

# The City of North Bay

## Energy Conservation and Demand Management Plan



**June 2023**

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## Executive Summary

The City of North Bay recognizes that energy conservation and demand management is an integral part of the organization's long-term sustainability as it strives to build a healthy and vibrant community. In 2008, the City established its initial Green Plan. During the life of the plan (2008 to 2012) the City reduced its greenhouse gas (GHG) footprint on the environment from the consumption of fossil fuels by a reduction of approximately 5% from the base year (2007), while adding and expanding assets to the organization.

In 2013, the City of North Bay used its experience working through its initial plan to establish a Conservation and Demand Management Plan that not only meets its regulatory requirements under the Electricity Act (1998), O. Reg. 507/18, but will continue to guide the organization as it embeds environmental awareness into the City's processes and decision-making in order to minimize its carbon footprint on the environment while meeting social and economic responsibilities. During the life of the initial CDM plan (2013-2017) the City reduced its GHG footprint from the consumption of fossil fuels by a reduction of 13.7% from the base year (2012), while adding and expanding assets to the organization. This exceeds the 2.5% per year reduction of GHG goal from the initial plan.

The City of North Bay's Conservation and Demand Management (CDM) Plan establishes a commitment to improve monitoring, tracking, and reporting systems, embeds conservation into departmental planning and budgeting, and identifies energy conservation opportunities throughout the corporation. A central consideration of the City of North Bay's Conservation Management Plan was to ensure it was aligned to the City's Corporate Business Plan's Vision and Mission.

Successful implementation of the CDM Plan will support economic and community development, demonstrate financial responsibility, promote a healthy community, support the organization's goal to foster a culture of continuous improvement and enhance communication to our stakeholders.

The City has demonstrated that it is capable of reducing energy consumption despite pressures that include growth in services, addition of assets, and year-to-year weather variations. The objectives, goals, and targets detailed in the CDM Plan were established recognizing the need to balance competing environmental, economic, and social aims of the community.

Over the life of the CDM Plan the City has targeted to annually reduce its greenhouse gas emissions into the environment by 3% per year. The path to achieving this target is detailed in this Plan.

The Plan articulates the City of North Bay's commitment to reducing its impact on global climate change by making energy and demand management an integral part of the City's operations, planning, and the way it delivers services to the community.

## Background

The Conservation and Demand Management Plan is the City's roadmap to reduce its impact on the environment through energy reduction and process improvements to improve the City's long-term sustainability.

In 2008, the City of North Bay developed and implemented a corporate wide Green Plan. The five-year plan established in 2008 used 2007 as its baseline. Targets and objectives were established, and the City reported its progress through an annual report summarizing its performance against the baseline and the previous year. In 2013, the City committed to establishing a new Green Plan that built on the previous Green Plan and would meet the requirements established by the Electricity Act (1998).

The initial City of North Bay Energy and Conservation Demand Management Plan (2013 – 2017) used 2012 as its baseline. The City of North Bay developed an updated CDM Plan which outlined the City's energy management plan for the following 5 years (2018-2022). The City of North Bay's current Energy and Conservation Demand Management Plan will cover 2023 – 2027. The plan continues to use 2007 as its baseline to realize Ontario's commitment to meet the reductions promised in the Paris Accord of a 30% reduction in GHG emissions from 2005-2030 and progress against the plan will be reviewed annually.

The plan will assist the City of North Bay to meet its regulatory requirements under the Energy and Demand Management Regulation under the Electricity Act (1998). The above requirement came into effect on December 12, 2018. Under the new regulation public agencies are required to report annually to the Ministry of Energy their energy use and greenhouse gas emissions, develop and implement energy management plans, and report on results.

## CDM Results

The initial Conservation and Demand Management Plan (2013-2017) was the City's roadmap to reduce its impact on global climate change by making energy and demand management as an integral part of the City's operations, planning, and the way it delivers services to the community. The City has demonstrated that it is capable of reducing energy consumption despite pressures that include growth in services, addition of assets, and year-to-year weather variations.

The initial CDM plan sought to reduce electricity from the grid by 2.5% per year, reduce natural gas consumption by 2% per year, reduce the use of traditional fuels by 3% per year, and realize a 2.5% reduction of GHG or 300 tonnes of CO<sub>2e</sub> gases annually. From the baseline year (2012), the City has met 3 of the 4 targets by reducing the use of traditional fuels by 3.43% per year, reducing electricity from the grid by 2.95% per year, and reducing greenhouse gasses by 2.73% per year. The City did not meet the natural gas target and realized an increase of 3.70% in natural gas consumption per year.

## Plan Development

The City of North Bay's Energy Conservation and Demand Management Plan uses a framework established in the development of its original Green Plan. The City utilized its experience from previous years to establish objectives, goals, and targets for the new Energy CDM Plan.

The development of the initial draft was completed by department managers and directors. It was presented and discussed by senior managers to ensure it was aligned with the City of North Bay's Strategic Plan to ensure input from leaders and doers of the organization was included.

The plan was developed using the Ontario Provincial Government's Guide to Preparing Conservation and Demand Management Plans.

Key steps in developing the plan are illustrated in the following figure.



Through this process, the City of North Bay's Corporate Mission Statement, Goals, Objectives, and Targets were established. To establish new Goals, Objectives, and Mission Statements, the City analyzed the data from previous CDM plans (2013-2017 and 2018-2022) to establish a better and more targeted plan to reduce its GHG emissions.

## Mission Statement

North Bay commits to actively and sustainably reduce its impact on global climate change by making energy and demand management an integral part of the City's operations, planning and the way it delivers services to the community.

## Objectives

- Reduce corporate dependency on conventional (GHG intensive) forms of energy (electricity, natural gas, and transportation fossil fuels) through smart management of all assets.
- Use renewable forms of energy where feasible to reduce GHG impacts.
- Support and enhance the City's corporate culture with respect to energy conservation through management leadership and employee engagement.
- Incorporate life-cycle and global climatic impact analysis into business plans and policies.
- Engage and develop community partners.
- Exemplify energy conservation leadership that can be emulated by ABC's and the community at large.
- Communicate progress to all stakeholders.

