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COMMUNITY ENERGY PLAN PROJECT

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SUMMARY

This research explored and compared community energy plans from six single-tier municipalities in Ontario including Kingston, Hamilton, Windsor, London, Peterborough, and Sault Ste. Marie. A Community Energy Plan (CEP) is a publicly available document that outlines different ways communities aim to improve energy efficiency, reduce emissions, and drive economic development (Community Energy Planning, 2018). Although there are no standard approaches to CEPs, they often contain information emission reductions targets, energy inventories and forecasts, target actions, and timelines for implementing these approaches (Community Energy Planning, 2018). Thus, CEPs are important roadmaps in helping communities improve energy management.

- **Research Goals:** to examine initiatives being pursued through CEPs with an emphasis on the role of the municipality, and with an eye toward innovative approaches.
- **Methods:** a structured content analysis to compare community energy plans across six cities.
- **Main Findings:** various similarities (i.e. energy efficient vehicles, building codes) and innovative practices (i.e. wind energy, pedestrian based communities) were identified across these six cities.



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INTRODUCTION

This research involved the assessment of Community Energy Plans (CEPs) for six different cities in Ontario including Kingston, Hamilton, Windsor, London, Peterborough, and Sault Ste. Marie. A CEP is a publicly available document that outlines different ways communities aim to improve energy efficiency, reduce emissions, and drive economic development (Community Energy Planning, 2018). While there is not a standard approach to CEPs, they often contain information around community energy inventories and forecasts, emission reduction targets, target actions, and timelines for implementing these approaches (Community Energy Planning, 2018). In addition, actions described in CEPs may revolve around the following:

- Energy efficiency in new and older buildings
- Transportation, including active transportation and public transit
- Low carbon vehicles to reduce emissions
- Forms of renewable energy
- Water conservation
- Policies, regulations, and stakeholder and community outreach activities to pursue the former

Our aim was to examine initiatives being pursued through CEPs with an emphasis on the role of the municipality, and with an eye toward innovative approaches. The intention of this document is to support municipalities to learn from each other about innovative initiatives, and to take a leadership role in energy planning.

METHODS

This research employed structured content analysis; it consisted of website searching then coding to set the foundation for an online database. Beginning in November 2017, Community Partners (Dr. Kirby Calvert and Abhi Kantamneni who represent 'Our Energy Guelph' [www.ourenergyguelph.ca]) provided Interns and the Project Manager from the Research Shop with a list of single-tier cities in Ontario. From this list, the community partners suggested six priority cities: Kingston, Hamilton, Windsor, London, Peterborough, and Sault Ste. Marie. Three Interns and the Project Manager searched municipal websites for 'Community Energy Plans' (CEP). If a CEP was not available, we



searched for documents that would contain information relevant to CEP, such as: 'climate action plan', 'climate mitigation strategy', 'local action plan', 'municipal action plan', and 'energy efficiency'. The search was conducted on municipal websites and in Google. Of the six cities, Windsor and London have CEPs, while Kingston and Hamilton have variations of Community Action Plans (i.e., broader plans that address climate change action points beyond energy use). Alternatively, Peterborough and Sault Ste. Marie have Corporate Energy Plans that specifically address municipal actions only, with additional documents that describe some community-based initiatives.

Initiatives were identified and compared using a structured content analysis. Documents were coded using a template provided by the Community Partners, made available in a shared Excel file. Examples of 'codes' are listed below in a glossary of terms used by the researchers. Once individual researchers completed coding, they compared their output with one another's work and it was approved by the Community Partners for accuracy and consistency.

Glossary of Coding Terms

Levers describe various means of achieving outlined action items in community energy plans. These are divided into generic levers (e.g., direct provision) and specific levers (e.g., alternative energy - solar panels on municipal buildings).

Partnerships are the alliances and associations cities foster to achieve their community energy plan goals. Partnerships include: local utility providers, hydro providers, community organizations, not-for-profits, educational facilities (e.g., elementary, secondary, and post-secondary), employers, federal agencies, private consultants, developers, and municipal divisions (e.g., city transit).

Roles are the overarching activities that the City or community will engage in to realize their energy plans. These are divided into four roles (listed below) and include: regulate, implement/direct provision, invest/indirect provision, and facilitate.

