

Community Energy and Emissions Plan

The City of Dauphin with support from the Federation of Canadian Municipalities (FCM) has developed a Community Energy and Emissions Plan (CEEP). The plan focuses on the reduction of energy consumption and greenhouse gas (GHG's). The Federation of Canadian Municipalities (FCM) has, in association with ICLEI, produced a protocol for monitoring and reporting energy consumption and emissions called the Partners for Climate Protection Protocol (PCP). The CEEP progresses the City of Dauphin to milestone 3 through the PCP program.

The plan also serves as a living document that can be reported and reviewed annually by the City of Dauphin's Mayor, council and executive management team. The CEEP is intended to evolve as the City of Dauphin actively pursues energy and GHG reductions. The **vision** for the City is to become **Manitoba's most sustainable City by becoming the first MB City to reach Carbon Neutrality and Net Zero Energy Status for Municipal operations.** Success in fulfilling the vision for the City requires understanding its importance from the viewpoint of the various civic stakeholders. Success also requires a commitment of finite resources such as capital, staff time and resources. Each department of a municipality has to compete for these resources by creating a strong case for the benefits of funded activities.

Why then is energy and GHG reductions important globally, at the national level and ultimately for the City of Dauphin? The overwhelming majority of scientists around the world predict that if GHG levels are not drastically reduced effects of climate change will make the planet uninhabitable for human life. Canada's emissions account for approximately 3% the world's GHG total emissions and are nowhere close to countries such as the USA, China and India. However, when we take a look at Canada's emissions from a per capita viewpoint we are one of the top 3 emitters behind the USA and Australia.

Recent data shows a trend of global populations shifting towards urban centers. With the vast majority of the global population living in urban centres strong leadership on climate action will be required by Cities. According to the UN "Cities consume 78 per cent of the world's energy and produce more than 60 per cent of greenhouse gas emissions. Yet, they account for less than 2 per cent of the Earth's surface."(ref)

It is clear Cities will play a pivotal role in reducing emissions. To achieve success a cultural shift at all levels within the community is required. The CEEP provides a guide to create that cultural shift and increase buy in from internal and external stakeholders. The phases of the plan will move through the following evolution:

- Activities causing climate change and damage to the natural environment need to be minimized or eliminated
- Implement offset activities where the municipality is currently unable to prevent environmental damage
- Actions will eventually need to focus on restoring the existing environmental damage and build resiliency against irreparable damage



The City of Dauphin can capitalize on this shift to create new employment opportunities, build resiliency, save money and drive growth. Cities focused on becoming green ultimately become more attractive places to live and work.

Plan Objectives

Energy consumption is an important management factor for municipalities. Each unit of energy, whether litres of fuel, kilowatts of electricity or the more abstract gigajoule (GJ), costs something to purchase and use. Knowing how much is being used, and where, gives municipalities a chance to manage energy consumption costs and to look for efficiencies.

Energy consumption has side effects, and one important side effect is greenhouse gas emissions. Measuring and reducing GHGs allow municipalities potential access to carbon credits and funding opportunities, as well as the altruistic goal of impacting climate change. The plan specifies actions designed to integrate sustainable actions throughout the City's organization. Sustainability in this context is to reduce energy consumption, GHG emissions and waste. To simplify energy consumption and GHG production is summarized as follows:

- Municipal energy is consumed for heating and cooling buildings, lighting, heating water, operating pumps, operating motors and running equipment & appliances.
- Municipal GHG's are produced from generating energy, consuming fossil fuels for heating, landfill waste and fleet fossil fuel consumption .

Approach

The CEEP represents a cumulation of knowledge and experience gained in the process of the development. The following flow chart describes a general sequence to plan, prepare and execute the reduction of energy consumption and GHG production. For the development of the CEEP some of these segments were pursued simultaneously. The City of Dauphin already undertaken several sustainability initiatives however the creation of the CEEP represents a higher level of sophistication.



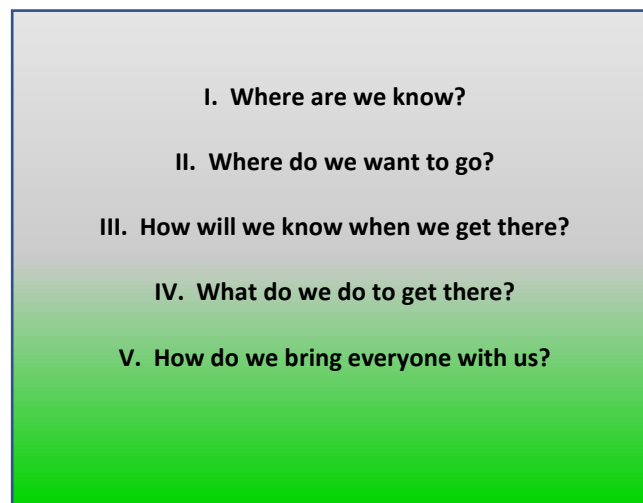
The CEEP will explore each of these steps in greater detail in with each segment comprising a section of the plan. The intent is for the CEEP to act as a living document which focuses on creating momentum and progress that can be tracked reviewed and refined. Many organizations struggle with creating momentum due to creating a highly complex plan at the outset. As a organization participates in simple actionable projects the depth of knowledge grows as does ownership in the plan. The development of the CEEP was as much of an exercise in capacity building as it was the development of a framework. Organizing and directing the efforts of the City regarding energy and GHG reductions should begin with the easy wins and simpler actions and grow as the knowledge and experience grows. To explain that statement let's compare something like building a sidewalk within the City vs. a GHG reduction activity.

Ex. Mayor and council determine that more sidewalks need to be constructed within the City. There is an existing set of policies and standards that determine where a sidewalk must exist, guidelines on the type of sidewalk to build, widths, thickness, set back from the street, a map of infrastructure in the ground etc. The annual financial plan will have designated funds for this type of work and managers are designated to oversee the project. The public works crew has the tools, training and experience to build the sidewalk and the ability to order any necessary materials for construction.

Compare that to the same Mayor and Council determining the City needs to reduce energy consumption and GHG emissions. How much energy is being consumed? What are the total emissions? Where are we consuming the most energy or producing the highest emissions? How do we know what our target reductions should be? What do we do to reduce them and how do we pay for it? Who will oversee supervision and management of the actions? Do we have the necessary tools, experience and access to required materials? Is there money allocated in the budget annually to achieve the targets? The answers to these questions are not as readily available or organized.