## Goals

- Re-mandate steering and working committees.
- Develop Energy Management Systems to establish a more effective energy measuring, tracking and monitoring system.
- Establish a Sustainable Buildings Program.
- Integrate Energy Conservation & Demand Management Programs into the Wastewater and Water Distribution and Facilities operations and modernization plans.
- Review and update the Green Fleet Plan to continue to improve energy efficiency of the municipal fleet.
- Support energy conservation training and education to expand corporate ability to better address global warming impacts on the corporation.
- Reduce energy related costs.
- Make energy conservation and demand management an element of departmental budget and purchasing processes.
- Meet regulatory requirements.
- Establish a funding plan to help finance energy conservation and demand management projects including expanding renewable energy projects.
- Develop a Communication Plan to spread information to the corporation and to the community.

## Targets

- Reduce electricity from the grid by 2.5% per year
- Reduce the use of traditional transportation fuels by 4% per year
- Realize a 3% reduction of GHG or 429 tonnes of CO<sub>2e</sub> gases annually.

An expanded discussion of the City of North Bay's Objectives and Goals is presented in Appendix 1.

## Baseline Year

The City of North Bay's Green Plan (2008-2012) used 2007 as its baseline. The initial CDM Plan (2013-2017) used 2012 as its baseline for comparison due to the availability of data and a re-confirmation of the commitment to reduce energy. The 2018-2022 CDM Plan established 2007 as its baseline for comparison due to availability of data and Ontario's commitment to meet the reductions promised in the Paris Accord of a 30% reduction in GHG emissions from 2005-2030.

The new CDM Plan (2023 – 2027) has also established 2007 as its baseline for comparison. The baseline year will be used for analysis and measurement of progress for future energy and emission reduction calculations.

Table 1 below is a high-level summary of 2022 versus the baseline year. Detailed annual consumption data is summarized in Appendix 2.

**Table 1: City of North Bay 2022 versus 2007 Energy Use – All Sectors**

<b>2007 Baseline</b>	<b>Electricity (kWh)</b>	<b>Natural Gas (m<sup>3</sup>)</b>	<b>Transportation Fuel (L)</b>	<b>Total</b>
<b>Total Quantity Used</b>	23,093,113	1,359,460	1,489,778	
<b>Total GHG Produced (tonnes of CO<sub>2e</sub>)</b>	17,181	2,641	15,346	35,168

<b>2022</b>	<b>Electricity (kWh)</b>	<b>Natural Gas (m<sup>3</sup>)</b>	<b>Transportation Fuel (L)</b>	<b>Total</b>
<b>Total Quantity Used</b>	19,337,166	928,418	1,595,264	
<b>Total GHG Produced (tonnes CO<sub>2e</sub>)</b>	13,671	1,796	16,240	31,707

<b>2007 vs 2022</b>	<b>Electricity (kWh)</b>	<b>Natural Gas (m<sup>3</sup>)</b>	<b>Transportation Fuel (L)</b>	<b>Total</b>
<b>2022 vs 2007 Reduction Quantity Achieved</b>	3,755,947	431,042	-105,486	
<b>GHG Reduction Achieved in 2022 vs 2007 (tonnes CO<sub>2e</sub>)</b>	3,510	845	-894	3,461
<b>Percent GHG Reduction Achieved (30% Goal)</b>	20.43%	31.71%	-7.08%	9.8%



## Greenhouse Gas Emissions

Another important metric that the City will measure to monitor its progress is the reduction of greenhouse gas emissions to the environment. The City has established a target of reducing its greenhouse gas emissions by 3% per year or the approximate equivalent of 429 tonnes of CO<sub>2e</sub> gases to the environment.

A summary of its performance from 2022 relative to the 2007 baseline is presented in Appendix 4.

Table 2 below summarizes the greenhouse gases generated in 2022 by the City of North Bay.

**Table 2:** City of North Bay 2021 versus 2022 Energy Use – All Sectors

2021	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Total
<b>Total Quantity Used</b>	17,919,336	1,041,471	1,349,895	
<b>Total GHG Produced (tonnes of CO<sub>2e</sub>)</b>	12,669	2,015	13,742	28,426

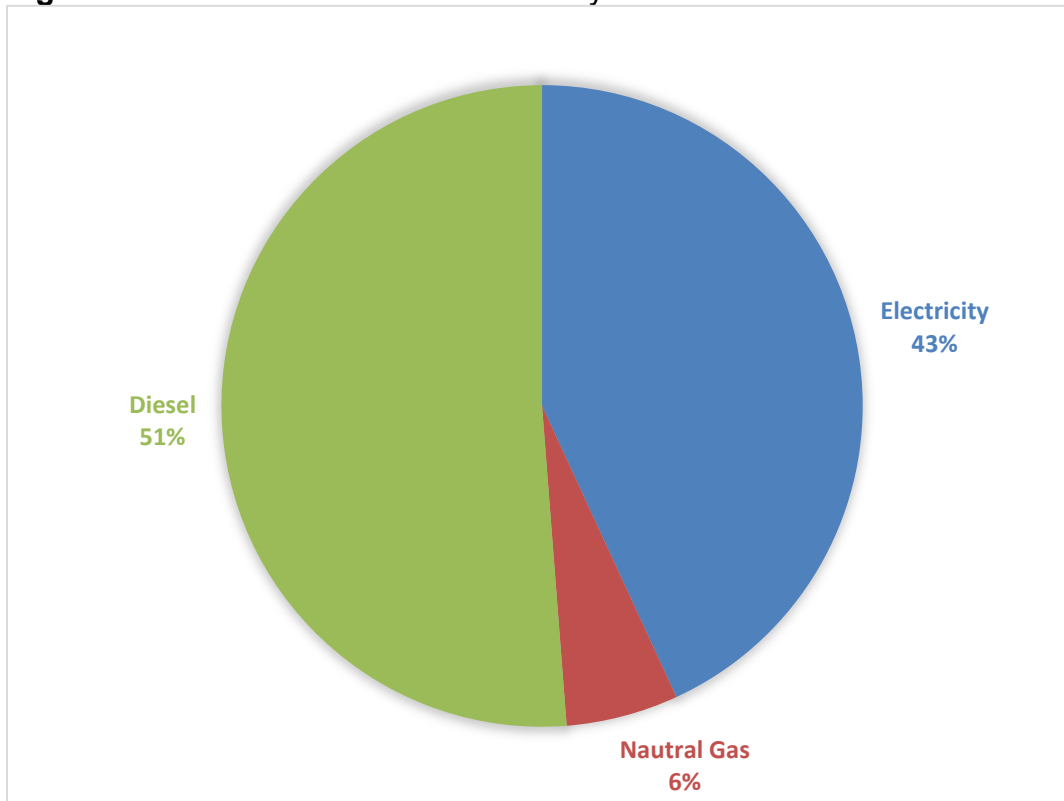
2022	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Total
<b>Total Quantity Used</b>	19,337,166	928,418	1,595,264	
<b>Total GHG Produced (tonnes CO<sub>2e</sub>)</b>	13,671	1,796	16,240	31,707

