

2016

Energy Management Plan and Greenhouse Gas Reduction Strategy



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City of Spruce Grove

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Executive Summary

The City of Spruce Grove is committed to sustainable development and to foster continuing excellence in environmental stewardship. By recognizing the ever-present link between the social, economic and environmental factors of our society, we will be in a position to reconcile these facets and move forward with a holistic systems approach to a sustainable community.

Comprehensive energy planning is a key way to move towards our goals of being a sustainable, vibrant and, healthy community for future generations. Thus, in 2003, Spruce Grove City Council voted unanimously to join Partners for Climate Protection, a voluntary greenhouse gas (GHG) emissions reduction program offered by the Federation of Canadian Municipalities (FCM) and the International Council for Local Environmental Initiatives (ICLEI). Council committed to a 20% reduction of corporate 6% community reduction in GHG emissions by 2013.

Due in large part to unprecedented population increases, the City did not meet its goals; however the per-capita data does indicate increasing efficiencies in both corporate and community activities. This energy management plan will evaluate the success of earlier efforts and make recommendations for future actions.

Total per-capita Community emissions decreased by 21% between 1996 and 2015, with residential per-capita emissions decreasing by 43%.

Corporate emissions on a per resident basis decreased 40% between 1996 and 2015.

Key components of the Energy Management Plan include:

- A detailed background of the city, its emissions indicators, and its participation in national climate change mitigation efforts through Partners for Climate Protection;
- A series of guiding principles that voice our philosophy towards energy management and will act as an overall guide to project development and the organization as a whole;
- A past, present and future profile of our corporate and community energy use and emissions output for 1996, 2003, and 2015 to measure where we are now and where we need to go; and
- Two action plans, corporate and community, containing project ideas and objectives that will work to meet reduction targets.

Energy Management Objectives

The following Energy Management Objectives were included in the 2003 report and continue to guide city operations.

Working with the City's Strategic Plan:

- Key initiatives and associated priority areas – Clean and Green (Environmental Responsibility) and Service Excellence (Service Delivery, Fiscal Plan)
- Ensure that all action items and outcomes correspond with the City's key initiatives
- Align goals with community vision established at 2000 Community Caucus

Sustainable Development Principles:

- Represent the concept of "Natural Capital" by attaching a value to the environment
- Integrated/systems approach to decision-making
- Strive to achieve a balance between cost and environmental impact by incorporating environmental and community considerations into our bottom line

Demonstrated Leadership:

- Demonstrate individual and organizational commitment to environmental management – lead by example
- Encourage staff to change behaviours and take ownership of their impact
- Provide a working, practical example of the Sustainability Development Charter and its function

Environmental Stewardship:

- Take every opportunity to achieve the highest possible standard of environmental stewardship
- Challenge traditional thinking by incorporating a fresh approach with an emphasis on innovation

Improving Quality of Life:

- Understand the effects of climate change on air quality and human health
- Air quality as a community asset to be sustained and protected
- Recognize that a clean physical environment promotes a healthy lifestyle

Background

In 2003, Spruce Grove City Council voted unanimously to join Partners for Climate Protection (PCP), a voluntary GHG emission reduction program offered by the Federation of Canadian Municipalities (FCM) and the International Council for Local Government Initiatives (ICLEI). Using a 1996 baseline, Council committed to a 20% reduction in corporate GHG emissions and a 6% reduction in community emissions by 2013.

As part of the 2003 Energy Management Plan two action plans were created; one for corporate emissions and one for community emissions. The plans contained project ideas and objectives designed to help the municipality reach its reduction targets.

The PCP Program uses five milestones to measure progress.

- Milestone One: Create a greenhouse gas emissions inventory and forecast
- Milestone Two: Set an emissions reduction target
- Milestone Three: Develop a local action plan
- Milestone Four: Implement the local action plan
- Milestone Five: Monitor progress and report results

The City of Spruce Grove has achieved milestones one through four, with the contents of this report being used to apply for milestone five.

This report will be used to support the Sustainability Action Plan, review our progress, and determine opportunities for further advancement.

The Alberta Climate Leadership Plan, and its associated carbon levy, will have an impact on City energy costs. It will also change the economics surrounding energy, making investments in efficiency more advantageous as the cost of energy increases. Both federal and provincial governments have signaled a readiness to invest in green infrastructure, suggesting that funding will be available to help decrease corporate and community emissions. This report will allow the City of Spruce Grove to better prepare for the costs and opportunities present in upcoming government programs.

Energy Management Plan

The Energy Management Plan (EMP) views the community over the long term, allowing the City to set goals and track progress over time. The City has made a commitment to sustainable development and operations; responsible energy use is a large component of that. The EMP defines the energy goals of the organization and will outline how they are to be carried out.

Producing an EMP allows for a strategic direction regarding energy use within the organization and the broader community. All facets of the city can be looked at as a whole, allowing for more effective and efficient activities. In addition, regular monitoring of energy consumption facilitates easy reporting, such as for the PCP Program, and will likely prove useful in future grant proposals. The EMP is designed to be a living document, with updates provided annually and a full rewrite every four years.

Local Context and Demographics

Spruce Grove is located approximately 11 kilometers west of the City of Edmonton. The City is surrounded by Parkland County and shares much of its west border with the Town of Stony Plain. Current growth is anticipated to come into conflict with city borders in the next few decades, and a growth study is currently underway to determine the best route forward.

