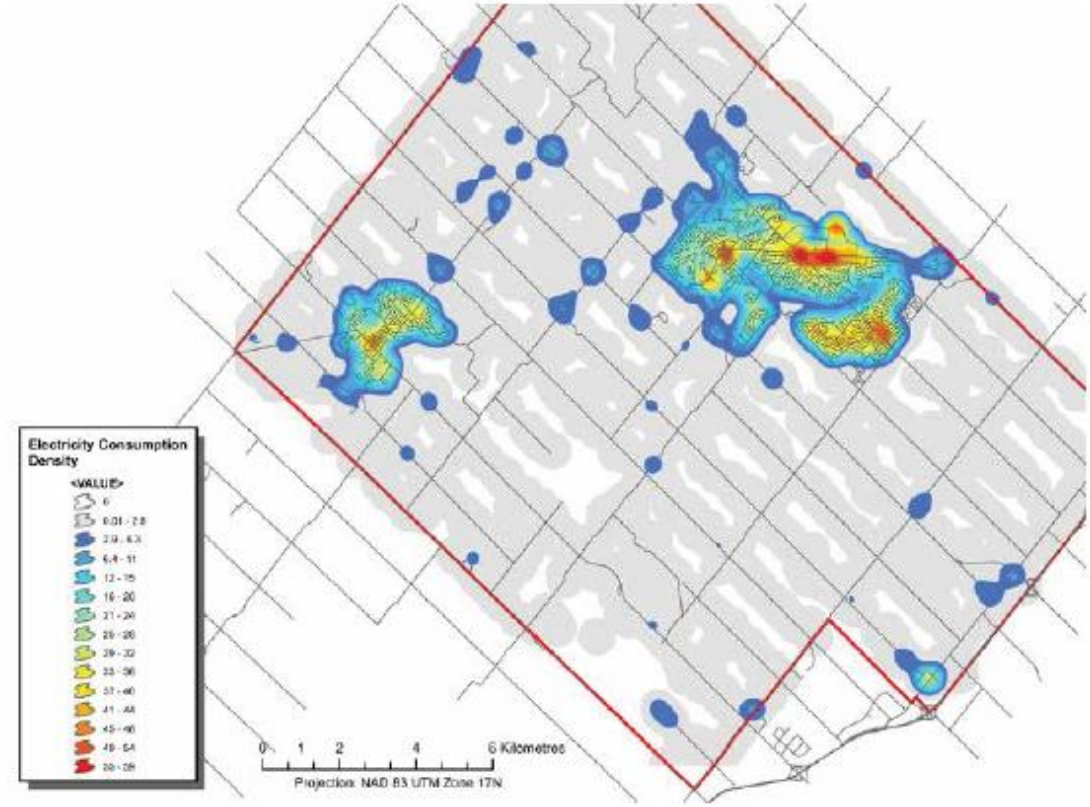
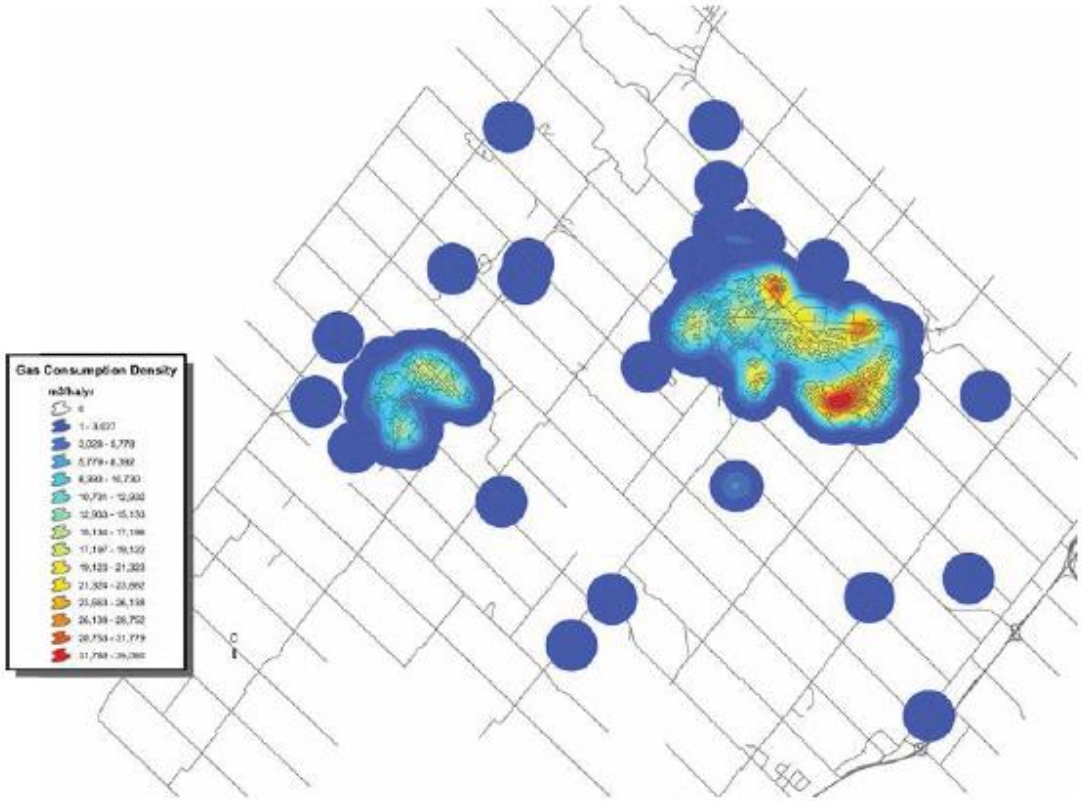