2021 vs 2022	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Total
<b>2021 vs. 2022 Reduction Quantity Achieved</b>	-1,417,830	113,053	-245,369	
<b>GHG Reduction Achieved in 2022 vs 2021 (tonnes CO<sub>2e</sub>)</b>	-1,002	219	-2,498	-3,281
<b>Percent Reduction Achieved</b>	-7.91%	10.86%	-18.18%	-10.9%

Figure 1 provides a summary of energy used and overall greenhouse gas emissions for the City of North Bay in 2022. Electricity and Transportation Fuel comprise the majority of emissions. In 2022 The City of North Bay produced 31,546 tonnes of CO<sub>2e</sub>, a decrease of 3,622 tonnes compared to 2007.

**Figure 1: 2022 GHG Emissions Summary**



## North Bay's Energy Projects

Since 2007, the City of North Bay has investigated, developed, and implemented many energy efficiency projects.

A summary of major initiated, completed, and future energy related projects is presented in Appendix 5.

Listed below is a sampling of some of the projects/programs.

### Completed Energy Projects

- Replacement of HPS street lights with LED fixtures
- Converting traffic lights to LED's
- Evaluating and replacing decorative lights
- Lighting and heating upgrades at City/YMCA Aquatics Center
- Utilization of landfill gas for the production of electricity
- Evaluation of Cogeneration Project at Wastewater Treatment Plant
- Installation of residential water meters
- Reduction of the City's fleet size

- Elimination of Janey Avenue pumping station
- Education and Awareness Training Pilot with LAS/AMO
- Upgrading bus barn overhead doors to improve building envelope performance
- Purchasing of fully electric Zamboni
- Sewage Treatment Plant digester gas utilization
- On-demand bus system
- Water meter installation and water conservation
- Community Energy Park
- Demand Response Initiatives
- Interval metering
- Parking lot lighting review
- Investigating a new low energy filter technology for the Aquatics Centre

### Current Projects

- Outdoor area lighting review (Lot 8 and City Hall Grounds)
- Improve traffic flows/automate signalization systems
- Quantitative energy audit of the City Hall building envelope
- Narrow AI HVAC Control System at City Hall
- Renewing the Pete Palangio Ice Plant chiller
- High efficiency pumps at the Waste Water Treatment Plant

### Future Energy Projects

Going forward, the City has identified several potential projects. These include:

- Improved use of Building Automation Systems
- Landfill Gas Well System Expansion
- Waste Water Treatment Plant blower upgrades
- Building envelope upgrades at Pete Palangio
- Memorial Gardens ice plant condenser upgrade
- City Hall window replacements

For the full listing of major projects see Appendix 4.

## Renewables

### Solar Initiatives

In 2008, the City commissioned a 60 panel (10-kilowatt) solar photovoltaic array on the roof of City Hall (shown in Figure 2). In 2022, 4,784 kWh of solar power energy was produced, resulting in \$3,837 in revenue. Since commissioning to the end of 2022, the system generated 89,913 kWh of electricity. The electricity was originally sold to the Ontario Power Authority under the Renewable Standard Offer Program (RSOP) for 42¢ per kilowatt hour. Beginning in November 2010 the City was approved to transfer the RSOP to the OPA's microFIT program and received 80.2¢ per kWh for all power produced until May 2028.



**Figure 2:** 10 kWh solar panels on the roof of City Hall. **Figure 3:** Solar Hot Water on roof of new Water Plant

In 2010 the City commissioned its new Water Filtration Plant which uses a solar hot water system on its roof (shown in Figure 3) to heat water used for filter cleaning.

### Landfill Gas to Electricity

The City partnered with North Bay Hydro Services to install a power generation facility that utilizes landfill gas produced at the Merrick Landfill Site. The station was commercialized in June 2012. Prior to providing landfill gas to the power generation facility the City operated a landfill gas flaring station. In 2013, the landfill collected and supplied 7,829,552 m<sup>3</sup> of landfill gas (LFG). Utilization of the LFG for electricity generation reduced greenhouse gas emissions by 58,829 tonnes. Without the flare and generator, Merrick would have produced approximately 2.5 times more greenhouse gas emissions than all of the energy used by the City in its operations. In its first full year of operation the project generated \$391,984 in LFG sales for the City. At its peak, the Merrick Project will generate enough electricity to satisfy the electrical power needs of approximately 1200 homes per year. In 2022, the landfill gas to electricity operation produced total revenue of 2,647,564 kWh. Each kWh is sold with a unit price of 0.038 cents. This generated

a total income of \$100,607.42 in 2022. It has produced a total income of \$2,046,739.96 since its commissioning.

**Figure 4:** Landfill Gas Utilization to Electricity Facility and Landfill Gas Flaring Station located at the City's Merrick Landfill Site



Table 3 presents a summary of the LFG to electricity project in terms of finances and energy produced.

**Table 3:** Merrick Landfill Gas to Electricity Project

Total Costs	\$4,000,000
Start Date	May 2010
Construction Start Date	July 2011
Completion Date	June 12, 2013
Electricity Generated (2022 average/month)	220,630 kWh
Projected Annualized Revenue	\$1.05 to 1.15 Million
Projected Annual Revenue to the City	\$350,000 to \$450,000
Expected Payback	10 Years

## **Sewage Treatment Plant Energy Audit**

In 2022 the City employed the services of engineering consultant RV Anderson to complete an audit for the energy use at the Sewage Treatment Plant. The report will include recommendations for improvements to the treatment process which would enhance effluent quality and/or reduce energy consumption. It will also include suggestions for potential energy reducing strategies and/or energy production, such as, for example, hydropower from wastewater outfall.

## Education, Training, and Awareness

Education, training and awareness is an integral part of the project plan and is critical to the success of the projects in terms of achieving and sustaining proposed savings. They are also essential in creating, maintaining and improving a sustainable energy culture within the Corporation of the City of North Bay and throughout the community. The overall intent of the training program is to complement the technological and organizational changes proposed in the plan and maximize the energy savings resulting from projects. The City of North Bay has made numerous efforts to ensure resources and operations are assisting in meeting the goals of the CDM plan to the best of the operation's current abilities while factoring in variances shown by isometric data, feasibility studies, and concerns.