Incorporating sustainability to address climate change and become energy efficient as a City can be daunting. It is not common practice and traditionally has not been a priority for many communities. There are numerous barriers to implementing a strategy to reduce energy and emissions. Despite these barriers and challenges the City of Dauphin has already taken its first steps. This plan does not represent the beginning but rather another milestone in of progress towards achieving the vision set out for the City.

The segments of the plan can be understood by asking the following set of questions:



I. Inventory

-Where are we now?-

The first step of the CEEP was the collection and analysis of data for municipal operations and the community at large. This necessary starting point provides a high-level picture of “where we are at” for the current time. Using data from 2017 and 2018 will provide a starting point for what volume of energy is being consumed, where it is being consumed and the contribution to GHG emissions. The initial collection of aggregate data was an arduous and time-consuming task. It is important to note however that as data was collected later in the CEEP more details about future data collection will be discussed. The various levels of inventory relied on the following data:

- Climate smart for Business
- Community residential survey
- Manitoba Hydro
- Comparisons data from similar sized community’s

The inventory is comprised of 2 separate categories: community and corporate. This data and analysis in the following section has been compiled by Eco-West Canada Inc. The source material was provided by the City of Dauphin, Manitoba Hydro and outside sources produced specifically for the CEEP.

a. Corporate Inventory

The Corporate inventory includes all consumption and emissions brought about by the operations of the municipal corporation. This includes the heating and powering of all Buildings and Water infrastructure, all Streetlights (though Manitoba Hydro has near-exclusive control over this sector), and the Vehicle Fleet. Depending on the energy mix of the sector and where electricity comes from the impacts of these sectors can vary considerably. In Manitoba, where electricity is generated by hydroelectric dams the GHG impact is nearly 0, while in Alberta or the East Coast the emissions rates per kilowatt hour are significant. Usually, however, the major impact for rural municipalities is found in the vehicle fleet sector, where fossil fuels are burned for energy.

b. Community Energy Consumption and Emissions

The Community inventory includes all consumption and emission brought about by the citizens of the municipality and its neighbours going about their daily lives. This includes the heating and powering of the Residential, Commercial and Industrial sectors, as well as vehicle Transportation sector and all Community waste. Again, depending on the energy mix of the sector and where electricity comes from, the impacts of these sectors can vary considerably. In Manitoba, where electricity is generated by hydroelectric dams the GHG impact is nearly zero, while in Alberta or the East Coast the emissions rates per kilowatt hour are significant. Usually, however, the major impact for rural municipalities is found in the Transportation sector, where fossil fuels are burnt for energy.

c. Data sources

The data in this report come from a variety of sources. Electricity and natural gas consumption information for the municipality’s operations and for the aggregate of the community at large comes from Manitoba Hydro. Vehicle fleet consumption, and the fuel types and respective quantities used are provided by municipal staff. Waste and recycling tonnage similarly come from municipal records, supplemented by recycling data from Manitoba Multi-Materials Stewardship. Transportation data is estimated using a proxy rate provided by the Federation of Canadian Municipalities.

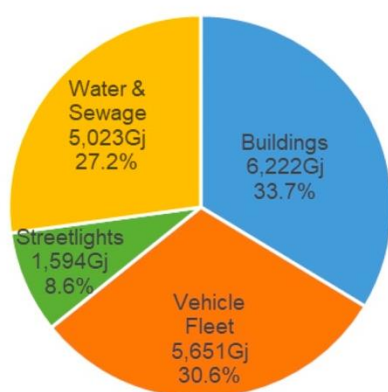
Additional data allowing cross-community comparisons comes from the communities themselves.

This report makes comparisons across a number of dimensions to give context to the consumption and emissions figures presented. Comparisons are made between communities, between years for the Municipality, and to averaged Manitoba municipalities. Although not exhaustive, they give a global picture of the magnitude of consumption and emissions in the Municipality and whether that is high or low.

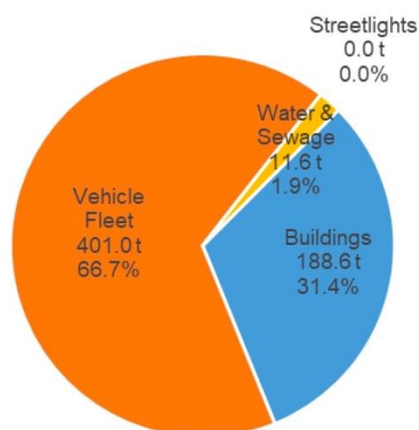
An important additional consideration for the reader is annual weather differences. The two years compared in this report—2017 and 2018—had different weather. Normalized to a 24 year average, 2018 had as much as 10.3% more heating requirements than 2017, and 70.4% more cooling requirements. This likely had a significant impact on energy requirements for any buildings or water infrastructure in use by the Municipality. 2018 also had 14% less snowfall than the average over the same period (using snowfall data for Winnipeg), which likely had a significant impact on fuel use, re-quiring fewer snow plow trips. Cross-community comparisons do not take into account differences between surveyed years despite that most other communities shown in this report are displaying 2015 or 2016 data.

e. Summary of Corporate Inventory:

2018 Corporate Energy
City of Dauphin



2018 Corporate GHGs
City of Dauphin



Sector	2017		2018	
	Energy GJ	Emissions tonnes	Energy GJ	Emissions tonnes
Buildings	5,632	164.6 t	6,222	188.6 t
Vehicle Fleet	5,336	378.8 t	5,651	401.0 t
Streetlights	1,594	0.0 t	1,594	0.0 t
Water & Sewage	5,613	12.7 t	5,023	11.6 t
Total	18,175	556.0 t	18,490	601.2 t

The operations of the City of Dauphin emitted 601 tonnes of CO₂e in 2018, from the consumption of 18,490GJ of energy. These energy purchases cost approximately \$530,022.

The City of Dauphin's most energy intensive sector is the **buildings** sector, consuming 33.7% of all energy used by the corporation (6,222GJ in total), and emitting 188.6t of CO₂e.

The **buildings** sector tends to be quite a significant energy consumer because buildings must be kept lit and habitable for people to function. In Canada, this means significant heating and cooling costs. Vehicle bays have the

added issue of having doors the size of whole walls that can vent an entire building's heat in seconds, creating problems for firehalls and public works garages.

Typically, for large urban municipalities, the major consumer of energy is this sector, at 3,247GJ total energy consumed, or 1.1GJ/capita. The City's consumption is more than that.