Figure 4: Natural Gas Consumption (m^3/hectare/year)



2.6.2 Future Scenarios (2031 compared to 2011 baseline)

Detailed results for each of the three future scenarios are included in the body of the LAP. The results demonstrate an important relationship between population growth and greenhouse gas emissions. As population grows, achieving reductions in total emissions is difficult. Achieving per capita reductions is more achievable.

In terms of greenhouse gas emissions, Figure 5 shows the estimated total/absolute and per capita greenhouse gas emissions for each scenario.

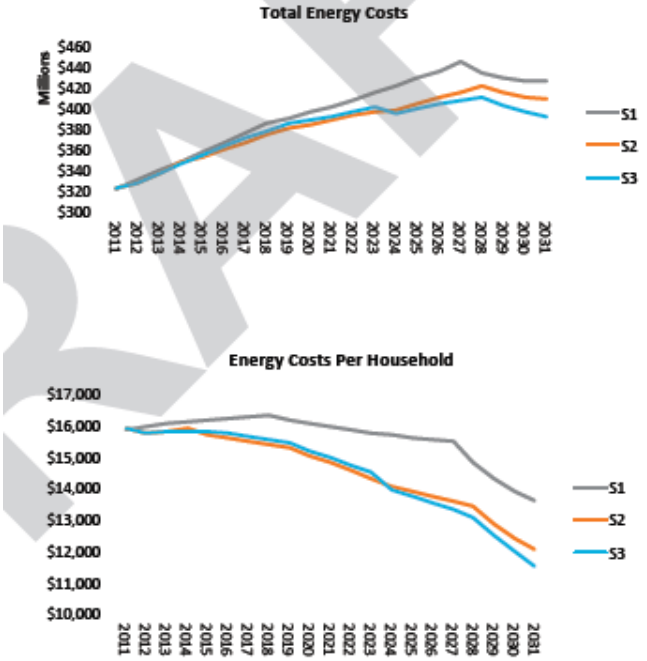
Total greenhouse gas emissions will continue to climb in Scenarios 1 and 2. Under Scenario 3, a 12% reduction in total emissions will be achieved. Compared to Scenario 1, Scenario 2 is modelled to achieve a 14% decrease in emissions. Significant per capita greenhouse gas reductions will be achieved across all scenarios. Per capita emissions decline by 35% under Scenario 2.

Figure 5: Total and Per Capita Greenhouse Gas Emissions – All Scenarios

	Total (tCO2e)			Per capita Total (tCO2e)		
Scenario	Baseline (2011)	2031	% change	Baseline (2011)	2031	% change
1	618,465	720,291	+17%	10.5	8.3	-21%
2	618,465	638,353	+3%	10.5	6.8	-35%
3	618,465	542,430	-12%	10.5	5.8	-45%

Figure 6 shows the estimated total (top graph) and household (bottom graph) energy costs projected for each of the three scenarios.