Training on building systems and energy efficiency will allow the building staff to modify operations to increase efficiencies, identify opportunities for energy savings measures and raise awareness of energy efficiency among all staff.

In 2014, the City undertook a partnership with LAS to complete an Energy Conservation Education and Awareness Training initiative. The purpose of this workshop was to help inspire the change of typical workplace behaviours from energy consuming to energy conserving. In order to do this, the workshop promoted the understanding of energy consumption as well as to offer many workplace energy conservation tips. The training also included helpful tips that participants can utilize to reduce their energy consumption in their homes.

In an office environment it is recognized that lighting can account for up to 40% of energy costs, space heating and cooling can account for between 20-40%, and plug loads for 5-10%.

Thus training sessions included ways to save costs through conservation by exploring means to reduce lighting consumption, heating and cooling demand, plug loads. In addition, the training sessions will provide a vehicle to communicate past and present progress on energy conservation and demand management and introduce future conservation and demand management plans.

Recognizing beneficial advances that have been previously made towards achieving the City's goals is an important step in sustainability. These advances are continuing to be made to further increase the value and impact of these initiatives. Raising awareness through controllable environmental initiatives is implemented corporately, impacting all City assets. Staff have been given several tools to increase their own energy efficiency.

The City of North Bay website is a great resource for both staff and the public to become informed and learn more about environmental services and renewability. The website provides information on composting, recycling, pesticide use and water conservation and can be found at the following address: <https://www.northbay.ca/our-community/environment-sustainability/>

## **Action Items, Responsibilities and Timelines**

Appendix 1 expands the City of North Bay's Objectives and Goals previously presented. It also provides for responsibilities and timelines.



## **Appendix 1: City of North Bay's Expanded Objectives and Goals**

### **1. Re-Mandate steering committee and working committee.**

- a. Steering committee meets quarterly to review corporate and departmental progress, exchange CDM information, learn about new opportunities etc.

Timing: Ongoing.

### **2. Update Energy Data Management System to establish a more effective Monitoring and Tracking System that includes:**

- a. Efficient Data Collection
- b. User Friendly Interface for major asset groups
- c. Quarterly and Annual Reports
- d. Identify, investigate, and implement where viable sub-metering capabilities

Timing: Ongoing

### **3. Establish a Sustainable Buildings Program**

- a. Develop a Sustainable Building Policy.
- b. Complete 2 Building Energy Studies targeted on major energy consumers with potential for significant improvement over the next 5 years.
- c. Integrate Sustainable Building Best Practices into all new building construction and retrofit projects.
- d. Improve utilization of BAS where available
- e. Investigate feasibility of a corporate wide open protocol BAS
- f. Identify peak demand for development of peak demand management strategies
- g. Include major departments and ABC's
- h. Improve energy efficiency for new and existing residential and commercial buildings in the community.

Timing: Establish a corporate subcommittee mandated to establishing a Sustainable Buildings Program in 2023-2027.

#### **4. Wastewater and Water Distribution and Facilities**

- a. Integrate CDM into operations and modernization plans.

Timing: Driven by the Senior Facilities and Environment Engineer, Director of Public Works, Manager Water/Wastewater, and Manager Distribution/Collection the CDM plan will be integrated in current operations planning modernization plans. Plan development is targeted for 2023-2027.

#### **5. Establish key partners and relationship.**

- a. To identify and develop viable projects
- b. To fill technical and resource gaps where applicable
- c. To effectively utilize all available funding avenues to finance best in class projects that meet the corporation's goals.

Timing: Ongoing.

#### **6. Improve the energy efficiency of the municipal fleet.**

- a. Establish goals to be achieved by 2027
- b. Establish plan for switching to more efficient vehicles during the normal replacement cycle
- c. Investigate and evaluate potential of alternative fuels

Timing: Ongoing.

#### **7. Update Green Fleet Plan**

- a. Identify new potential projects
- b. Audit operating practices

Timing: Ongoing.

**8. Establish a funding plan to help finance energy conservation and demand management projects including expanding renewable projects.**

- a. Utilize multiple funding options.
- b. Wherever possible funding for projects should include all available sources including other government incentives, utility and/or equipment incentives etc.
- c. Develop policy and guidelines for the CDM Project Fund.

Timing: 2023 - 2027.

**9. Facilitate communication to the corporation and to the community**

- a. Communication of performance
- b. Continue to enhance energy conservation culture
- c. Communication to Developers/Builders for new construction

Timing: Items (a) and (b) are ongoing. Develop a communication plan to communicate results to other local groups.

**10. Incorporate energy conservation into project management**

- a. Examine life cycle cost vs up front cost when planning

Timing: Ongoing

**11. Education, Awareness and Training**

- a. Identify potential Energy Conservation Education and Awareness Training.
- b. Complete workshops for designated staff.

Timing: 2023 - 2027

**12. Meet all provincial regulatory requirements.**

- a. The Electricity Act

Timing: Ongoing.

## Appendix 2: City of North Bay Detailed Energy Consumption Data

### 2.1 Electricity

**Table 5:** The City of North Bay's Electricity Annual Consumption Data 2007-2022

Facility	Baseline 2007 kW-hrs	2021 kW-hrs	2022 kW-hrs	Variation 2007 vs. 2022 kW-hrs	Variation 2021 vs. 2022 kW-hrs
Trout Lake WTP	4,944,149	3,782,466	4,025,158	-918,991	242,692
Sewage Plant	3,499,040	2,933,053	3,037,825	-461,215	104,772
Street Lights	3,306,186	2,036,369	2,036,369	-1,269,817	0
Pete Palangio Arena	1,610,640	788,275	1,025,296	-585,344	237,022
City Hall	1,624,320	1,304,548	1,513,689	-110,631	209,140
Public Works	1,421,790	615,156	627,471	-794,319	12,315
Memorial Gardens Arena	1,231,920	1,632,663	1,931,082	699,162	298,419
Reservoirs/ Water PS	1,087,204	643,115	631,083	-456,121	-12,032
Aquatic Centre	933,840	644,233	773,580	-160,260	129,347
Parks/Beaches	825,000	825,000	825,000	0	0