Since the base year of 1996, Spruce Grove's population has grown by 124%. Spruce Grove has seen substantially above-average growth rates in recent years, averaging 6.5% annual increases from 2013-2015. This rapid growth has resulted in significant expansions to both community and corporate emissions on an overall level, meaning the City did not meet the 2003 goal of reducing overall emissions. A per-capita analysis shows positive results, however, and is covered further in this report.

Nature of the Community

Through community consultation sessions held in 2001, a vision of a "clean and green" community was expressed by residents. Issues of air quality, waste management, efficient use of resources, and environmental stewardship were identified as priority areas and subsequently highlighted in the organization's strategic plans.

The Environmental Sustainability Action Plan (2011) identified the reduction of GHG emissions as an overarching objective, to be achieved through focusing on five priority areas: land use and natural areas, transportation, waste, water, and energy.

The Environmental Sustainability Action Plan provides a vision statement to guide City initiatives and programs:

We value the natural environment as our economic and community foundation. We will do this by:

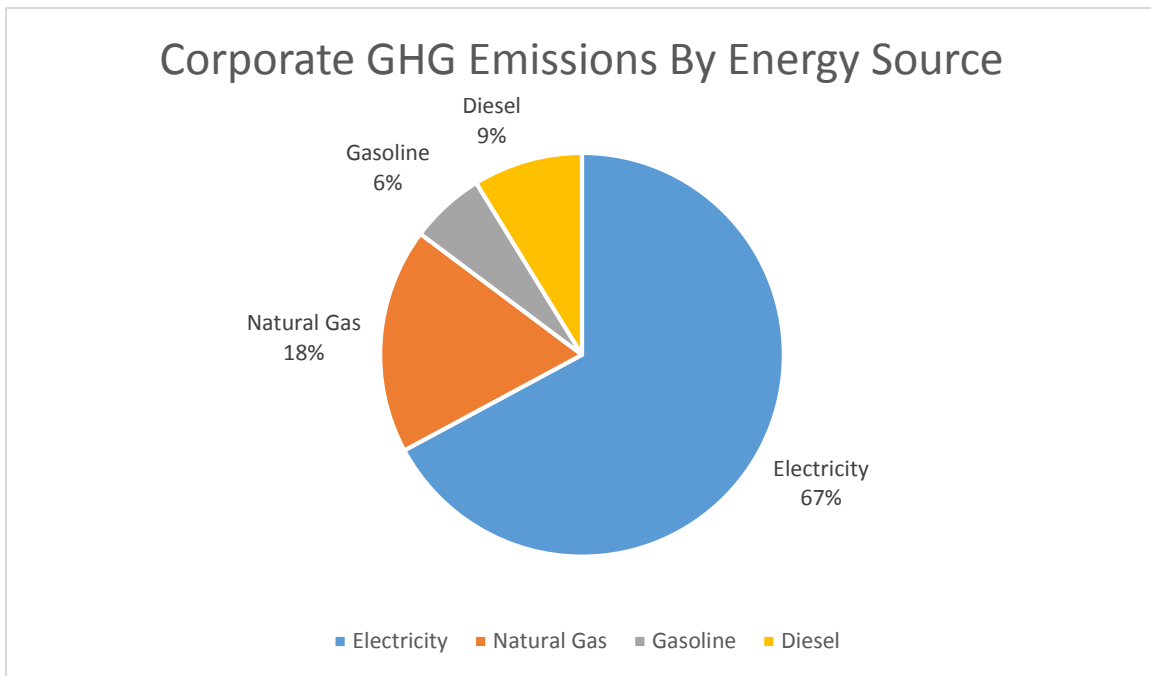
- *Protecting and enhancing our natural areas, green space and biodiversity;*
- *Living within the capacity of our natural resources of air, land, water and energy, and;*
- *Leading by example through stewardship and a creative approach.*

Corporate Energy Profile

The Corporate GHG emissions inventory incorporates all electricity, natural gas, gasoline, and diesel usage from all City buildings, fleet, streetlights, and the water distribution network. The largest source of emissions, by far, is electricity. This is due to high consumption numbers, particularly in the Agrena, combined with the high carbon intensity of Alberta's electricity grid.

A detailed breakdown of energy use and emissions is included as Appendix A.

Corporate Emissions (tonnes CO ₂ equivalent)				
Sector	1996	2003	2015	Change (1996-2015)
Buildings	4,526	3,012	4,962	+ 10%
Fleet	419	368	1,304	+ 211%
Streetlights	1,157	1,450	1,849	+ 60%
Water	572	627	711	+ 24%
TOTAL	6,675	5,456	8,826	+ 32%



Buildings

- A building audit was conducted by ENMAX in 2003, with many of the recommendations being implemented. These recommendations have resulted in a significant decrease in building energy use and related emissions.
- Buildings constructed since 2014 have met the Council mandated requirement for LEED or equivalent energy performance. This has resulted in a large drop in energy usage per square meter for new buildings when compared to older structures.
- City Hall was renovated to LEED-Silver status in 2006, resulting in a decrease in overall building emissions.
- City facilities have expanded along with population, with seven new facilities opening since 2003. These include the renovated Elks Hall, FCSS, Eco Centre, Fuhr Sports Park, New Public Works Facility, 414 King Street, and the Border Paving Athletic Centre. This has nearly doubled building space from 17,141 m² to 29,921 m².

Vehicle Fleet

- Some services previously contracted have been brought in-house, including mowing. Service standards for snow removal have also changed since 2003.
- Spruce Grove Fire Services has significantly expanded its activities since 2003, resulting in a 633% increase in fuel consumption. This includes taking over Ambulance services from Parkland Ambulance Authority.