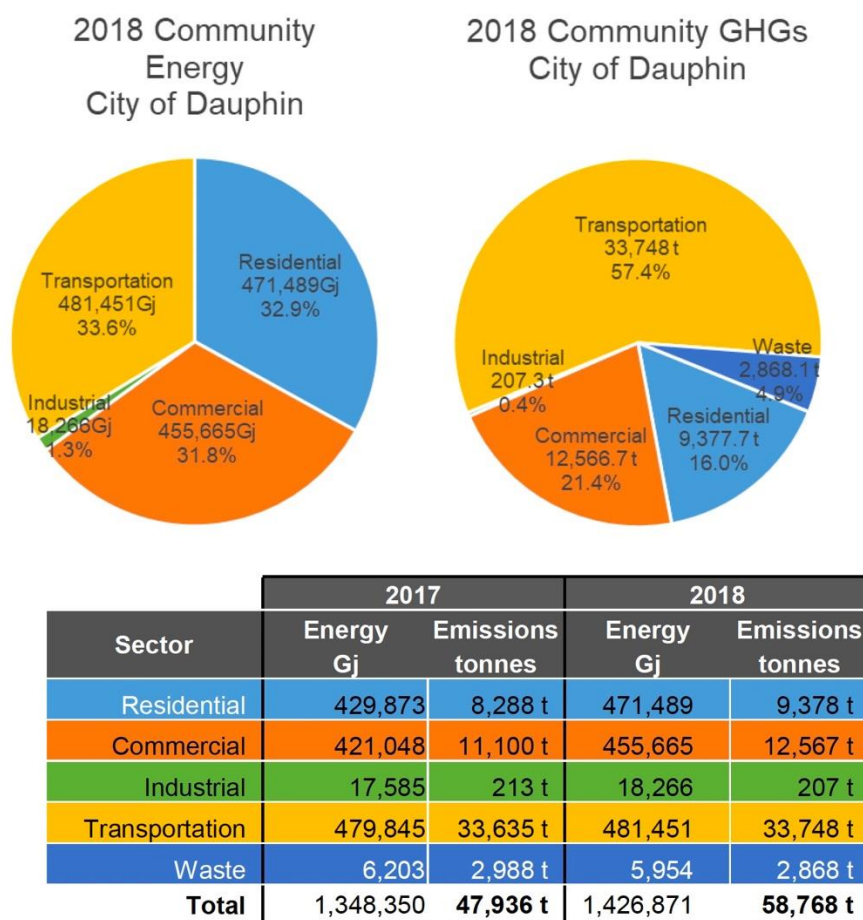
The second most energy intensive sector for Dauphin is **vehicle fleet** accounting for 30.6% of consumption, and 66.7% of emissions. On a per capita basis, this is 34% less than the urban average.

Care must be taken when considering the vehicle fleet sector; it uses primarily fossil fuels, which makes its energy consumption the "dirtiest" per unit of consumption. It is also the most difficult to measure, though any changes made will have significant GHG emissions impacts.

The third highest sector is **water and sewage** at 27.2%.

Finally, the **streetlights** sector represents just 8.6% of total consumption, and a negligible amount of GHGs.

f. Summary of Community Inventory



This inventory divides community energy consumption into the following sectors: **residential, commercial, industrial** and **transportation**. Emissions include a further sector: **waste**.

The community at large in the City of Dauphin uses the most energy in the **transportation** sector, which comprises 33.7% of the total. This consumes 481,451GJ of energy, and emits 33,748 t of CO₂e.

Typically, for urban municipalities, the transportation sector consumes 46.2GJ per capita. Dauphin, at 57.2GJ per capita, is more than the average (23.8% the per capita average).

The second highest energy consumer in the community is the **residential** sector, with 471,489GJ, 33.0% of total consumption. Per capita this is 56.0GJ, about much more than the Urban average of 41.4GJ.

Commercial was next highest at 455,665GJ, 54.1GJ per capita and 31.9% of total energy consumption, double the Urban average of 26.7GJ/capita.

The least energy intensive sector, accounting for 1.3%, is the **industrial** sector, which consumed 18,266GJ total and 2.2GJ/capita (less than one fifth the average of 99.0GJ on a per capita basis).

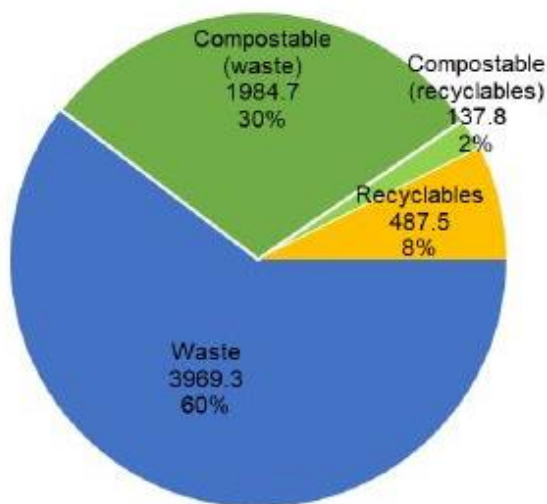
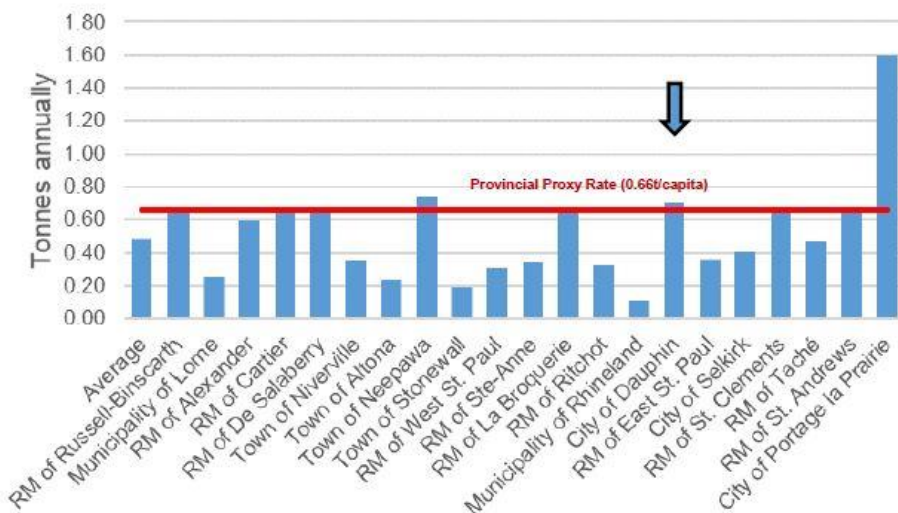
g. Waste Analysis

In 2018 the City of Dauphin reported 5,954.0 tonnes of waste landfilled, or about 707.4 kg per per-son per year. This amount of waste is approximately 50% greater than the average level seen by most other communities. Dauphin recycles 73.9 kg per capita, more than the peer group average of 55.5 kg, but less per kilogram of waste (9.5% of the total waste stream).