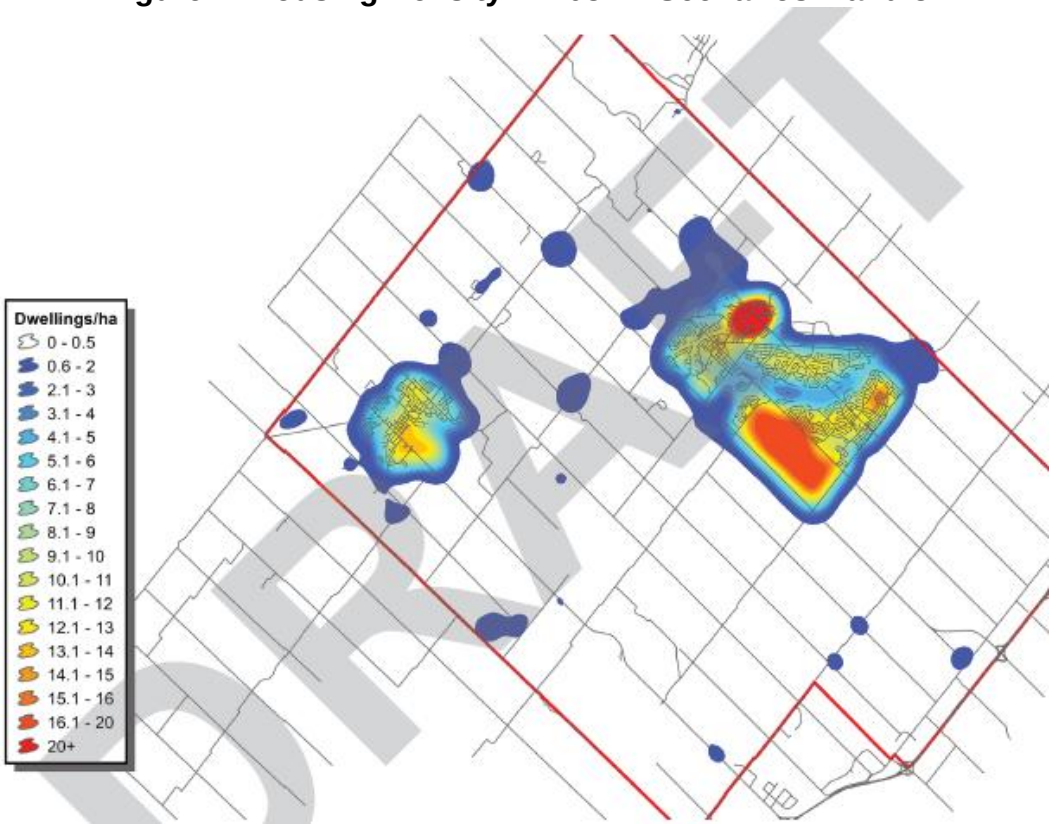
Figure 6: Total and Household Energy Costs – All Scenarios



In terms of total community energy costs, under Scenario 1, energy costs reach $426 million by 2031, an increase of about $105 million over the 2011 baseline. This compares to an increase of $88 million under Scenario 2 and $70 million under Scenario 3. Annual household energy costs decrease from the 2011 baseline ($15,846) to $12,037 under Scenario 2 and $11,379 under Scenario 3. Overall, as the level of ambition with respect to energy conservation increases, the incremental rise in community energy costs is decreased.

Figure 7 illustrates the housing density achieved under Scenarios 2 and 3, by 2031. A similar map is included in the LAP for Scenario 1.

Figure 7: Housing Density in 2031 – Scenarios 2 and 3



The highest dwelling densities (number of dwellings per hectare) are generally anticipated in the 1000 acres subject to the Vision Georgetown Secondary Plan exercise, and east and west of Mountainview Road in proximity to the Georgetown GO Station, subject to the approved GO Station Area/Mill Street Corridor Secondary Plan.

3.0 Additional Result Highlights

In addition to the information already presented above, LAP highlights include:

- Halton Hills already has the many key ingredients needed to move towards a low carbon future, characterized by a community that uses less energy and generates less greenhouse gas emissions. This includes:
    - Established downtowns of Acton and Georgetown;
    - Extensive greenspace to offset greenhouse gas emissions and limit sprawl;
    - Strong policy framework to support intensification;
    - Vision Georgetown lands which offer an opportunity to plan a community that reduces energy use and greenhouse gas emissions. In fact, at a Vision Georgetown Community Visioning Workshop held on November 2, 2013, among other matters, more than 80% of the participants felt that it is either very important or somewhat important that conservation and energy efficiency be encouraged in the new community;
    - Strong relationship with Halton Hills Community Energy Corporation/Halton Hills Hydro; and
    - Numerous existing initiatives focused on energy efficiency and greenhouse gas emission reductions.