1. **Regulate** is a role that the City or community adopts that represents any rules that modify behaviours. This may consist of new municipal regulations or provincial laws that are municipally enforced. Levers that fall under the regulate role are: a) building codes, b) zoning bylaws, and c) tax reform.
2. **Implement / Direct Provision** is a role that the City or community undertakes to change or develop new infrastructure that reduces energy use, produces alternative



energy, or alters the distribution of energy. Under this umbrella, there are also services that are already municipally managed or areas that municipal governments step into a new management role. Levers that fall under the implement/direct provision role are: a) urban development, b) procurement and service delivery, and c) ownership.

- 3. Invest / Indirect Provision** is the use of market structures to stimulate market actions or reduce the market burden for the City / community (e.g., capital generation and redistribution). Levers that fall under the invest / indirect provision are: a) cash reserves, b) development charges, and c) access to capital.
- 4. Facilitate** is the role that the municipal government steps into to stimulate community actions. This may include non-traditional market activities, working with the local community, collectively working across sectors, or lobbying the government. This category can be divided into internal and external factors. Internal factors are those that unlock the potential of communities (e.g., financial support for human resources), whereas external factors are those that support the City and community to overcome limitations (e.g., developing a Task Force to change the heating grid). Levers that fall under this role include: a) sharing and building institutional capacity, b) community engagement, c) lobby the provincial or federal government, and d) mediate.

Sector Target describes the subdivision of the economy that a lever applies to. Sector targets for community energy plan levers include: buildings (municipal, residential, or commercial), transportation (active or motor), alternative energy, waste management, land-use/agriculture, or conservation.

Supply Chain Target is the component of the sequence of producing, distributing, or using energy that the specific lever focuses on. The supply chain target refers to supply (i.e., production of energy), distribution (i.e., the process of energy allocation from one location to another), or demand (i.e., consumption of energy).

Targets are the proposed reduction of energy consumption or greenhouse gas (GHG) emissions for a selected City or community by a specific date. Details included are the level (i.e., indication of municipal or community target), type (i.e., GHG emissions or energy consumption), dates (i.e., date the target was set and proposed completion date), and percentage (i.e., the proposed reduction percentage of GHG emissions or energy consumption).



RESULTS/FINDINGS

The following table presents a cross comparison of the six municipalities. Information from this chart is based on coded information (see links for coding documents in the Appendix). Following this chart, we discuss in greater depth some of the energy efficient methods highlighted in the chart. Specifically, we explore commonly used methods as well as innovative methods across these six cities. This is organized by the following themes: Buildings, Transportation, Alternative Energy, and Education.

Table 1, Version 1: Cross-Comparison of Ontario City Energy Initiatives

Domains of Energy Management		Cities					
		Kingston	Sault Ste Marie	Peterborough	London	Windsor	Hamilton
Buildings	Municipal	x	x	x	x	x	x
Buildings	Residential	x		x	x	x	x
Buildings	Commercial	x				x	x
Transportation	Motor	x		x	x	x	x
Transportation	Active	x		x	x		x
Transportation	Infrastructure	x		x	x	x	x
Alternative Energy	Solar	x	x	x	x		x
Alternative Energy	Wind		x				
Alternative Energy	Biogas			x			
Education		x	x	x	x	x	x



Table 1, Version 2: Cross-Comparison of Ontario City Energy Initiatives (Accessible Version)

City	Forms of Energy Management
Kingston	Municipal Buildings, Residential Buildings, Commercial Buildings, Motor Transportation, Active Transportation, Infrastructure for Transportation, Solar Energy, Education
Sault Ste. Marie	Municipal Buildings, Solar Energy, Education
Peterborough	Municipal Buildings, Residential Buildings, Motor Transportation, Active Transportation, Infrastructure for Transportation, Solar Energy, Biogas Energy, Education
London	Municipal Buildings, Residential Buildings, Motor Transportation, Active Transportation, Infrastructure for Transportation, Solar Energy, Education
Windsor	Municipal Buildings, Residential Buildings, Commercial Buildings, Motor Transportation, Infrastructure for Transportation, Education
Hamilton	Municipal Buildings, Residential Buildings, Commercial Buildings, Motor Transportation, Active Transportation, Infrastructure for Transportation, Solar Energy, Education

Buildings

Any municipal energy plan must consider buildings in their efforts, because buildings comprise a major source of energy demand: cooling, heating, lighting, ventilation, and lighting, among other factors, are all energy-intensive activities (Diesendorf, 2007). All six cities of study identified ways they could address energy demand from buildings, at varying levels of detail. Commonly leveraged tools included new building policies, retrofits, audits, and promotion of incentives for homeowners and businesses.