The total waste stream of the community, with recycling and waste combined, is 781.3 kg/capita. This is approximately 50% greater than the estimated average for the peer group.

Some care must be taken with this figure, though, as Dauphin is currently a regional waste handler, which may increase the apparent amount of waste. Dauphin has limited organics waste processing, which puts about one third of the waste stream, the third most responsible for GHGs and ground water issues, into landfills. An organics processing system would reduce landfill fees, WRARS levies, landfill use rates, GHGs, odor issues and generate a usable material for landscaping.

Annual Waste Production per capita



■ Waste ■ Compostable (waste) ■ Compostable (recyclables) ■ Recyclables

II. Goals

-Where do we want to go?-

In a period of modest population growth, the City increased operations emissions and energy consumption slightly more than projected. The community similarly increased GHG emissions in line with projections.

In 2018 Dauphin reported 602 tonnes of CO₂ or equivalent emissions for Municipal operations, and 58,768 tonnes for Community operations. To determine whether this describes an improvement since 2017 a forecast was made for 2018 using data from 2017. This was scaled on the increase in households for the **residential, transportation and community waste** sectors, and by **commercial and industrial** Hydro clients for those sectors.

Community

Compared to the projection, the community-at-large is emitting 4.1% more GHGs than would have been expected. Going into the future, if no changes are made total emissions will increase by 2.5% assuming growth remains constant for the next ten years (bar 3, top graph). A commitment to a 6% per capita decrease in emissions would save 3,615.8 tonnes of CO₂ annually, removing the equivalent of nearly 764 cars from the road (bar 4, top graph). A more ambitious target of 6% off unmodified 2018 levels would put that at 5,022.5 tonnes, the equivalent 1061 cars (bar 5, top graph).

Corporate

Compared to the projection, municipal operations is emitting 7.2% more GHGs than would have been expected (bars 1 and 2, bottom graph).



For City operations, **buildings** and **vehicle fleet** sectors both increased energy consumption while the **water** sector decreased; the net change was an increase, setting total emissions to exceed the projected levels by 1.7%.

Efficiency measures aimed at decreasing the usage of vehicle fleet or increasing efficiency of the equipment would have significant impacts on energy bills and emissions rates.

While the population is increasing by .03% every 1 years and 2.9% every 10 years a 20% reduction in CO₂ emissions from 2018 levels could save an estimated \$124,015 in energy expenditures and 141 tonnes of GHGs (off projected levels), the equivalent of 30 cars annually in 2028 (bar 5, bottom graph).

A target reduction of 6% over ten years should be the starting place for the City and community inventory. The bulk of the emissions reductions could be achieved through reducing waste.

III. Measure

-How will we know it is working? -

The previous section outlined with charts and graphs the corporate and community inventory. This section of the plan will break down the tools and processes developed to create that inventory. With every activity designed to reduce energy consumption or GHG's there needs to be a manageable way to track progress. The community inventory is important but not practical to collect annually. The corporate inventory however can be actioned over a shorter time frame and will be essential in prioritizing actions year over year.

One of the barriers at the outset was the lack of process around GHG and energy data collection. For the most part the focus for the Corporate inventory was cost tracking regarding energy and fuel. The costs associated with heating and cooling the buildings for instance was not collected in energy units such as kilowatts or cubic meters of natural gas or propane. The fleet fuel consumption was tracked by litres but was stored in separate departments in a variety of formats. This did not allow for a complete picture of total fleet fuel consumption. The landfill, water treatment plant and airport all use propane for heating the buildings, but the volumes were not collected. In addition to the lack of volumes the original invoices were buried in aggregate monthly invoices making it difficult to find the originals. Here is a summary of some of the early challenges:

- The required information such as volumes not collected in the existing accounting processes
- The required information was not collected and stored in one place
- The required information did not exist in a digital form
- The data was not collected in a single consistent format
- Collection of data was time consuming and required sorting through historical paper invoices
- Once the data was collected there was no simple way to convert energy and fuel to GHG's
- There was no simple way to use the data to direct reduction activities

It became obvious that the time required to collect, sort and analyze the data was not feasible. At this stage there are different approaches that can be taken. One approach would be to hire the services of an outside consultant, another to hire a full or part time staff member to complete the necessary work or modify existing processes and use new and existing software to simplifying the entire process.

For the CEEP it was determined to take the software and process refinement approach. While it is important to note that Ecowest was contracted to develop corporate and community inventory for the initial development of the plan, it was crucial the plan allows existing staff members to complete the inventory on an ongoing basis. There were three main pieces of software finally chosen to incorporate into the operations:

- Pearl Software – This software program is the primary used for the majority of municipal operations. The program offers add on modules for performing specific tasks or managing data tailored to the needs of the user. In this instance Pearl modules will be used to track volumetric data as it relates to gasoline, diesel and propane across the entire organization despite the department. This will create one place where the pertinent data is collected and available for export in a usable format. The data is intended for export into climate smart for business.

The decision to implement consolidated, volumetric data requires buy in from executive management and front-line employees. Many municipalities are incorporating software into routine processes. This shift requires time and commitment as computer skills were not previously a requirement but are now necessary moving forward.

- MB Hydro MyBill – This program is offered for customers by the utility company to pay bills and access consumption data. The organization manages approximately 50 separate utility accounts for natural gas and electricity. The invoices with consumption data would be received via the mail in paper format. The

initial collection, consolidation and analysis of data took place over 4 months and required a high volume of staffing hours. The MyBill software was tested on a single account for a two-month period before converting all the accounts to MyBill. This action required a change in the accounting procedures, specifically how payables were managed. The resulting net benefit was a simple and effective way to access consumption data at any time. Due to the simplified format which locates all of the accounts in one digital location billing discrepancies were discovered and corrected. Many organizations request the consumption data directly from the utility company but in the City of Dauphin's experience this information could take months to obtain.