Streetlights

- City population nearly doubled from 2003 to 2015, with 7,373 dwelling units and 78km of maintained road added in that time.
- Conversion of streetlights to LED, anticipated in the next 1-2 years, will decrease streetlight energy consumption by an anticipated 50% and emissions by 925 tonnes.
- Intersection signals have been gradually converted to LED, resulting in a 45% drop in energy usage despite the increased number of signalized intersections.

Notes

- In this assessment of carbon emissions our methodology and data sources have been fully documented. This unfortunately was not the practice in previous versions, although it is assumed that the calculations were as accurate as possible.
- Agrena natural gas usage for 2003 was significantly under both 1996 and 2009-2015 numbers. As detailed utility bills are only maintained for a limited number of years, it is impossible to verify this number. The Agrena is by far the largest energy consumer owned by the City, so this number is significant to total calculations.
- A City-owned pool was replaced by the Tri-Leisure Centre in 2003. The numbers for the pool are incorporated in the 1996 and 2003 numbers, but Spruce Grove's 'share' of TLC emissions are not included in 2003 or 2015 numbers. As recreation centers are very large energy users, this discrepancy has a substantial impact on total numbers.
- This record only contain results for city owned and operated equipment. Contracted services, such as transit or garbage collection, do not show up in these records. Water energy records include only the city-operated pump stations and do not include energy used for treatment of fresh or waste water.

Per Resident Corporate Energy Consumption

Corporate Energy Use (gigajoules) and Emissions (tonnes CO ₂ equivalent) Per Resident					
	Population	GJ	GJ/Resident	Emissions (t)	Emissions/ Resident
1996	14,123	54,820	3.88	6,675	0.47
2003	17,082	36,184	2.12	5,456	0.32
2015	32,036	76,122	2.38	8,826	0.28

The goal set in 2003 was to reduce overall corporate emissions by 20% as compared to 1996. The City did not meet this goal, our emissions instead increasing 35% overall. Per resident, however, corporate emissions decreased 40% since the baseline year of 1996. While the city did not meet the goal set, the per-resident reduction in emissions indicates a strong increase in corporate efficiency, particularly considering the large population increase that was not anticipated in 2003.

Corporate Energy Costs

Corporate energy costs totaled \$1,028,674.58 for 2015. Per unit of energy, this is the lowest cost recorded. For one gigajoule of energy, the cost was \$21.00 in 1996, \$31.89 in 2003, and \$13.51 in 2015 (all numbers corrected to 2015 dollars). The wide variation in energy prices provides further support to conservation efforts – if prices in 2015 were equal to 2003 our energy bill would be \$2.5 million, more than double our current expenditure.

The upcoming Alberta Climate Leadership Plan will impact energy costs as well. Using 2015 numbers, the \$30/tonne levy scheduled for 2018 would add a combined \$74,730 to costs of gasoline, diesel, and natural gas. Projecting the impact on electricity is difficult; large power plants are already paying the \$20/tonne tax on large emitters, and the effect of changes to the electricity grid to encourage renewables and reduce coal use are yet to be seen.

The goal of the Climate Leadership Plan is to change the economics surrounding energy usage, and for the City this will certainly be the case. Efforts to reduce emissions become more profitable as the price of polluting goes up. The carbon levy is designed to be revenue neutral, with funds made available for a variety of projects. This suggests an opportunity for provincial grant funding of emissions reduction projects, such as transit, building retrofits, or solar.

Community Energy Profile

The Community GHG emissions inventory includes residential, commercial, institutional, and industrial buildings, as well as transportation related fuel use and landfill waste.

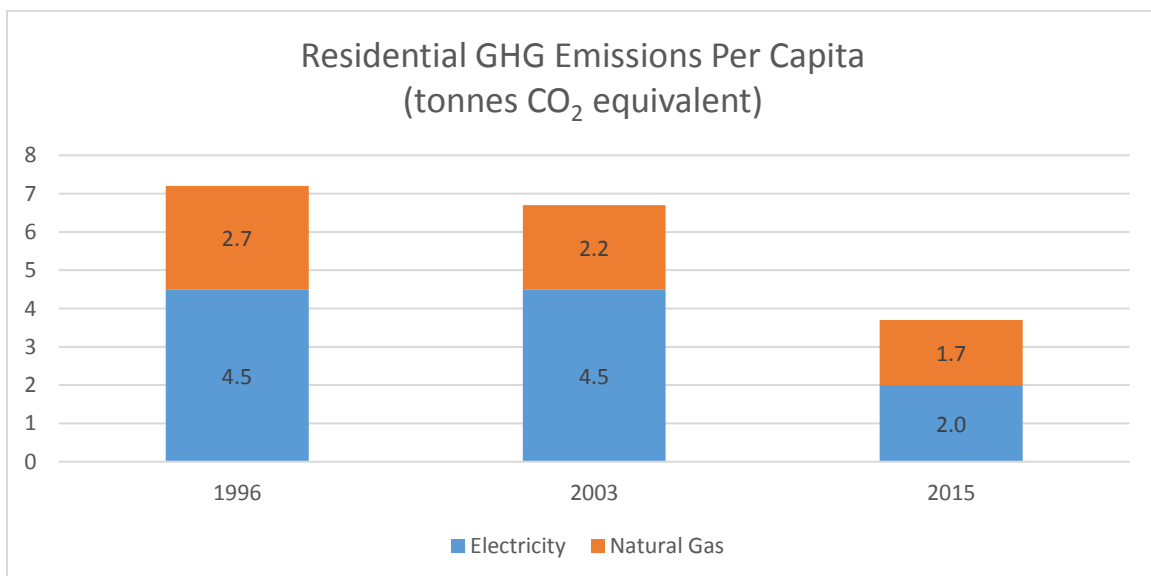
Electricity and Natural Gas numbers are based on actual consumption figures provided by Fortis and Atco Gas, respectively. Much of the 1996 baseline data was estimated due to lack of records. A detailed breakdown of energy use and emissions is included as Appendix B.

