

# Energy Strategy

City of Grande Prairie



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## Intent

The Grande Prairie Energy Strategy creates the foundation for a profound shift towards efficient energy generation, conscious energy consumption, and reduction of Greenhouse Gas ("GHG") emissions Community-wide and within the Corporation of the City of Grande Prairie (the City). It will initiate actions to transition to more sustainable energy systems, resulting in an economic advantage to attract significant industrial, commercial, and residential developments and improve city residents' quality of life. The Grande Prairie Energy Strategy is consistent and complementary to Canada's Climate Action Plan. The Grande Prairie Energy Strategy goals are to reduce GHG emissions, develop renewable energy (and replace base-load coal generating capacity with natural gas-fired capacity), and create a positive economic impact.

At the municipal level, the City has been an active participant in the Federation of Canadian Municipalities (FCM) Partners for Climate Protection Program (PCP) since 2013. The PCP program focuses on reducing GHG emissions and includes five milestones:

1. Creating a GHG emissions inventory and forecast
2. Setting emissions reduction targets
3. Developing a local action plan to achieve the targets
4. Implementing the local action plan or strategies
5. Monitoring progress of the plan and reporting results

One of the primary means to reduce GHG emissions is to reduce the consumption of energy. Reducing the amount of energy consumed by an organization lessens GHG emissions for the organization. Additionally, reducing energy consumption influences costs associated with purchasing electricity, natural gas, and transportation fuels.

The City committed to a 20% reduction in emissions below 2009 base levels. In 2009, the corporate emissions were approximately 40,000 tonnes. The 2017 emissions are 54,530 tonnes. Electricity is the primary source of emissions at 59%.

To reduce energy consumption, the City has developed energy improvement actions contained in this strategy. The Energy Strategy provides a two-fold benefit. First, it achieves the requirements of Milestone 3 in the PCP program as it acts as the local action plan to reduce GHG emissions. Second, it delivers programs that reduce energy consumption at the community and corporate scales, with the potential to save residents and the municipality money by improving overall energy performance.

## Core Initiatives

The City will access Federal and Provincial grant funding sources when applicable. Other cost-efficient capital sources will help reduce the effective cost of Energy Strategy initiatives and improve economics. Additionally, Public-Private-Partnerships may be required to foster interests and objectives and optimize value contributions from multiple sources. The Energy Strategy will be based on three fundamental pillars, as follows:

## Pillar #1: Major Energy Project (Generation)

Hughes Lake area is a potential location for a Major Energy Project located in the NW section of the City. This area is currently mostly farmland, totalling 1,200 hectares, with 90% of the site is zoned Industrial. This area has been identified as having renewable energy potential and will be the Economic Development Hughes Lake Energy Study subject in 2021. A project may generate affordable electricity to feed the entire area. Electricity is a high operational cost for industrial users, and a project (generation) will enable a competitive advantage to attract multiple industrial users within the City limits.

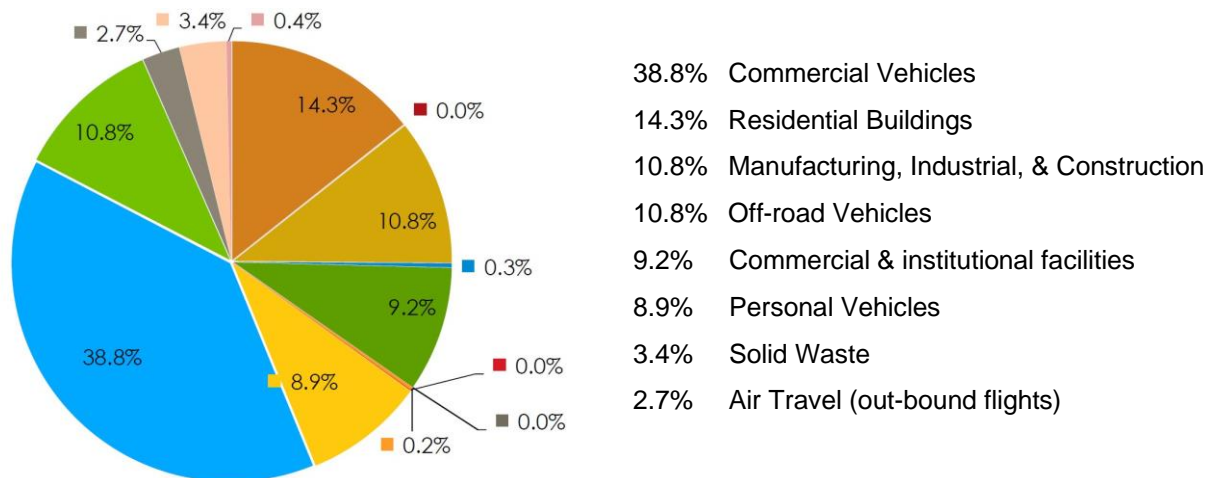
Hughes Lake has highway, rail, and airport access nearby, making this area a prime candidate for a stand-alone, on or off-the-grid generation project. This area is proximal to another potentially complimentary area called Bear Creek North which totals 2,050 hectares of permitted mixed-use, 70% residential, and 30 % commercial and industrial uses. Based on Industrial land uses on Hughes Lake and the proposed mix uses on Bear Creek North, a very high-level order of magnitude estimate for energy demand might be 500 MW, which represents ~ 3% of the total installed generating capacity of the Province of Alberta. (~ 16,000 MW)