- Investing in lower energy use and greenhouse gas emissions across Halton Hills is projected to have significant economic benefits, including:

    - About $17 million in gross annual community energy cost reductions under Scenario 2 in 2031, compared to Scenario 1, for total energy cost savings of $271 million between 2011 and 2031. At the household level, annual energy costs decrease by $1,550 under Scenario 2 compared to Scenario 1, or $3,809 compared to 2011.

    - Investments in energy and greenhouse gas emission reductions are estimated to translate into about 218 additional jobs under Scenario 2.

    - Greenhouse gas emissions contribute to climate change. In turn, climate change is associated with a wide range of negative impacts, including flooding, droughts, extreme weather, human health costs and loss of habitat.

      One way of estimating or monetizing the costs of these damages is to estimate the “Social Cost of Carbon”. The Social Cost of Carbon assigns a value to the damages caused by climate change anywhere in the world (including in Halton Hills) due to emissions produced in Halton Hills. Due to the uncertainty of the estimates of the costs and other factors, estimates of annual damages caused by carbon dioxide emissions originating in Halton Hills range from about $3 million to $74 million.

- Every kilowatt-hour (kWh) of electricity saved in Halton Hills represents greater savings than that one kWh in the context of the broader energy system. This is because every kWh of electricity used by the end customer requires more than one kWh to be generated in order to account for efficiency losses between the electricity being generated and used.

4.0 Recommendations

At the community-wide level, to achieve efficiencies and improve quality of life, it is recommended that the following targets be adopted by the Town:

- 35% reduction in per capita greenhouse gas emissions by 2031 – compared to 2011 levels; and

- 14% reduction in total greenhouse gas emissions by 2031 – compared to emissions modelled for Scenario 1 (Moderate Energy Efficiency).

Table 16 of the LAP outlines 16 actions recommended to be pursued in order to work towards achieving the aforementioned targets. The recommended actions are based on several inputs, including existing initiatives, stakeholder and community feedback, best practices, and professional judgment by the consulting team. Successful implementation of the recommendations will require collaboration with internal and external stakeholders, as well as the leveraging of existing Town and community initiatives and policies.

The recommendations of the LAP will be subject to additional review by Town staff, discussions with potential partners/stakeholders, as well as the development of an implementation plan and associated budget/resource requirements.

Recommended timelines, estimated costs, funding sources, suggested/possible lead Town departments, supporting policies and potential partners are also noted. Recommended actions include:

- Continue to promote intensification: Continue to focus on intensification by increasing the number of dwellings within 500 metres of commercial cores, and implementing the Town's intensification policies.

- Continue to encourage mixed-use development: Continue to focus on promoting mixed-use developments and complete communities. These developments encourage active transportation, reduce the vehicular mode share, are more energy efficient, and generate fewer greenhouse gas emissions. Work towards decreasing the share of total trips taken by vehicles from 84% to 71%.

- Energy Retrofits: Develop a program for Property Assessed Payments for Energy Retrofits (PAPER). This could be a way for the Town to encourage energy retrofits in the community through the provision of secure, low-interest

financing that is repaid on the property tax bill of participating landowners. Focus should be on increasing the energy efficiency of new dwellings as well as retrofitting 5% of the existing building stock each year.

- Revolving Loan Fund: Implement a revolving loan fund mechanism for financing energy efficiency projects using the savings from energy conservation projects.

- Incentives: Encourage the uptake of existing energy efficiency incentives as a way of increasing the efficiency of new and existing buildings. Develop a community engagement strategy to facilitate increased awareness and update of available incentives.

- Green Development Standards: Enhance the Green Development Standards by expanding them to address the efficiency of major renovations and the retrofit of the existing building stock. Consider the use of the 'Passive House' standard for the Vision Georgetown lands. According to the Canadian Passive House Institute, a Passive House involves construction techniques that achieve 80% to 90% energy savings compared to conventional construction. Among other things, this is achieved by minimizing surface area to reduce heat loss, maximizing heating by natural sunlight, substantial insulation improvements and advanced windows.

- District Energy: Complete a feasibility study for district energy as part of the Vision Georgetown planning project. Engage Halton Hills Community Energy Corporation, landowners, school boards and other appropriate stakeholders to include district energy criteria as part of the Vision Georgetown Secondary Plan exercise to determine if district energy is feasible for all or part of the urban expansion area.