<b>Facility</b>	<b>Baseline 2007 kW-hrs</b>	<b>2021 kW-hrs</b>	<b>2022 kW-hrs</b>	<b>Variation 2007 vs. 2022 kW-hrs</b>	<b>Variation 2021 vs. 2022 kW-hrs</b>
Sewage Lift/ Pump Stations	495,138	463,442	447,734	-17,047	-19,795
West Ferris Arena	590,600	278,418	358,542	-312,182	-232,058
Fire Stations	287,326	276,712	288,430	-10,614	1,104
Other Parking Lots	195,000	195,000	195,000	0	0
Parking Garage	151,412	43,598	44,881	-107,814	-106,531
Traffic Lights	269,138	164,058	158,964	-105,080	-110,174
Merrick Landfill	126,532	589,973	712,779	463,441	265,884
Marina	135,828	123,163	99,802	-12,665	-36,026
Lee Park	125,200	67,349	76,017	-57,851	-49,183
Marsh Landfill	86,850	128,991	140,484	42,141	53,634
Other Waterfront	75,000	75,000	75,000	0	0
Transit/Shelters	70,000	97,074	85,340	27,074	15,340

<b>Facility</b>	<b>Baseline 2007 kW-hrs</b>	<b>2021 kW-hrs</b>	<b>2022 kW-hrs</b>	<b>Variation 2007 vs. 2022 kW-hrs</b>	<b>Variation 2021 vs. 2022 kW-hrs</b>
Public Library	NO DATA	211,680	227,640	NO DATA	15,960
<b>Annual Total</b>	23,092,113	17,919,336	19,337,166	-3,982,587	1,190,191

Note: Numbers with an asterisk (\*) are estimate.

Figure 5 presents annual electricity consumption of the top 10 users of the City from 2007 to 2022. These locations plus the Public Library consume most of the City’s electricity and this is where the majority of energy efficiency recommendations are focused.

**Figure 5: Electricity Consumption by Facility (2008-2022)**

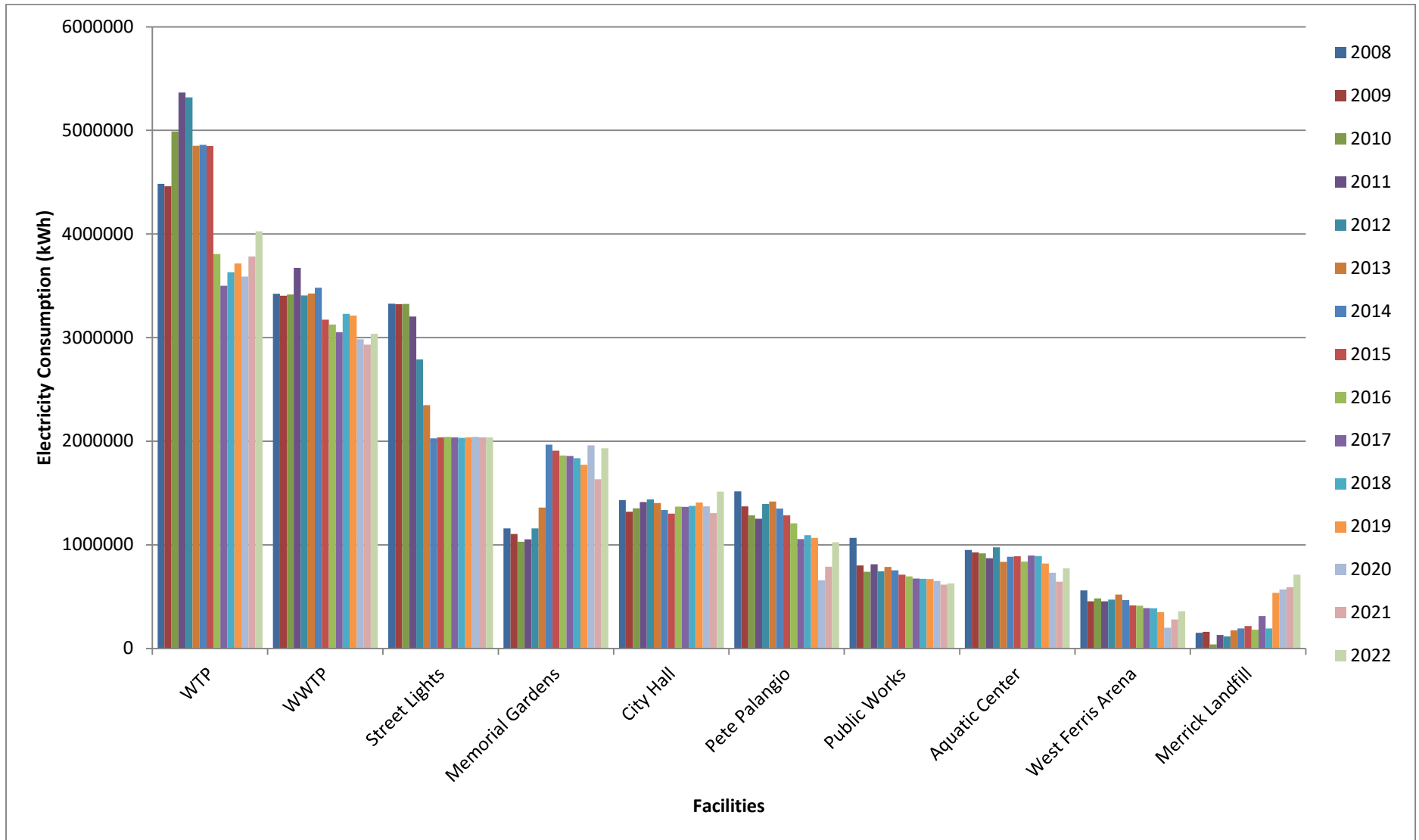
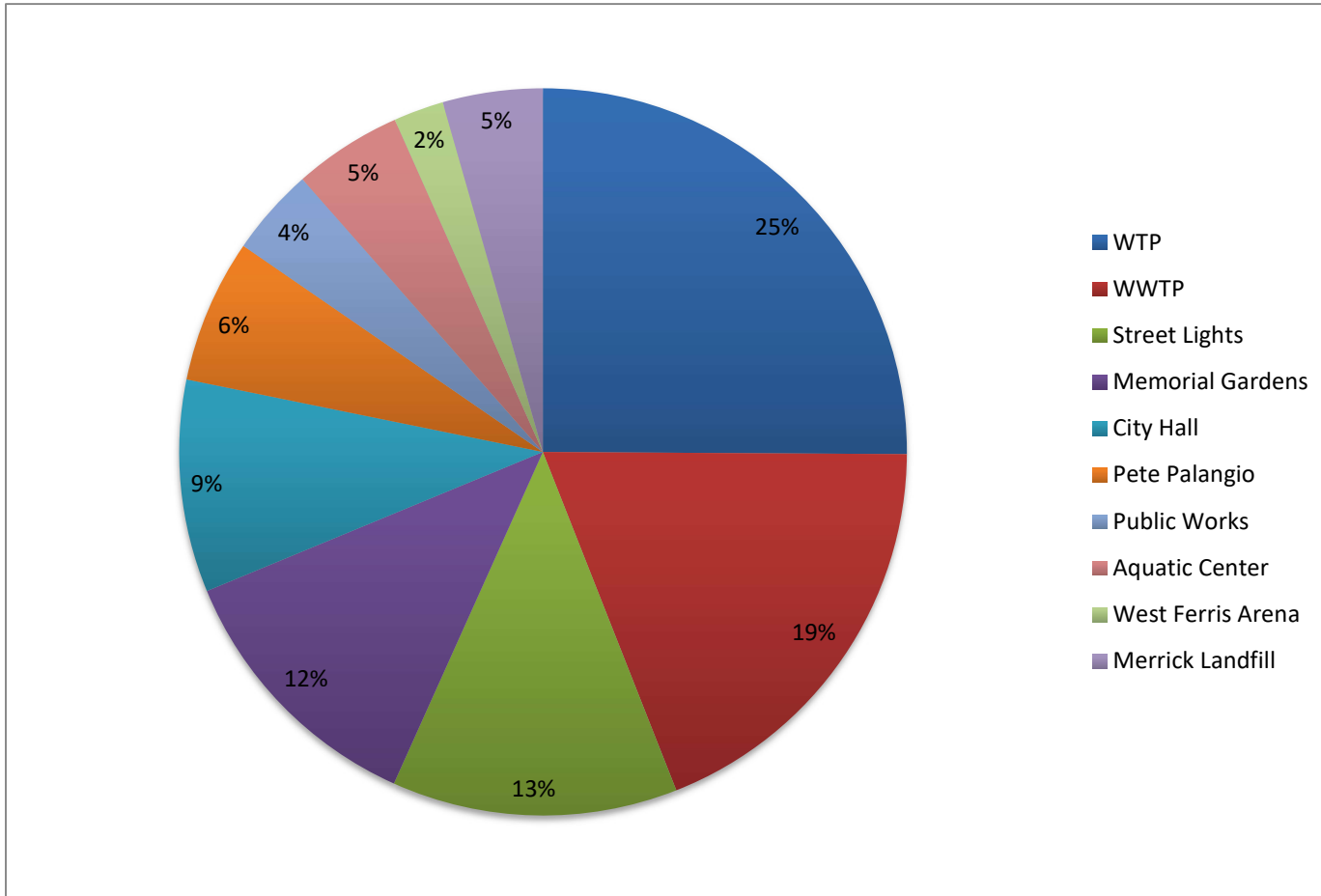