Building Policies

Each of the six cities made some mention of new building policies in their CEPs (or equivalent documents). Kingston outlined some similar initiatives: a municipal green building policy was established, which would mandate constructions and retrofits of city-held buildings to consider LEED certification as a design objective. Peterborough stated it would develop new energy efficiency standards in the near term, and that any new constructions should be considered for LEED status. London adopted the NRCan





EnerGuide Rating System and began advocating for its use to the real estate associations in the London community.

Windsor stressed that for all new residential and commercial builds, they would enforce the energy efficiency requirements of Ontario Building Code 2012; Hamilton, meanwhile, aimed to advocate to the province for even stricter requirements in the Code. In addition, Windsor declared it would create a deep retrofit program for existing residential, commercial and municipal buildings, and develop a net zero energy use neighbourhood. Hamilton identified a key priority of establishing development charges to better reflect the real cost of buildings and infrastructure, and said it would require greenhouse gas emissions assessment from buildings. The emissions assessments would be incentivized by offering refunds on permit fees for any building that met a certain emissions goal.

Direct Action

In addition to building codes, green building policies, and other regulatory frameworks, some direct building-related actions were outlined in the CEPs: Peterborough and Sault Ste. Marie both completed energy audits on their municipally owned properties, and Sault Ste. Marie complemented its audits with complementary retrofits (of lighting, roofing, sealing, HVAC, and hot water systems). Kingston also completed retrofits of its existing facilities. Hamilton and Windsor did not outline any forms of energy audits or assessments as part of their community energy plans. In three of the six cities, solar utilities and/or incentive programs were developed; these will be elaborated upon in the Alternative Energy section.

Promotion

Kingston and London both emphasized community engagement and incentives to encourage energy-efficient ownership to single-home residential, multi-unit residential, commercial and institutional building owners/managers. Promotion of efficient building management principles was a prominent part of both London's and Kingston's CEPs: Kingston created a checklist-style guide for efficient design and construction that developers could use on a voluntarily basis. London, meanwhile, was not specific about their role in promotion but stated it would encourage collaboration between the LHBA, London Hydro, Union Gas, and BOMA Toronto (a real estate industry association). London's role was to encourage capacity sharing between these organizations, so they



could collaborate to create awareness of existing programs meant to encourage energy-saving building practices.

Each of the other cities' CEPs were descriptive of promotional activities that were occurring in their communities, but they did not specify whether the municipalities themselves were involved in the promotion.

Transportation

Active transportation and public transit play key roles in helping Windsor, Hamilton, London, Kingston, and Peterborough achieve their goals of energy efficient transportation and the reduction of greenhouse gas emissions. Across these five cities, energy efficient transportation and the reduction of greenhouse gas emissions are key priorities. Similarities between these cities in achieving their transportation goals include the following; the implementation of a transportation master plan, a focus on investing in public transit infrastructure and active transportation, and consideration given to energy efficient vehicles and alternative sources of fuel. Overall, the aim among these cities is to reduce the use of vehicles for transportation altogether.

Windsor's Active Transportation Master Plan is innovative because it brings in urban design of "complete streets" (Windsor Community Energy Plan, 2017, p.67). The idea behind this urban design initiative is to encourage walking, minimize vehicle use, and reduce greenhouse gas emissions. The "complete streets" are supported by Windsor in three key ways.

Firstly, Windsor will create mixed use and employment centers that allow businesses and services to be located closer to homes, which will result in balanced opportunities for walking, cycling and transit (Windsor Community Energy Plan, 2017, p.67).

Secondly, in order to increase the use of public transportation, cycline, and walking within the Mixed Use area, Windsor will implement a land use planning policy that emphasizes a strong live-work-shop-recreation relationship (Windsor Community Energy Plan, 2017, p.67). Finally, there will be increased pedestrian access to and within the City Center (Windsor Community Energy Plan, 2017, p.67).