  Among other matters, an in-depth district energy feasibility study may address:

  - Baseline Data (e.g. practical examples of district energy systems implemented in a context similar to Halton Hills, current and projected energy loads; utility costs; availability and proximity to energy anchors);

  - Development Densities and Land-use Mix (e.g. establish a build-out scenario which will be accomplished through the Vision Georgetown concepts; which buildings to connect and when; development phasing, and scheduling of how the system will grow over time);

  - System Boundaries (e.g. identify the boundaries, size and configuration of a district energy system, including location(s) for a possible district energy plant and pipe distribution network);

  - Availability of Suitable Energy Sources (e.g. wood waste, solid waste, solar energy, waste heat, geothermal; energy costs; building/customer proximity to energy sources);

- Technology (e.g. type of technology that may be used to power the district energy system; its availability and costs);

- Ownership Structure (e.g. Town ownership vs private utility vs Public Private Partnership; and the financial, legal and political implications of each ownership model);

- Type of District Energy System (e.g. will the system be for heating, cooling or both);

- 'District Energy Ready Development' (e.g. requirements for development to be 'District Energy Ready' so that new and existing projects are compatible and easily connectable to a district energy system);

- Implementation (e.g. a detailed implementation plan, including financing mechanisms, marketing plan, timelines and recommended ownership structure);

- Policy Framework (e.g. Town, Regional, Provincial and national policies to encourage and support district energy; mechanisms for ensuring connections to district energy; review of applicable regulatory considerations);

- Engineering Considerations (e.g. recommended piping distribution system size and layout; assessment of the energy characteristics of potential buildings that will be connected to the system);

- Financing Options (e.g. who will finance the system and how; availability of grants and loans);

- Business Case (e.g. cost-benefit analysis, projected capital costs, revenues and expenses; greenhouse gas emission reductions; customer pricing; timing of connections of customers and main anchors, lower and more stable utility costs);

- Risk Assessment (e.g. consideration of possible risks associated with financing, likelihood of customers connecting to the system, energy costs fluctuations and changing economic conditions); and

- Consultation (e.g. consultation with technical experts and key stakeholders, including Halton Hills Community Energy Corporation, landowners, school boards, and possible energy suppliers and customers).

Regarding the feasibility of district energy, it is important to emphasize that while the LAP suggests that district energy may potentially be feasible, this conclusion is based on a wide range of assumptions. Consequently, the viability of a district

energy system in all or part of the Vision Georgetown lands requires a much more detailed assessment which takes into account specific variables, as listed above. Recognizing this, the undertaking of a district energy feasibility study is one of the recommendations of the LAP (see Table 16 of the LAP).

Acknowledging the benefits of energy conservation and the fact that low carbon solutions are a critical part of developing sustainable communities, Phase 3 of the Vision Georgetown project includes the preparation of an Energy Conservation Assessments/Strategy. This Strategy will be closely coordinated with the outcomes of the Mayor's Community Energy Plan.

Town staff note that the scope of the district energy feasibility study will need to be assessed and potentially adjusted against the available budget included within the Vision Georgetown Secondary Plan exercise that is available for this purpose ($48,000). Based on discussions with the Vision Georgetown consultants, the scope of the feasibility study recommended by the Mayor's Community Energy Plan is somewhat broader than that originally budgeted as part of the Vision Georgetown project. The additional cost of completing an in-depth district energy feasibility study will be approximately $23,000. Based on discussions with Halton Hills Community Energy Corporation, this additional cost will be covered by Halton Hills Community Energy Corporation.

Appendix 2 to this report provides a brief overview of district energy.

- Active Transportation: Support active transportation. Implement the Cycling Master Plan. Prioritize walking and cycling over vehicle travel in the Vision Georgetown lands. Decrease the share of all trips being taken by car from 84% to 71%.

- GO Transit: Increase GO Transit service. Increase densities within 500 metres of hourly GO Transit service.

- Transportation Linkages: Explore additional public transportation linkages to other communities.

- Smart Commute: Enhance the Smart Commute program. Engage employers in transportation planning and offer more custom transportation planning opportunities. Establish a car sharing program.

- Walking: In collaboration with the school boards, expand options to walk to school. Walking to school reduces vehicle traffic and can reduce the vehicle mode share.

- Local Food: Local food production and consumption reduces greenhouse gas emissions. Continue to support local farmers' markets. Develop a Halton Hills Food Security Plan. Introduce a local food procurement policy, and explore opportunities to engage a new generation of farmers.