A project will require significant capital investment; however, the initiative might be the catalyst for a structural change in the tax base allocation for the City of Grande Prairie due to the substantial increase in the industrial base's subsequent growth.

## Pillar #2: Community Energy

The City completed an inventory of community emissions was completed in 2017.

Figure 1 outlines the most significant sources of GHG emissions within the community. The City used an emissions calculator using a global best-practice standard called the *Global Protocol for Community (GPC) Scale Greenhouse Gas Emissions Inventories: An Accounting and Reporting Standard for Cities (the Protocol)*. The Protocol is the industry standard municipal GHG emissions inventory tool recognized by the FCM as the standard emissions calculating tool.



**Figure 1.** Proportion of GHG emissions by sector. The percentages are based on the best available information during development of the inventory.

While Figure 1 presents a picture of the overall emissions profile for Grande Prairie, it is useful to know how the data collection method to arrive at the numbers in the figure. Within the Protocol is the ability to collect emissions data in multiple ways depending on the available information. For example, calculating emissions from vehicles can be completed by accounting for each vehicle category's fuel volume (commercial, off-road, and personal). In circumstances where that information is not available, the calculation of vehicle emissions is on the number of vehicles registered within a municipality. When developing Grande Prairie's emissions profile, the City could not secure fuel consumption data specific to Grande Prairie; therefore, it used registration data to determine emissions from the different vehicle classes.

Because registration data incorporates assumptions (number of trips, the distance of trips, etc.) some of the data may be slightly skewed. For example, Commercial Vehicles (38.8%) dominate the emissions profile. This sector may undoubtedly make up a large portion of the emissions profile but may be slightly inflated due to the vast number of commercially registered vehicles in Grande Prairie. This inflation is likely a result of the significant industrial activity near Grande Prairie and the city being an important hub for commercial services within the Peace Region. Therefore, these factors influence the number of commercial vehicles, affecting the value of GHG emissions from those vehicles.

When developing which action items would be most suitable for Grande Prairie, it is essential to keep in mind solutions that significantly impact reducing GHG emissions, given the breakdown of emissions in Figure 1. For example, because Air Travel only accounts for 2.7% of emissions within the city, it may not be worth spending significant resources to reduce that amount. However, because residential buildings account for 14.3%, it may be worth investigating building efficiency standards for that sector.

In 2017, the Community Enhancement Advisory Committee recommended Council adopt a 6% reduction from the 2015 baseline by 2035 in community-generated GHG emissions.

Following the 6% reduction target adoption, the City undertook engagement activities to understand what the community and internal stakeholders believed were the best options to meet the emissions reduction target.

The City's strategy consists of:

1. Input from the public (community consultation)
2. Results from the community consultation
3. Energy improvement actions
4. Implementation strategies

To promote a community-wide knowledge and application of new technologies related to renewable energy and to reduce GHG emissions, the following projects reflect the suggestions received from stakeholders:

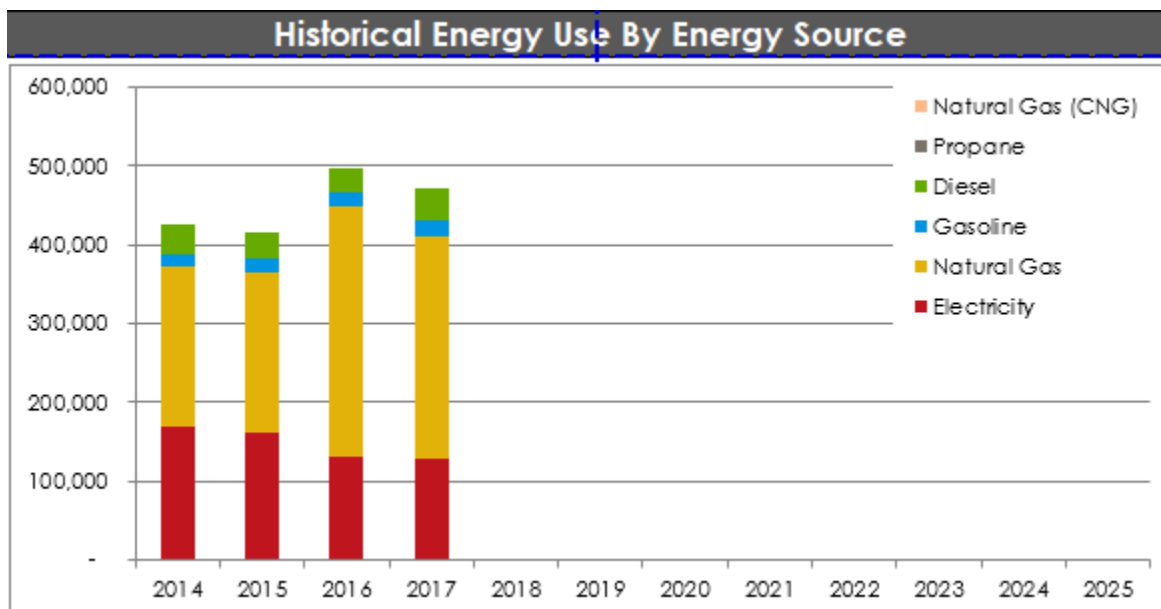
- Clean Energy Improvement Program (CEIP), also known as PACE
  - Micro CHP for residential and commercial uses
  - Heat pumps for residential uses (air-source & ground-source)
  - Energy efficiency upgrades for commercial properties
- Battery Vehicle (BEV) public charging stations (Downtown Enhancement Project and new buildings)
- Renewable Energy Microgrid - solar PV, solar thermal, and small-scale wind in microgrid configurations
- District Energy System for a high-density spot area in the city (*if sufficient density*)
- Small demonstration projects like geothermal, thermal solar PV solar with monitoring systems and dashboards that the public can access
- EV Charging incentives for multi-family and residential
  - Update applicable bylaws to reflect the need for EV charging stations in multi-family and some commercial establishments
  - Develop educational and information programs on EVs
  - Support an EV charging network along Highways 43 and 40
- High-level feasibility study for solar farms in Grande Prairie
- Renewable Natural Gas ("RNG") – potential landfill partnership with *Aquatera*
- Educational and engagement programs for residents and businesses such as
  - Residential net metering brochure with easy-to-understand steps to complete the process
  - Incentives for a blower door test (residential) and a list of recommendations to seal the building envelope
  - Incentives to increase efficiency in new home builds
  - De-mystifying energy bills
  - Energy efficiency network
  - Student outreach program
- Review programs and outcomes annually with the Community Advisory Committee
- Community inventory by emissions source (electricity, natural gas, gasoline, diesel) every five years

The Energy & Environmental Services Department can accomplish these goals by enhancing the department and external collaboration from utility companies (e.g., ATCO), the Pembina Institute, QUEST, MCCAC, and other academic organizations.

### Pillar # 3: Carbon Neutral Operations Plan ("CNOP") - City of Grande Prairie

In 2014, Council adopted a GHG emissions reduction target of 20% below 2009 baseline levels. This strategy commits the City of Grande Prairie to be carbon neutral in its operations by 2035. Achieving the goal entails reducing energy consumption and GHG emissions as much as possible and purchasing offsets for any remaining emissions. The carbon-neutral plan will broadly identify energy and emissions reduction opportunities and recommend reduction targets, policies, and actions for becoming carbon neutral. Carbon neutrality will increase in importance as the carbon pricing increases, expecting to reach \$170.00/tonne in 2030. Carbon pricing has the potential to increase operating costs for city facilities and operations (fleet, transit).

Figure 2 – Historical Energy Use by Source



**Figure 2.** shows an increase in the consumption of natural gas and electricity. The recommendation in 2014 did not include a growth factor. Projects such as the Transit Solar (and electric buses) and the Combined Heat and Power (CHP) at Eastlink occurred after this inventory and will reduce our emissions.

The main elements of the CNOP will contain information related to:

- Corporate Inventory by Emissions Source (electricity, natural gas, gasoline, diesel) conducted every five years
- An assessment of opportunities for energy and GHG reductions will be performed, examining buildings and infrastructure, fleet and equipment, solid-waste, renewable energy, policies, and staff awareness. These critical steps include:
  - Conducting energy scans every five years on municipal buildings, retrofits and building envelope improvements, driver training and vehicle maintenance, solid-waste recycling at civic facilities, solar PV, solar thermal, urban-wind, continual