Figure 6 presents the electricity used by facility by the percentage of total used in 2022 by the City of North Bay. The top 10 users are identified.

**Figure 6:** Breakdown by Facility of 2022 Electricity Consumption





## 2.2 Natural Gas

**Table 6:** The City of North Bay's Natural Gas Annual Consumption Data 2007-2022

Facility	Baseline 2007 m3	2021 m3	2022 m3	Variation 2007 vs 2022 m3	Variation 2021 vs 2022 m3
Public Works - Franklin	299,538	158,382	109,082	-190,456	-49,300
Aquatic Center	320,024	81,374	60,273	-259,751	-21,101
Memorial Gardens Arena	186,361	155,601	135,296	-51,065	-20,305
Sewage Treatment Plant	161497	217,686	132,080	-29,417	-85,606
Pete Palangio Arena	102,424	121,307	158,477	56,053	37,170
West Ferris Arena	64,681	43,482	50,093	-14,588	6,611
City Hall	54,996	79,795	70,773	15,777	-9,022
Fire Stn 1 - Princess	49,740	34,975	37,668	-12,072	2,693
Lee Park - Memorial Dr	22,441	16,421	17,903	-4,538	1,482
Fire Stn 2 - McKeown	18,117	10,460	10,834	-7,283	374

<b>Facility</b>	<b>Baseline 2007 m3</b>	<b>2021 m3</b>	<b>2022 m3</b>	<b>Variation 2007 vs 2022 m3</b>	<b>Variation 2021 vs 2022 m3</b>
352 McIntyre (Rented)	2,470	0	0	-2,470	0
Fire Stn 3 - Marshall	15,270	10,520	11,852	-3,418	1,332
New Bus Trml - Oak	12,993	12,074	12,556	-437	482
NB Water Treatment Plant	11,966	33,653	47,506	35,540	13,853
Fire Stn 4 - Duxford	12590	8,115	7,444	-5,146	-671
Kinnette Playground	5,713	6,442	5,618	-95	-824
Circle Lake Playground	6,590	0	0	-6,590	0
Police Playground	3,680	3,864	4,183	503	319
Parks - First Ave Unit 1	2,950	0	0	-2,950	0
Marathon Beach	-	86	102	102	16
Parks - First Ave Unit 2	1,800	0	0	-1,800	0
Laurentian Playground	1256	1,354	1,858	602	504

<b>Facility</b>	<b>Baseline 2007 m3</b>	<b>2021 m3</b>	<b>2022 m3</b>	<b>Variation 2007 vs 2022 m3</b>	<b>Variation 2021 vs 2022 m3</b>
Graniteville Playground	1,077	1,279	1,146	69	-133
Thompson Park	1,102	0	0	-1,102	0
ONR Field	184	0	0	-184	0
330 Main East	0	10,850	10,926	10,926	76
1105 Lakeshore Drive	0	6,336	7,310	7,310	974
Library	-	27,415	35,438	35,438	8,023
<b>Annual Total</b>	1,359,460	1,041,471	928,418	-431,042	-113,053

Figure 7 presents the annual Natural Gas consumption of the top 10 users of the City since 2007.