- Climate Smart for Business – This program yielded the highest return of any other effort regarding the use of software. While the implementation of a carbon tax is in the early stages it appears that it will continue at the national level for the at least the next 4 years. At the current time the Provincial Government of Manitoba is pursuing litigation with the Federal Government regarding a forced participation in a carbon tax program. Despite this the Province has shown support for the deployment of Climate Smart for Business in MB for the next 3 years. Additionally, the City of Dauphin participated in a sector working group, making recommendations to the Province in regards to actioning sustainability as a City. Based on those activities it is assumed as some point Cities will be required to track GHG emissions and energy use on an ongoing basis. Another assumption that can be made is that future grants, incentives and tax breaks will be created for the Cities that have an inventory, reduction goals and action plan.

Two years of data was collected for the creation of the CEEP which required looking into historical and current data. Initially collecting data was a monumental task performed over several months with several staff members. At the current time it is estimated that the same data can be collected by a single staff member in less than 2 days moving forward. The Climate Smart for Business software collects and presents data for the entire organization in a clear and consistent format. It also provides graphs and charts for council reports and fine grain detail on building and vehicle consumption. ex. the highest emitting vehicle in the fleet is the garbage collection truck.

- GRITS- The CEEP committed to exploring return on investment (ROI) models as they apply to sustainable actions. The traditional models of ROI are important however they tend to neglect the cost of damage to the environment. Additionally, with the exception of the “low hanging fruit” the ROI will typically show a negative return. New technology is still cost prohibitive because savings resulting from economy of scale do not exist. Our society has not yet reached a stage where fiscal accounting takes into consideration damage to the natural environment and public health as part of the cost of doing business.

This is changing with the increased public pressure to address climate change and with the introduction of a carbon tax. The GRITS software was a simple tool designed to evaluate projects with the traditional ROI function but also estimates the GHG reduction. Given the purpose of the CEEP is to reduce energy and emissions it is a logical step to evaluate each project factoring in potential GHG reductions. The intention is that future projects will have access to Carbon Tax Revenue requiring a “return on GHG reduction”. The GRITS software also provides access to a North American database sharing project information to subscribers. The ability to review other projects and results allows for benchmarking. Leveraging data and experience from early adopters de-risks projects while creating a shortcut to success.

Level 1. Energy Audits:

A level 1 energy audit is the simplest form of audit for evaluating a building in terms of its energy efficiency. While there are several energy audit templates there are few that are simple and pragmatic enough to be actioned at the municipal level. A template that incorporated what was deemed necessary criteria was developed for the City's use. Outside of aggregate energy consumption data the audit provides a more detailed look into the consumption within the building itself. These audits are intended to be performed annually with deeper level 2 audits for the

Level 1 Energy Audit				
Building Name:	Dauphin Regional Library			
Square Footage	8611			
Category:	Office/garage 90/10			
Building Manager:	Allison Moss			
Efficiency				
Inventory				
Heating System:	Natural Gas	low		
Cooling System:	Electric	low		
Ventilation:	HRV	low		
Control System(s):	Honeywell		med	
Lighting:	90% LED			high
Lighting Controls:	none			
Water Heating:	gas	low		
Envelope				
Windows				
Number	24			
Efficacy	double pane	low		
Doors				
Number	5	low		
Efficacy	commercial steel		med	
Maintenance				
Annual Envelope Inspection				
- The roof had trees growing in through the layers of the flat roof				
- Roof around the furnace was deteriorated creating a leak				
- door sweeps need replacement, gaps under doors creating draft				
- windows are leaking and frames are rotten and in need of replacement				
-furnace filters need replacement				
*perform maintenace tasks prior to recommendations				
Recommendations:				
upgrade furnaces to ASHP or high efficiency furnaces				
replace windows and eliminate windows around rear entrance				
retrofit remaining incandescent bulbs				
Long Term- Increase envelope insulation when replacing exisitng siding				
install natural light dimming sensors in offices and main area				
upgrade hot water tank to tankless hot water heater				

building(s) with the largest reduction opportunity. The Water Treatment Plant and Lift Stations are scheduled for an immediate level 2 audit by Manitoba Hydro specifically to evaluate potential pump and motor upgrades.

IV. Actions

The move towards sustainability is as much of a cultural shift as it is a technical one. The technology and processes are very specific and require not only technical knowledge but a depth of understanding. It is important to establish a starting point using benchmarks, create a clear set of goals, list and evaluate potential actions and determine a methodology for measuring progress. To add complexity, within any system, actions committed in one part will have an effect on another part of the organization. A typical example is budget allocation. To develop buy in from across the organization consideration needs to be taken to create an alignment of existing goals. Energy reduction is usually a good starting point as it encourages the repair or replacement of older equipment while reducing annual operating costs for example. Creating “quick wins” or beginning with the “low hanging fruit” is a common practice which allows people to become comfortable with the concept of sustainability and to recognize the immediate benefits.

The other aspect of the CEEP to consider is the impact it could have beyond the municipality. The City will provide a leadership role, direction and resources while also seeking to create alignment with common goals of the commercial and residential sector. In a municipality revenue is generated through taxes and fees making the businesses and residents the “customer”. One important role of the City is to develop the infrastructure and necessary services that will allow businesses to be competitive with outside regions and an attractive place to live and work for residents. These sectors are affected indirectly through the execution of the strategic plans set out by the City. The CEEP will have a strong focus on the direct actions that can be achieved through the municipality but will take into consideration the external impacts of these actions as well.

It is important to stress that while sustainability is complex the plan should strive to be as simple to understand as possible. A road map will provide directions to a restaurant, but it is not necessary for the map to break down the recipes for each menu item at that restaurant. The CEEP will allow decision makers to evaluate progress in each area of the City at a glance while not becoming overwhelmed by fine grain details.

Each action is broken down into 5 categories. Within each category the list of potential projects will identify the project, expected energy/GHG impact and determine if it is a long-term or short-term project. Due to the uncertainty around the how the carbon tax will be distributed or potential grants available the lists are not ranked in any specific order. Many project successes in the past have been dependent on timing and the ability to move quickly as funding opportunities present themselves.

Previous Activities

Due to the fortuitous timing of the development of the CEEP the City of Dauphin was able to capture emissions and energy consumption data from 2017 & 2018. Projects were also undertaken and completed during that time with several projects still underway. The following section lists some of the earlier projects which unfortunately did not have the benefit of the inventory, audits or software management. The previous section of the CEEP refers to some of the refinement of processes. Some of these processes were at the operational level and adopted as needed while other processes require formal policy adoption at the council level. The initial development of the CEEP incorporated 2017 & 2018. The activities undertaken and completed as part of the CEEP are listed in the following section.