- Green Economic Development Strategy: Develop an energy hub for energy conservation and renewable energy businesses to facilitate collaboration and learning opportunities.

- Forests: Protect and enhance forested areas. Complete an analysis of the carbon storage capacity of forested areas as these areas absorb greenhouse gas emissions.

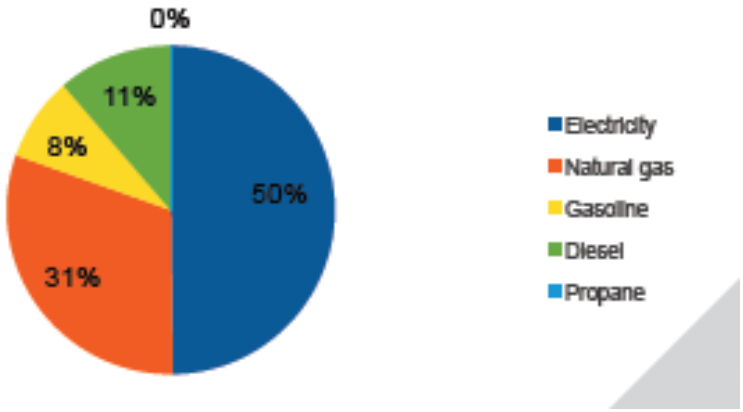
- Monitoring and Update: Monitor progress towards achieving targets, and update the greenhouse gas inventory and GHGProof computer model bi-annually. Update the LAP every five years. Report on progress annually.

5.0 Corporate Targets

The Partners for Climate Protection milestones also require the consideration of the Town's corporate operations. Although these operations were detailed in the Corporate Energy Plan, the Local Action Plan supplements the Corporate Energy Plan by expending the scope to include the Town's vehicle fleet, streetlights and solid waste[6].

For 2011, the baseline year, total energy consumption by the Town's operations is estimated at nearly 72,000 gigajoules[7] at a cost estimated to be about $1.9 million, generating nearly 3,200 tonnes of greenhouse gas emissions. Figure 8 shows the Town's 2011 corporate energy consumption by fuel type.

Figure 8: Energy Consumption by Fuel Type (2011) – Town Corporate



[6] Consideration of solid waste is limited to the amount of solid waste generated by Town staff (on average).

[7] According to the Alberta Ministry of Energy: "One gigajoule is one billion joules. The amount of natural gas consumed each year in a typical Canadian home is equivalent to 120 gigajoules…The amount of energy represented by one gigajoule is equivalent to about 30 litres of gasoline, 39 litres of propane, 278 kilowatt-hours of electricity or 45.5 kilograms of coal." Source: www.energy.alberta.ca/about_us/1132.asp

The Gellert Community Centre, Mold-Masters SportsPlex and the Acton Arena are the major energy loads in the Town's building portfolio. The same three facilities generate the highest greenhouse gas emissions, and have the highest energy cost.

The targets presented by the LAP for the Town's corporate operations build on the targets outlined in the Corporate Energy Plan by adding a possible 30% reduction in energy consumption from the conversion of streetlights to LED technology. As a result, the overall corporate greenhouse reduction target recommended to be achieved by 2019 via the LAP is 20%.

In addition to implementing the recommendations of the Corporate Energy Plan, in order to achieve the 20% greenhouse gas emissions reduction recommended by the LAP, the following actions are recommended:

- Converting streetlights to LEDs;
- Purchase electric and/or hybrid vehicles where small cars are suitable;
- Purchase electric vans;
- Offer fleet management courses to improve fuel efficiency; and
- Identify opportunities to reduce fleet vehicle use to deliver services.

Achieving a 20% reduction in the Town's corporate greenhouse gas emissions by 2019 is estimated to generate between $300,000 and $360,000 in annual energy cost savings by 2019.

6.0 Stakeholder and Community Engagement

As with the Corporate Energy Plan, the LAP incorporated stakeholder input. This was achieved through a variety of channels, including workshops, interviews, employee engagement opportunities, online crowdsourcing, surveys, stakeholder presentations, meetings of the Steering and Technical project committees, and outreach at several community events, including:

- Georgetown Farmers' Market
- Acton Farmers' Market
- Acton Fall Fair
- Halton Forest Festival
- Presentations to:
    - Halton Hills Chamber of Commerce
    - Georgetown BIA
    - Town Environmental Advisory Committee
    - Mayor's Youth Action Committee
    - Halton Hills Hydro Board of Directors
    - Youth Summer Camps

The full scope of community engagement is detailed in the LAP.