**Figure 7:** Natural Gas Consumption by Facility (2007-2022)

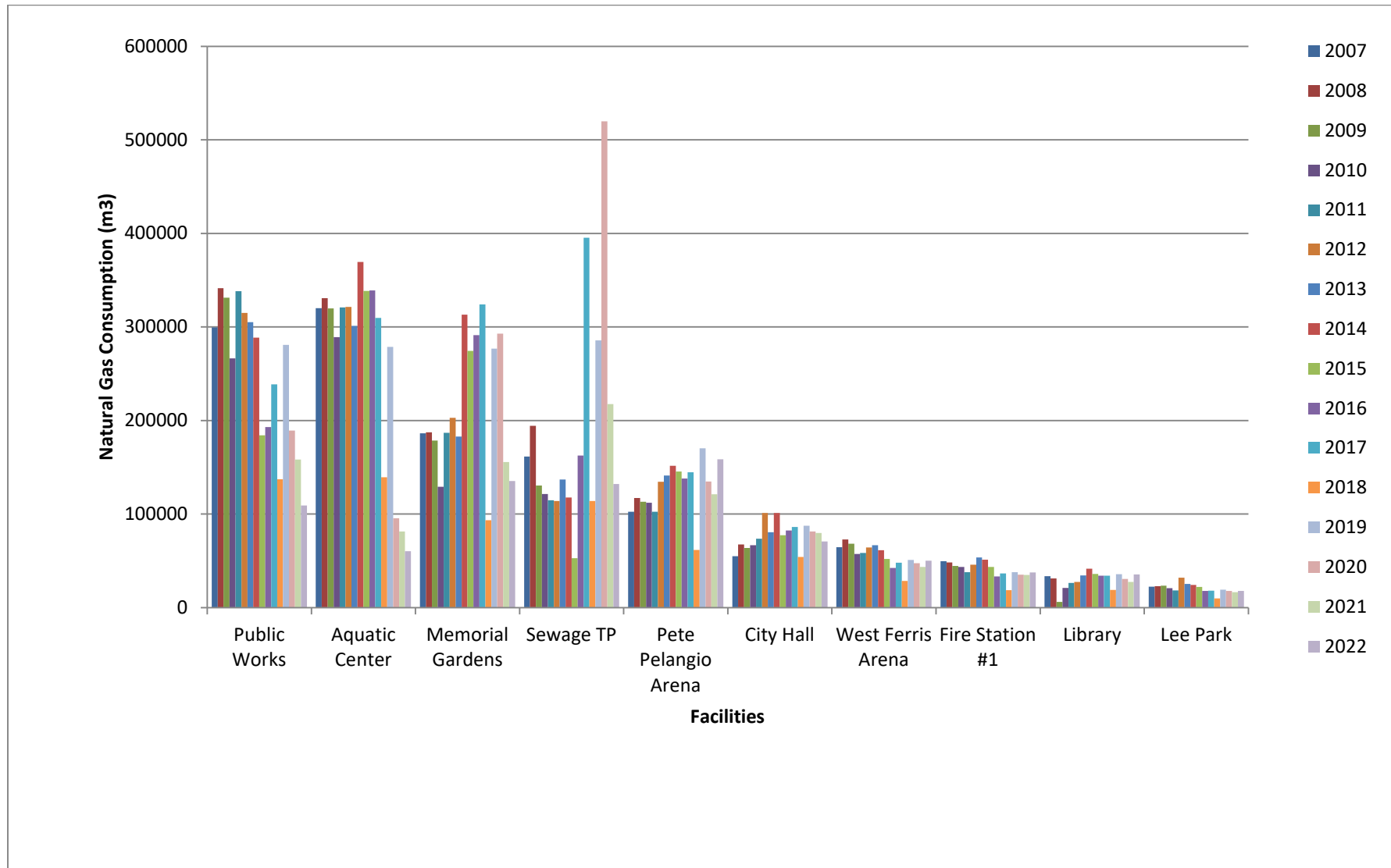
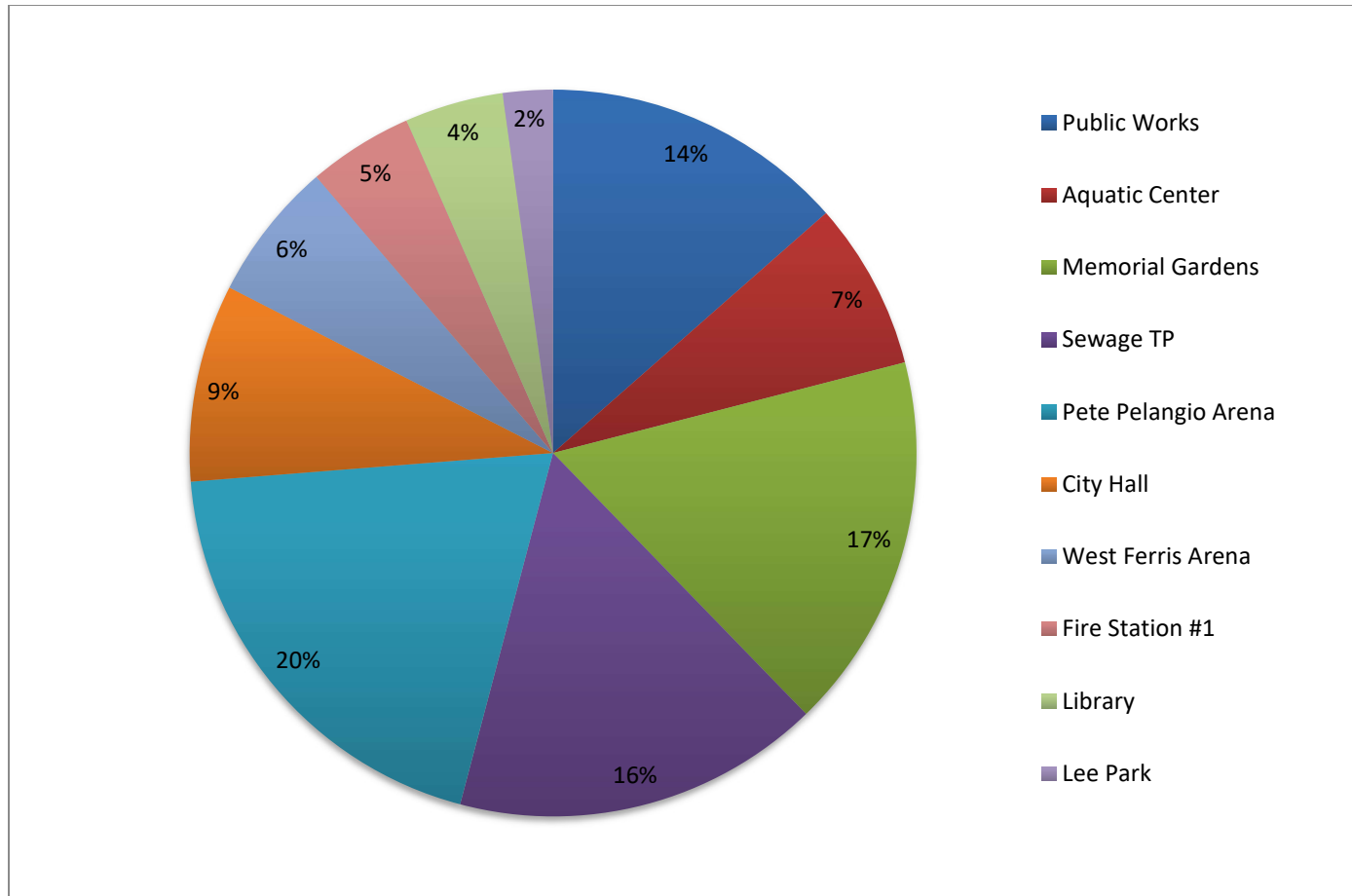