1. Climate Smart for Business

Climate Smart for business is a program that uses software to track organizational emissions. Building energy use, fleet fuel consumption and waste can be tracked. The program also allows access to strategies and efforts of other organizations to reduce GHG's, energy and waste. The purpose of CSB is benchmarking (other businesses efforts), inventory, stakeholder engagement (creating buy in throughout the workplace), process development (create a system to input the data) and communications (Climate Smart will be using the City of Dauphin as a case study and promoting its efforts throughout the network). The municipal inventory has been completed on the software for 2017-2108. The City moved all of the MB Hydro bills online to facilitate annual data collection.

2. 50KW Solar PV project

The Solar PV at lift station 1 was the first of 2 planned solar PV installations. The project had several benefits to the overall plan. ROI calculations were used and then verified by tracked the estimated performance to confirm calculations. The first installation allowed the City to learn how MB Hydro buys excess energy generated and explore the way invoicing records energy generation. A great deal of time was spent doing ROI calculations, project management and reviewing outcomes.

3. Safe Schools Route

The safe schools route is a planned 4km route of protected cycling lanes connecting every school in Dauphin. The intent of the project as it relates to the plan was to provide a zero emission alternative for transportation. The costing, methodology, communication strategy and usage were calculated and will be reviewed after phase 1 has been in operation for a few months.

The first 2 km is complete and best practices are being developed for subsequent phases. Before the first segment has been completed we have adjusted lane width, used paint to highlight manhole covers or drains along the corridor, reduced the height of the curb markers, added reflective tape on the backside of markers by driveways/back lanes and created a bracket system for curb markers. On the project side we have created a communications policy for residents prior to implementation.



4. Boiler Controls CN Station:

With budgetary and staffing constraints digital control systems like this one will enable smaller organizations to monitor, maintain and measure performance of the HVAC systems at the various locations. While there are a variety of systems, direct knowledge of how they work in real world application is an important step before adopting this technology as a standard practice for all buildings. Combining software and mechanical systems is a necessary step however there is reluctance to add what is initially perceived as added complexity. Policy regarding staff hires will need to add a basic understanding of computers and software.



5. Community GHG Inventory:

Eco-west was commissioned to create a community GHG inventory and they have completed years 2017 -2018 are complete and have been incorporated into the CEEP. The plan is attached as Appendix 1

6. Residential Survey of Energy Efficiency Measures

The residential community was surveyed and the results are attached. This survey was the second of its kind done in Dauphin. The two were similar to allow a direct comparison and measure early results as they relate to the uptake of energy efficiency promotions. The business community received a door to door visit while encouraging them to participate in the Power Smart Shops Program. This program allowed commercial, municipal and religious buildings to receive a 100% incentive for prescriptive lighting upgrades and also included labour costs. Using this data the CEEP was able to identify which incentives offer the most value to businesses and residents in the community.

7. Power Smart Shops LED Commercial Retro Fit Campaign

This program offered a 100% lighting and labour incentive for specific lighting types at commercial, municipal and religious buildings. Over 200 buildings participated which represents over 80% of the commercial businesses in the City. Door to door visits were a large contributing factor for the high uptake of the program. At these visits an assessment was made for any additional energy retrofits that the businesses would benefit from. As a result there were additional lighting and commercial envelope retrofits.

8. Community Energy Efficiency Program Advertisement

Through the CEEP a full two page article was submitted for the Dauphin Tourism magazine. It was compiled with data collected by Manitoba Hydro and framed the savings in a way that would be relatable to the community at large. The City is seeking to build a reputation of growth around aspects of sustainability and active living. The advertorial was a piece of the ongoing communications strategy.

9. Article for the Association of Manitoba Municipalities Quarterly Journal

A big factor in earning buy in from community and council is to continuously promote the benefits of sustainability. A two-page article was submitted to the municipal leader expanding on the benefits for municipalities to tackle green initiatives. There is no upper limit on promoting early successes which make tackling more ambitious projects feasible.

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<https://www.kelmanonline.com/httpdocs/files/AMM/leaderwinter2019/index.html>

10. Watson Arts Centre RGBW LED Lighting Project

The colorful up lighting of the historic Watson Arts Centre is one of the first instances of using sustainability to drive Tourism and Economic Development. The type of wall grazer lighting technology is a new application of LED technology in the Province. The light bars that were able to achieve the color wash effect are controlled through software allowing user groups to create “shows”. The lights themselves use 50% less energy than traditional lighting. Adopting control systems for use in a variety of applications was important to create a cultural shift in how lighting is part of a system that needs controlling and management.



11. Net Zero Home Project

The City of Dauphin is involved in a net zero home project. The goals of the project are to introduce energy modelling, the energuide rating system for homes and high efficiency materials and building techniques. This project has provided the opportunity to use Hot 2000 energy modelling for a high performance home and code built homes. The building inspector and CEM have used modelling on a traditional home plan and explored the details involved in becoming an energy advisor. This role doesn't fit with municipal operations at this time. The volume of energy modelling on residential homes is low. If the federal government is successful in adopting net zero national building codes for 2030 there will be a large demand for this service. Encouraging an energy modelling incentive through MB Hydro at the permitting stage is a policy that is being proposed at the municipal level.

12. Landfill GHG Calculators

Some preliminary work was done to evaluate the GHG impact of the existing landfill. The CEEP will address emissions at the landfill as part of the asset management plan it is still a contributor of overall emissions for the City. Data collected was incorporated into the work done by Ecowest.

Recommended Activities

In this section a list of recommendations are made for future activities. The City has developed a deeper understanding of sustainability and a higher level of sophistication. This segment is intended for review in conjunction with budget deliberations for the subsequent year. It is expected that at least one major capital investment is made annually to further shift the City towards its vision of Net Zero Energy and Carbon Neutrality.

Buildings

Process & Policy Recommendations

1. Energy Modelling

The construction of any heated building by the City of Dauphin require energy modelling as part of the design and target at minimum 30% above code as it relates to energy code.

The City reduce the cost of residential building permits 25% if energy modelling is used in the design of a new build.

2. Renew Energy Audits Annually

The level 1 energy audits should be redone every year and reviewed. The reports should be cumulative and make note of any improvements made over the previous year.

3. Set and Review Energy Reduction Targets Annually

Part of the annual review should include confirming a firm energy reduction target for each building and review progress.