Community Emissions (tonnes CO ₂ equivalent)				
Sector	1996	2003	2015	Change (1996-2015)
Residential	101,536	114,014	131,358	+ 29%
Non-Residential	59,515	63,328	106,109	+ 78%
Road Transportation	100,908	144,851	233,727	+ 132%
Solid Waste	2,915	1,765	4,038	+ 39%
TOTAL	264,874	323,957	475,232	+ 79%
Total Per Capita	18.75	18.96	14.83	- 21%

The Environmental Sustainability Action Plan lists [community] energy use as one of its five priority areas. Education and incentives are available as options to reduce the overall energy use and emissions of residents.

Residential

Spruce Grove has seen significantly above-average growth, with a population increase of 88% from 2003 - 2015. While our overall emissions have increased significantly since 2003, per capita emissions have decreased. This is in large part due to the low average age of Spruce Grove's housing stock, with 47% of residences being less than 20 years old. The GHG emissions intensity of Alberta's electricity grid also decreased 13% per kWh from 2003-2015.



Non-Residential

Spruce Grove has seen significant expansion in its commercial, industrial, and institutional sectors. Similar to residential, many of our larger facilities are relatively new and energy efficient compared to their older counterparts.

Road Transportation

Goals three and four of the Environmental Sustainability Action Plan related to public transportation. Goal three was to increase the awareness and availability of alternative transportation, including biking and walking, carpooling, and transit. Goal four was to increase public transit ridership and service levels. Progress has been made in both of these areas – Spruce Grove supports a comprehensive trail network for cyclists and is expanding transit service in the next few years. Spruce Grove has purchased six busses and recently signed on to the capital region U-Pass for students. Service is being expanded to include Acheson Industrial Park, and plans are in place for additional routes to Edmonton and local transit service within Spruce Grove.

Solid Waste

Spruce Grove now has three-stream waste collection and is working on increasing the amount of waste diverted from landfills. Goals five and six of the Environmental Sustainability Action Plan are to reduce the amount of waste going to landfill, both residential and non-residential.

Risks

The City of Edmonton's Energy Transition Strategy, published in 2015, named five key risks associated with the dependence on fossil fuel energy sources. These are very similar to the risks faced by Spruce Grove.

- *Risk 1: The world could become energy constrained in the period 2014-2035 with energy supply unable to keep pace with demand, the consequence being much higher energy prices.*
- *Risk 2: The world could become energy constrained beyond 2035 (from 2035 to 2099) with energy supply unable to keep pace with demand, the consequence being much higher energy prices.*
- *Risk 3: World average temperature increase could exceed 2°C in this century, with the city experiencing disruptions to its food, energy, social, economic, and natural systems.*
- *Risk 4: Local climate change could damage the city's energy systems, with resulting energy system failures and disruptions.*
- *Risk 5: Continued high levels of fossil fuel consumption could diminish the city's air quality, with health and economic consequences.*

Opportunities

The City of Edmonton also looked at the opportunities available to sustainable communities.

In developing this strategy, an extensive literature review was conducted to examine the benefits of energy transition in communities where sustainability strategies are being pursued. The intent of this review was to determine if a policy direction that supports lower energy and sustainability (including the promotion of sustainable transit; energy efficiency in residential, commercial, institutional and industrial facilities; mixed use and higher density residential development; and transit oriented development) would enhance a city's economy and make it a better place to live. Based on this literature review, there is strong evidence that sustainability (of which energy sustainability is a major part) and overall quality of life are closely correlated.

Observations from 27 major urban centers across North America showed that cities with higher levels of energy efficiency, reduced GHG intensity, increased penetration of "green" buildings, greater availability of sustainable transport options and higher levels of water conservation tend to have:

- *Higher rates of employment / lower rates of unemployment;*
- *Higher GDP per capita;*
- *Lower rates of violent crimes;*
- *More graduates (higher levels of educational attainment);*
- *Lower levels of perceived stress among residents (improved mental health);*
- *A greater sense of community among citizens; and*
- *Higher levels of investment in new commercial and institutional buildings.*

Large North American cities that typically score the highest in terms of sustainability include San Francisco, Vancouver, Washington DC, Seattle, New York, Boston, Toronto, Ottawa, Denver and Philadelphia. Many smaller cities such as Portland, Oregon are also ranked high in this regard. In these great cities, sustainability and quality of life go hand-in-hand.

Goals

Using 2015 emissions and consumption as a baseline:

- **Community:** Reduce community GHG emissions by 35% and energy consumption by 25% per resident by 2035.
- **Corporate Leadership:** Reduce corporate GHG emissions by 50% and energy use by 40% per resident by 2035.

Other Governments

Stony Plain: Reduce corporate emissions 20% and community emissions 6% below 2000 baseline by 2019.

St. Albert: Reduce corporate emissions by 20% and community emissions by 6% below 2008 levels by 2020.