When it comes to using vehicles for transportation, the City of Windsor supports the adoption of electric vehicles, and in particular, the use of vehicles which make use of fuel alternatives (such as biofuels) (Windsor Community Energy Plan, 2017, p.69).

Several strategic actions are part of this approach: the City of Windsor will install



strategic charging stations, provide free overnight vehicle charging stations, and encourage the public to replace older vehicles with electric ones by providing financial incentives (Windsor Community Energy Plan, 2017, p.69).

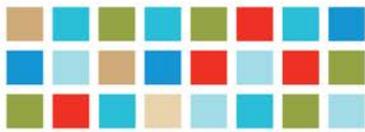
Similarly, the City of Hamilton wants to encourage a shift in public consciousness toward more energy efficient vehicles, and focus on vehicles that use cleaner sources of energy. An important part of this strategy is emphasizing cooperation between the City of Hamilton and the community (Hamilton Community Climate Change Action Plan, 2015, p.2-11). Some of the top responses from the community include the need for increased awareness and education, reducing greenhouse gas emissions, and more political intervention (Hamilton Community Change Action Plan, 2015, p. 2-11).

In addition to providing more awareness and education about the option of energy efficient vehicles, the City of Hamilton aims to dedicate rapid transit lanes wherever possible for public transportation (Hamilton Community Climate Change Action Plan, 2015, p.3-4, and p.5-25).

Hamilton's focus on expanding its rapid transit services aligns with its goal to reduce the use of automobiles for transportation, which would in turn greatly lower greenhouse gas emissions. Like the City of Windsor's "complete streets," the City of Hamilton encourages citizens to use alternative modes of transportation, such as walking and cycling.

The City of Kingston shares a similarity with Windsor in that it also has a Municipal Transportation Master Plan. This Plan focuses on the key area of investing in public infrastructure which includes several energy efficient changes. Firstly, the City of Kingston will implement a transit demand management strategy that carefully considers geographic areas and increases bus service to every fifteen minutes from the downtown core (Kingston Climate Action Plan, 2014, p.41-42). Secondly, there is crucial investment in the creation of city cycling paths, bike parking spaces, and the installation of electric vehicle charging stations (Kingston Climate Action Plan, 2014, p.41-42). The City of Kingston is also focusing on investing in new buses and shelters that will support energy efficient transportation.

Along with Windsor, Hamilton, and Kingston, the City of London is also investing heavily in energy efficient transportation by promoting Natural Gas (CNG) vehicles, hybrid technology, and reducing the overall need for vehicle based transportation by encouraging bike and pedestrian travel (London Community Energy Action Plan, 2014,



p.29). In order to promote public transit infrastructure, the City of London supports and encourages local fleet owners and operators to invest in natural gas and fleet vehicles. Another initiative is for London Police Services to expand their propane fleet development (London Community Energy Action Plan, 2014, p.29). All of these factors contribute to creating a transportation network which increases walking, cycling, and use of energy efficient public transportation.

Across these five cities there is also emphasis placed upon the involvement of community partners and community members throughout the process of making transportation more efficient. For example, the City of Hamilton has partnered with Hamilton Street Railway and Metrolinx, the Hamilton Chamber of Commerce, Smart Commute Hamilton, Mohawk College, McMaster University, and citizens to work together in achieving transportation goals (Hamilton Community Climate Change Action Plan, 2015, p.3-4).

Of these six cities, Peterborough is especially innovative in how they are approaching energy efficient transportation because the city faces the challenge of connecting public transit to rural communities. Peterborough's approach in addressing this challenge is rooted in concern for the well being of the community. As a result, the city has implemented unique design guidelines to create "pedestrian based communities" (Greater Peterborough Area Community Sustainability Plan, 2012, p.26)

These communities are part of the Comprehensive Transport Plan Update that aims to integrate active transportation and passive transportation. The design guidelines would ensure equal opportunities for both types of transportation in communities, along with implementing a Short-Term Cycling network. By creating a pedestrian based community using these innovative guidelines, the City of Peterborough has addressed several key issues at once.