7.0 Next Steps

To complete the Mayor's Community Energy Plan, the draft LAP will be updated based on any additional feedback received. The final LAP will then be consolidated with the Corporate Energy Plan into one seamless Plan – the Mayor's Community Energy Plan.

RELATIONSHIP TO STRATEGIC PLAN:

Sustainability is one of ten Council priorities identified in the Town's Strategic Action Plan, and repeatedly referenced throughout the Strategic Plan's Strategic Objectives and Strategic Actions. Therefore, the completion of the Mayor's Community Energy Plan will better enable the Town to fulfill its many sustainability objectives, including those directly related to energy. In particular, Strategic Action B.5.(h) which reads: "Develop a Community Energy Plan, in cooperation with Halton Hills Community Energy Corporation."

FINANCIAL IMPACT:

Implementation of the LAP is anticipated to result in significant economic benefits for the broader Halton Hills community, as well as the Town's corporate operations. For example, at the community level, annual energy costs are modelled to be reduced by $17 million ($271 in total). There is also the benefit of about 218 new jobs being generated under Scenario 2, and the potential to reduce the costs associated with damage caused by climate change.

At the corporate level, achieving a 20% reduction in greenhouse gas emissions, is projected to result in up to $360,000 in annual energy cost savings by 2019.

In terms of implementation, the recommendations of the LAP will be subject to additional review by Town staff, discussions with potential partners/stakeholders, as well as the development of an implementation plan and associated budget/resource requirements.

COMMUNICATIONS IMPACT:

The LAP contains a large amount of technical information. Recognizing the need to make the LAP accessible and relevant to Town staff and the wider community, Town staff will:

- Develop a practical Communication Plan;
- Prepare a short executive summary; and
- Prepare outreach materials.

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 relationship between this report and the Strategy is summarized below:

Do the report's recommendations advance the Strategy's implementation?

Yes ☑ No ☐ N/A

Which pillar(s) of sustainability does this report support?

☐ Cultural Vibrancy ☑ **Economic Prosperity** ☐ N/A
☑ **Environmental Health** ☑ **Social Well-Being**

There is strong alignment between the LAP and the Community Sustainability Strategy, specifically the focus areas of:

- Diversified and Resilient Economy
- Knowledge-Based Industry & Research and Innovation
- Energy
- Air Quality and Greenhouse Gas Emissions
- Green Economy
- Infrastructure
- Natural Heritage
- Land Use
- Housing
- Transportation

The LAP and the broader Mayor's Community Energy Plan also relate to numerous Green Plan recommendations, including #25, 26, 31, 39, 43, 44, 48, 60, 66 and 67 which relate to energy and water efficiency, new development practices, energy management, LEED® building design, renewable energy and greenhouse gas emission reductions. There are also synergies with the Town's Strategic Plan, Official Plan, Green Development Standards, Vision Georgetown Secondary Plan process, and the climate change report prepared by the Town Environmental Advisory Committee.

The LAP's recommendations are anticipated to benefit future generations through a focus on efficiency, conservation, renewable energy, greenhouse gas emission reductions, and mitigation of climate change impacts. Successful implementation is anticipated to translate into financial benefits.

Overall, the alignment of this report with the Community Sustainability Strategy is:
☐ Excellent ☑ **Very Good** ☐ Good ☐ Fair ☐ N/A

CONSULTATION:

The project's Steering and Technical committees were engaged throughout the project. In addition, various modes of community engagement were used for the LAP and the broader Mayor's Community Energy Plan, including workshops, staff interviews, staff survey, engagement at community events, newspaper ads, newspaper article, Social Media, Media Releases, Mayor's announcements, website postings, presentations to community stakeholders, and youth presentations at Town summer camps.

In the course of preparing the LAP, a draft was presented to the Senior Management Team.

CONCLUSION:

This report highlighted one of the two key components that will make up the overall Mayor's Community Energy Plan – the Local Action Plan (LAP).

Building on the Town's past successes and many existing efforts, the LAP is anticipated to materialize in reduced energy use, lower greenhouse gas emissions, retention of energy spending within the local economy, household energy savings, employment, climate change mitigation, and more efficient and healthy communities.

At the community-wide level, to achieve efficiencies and improve quality of life, it is recommended that the following targets be adopted by the Town:

- 35% reduction in per capita greenhouse gas emissions by 2031 – compared to 2011 levels; and

- 14% reduction in total greenhouse gas emissions by 2031 – compared to emissions modelled for Scenario 1 (Moderate Energy Efficiency).