Strathcona County: Decrease kilowatt hours per square foot of corporate building space 10% by 2020.

Edmonton: Reduce corporate emissions by 50% below 2008 levels and community emissions by 20% below 1990 levels by 2020, eventually become carbon neutral.

Calgary: Reduce corporate emissions by 50% below 1990 levels by 2012. Reduce community emissions by 20% below 2005 levels by 2020, 50% below 1990 levels by 2036, 80% below 2005 levels by 2050.

Federal government commitments under the Paris Agreement are currently set at 17% below 2005 levels by 2020 and 30% below 2005 levels by 2030.

Initiatives to Date

The following is a list of initiatives listed in earlier Energy Management Plans and their estimated GHG emission savings.

Corporate

Green Building Policy, Implementation of 2003 Enmax audit recommendations

20% Building Reduction: 992 tonnes

LED Retrofits for traffic signals

50% Traffic Signals Reduction: 25 tonnes

Community

Enhance website as a source of environmental information

0.1% Overall Community Reduction: 475 tonnes

Implement and expand public transit system

0.2% Transportation Reduction: 414 tonnes¹

¹ Bus: 283,090km x 33.13 L/100km = 93,788 L diesel = 256 tonnes

Car: 84,175 trips x 33.6km = 2,828,280km x 10.3 L/100km = 291,313 L gasoline = 670 tonnes

Funding Sources

Internal

Several strategies have been used by different municipalities to fund emissions reduction projects using reallocated municipal dollars.

One, as used in Black Diamond, allows savings from energy generation or reduced utility use to be collected and used for further reduction projects. This strategy was briefly implemented in Spruce Grove but was discontinued with the simplification of accounting systems in 2006. The advantage to this system is that initial investments are able to compound over time, growing as the system itself grows.

Another option, as used in Dawson Creek, sets an internal 'carbon tax' for corporate emissions. Funds are used to invest in efforts to reduce GHG emissions. Dawson Creek set the initial amount at \$100/tonne. For Spruce Grove, that would have made \$882,600 available for investment based on 2015 emissions. The advantage to this system is that funding levels match need – they are highest when emissions are highest, and drop as emissions drop.

External

Both the federal and provincial governments have expressed intentions to invest in emissions-reducing infrastructure. Proper preparation, including this catalogue of energy use and the proposed business cases for alternate energy, will allow the City of Spruce Grove to take advantage of these programs.

The Alberta Climate Leadership Plan is anticipated to bring in \$9.6 billion, which will be spent as follows (copied directly from the Environment and Natural Resources website):

\$6.2 billion will help diversify our energy industry and create new jobs:

- *\$3.4 billion for large scale renewable energy, bioenergy and technology*
- *\$2.2 billion for green infrastructure like transit*
- *\$645 million for Energy Efficiency Alberta, a new provincial agency that will support energy efficiency programs and services for homes and businesses*

\$3.4 billion will help households, businesses and communities adjust to the carbon levy:

- *\$2.3 billion for carbon rebates to help low- and middle-income families*
- *\$865 million to pay for a cut in the small business tax rate from 3% to 2%*
- *\$195 million to assist coal communities, Indigenous communities and others with adjustment*

Energy Efficiency Alberta is a new government agency focused on energy and emissions reductions. The activities of the department are still in the preliminary stages, but specific programs targeting residents, business, non-profit, and institutions across the program have been outlined. Funding may be available for retrofits and upgrades to corporate and community facilities in Spruce Grove, and information provided by the agency may be useful to ensure future energy use is kept to a minimum.

Funding Community Energy and Climate Change Initiatives, a document produced as part of the 'Getting to Implementation' initiative, lists 26 different public and private funding opportunities available to municipalities. The grants focus on buildings, infrastructure, renewables, and transportation, and include both financial and non-financial supports.

Tactics	2017-2020				2021-2024				Lead
	17	18	19	20	21	22	23	24	

Action Plan: Corporate Leadership

The City is better positioned than any other entity in Spruce Grove to coordinate and lead the community’s energy transition. However, in order for the City to have credibility in this role, it must lead by example with exemplary energy efficiency and GHG mitigation performance in its own operations.

Goal: Reduce corporate GHG emissions by 50% and energy use by 40% per resident from 2015 levels by 2035.

Overall Corporate Emissions									
Prepare a business case for the purchase of zero-emissions electricity for City operations, resulting in a 66% reduction in total corporate emissions.			•						SUS
Look at including the social/external cost of polluting into budgeting decisions, using the City of Edmonton as a model.					•	•	•	•	SUS/ FIN
Implement an energy education program for City operations stakeholders who have responsibilities that affect or influence the energy consumption of City assets or infrastructure.		•							SUS
Hire a contract energy management coordinator to perform bi-annual audits and update the energy management plan.		•		•		•		•	SUS
Continue to improve the Corporate Planning process by including life-cycle costing into decision-making.	•	•	•	•	•	•	•	•	CORP/ FIN
Buildings									
Create a business case for closing or retrofits of our highest energy use buildings, specifically the old Public Works Shop and Fuhr Sports Park.	•	•							AM/ SUS
Create plan for solar energy to be ready for federal or provincial grant availability. Initial planning in 2017, comprehensive report in 2018.	•	•							AM/ SUS
Update the Green Building Policy to increase energy efficiency standards for new City owned or operated buildings.		•							AM/ SUS
Establish policies surrounding environmental and energy management requirements for buildings leased by the City.			•						AM/ SUS
Publish energy usage information for city buildings online or in the building itself.				•					AM/ SUS