- consumption monitoring and data collection, policies for new and existing buildings, vehicles and equipment and City staff engagement programs.
  - Install interval meters at high energy-use sites and equipment to provide accurate consumption data
  - HVAC replacements include carbon emissions scrubbing to reduce carbon pricing
- Administrative planning will ensure that CNOP energy reduction and GHG reduction targets are incorporated and the remaining corporate emissions offset with third-party verified, high-quality carbon offsets. Annual net corporate emissions are zero.
  - To implement the recommended actions to achieve carbon neutrality will require a multi-year budget as part of the CNOP.
- 8,000 Streetlights Conversion (HPS to LED)
  - A review of corporate fleet emissions. The review should encompass the following actions
    - Increase the size of the Battery Energy Storage System (BESS) for the electric transit buses to meet the capacity requirements for charging the five E-buses in the fleet, and potential increases needed for any additions to the fleet
    - Conduct a study on fleet conversion to Battery Electric Vehicles or Plug-in Hybrids for light-duty equipment
    - Hydrogen conversion pilot project for heavier equipment
- Consider alternative and innovative energy and energy-efficient delivery methods similar to the Eastlink Combined Heat & Power ("CHP"). These projects can include:
  - Small-scale CHP at City Hall
  - Small-scale CHP for heating and cooling at Dave Barr Community Centre
  - Solar PV at Coca Cola Centre and Eastlink Centre
  - Solar heat pumps where possible
- Education and engagement for internal stakeholders to understand consumption and consider options
  - Develop, implement, and monitor policies regarding reducing energy consumption and GHG emissions
- Updating the Active Transportation plan
  - Fund active transportation gaps through 2035
  - Develop and deliver engagement and education programs
- Advocacy should be considered to remove natural gas from carbon pricing in certain zones if it is required for heating

Achieving the goals identified within this strategy will require commitment from Council and Administration and the development or strengthening of partnerships within the community and the private sector.

Administration will require a multi-disciplinary team which should include representation from the following internal stakeholders:

- Finance
- Corporate Facilities Maintenance
- Corporate Efficiency and Strategic Initiatives
- Economic Development
- City Manager's Office



Technical specialists will be needed to develop the financial and energy models and the Engineering Specs for the different projects.

The Energy Strategy is designed to accomplish two primary objectives. The energy improvement actions described in this plan will improve energy performance and energy efficiency throughout the community. And will reduce GHG emissions to achieve the requirements of Milestone 3 in the PCP framework. These two objectives fall in-line with City Council's Strategic Plan by promoting and implementing energy strategies that contribute to sustainability and resource conservation.

In addition to advancing energy efficiency and reducing GHG emissions, these strategies will also save future operating costs by maximizing current resources and strategically implementing new technology. These strategies build on the information gathered during consultation and facilitate residents' preferred programming at the community scale. Together the community and corporate energy improvements will advance Grande Prairie's progress towards a cleaner, healthier, and sustainable future.

The inclusion of a draft budget is to understand the scope of financial commitment required to proceed with the vision of carbon neutrality. The intention is to show costs over the next ten years as the organization strives towards a cleaner and energy-efficient future. The suggested costs are below.

**Table 1. Capital Projects – Corporate**

Project	Cost	Grant Funding \$	Source
Eastlink CHP	\$ 2,600,000.00	\$ 2,600,000.00	REC Program and MSI
City Hall CHP	\$ 200,000.00		
Coca Cola Centre Solar	\$ 2,100,000.00	\$ 800,000.00	AMSP
Dave Barr CHP	\$ 300,000.00		
Hughes Lake	\$ 5,000,000.00		
Transit BESS	\$ 1,000,000.00		Municipal Contribution/MSI
Fleet conversion study	\$ 35,000.00	\$ 6,000	EVMP - MCCAC
Hydrogen Conversion Pilot	\$ 200,000.00		
Curling Club Upgrades	\$ 600,000.00		
<b>Total</b>	<b>\$ 12,035,000.00</b>	<b>\$ 3,406,000.00</b>	<b>\$ 8,629,000.00</b>

**Table 2. Capital Energy Projects – Community**

Project	Cost	Grant Funding \$	Source
EV Charging	\$ 100,000.00	\$ 75,000.00	Included in Downtown Enhancement Phase 4
CEIP	\$ 1,300,000.00		FCM loan
EV Rebate program	\$ 50,000.00		
Energy Efficiency Campaign	\$ 250,000.00		
Renewable Natural Gas Feasibility Study	\$ 75,000.00		
GHG emissions Inventory	\$ 50,000.00		To be conducted every five years
Total	\$ 1,825,000.00	\$ 75,000.00	\$ 1,750,000.00

**Table 3. Operational Impacts**

Position	Cost Annually	Grant Funding \$	Source
Permanent Administrative Support	\$ 60,000.00	\$ 68,000.00	MEM - MCCAC
Energy Strategist	\$ 110,000.00		
Total Annually	\$ 170,000.00		