Firstly, the city is responding to the needs of communities that prefer a combination of active transportation (such as cycling) and passive transportation, and also designing future communities to be energy efficient from the ground up, instead of simply reworking old transportation infrastructure and urban planning methods. Secondly, the city is responding to the unique challenge of small, rural communities which need to be connected to public transit. And finally, the city is striving to reduce greenhouse gas emissions by using preventative measures such as these design guidelines, which would go a long way in eliminating the problem before it has a chance to fully form. In



this regard, Peterborough's approach in creating pedestrian based communities offers important lessons for the future of energy efficient transportation.

Alternative Energy

Alternative energy sources were noted by all six cities as an important part of their goals to be energy efficient. Described primarily as solar and wind energy, these alternative energy sources were noted as replacing coal in efforts to be environmentally friendly as well as leading the way in renewable energy resources.

Solar energy was described by the majority of cities as a renewable energy source they are currently using and plan to continue investing in. One solar energy method currently being used by the cities of Kingston, Sault Ste. Marie, London, and Peterborough are solar panels installed on municipal buildings. At a municipal level, these solar panels are funded through organizations like Peterborough Utilities Ltd. Solar hot water systems are also installed in Sault Ste Marie, Kingston, London, and Hamilton, especially for local pools. Utilities Kingston, the city owned utility company, provides solar hot water rental units as an affordable option for businesses and residences to reduce the fuel they use through solar technology.

Beyond using solar energy for buildings and water heating, Peterborough and Sault Ste. Marie were the only cities to describe using solar energy for other means such as outdoor lighting. For Peterborough, solar energy is currently being used for temporary traffic signals, flashing beacons, and school safety zones. In comparison, the city of Sault Ste Marie uses solar energy for traffic lights (LED technology), stop lights at applicable four way stops, and lighting units.

Aside from solar energy, wind energy was also mentioned as a renewable energy source that many cities are seeking opportunities to expand into. However, of the six cities, only Sault Ste Marie is currently using wind as an alternative energy source. In addition, Sault Ste Marie has taken steps to further support the use of wind as an alternative form of energy by establishing an Alternative Energy Task Force. This task force is described as focusing on energy recovery and energy production. While other cities mention wind energy as a desired energy source, (for example Kingston states they aim to establish their city as a leader in green technology including that of wind energy), there are no concrete examples of how wind energy will be used especially at a municipal level.



Peterborough and Sault Ste. Marie also made mention of waste-to-energy initiatives. In Peterborough, Peterborough Utilities Inc. installed a 2MW landfill gas utilization system and a 300kW biogas conversion system at a wastewater treatment plant. Alternatively, Sault Ste. Marie described planned initiative for both municipal waste to energy (Elementa), and recycling tires to energy (Environmental Waste International).

Education

All six communities use education as an important way to reduce energy use. Common approaches include: public education campaigns, energy audits/assessments, publicly available documents, public events, and targeted trainings. The levers and partnerships used in each city for these approaches are described below.

Public education campaigns were used or recommended by all communities, ranging from broad education campaigns on climate change to specific initiatives. Hamilton established partnerships with McMaster University Centre for Climate Change, Mohawk College, and the Bay Area Restoration Council to develop ongoing education and awareness initiatives on climate change. Windsor and London recommend both general public education campaigns on energy use and conservation, as well as education on energy conservation in workplaces through partnerships with their Union Gas and London Gas, respectively. Workplace education on active transportation is also suggested by Peterborough, and Kingston. Specific initiatives on active transportation were also suggested by Kingston in partnership with Public Health, Kingston Coalition for Active Transportation, local cycling organizations and national initiatives (i.e., Canada WALKS - Green Communities Canada) via websites on Walkability and cycling path routes. Similarly, Peterborough publishes Active and Safe Routes to School online.

All communities had at least one document pertaining to community energy planning publicly available on their respective City website. In the case of Sault Ste. Marie, it was necessary to contact a municipal representative directly to gain access to an additional document (Sault Ste. Marie Smart Energy Strategy [2014]). London and Peterborough recommend having publicly available documents on energy use and conservation. For example, London publishes information through Union Gas and London Hydro, and recommends that the City report on progress made towards stated action items using community energy performance measures. In comparison, Peterborough recommends having publicly available reporting of their Sustainability Plan.