Tactics	2017-2020				2021-2024				Lead
	17	18	19	20	21	22	23	24	
Fleet									
Investigate hybrid, electric, and other alternate fuel vehicles.		•		•		•		•	AM/ SUS
Continue to work with end users to purchase the right size vehicle for the job.	•	•	•	•	•	•	•	•	AM
Create a Sustainable Fleet Plan to guide vehicle purchases.		•							AM/ SUS
Investigate alternatives to fossil-fuelled small equipment. Eg: chainsaws, trimmers.	•								SUS/ PW
Adopt anti-idle devices on applicable vehicles.	•	•	•	•	•	•	•	•	AM
Prepare business case for on-site fuelling station to allow for better fuel management.			•						AM/ PW
Conduct E3 Fleet Management Audit in partnership with the Fraser Basin Council to identify energy and emissions savings for the fleet.	•								AM
Streetlights									
Partner with FORTIS to convert all City streetlights to LED technology.	•								SUS/ P&I

Tactics	2017-2020				2021-2024				Lead
	17	18	19	20	21	22	23	24	

Action Plan: Community Energy Use

The community of Spruce Grove is responsible for 475,232 tonnes of GHG emissions. Reducing this number will take a concerted effort by residents, businesses, and all orders of government. Reducing carbon emissions will result in a healthier community, with better air quality and a more stable long-term environment. Reducing energy use will further insulate residents and businesses from price shocks related to future energy scarcity. Increasing the amount of waste diverted from the landfill to the organics or recycling streams will reduce emissions of methane, a potent greenhouse gas.

Goal: Reduce community GHG emissions by 35% and energy use by 25% per resident from 2015 levels by 2035.

General										
Support enhancements to building codes requiring more efficient construction.		•								PLN
Continue implementation of the Community Water Conservation Program.	•	•	•	•	•					SUS
Create a brochure to assist citizens in navigating the process to install solar or combined heat and power systems, including regulator and building requirements.	•	•								PLN/ SUS
Communicate environmental success stories to residents.	•	•	•	•	•	•	•	•	•	COM/ SUS
Support changes to Alberta’s electricity system aimed at reducing the carbon intensity of generation.	•	•	•	•	•	•	•	•	•	CORP
As referenced in the draft Economic Development Strategy & Action Plan 2017-2021, evaluate potential opportunities for renewable energy projects in Spruce Grove including potential funding sources from the Alberta government.	•	•	•	•	•	•	•	•	•	EDV
Residential										
Any new statutory plans will incorporate goals consistent with the City’s Municipal Development Plan, <i>Your Bright Future</i> , to ensure the City remains a compact and efficient community that emphasizes connectivity, integration, expansion of transit use with higher density development close to amenities and transit facilities, and bus-friendly neighbourhoods.	•	•	•	•	•	•	•	•	•	PLN

Tactics	2017-2020				2021-2024				Lead
	17	18	19	20	21	22	23	24	
Non-Residential									
Redevelop the Spruce Grove City Centre as a pedestrian friendly community space.	•	•	•	•					EDV
Transportation									
Create additional commuter transit routes into Edmonton.	•								SUS
Create local transit services for Spruce Grove or the tri-region, based on recommendations from the tri-municipal working group.			•	•					SUS
Investigate ways to support and encourage carpooling.		•							SUS
Assess infrastructure needs for future transportation technologies and create a plan to reduce barriers.			•						SUS/ PLN
Continue to expand the Spruce Grove multi-modal trail system.	•	•	•	•	•	•	•	•	ENG
Encourage bicycle parking facilities throughout the city.	•	•	•	•	•	•	•	•	SUS
Waste									
Investigate reduced black-cart collection, including bi-weekly collection or switching to 120L bins as default.		•							SUS/ UTL
Increase cost differential between 120L and 240L black bins.			•						SUS/ UTL
Support the waste reduction initiatives in the tri-municipal waste study	•	•	•	•					SUS/ UTL
Create a program to include apartment and non-residential facilities in three-stream waste diversion, either by including them in the City program or requiring diversion by bylaw.					•				SUS/ UTL
Use Community Based Social Marketing to improve the diversion of kitchen organics, with a goal of increasing organics diversion to 65% by 2020.	•	•	•	•	•				SUS
Continue to implement recommendations in the Residential Curbside Waste Program Blueprint, with the overall goal of reducing per capita waste to 200kg by 2016 and 150kg by 2020.	•	•	•	•	•				SUS/ UTL

Index:

AM: Asset Management
 COM: Communications
 CORP: Corporate Services Admin
 EDV: Economic Development
 ENG: Engineering
 FIN: Finance

PLN: Planning
 PW: Public Works
 P&I: Planning & Infrastructure Admin
 SUS: Sustainability
 UTL: Utilities