4. Climate Smart for Business

Collecting data using Climate Smart for Business on building energy use should be a requirement. The consistent use of this program should provide a consistent format and historical data for review.

5. Replacement policy

The City of Dauphin should review any equipment, appliance as it reaches end of life and require replacement with a more energy efficient version. Ex. Hot water heating, furnaces, refrigerator etc.

6. GRITS Software

Require evaluation of every new project or activity listed in the CEEP with the GRITS software to determine the potential GHG reduction.

Future Reduction Actions

1. Solar Thermal for Water Heating

Invest in a solar thermal water heating system at one municipal building for evaluation. This technology has been deployed in the area and would provide zero emission and low energy water heating. It is recommended to trial the test unit on a small scale with potential to use excess heat for other purposes.

2. Commercial Building Battery Storage

The Credit Union Place spends \$60,000 per year on electricity demand charges. Isolating equipment creating demand surges and supplying those needs with battery storage should be explored. This would create a significant cost saving while also developing the necessary capacity to achieve net zero status for a commercial building.

3. Explore light dimming and controls for municipal facilities

With almost 100% of municipal lighting upgraded to energy efficient LEDs the next stage would be to add a higher degree of control. In many cases the replacement of lighting on a 1 for 1 basis has resulted in excessive lumens. Dimming would add comfort for building occupants while lowering energy consumption.

4. Implement facility maintenance software

In the course of completing the level 1 energy audits a number of maintenance issues were identified. These upkeep routines were being overlooked as there is currently no one person responsible for facility maintenance. Using Smart CSM software would develop a GIS style map of facilities and push maintenance notifications to the appropriate managers. Routine maintenance and replacement of equipment would increase efficiency of operations.

Transportation

Process & Policy Recommendations

1. Active transportation policy

Develop an updated active transportation master plan which considers sidewalks and cycling lanes. Stakeholder consultation should be part of the design.

Newly constructed main feeder or arterial roads should incorporate sidewalk and protected cycling lane infrastructure when built according to the ATC master plan.

Where feeder and arterial streets reach end of life replacement should incorporate sidewalk and protected cycle lanes built according to the ATC master plan.

The annual City budget should fund the implementation of the ATC master plan on an annual basis and appoint staff resources to oversee the implementation.

2. Level 2 Electric Vehicle Chargers

The City of Dauphin develop level 2 charging at every City owned facility. This move would signal a cultural shift in zero emission transportation and provide leadership for consumers and businesses to follow.

Future Reduction Actions

1. Build level 3 EV charger in public/private partnership

The City of Dauphin was able to secure \$100,000 in Federal Government Grants for the construction of 2 level3 Electric Vehicle Chargers. These 2 Chargers should be built this summer in a public area.

2. Cycle Commuting Friendly Facilities

Encourage cycle commuting for employees by providing indoor bike storage, access to a fleet car if necessary and relaxed dress code for cycle commuters.

Energy

Future Reduction Actions

1. Evaluate Municipal Buildings for Potential Solar PV

Every building owned by the municipality should be evaluated for potential energy generation if they maximized the potential for Solar PV. This will allow the City to have a number for potential generation when determining energy reduction targets.

2. Implement annual Carbon offsets such as tree planting and cycle lanes

Determine an appropriate level of carbon offsets that could be achieved annually. These offsets should look at trees planted and distance of ATC plan implemented.

Fleet

Process & Policy Recommendations

1. Anti-idling policies for municipal fleet

Vehicle operators would be required to shut off vehicles when unattended or in a parked position. Fleet monitoring equipment should be installed in fleet vehicles to track and enforce this policy.

2. Right Sizing Vehicles

Fleet vehicles should be adequately sized based on needs. Smaller more fuel efficient vehicles should be used wherever possible.

3. EV Purchasing

Electric vehicles should be purchased whenever they are available as a choice. The target for fleet vehicles should be to achieve a zero emission fleet.

Future Reduction Actions

1. Purchase an electric garbage truck

These vehicles are available from more than one supplier and given the high level of emissions would be an ideal starting place for fleet electrification.

2. Replace bylaw vehicle with electric

The bylaw enforcement vehicle should be replaced with an electric version at the time of lease replacement.

3. Incentivize carpooling to conferences

A higher travel stipend should be offered when employees carpool when travelling to conferences.

Water & Waste

Process & Policy Recommendations

1. Rain Capture Irrigation Policy

The City require 100% of irrigation needs to source rain and surface water runoff for its needs.

2. Track City Waste Data

The City of Dauphin landfill serves as a regional waste collection facility. This may have a negative impact on the GHG inventory collected. The data for City operations should be collected separately from the waste collected from other municipalities to give the City of Dauphin a clearer picture of waste generated.

Future Reduction Actions

1. Expand waste diversion practices for landfill

Increase the variety of items that can be diverted at the landfill site.

2. Develop organic waste collection site (in progress)

The City of Dauphin should complete the construction of a organic waste collection site. This was a major opportunity indicated in the GHG inventory.

3. Implement weight tracking for residential garbage collection

Currently residential waste restricts volume but not weight. The garbage truck should use technology to weigh each bin as it is collected. With this data further reduction policies could be explored.

4. Install subsurface rainwater capture and storage

Rain and stormwater water collection systems are becoming more common. A system should be installed under the parking lot of the community sportsplex. This water would then be used to irrigate the soccer, rugby, cricket, and baseball greens. Shifting away from potable water reduces the demand placed on the water treatment plant and the energy it consumes.

5. Eliminate the purchase of single use items

The City should not purchase plastic or non recyclable single use items in its facilities such as cups, stir sticks, promotional items when possible.

5. Communication Plan

-How do we bring everyone with us?-

Any organization pursuing a cultural shift knows that it is difficult and a long-term endeavor. Change is often met with resistance sometimes caused by a sense that as change occurs people will be left behind and there is no place for them in the new. The purpose of an effective communications strategy is to ensure the public that it involves everyone, and their needs are being considered. In regard to the marketing of sustainability initiatives in the past there is a tendency to oversell the benefits. To be heard in the mainstream media claims tend to become exaggerated and then projects fail to meet the advertised outcome. On the other side managers involved with completing the project tend to overlook the importance of communicating wins to the public or even within the organization. In 2017 Dauphin was recognized with an award for excellence as a sustainable community and received an honourable mention in 2018. A press release was held, and the City was granted permission to use an attachment in all of its outgoing emails. At the time many initiatives had been undertaken but until the City applied for the award the various activities hadn't been consolidated in one place.