Public events were an additional means of providing education on energy planning. Kingston showcased their Climate Action Plan by hosting open houses throughout the community in partnership with local organizations, the public library, and the INVISTA Centre. As an innovative approach, Sault Ste. Marie also recommends hosting a Smaller Smart Cities Sustainability Think Tank as supported by partnerships with multiple actors (i.e., Economic Development Corporation, Innovation Centre, MaRS Institute, Ontario Centre for Excellence, Perimeter Institute, and Centre for Green Cities as Evergreen Brickworks). Further, Sault Ste. Marie offers a Biennial Smaller Cities Sustain Symposium.

As a final means of education, three of the communities suggest trainings on energy use or conservation for municipal employees. Windsor advocates a coaching approach through their Windsor Network and Mentorship Program for Transfer of Best Practices. Alternatively, Sault Ste. Marie will partner with Natural Resources Canada to provide educational workshops for municipal staff. Peterborough also suggests educational workshops for city staff but intends to provide training through their Corporate Green Team. Additionally, they recommend municipal fleet operator awareness training on new automotive technologies and hybrid vehicles.

CONCLUSIONS

This report has provided an overview of initiatives outlines in Community Energy Plans (CEPs) for the cities of Kingston, Sault Ste Marie, Peterborough, London, Windsor, and Hamilton partake in. By providing a comparison across these cities, we have highlighted commonly used as well innovative practices for increasing energy efficiency, reducing greenhouse gas emissions, and enhancing related economic development at the municipal level.

Limitations of the Report

The main limitation of this report is lack of consistency and clarity in the Community Energy Plans (CEPs). Notably, the scope of CEPs was often variable. While some CEPs represent initiatives for the city as a corporation, others represent the community at large. Additionally, some plans focused specifically on energy while others addressed climate change more broadly (see "Methods" section for specific details). Further, within the majority of CEPs, the City did not clearly state what actions they were committed to or the resources they would allocate. Relatedly, it was unclear which actions had already been taken, were underway, or would happen in the future. As such, the CEPs



that we coded are a snapshot of each City's stated actions within the specified timeframe. Consequently, the report does not capture actions outside of the CEP or after the CEP's date of publication.

Further limitations include coding discrepancies between researchers and small sampling of CEPs. In terms of coding, all four researchers analyzed different CEPs. This may have resulted in researchers focusing on slightly different details or trends. Related to sampling, the report is an overview of a small selection of single-tier municipalities and is not representative of all CEPs in Ontario. Taken together these limitations mean that this report does not encompass all current forms of levers and partnerships for CEPs across Ontario.



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APPENDIX – CODING

The coding of the CEPs can be accessed by clicking the following links for each city:

Windsor

<https://docs.google.com/spreadsheets/d/1CAKJL8eaaSnLibCj7E-zauq6-72nl08tTyaAQ-0ulf0/edit#gid=107004608>

Hamilton

<https://docs.google.com/spreadsheets/d/1CAKJL8eaaSnLibCj7E-zauq6-72nl08tTyaAQ-0ulf0/edit#gid=51461973>

London

<https://docs.google.com/spreadsheets/d/1CAKJL8eaaSnLibCj7E-zauq6-72nl08tTyaAQ-0ulf0/edit#gid=1947580067>

Guelph

<https://docs.google.com/spreadsheets/d/1CAKJL8eaaSnLibCj7E-zauq6-72nl08tTyaAQ-0ulf0/edit#gid=151987772>

Saulte Ste. Marie

<https://docs.google.com/spreadsheets/d/1CAKJL8eaaSnLibCj7E-zauq6-72nl08tTyaAQ-0ulf0/edit#gid=37270983>

Kingston

<https://docs.google.com/spreadsheets/d/1CAKJL8eaaSnLibCj7E-zauq6-72nl08tTyaAQ-0ulf0/edit#gid=1947152994>

Peterborough

<https://docs.google.com/spreadsheets/d/1CAKJL8eaaSnLibCj7E-zauq6-72nl08tTyaAQ-0ulf0/edit#gid=1581078683>



Coded information from Ontario Cities Community Energy Plans about Emissions Reductions for each of the cities can be accessed by clicking the following link:

<https://docs.google.com/spreadsheets/d/1CAKJL8eaaSnLibCj7E-zauq6-72nl08tTyaAQ-0ulf0/edit#gid=153345834>

Accessible Excel versions of each of the above can be accessed by clicking the following link:

<https://atrium.lib.uoguelph.ca/xmlui/handle/10214/12588>