Appendix A: Corporate Energy Use and Emissions

1996

	NG (GJ)	NG (\$)	NG (T)	Gasoline (L)	Gasoline (GJ)	Gasoline (\$)	Gasoline (T)	Diesel (L)	Diesel (GJ)	Diesel (\$)	Diesel (T)	Electricity (kWh)	Electricity (GJ)	Electricity (\$)	Electricity (T)	M2
Agrena	12,998	32,582.00	657									1,571,944	5,659	112,702.00	1,559	7,462
Brookwood Rink	254	890.00	13									7,222	26	900.00	7	107
City Hall	3,206	8,976.00	162									342,778	1,234	37,009.00	340	3,419
Protective Services	2,266	6,421.00	114									266,944	961	17,530.00	265	1,870
Henry Singer Park	95	457.00	5									556	2	241.00	1	89
Library	1,139	3,361.00	58									160,278	577	15,988.00	159	1,705
Log Cabin	223	802.00	11									6,667	24	2,000.00	7	379
Parks Shop	1,077	3,092.00	54									11,944	43	1,924.00	12	
PW Shop - Schram St.	2,778	7,847.00	140									209,167	753	18,619.00	207	1,825
Pool	7,533	20,756.00	381									377,222	1,358	20,383.00	374	
Cars				429	15	223.00	1									
SGFS				7,029	246	3,637.00	16	705	27	327.00	2					
Tractors								49,530	1,897	17,757.00	149					
Trucks				53,286	1,865	27,249.00	133	33,211	1,272	14,566.00	91					
Vans				10,971	384	5,664.00	27									
Zone 1 Pump House	508	1,561.00	26									345,556	1,136	26,320.00	313	138
Zone 2 Pump House	300	1,005.00	15									220,278	793	1,005.00	219	138
Crosswalks												51,111	184	2,215.00	51	
Signs												28,889	104	3,283.00	29	
Streetlights												1,013,056	3,647	336,531.00	1,005	
Traffic Signals												73,056	236	8,186.00	72	
Total	32,377	87,750.00	1,636	71,715	2,510	36,773.00	178	83,446	3,196	32,650.00	242	4,686,667	16,737	604,836.00	4,619	17,141
Cost Total		\$762,009.00														
GJ Total		54,820														
Emissions Total		6,675														

Corporate Energy Use and Emissions

2003

	NG (GJ)	NG (\$)	NG (T)	Gasoline (L)	Gasoline (GJ)	Gasoline (\$)	Gasoline (T)	Diesel (L)	Diesel (GJ)	Diesel (\$)	Diesel (T)	Electricity (kWh)	Electricity (GJ)	Electricity (\$)	Electricity (T)	M2
Agrena	5,226	45,884.00	264									1,313,333	4,728	157,763.00	1,248	7,462
Aspenglen Rink												7,500	27	1,024.00	7	9
Brookwood Rink	168	1,590.00	8									10,556	38	1,417.00	10	107
City Hall	1,933	17,371.00	98									288,611	1,039	36,315.00	274	3,419
Protective Services	1,094	14,988.00	86									308,333	1,110	35,778.00	293	1,870
Henry Singer Park	44	552.00	2									2,222	8	368.00	2	89
Kinsmen Arts Centre	320	3,063.00	16									10,556	38	1,819.00	10	
Library	1,200	10,850.00	61									188,333	678	23,633.00	179	1,705
Log Cabin	482	4,458.00	24									23,056	83	4,240.00	22	379
Parks Shop	645	5,961.00	33									8,056	29	1,268.00	8	
PW Shop - Schram St.	2,308	20,827.00	117									173,333	624	22,884.00	165	1,825
Pool	665	5,703.00	34									55,278	199	13,326.00	53	
Cars				4,114	144	2,531.00	10									
SGFS				4,200	147	2,600.00	10	3,551	136	1,784.00	10					
Tractors				57	2	27.00	0	40,104	1,536	18,319.00	121					
Trucks				54,029	1,891	32,766.00	134	19,817	759	10,639.00	54					
Vans				12,143	425	7,547.00	30									
Zone 1 Pump House	503	4,497.00	25									346,111	1,246	40,372.00	329	138
Zone 2 Pump House	226	2,178.00	11									275,000	990	35,782.00	261	138
Crosswalks												55,556	200	7,474.00	53	
Signs												33,333	120	4,427.00	32	
Streetlights												1,326,389	4,775	279,743.00	1,260	
Traffic Signals												110,556	398	14,141.00	105	
Total	14,814	137,922.00	779	74,543	2,609	45,471.00	84	63,472	2,431	30,742.00	184	4,536,111	16,330	681,774.00	4,309	17,141
Cost Total		\$895,909.00														
GJ Total		36,184														
Emissions Total		5,456														