The plan outlines a structured approach to ensure that communication is consistent and effective. The four segments break down the approach.

1. Purpose? - Creating sustainability as part of Dauphin's brand

The City of Dauphin is looking to renew its branding in the next 2 years. Sustainability and active living will likely be key elements of the overall brand. At this time there has yet to be a community in the province outside of Dauphin to make a claim as Dauphin's most sustainable City. Manitoba is one of the cleanest energy producers in Canada using almost exclusively renewable energy. The City of Dauphin has a strong relationship with Manitoba Hydro and will host the MB Hydro Sponsored MB Games in 2020. The City has received a complete lighting retrofit of all of its streetlights and more recently the traffic lights. The City is also located in the UNESCO designated Riding Mountain Biosphere Reserve. The Federal Park borders the south of the City and the Duck Mountain Provincial Park borders the north. With the abundance of nature all around Dauphin in addition to pursuing a large number of sustainable actions the City is well positioned to assert a position of leadership regarding sustainability.

The continued recognition from the Province and the ongoing partnership with MB Hydro should lend credibility to the sustainability claim. The City of Dauphin was one of the first and now only City in Manitoba to employ a community energy manager. The intent for the brand is to become more attractive for new residents and businesses while retaining existing ones.

2. Who is the audience? - Employees of the City => Community => Provincially

Employees

If the goal is to move forward as a group, it is essential to start with internal stakeholders. Typical operations of a City can be stressful. There is a higher level of scrutiny than the private sector and resources are limited. Adding complexity can sometimes lead to pushback from internal stakeholders or seen as a waste of needed resources. This makes internal communications critical to success. The strategy the CEEP will employ is to engage champions within the organization. These champions should be spread across the entire organization and should consist of employees with manager level authority. The concept would be to compile a list of sustainability actions specific to the department and prioritized. At this point actions from each of these groups should be proposed to the executive team during budget deliberations. During the year as actions are completed each champion and their team should be recognized and rewarded. The total projects would then be reviewed at the year end and each of the champions would discuss the challenges and knowledge gained.

Community

The community will have varying levels of knowledge regarding climate change. There will always be a segment of the population that will resist any action regardless of what it is. Taking the time to reach out to stakeholder groups can make a big difference between success and failure. The approach towards community engagement would be to seek out leaders within the community and seek buy in from them and their organizations. In the City of Dauphin this should also represent a broad spectrum of the community. Here is a list of potential organizations:

- Parkland Chamber of Commerce
- Mountainview School Division
- Deraillieurs Cycling Club
- Assiniboine Community College
- Dauphin Seniors Center
- Dauphin Rotary Club
- Dauphin Lions Club
- Dauphin Kinsmen Club
- Dauphin Recreation Services
- Parkland Crossing

Provincially

At the provincial level is another critical success factor. The definition of the Provincial sector as an audience of the CEEP is intended to include the general public outside of the City of Dauphin but primarily government agencies. The distribution of the Carbon Tax will be crucial to the success of some of the larger more capital-intensive projects. The City of Dauphin needs to demonstrate that it has a proven track record of success in the inception and completion of sustainability projects. It is also important as a long-term goal to continue to participate in the formation of policy when possible.

3. What is the Message? - Sustainability = Prosperity and Livability

Effective communications require a message that is succinct and easily understood. It is understood that sustainability has many benefits as a whole however but for the CEEP it will focus on prosperity and livability. Every project that makes the City a first mover adds to the feeling of progress and momentum. Regardless of involvement or opinion people tend to support success. To receive recognition from outside the community instills pride in the community at large. Residents should feel a sense of loss when relocating to another community and newcomers should be attracted to the energy and enthusiasm of projects throughout the City. In reviewing the statistics provided by the census Canada it shows that population growth for the community is consistent and New Canadians are providing a large portion of that growth representing 51 origin countries globally. Sustainability is message everyone can understand regardless of nationality. Projects such as the safe schools routes provide secondary benefits such as alternative transportation for people without access to cars.

4. What channels to Use? - Champions=>Local/Provincial Media and Presentations=>Social Media & Tourism Guide

The final consideration in the communication plan is to determine which channels of communication will be the most effective. The three intended audiences will all use require different channels to deliver the message.

1)employees

The most effective channel to date for generating internal buy in so far has been word of mouth and the participation in projects from various employees. The CEEP will take a more deliberate approach to ensuring there is participation across the entire organization and provide some structure. The primary channels therefore will be word of mouth, internal email and meetings. The idea is that participants will discuss their projects in informal settings and spread information on a daily basis.

2)community

The CEEP has generated several projects at the community level. These projects usually receive coverage from the local newspaper and radio station. This has naturally evolved into 2 interviews a month on the local radio station to discuss any sustainability related topic that is currently in the news. The community energy manager has provided input on dedicated cycling lanes, solar programs, electric vehicle charging, efficient new home construction, the carbon tax, water stewardship and climate resiliency. Another effective medium has been providing community workshops. These workshops range in topic but usually reach interested groups and provide a less formal venue to generate discussion. These are typically targeted to key stakeholder groups such as seniors, contractors, local municipalities, suppliers and community groups. This is a strategy of reaching out to champions at the community level. While involving more work these workshops have proven to be very effective at building rapport within the community.

3) Province

The channels required to promote the activities of the city of Dauphin to the province at large requires a broader reach. The annual tourism guide is a publication that is created by the City and has been used to highlight some of the sustainability projects within the City. This focus could be enlarged in future issues in alignment with a rebranding effort. The purpose of the tourism guide to become a selling tool for the City as a place to visit and possibly live and work. The City of Dauphin also has a website and social media accounts. While websites and social media have replaced traditional media not all websites and social media accounts have been successfully integrated by municipalities. Important consideration for the communication strategy is:

- consistent branding
- consistent messages
- regular posts and updates

Social media users tend to prefer brevity and are averse to reading a large volume of content. The focus for the social media then focuses more on awareness and less on education.

7. Conclusion

The creation of a community energy and emissions plan marks a significant milestone for the City of Dauphin. In Dauphin there is strong support from the Mayor, council and executive management to earn the title of Manitoba's most sustainable City. The development of the CEEP was an organization wide endeavour. The content is intended to be viewed holistically and this approach creates a never-ending inventory of ideas and projects with flexibility to implementation. While choices will be made year to year the with comprehensive CEEP every decision will bring the City further along the path to achieving its vision.

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