Sustained and comprehensive effort is anticipated to yield significant positive results.

Respectfully submitted,

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APPENDIX 1 to Report No. PDS-2014-0041
-Summary of Modelled Scenarios-

	2011	2031		
	Baseline	S1: Moderate Energy Efficiency	S2: Towards a Low Carbon Community	S3: Low Carbon Community
Total GHG emissions (tCO_2e)	618,465	720,291	638,353	542,430
GHG emissions per capita (tCO_2e)	10.5	8.32	6.79	5.8
% change in GHG emissions/capita over baseline	N/A	-21%	-35%	-45%
% change in absolute GHG emissions over baseline	N/A	+17%	+3%	-12%
Energy/capita (GJ)	168	136	120	110
Vehicle kilometres travelled/capita (km)	51,094	42,127	37,365	28,354
Average trip length (km)	22	19.6	20	20
Total dwellings		11,080	13,740	13,740
# of dwellings within 500m of a commercial area	9,200	11,071	12,230	12,230
Transportation improvements		GO station in Georgetown and Acton with increased daily service.	GO station in Georgetown and Acton with increased daily service. Bus service between Georgetown and Acton. (The model is based on a change from infrequent to frequent (at least hourly) service).	GO station in Georgetown and Acton with increased daily service. Access to the Georgetown GO station from South West Georgetown via shuttle bus or similar method. Regional bus service from Acton to Georgetown and Milton.
Vehicle mode share	84%	82%	71%	54%
Dwellings connected to district energy by 2031	0	502	2,713	2,713
Local food production	5%	20%	20%	20%
Agricultural area	18,390	17,707	17,707	17,707
Total annual community energy costs	$321 million	$426 million	$409 million	$391 million
Annual household energy costs	$15,846	$13,587	$12,037	$11,379
New jobs created	N/A	N/A	218	237
Estimated annual damages resulting from GHG emissions generated in Halton Hills	$3 million - $41 million	$7 million - $74 million	$6 million - $65 million	$5.5 million - $55 million

APPENDIX 2 to Report No. PDS-2014-0041
-Brief Overview of District Energy-

District energy is a system that provides heat and/or cooling to more than one building from a central power plant[8]. Buildings that are connected to district energy do not require their own individual boilers, furnaces, chillers or air conditioners. Instead, energy is transported through a network of underground pipes. District energy is not a new concept, with the first commercial system introduced in 1877. Today, there are about 120 district energy systems across Canada. District energy advantages include:

- Efficiency: Improved efficiency since there is no need for buildings to have their own individual heating systems, and achievement of economies of scale through centralization of equipment.

- Cost Savings: Efficiencies characteristic of district energy systems can result in reduced energy costs for customers connected to the system. Upfront capital costs for developers can be reduced by avoiding the need for individual heating and cooling systems for each building. The freed-up space that would otherwise be used for mechanical items, can be used as revenue-generating space.

- Reliability: District energy stems are professionally operated and known to provide more reliable service.

- Maintenance: Compared to the maintenance of multiple individual systems, the maintenance of a single system is more cost-effective.

- Local Economy: By sourcing fuel from local sources instead of importing energy from distant locations, a district energy system can retain spending on energy within the local economy. Local employment can be generated to support the construction, operation and maintenance of a district energy system.

- Flexibility: A district energy system can respond to changes in fuel costs and availability by being converted to the most economical fuel source. For example, a gas driven district energy system could potentially be converted to biomass in response to gas shortages and price volatility.

- Greenhouse Gas Emissions: Lower greenhouse gas emissions, especially when a renewable energy source is used to power a district energy system.

[8] This section is based on information from several sources, including: (i) *Kelowna District Energy – Prefeasibility Study*, January 2010. City of Kelowna. Community Energy Association; (ii) *District Energy System Pre-Feasibility Study, City of Whitehorse, Yukon – A study to assess the viability of establishing a District Energy System in the City of Whitehorse, Yukon.* Stantec Consulting Ltd. and Earthvoice Strategies; (iii) *Pearson Eco-Business Zone District Energy Feasibility Study for Toronto and Region Conservation Authority.* April 10, 2012. FVB Energy Inc.; (iv) *District Energy Inventory for Canada, 2013.* John Nyboer et al. Canadian Industrial Energy End-use and Analysis Centre. Simon Fraser University. March 2014.