Corporate Energy Use and Emissions

2015

	NG (GJ)	NG (\$)	NG (T)	Gasoline (L)	Gasoline (GJ)	Gasoline (\$)	Gasoline (T)	Diesel (L)	Diesel (GJ)	Diesel (\$)	Diesel (T)	Electricity (kWh)	Electricity (GJ)	Electricity (\$)	Electricity (T)	M2
Agrena	12,428	58,528.21	624									1,853,963	6,674	101,373.41	1,520	7,462
Aspenglen Rink												6,553	24	365.49	5	9
BPAC	591	2,620.43	30									179,961	648	9,980.17	148	2,728
Brookwood Rink	108	1,048.25	5									7,907	28	443.31	6	107
City Hall	1,786	10,049.55	90									460,630	1,658	25,621.52	378	3,419
Eco Centre	31	627.78	2									29,792	107	1,731.73	24	108
Elks Hall	2,065	11,466.62	104									94,822	341	5,086.43	78	800
FCSS												81,054	292	4,600.50	66	518
Fuhr Sports Park	1,527	9,036.66	77									161,241	580	8,834.92	132	733
Protective Services	1,411	7,847.98	71									438,457	1,578	24,210.33	360	1,870
Henry Singer Park	<i>Combined with Truck Fill Station</i>											4,961	18	281.93	4	89
Library	787	4,789.16	40									188,262	678	10,308.56	154	1,705
Log Cabin	375	2,384.27	19									24,092	87	1,332.87	20	379
P&E - 414 King St.	<i>Combined with Library</i>											<i>Combined with Library</i>				695
PW Shop - Century Cl.	6,954	24,112.21	349									507,847	1,828	28,035.94	416	7,176
PW Shop - Schram St.	2,639	12,926.70	133									131,369	473	7,272.03	108	1,825
Cars				22,590	791	22,046.28	52	5,965	228	5,755.33	16					
SGFS				34,416	1,205	32,022.33	81	22,392	858	21,861.92	61					
Tractors				3,704	130	3,646.41	9	149,277	5,717	139,618.59	449					
Trucks				138,431	4,845	135,513.20	318	91,189	3,493	88,632.55	249					
STS				30,189	1,057	28,954.84	69									
Zone 1 Pump House	443	2,974.39	22									680,363	2,449	37,676.31	558	138
Zone 2 Pump House	560	2,186.81	28									110,160	397	6,047.56	90	138
Truck Fill Station	77	836.58	4									10,320	37	575.97	8	22
Crosswalks												40,971	148	2,282.07	34	
Signs												25,359	91	1,415.70	21	
Streetlights												2,128,177	7,661	118,350.68	1,745	
Traffic Signals												60,316	217	3,360.08	49	
Total	31,783	151,435.60	1,596	229,330	8,027	222,183.06	529	268,823	10,296	255,868.39	775	7,226,577	26,016	399,187.51	5,926	29,921
Cost Total		\$1,028,674.56														
GJ Total		76,122														
Emissions Total		8,826														

Appendix B: Community Energy Use and Emissions

1996

	Residential	Commercial & Institutional	Industrial	Road Transportation	Solid Waste	Totals
NG (GJ)	747,880	424,571	12,345			1,184,796
NG (T)	37,786	21,451	624			59,860
Electricity (kWh)	64,264,444	36,722,500	1,020,000			102,006,944
Electricity (GJ)	231,352	132,201	3,672			367,225
Electricity (T)	63,750	36,429	1,012			101,191
Gasoline (L)				28,097,314		28,097,314
Gasoline (GJ)				983,406		983,406
Gasoline (T)				70,243		70,243
Diesel (L)				10,612,742		10,612,742
Diesel (GJ)				406,468		406,468
Diesel (T)				28,973		28,973
Propane (L)				795,496		795,496
Propane (GJ)				20,134		20,134
Propane (T)				1,204		1,204
CNG (L)				161,486		161,486
CNG (GJ)				6,151		6,151
CNG (T)				488		488
Paper Products (T)					1,641	1,641
Food Waste (T)					1,422	1,422
Plant Debris (T)					(125)	(125)
Wood/Textiles (T)					(23)	(23)
Total (T)	101,536	57,880	1,636	100,908	2,915	264,874
Total (GJ)	979,232	556,772	16,017	1,416,159	-	2,968,180

Community Energy Use and Emissions

2003

	Residential	Commercial & Institutional	Industrial	Road Transportation	Solid Waste	Totals
NG (GJ)	747,993	408,000	7,293			1,163,286
NG (T)	37,791	20,614	368			58,773
Electricity (kWh)	80,234,167	43,301,112	1,273,611			124,808,890
Electricity (GJ)	288,843	155,884	4,585			449,312
Electricity (T)	76,222	41,136	1,210			118,568
Gasoline (L)				43,841,000		43,841,000
Gasoline (GJ)				1,534,435		1,534,435
Gasoline (T)				106,972		106,972
Diesel (L)				13,489,974		13,489,974
Diesel (GJ)				516,666		516,666
Diesel (T)				36,855		36,855
Propane (L)				584,512		584,512
Propane (GJ)				14,794		14,794
Propane (T)				884		884
CNG (L)				46,154		46,154
CNG (GJ)				1,758		1,758
CNG (T)				140		140
Paper Products (T)					1,103	1,103
Food Waste (T)					749	749
Plant Debris (T)					(67)	(67)
Wood/Textiles (T)					(20)	(20)
Total (T)	114,014	61,750	1,578	144,851	1,765	323,957
Total (GJ)	1,036,836	563,884	11,878	2,067,653	-	3,680,251

Community Energy Use and Emissions

2015

	Residential	Commercial & Institutional	Industrial	Road Transportation	Solid Waste	Totals
NG (GJ)	1,087,173	514,129	9,692			1,610,994
NG (T)	54,599	25,820	487			80,906
Electricity (kWh)	93,607,984	33,497,184	63,821,853			190,927,021
Electricity (GJ)	336,989	120,590	229,759			687,337
Electricity (T)	76,759	27,468	52,334			156,560
Gasoline (L)				69,577,771		69,577,771
Gasoline (GJ)				2,435,222		2,435,222
Gasoline (T)				160,099		160,099
Diesel (L)				26,424,204		26,424,204
Diesel (GJ)				1,012,047		1,012,047
Diesel (T)				71,681		71,681
Propane (L)				1,286,843		1,286,843
Propane (GJ)				32,570		32,570
Propane (T)				1,947		1,947
CNG (L)					-	-
CNG (GJ)					-	-
CNG (T)					-	-
Paper Products (T)					686	686
Food Waste (T)					1,820	1,820
Plant Debris (T)					570	570
Wood/Textiles (T)					359	359
Total (T)	131,358	53,288	52,821	233,727	3,436	474,629
Total (GJ)	1,424,162	634,719	239,451	3,479,839	-	5,778,170