Figure 8 illustrates natural gas consumed by facility by the percentage of total used in 2022 by the City of North Bay. The top 10 users are identified.

**Figure 8:** Breakdown by Facility of 2022 Natural Gas Consumption



## 2.3 Transportation Fuel

**Table 7: Annual Transportation Fuel Consumption Data**

Function	2007 (L)	2020 (L)	2021 (L)	2022 (L)
Fleet/Garage	NO DATA	12,687	9,674	9,563
Police	NO DATA	126,505	124,266	108,605
Parks	70,174	57,982	63,736	69,478
Transit	868,826	482,853	417,752	500,133
Ambulance	NO DATA	102,237	109,194	119,500
Public Works	501,824	450,677	451,199	629,954
Hydro	NO DATA	99,930	100,881	95,916
Water/Wastewater Plant	NO DATA	9,805	9,272	9,441
By-law, Parking, Survey	2,447	16,162	17,327	15,000
Fire	46,507	33,876	34,931	36,967
Arena	NO DATA	242	572	708
<b>City Total</b>	<b>1,489,778</b>	<b>1,392,716</b>	<b>1,349,895</b>	<b>1,595,264</b>
<b>Reduction</b>	-	-97,062	-139,883	+105,486
<b>CO<sub>2e</sub> (tonne)</b>	15,346	14,178	13,742	16,240

Figure 9 presents the annual transportation fuel consumption by department in the City of North Bay since 2007.

**Figure 9: Transportation Fuel Consumption by Function (2007-2022)**

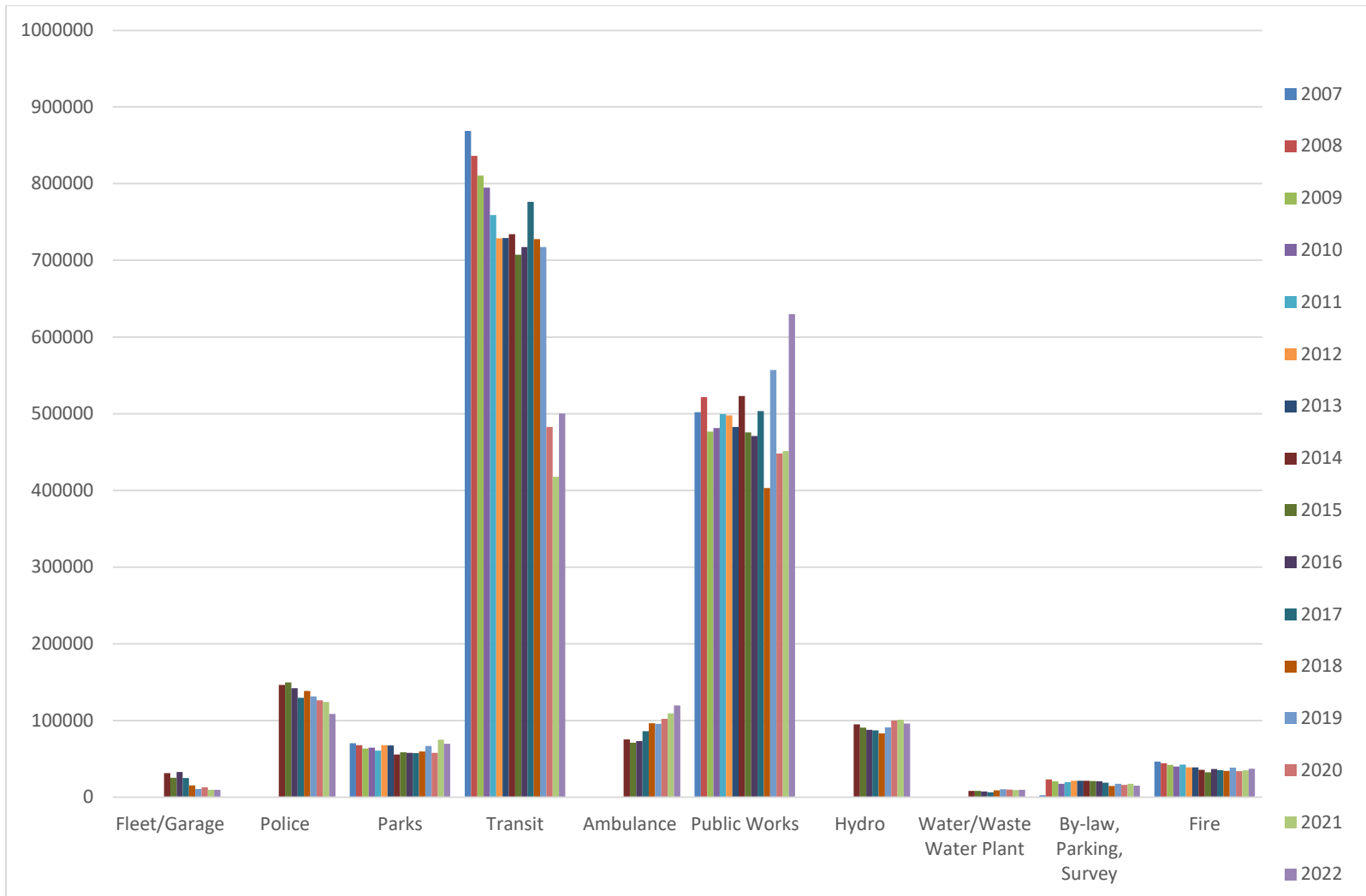
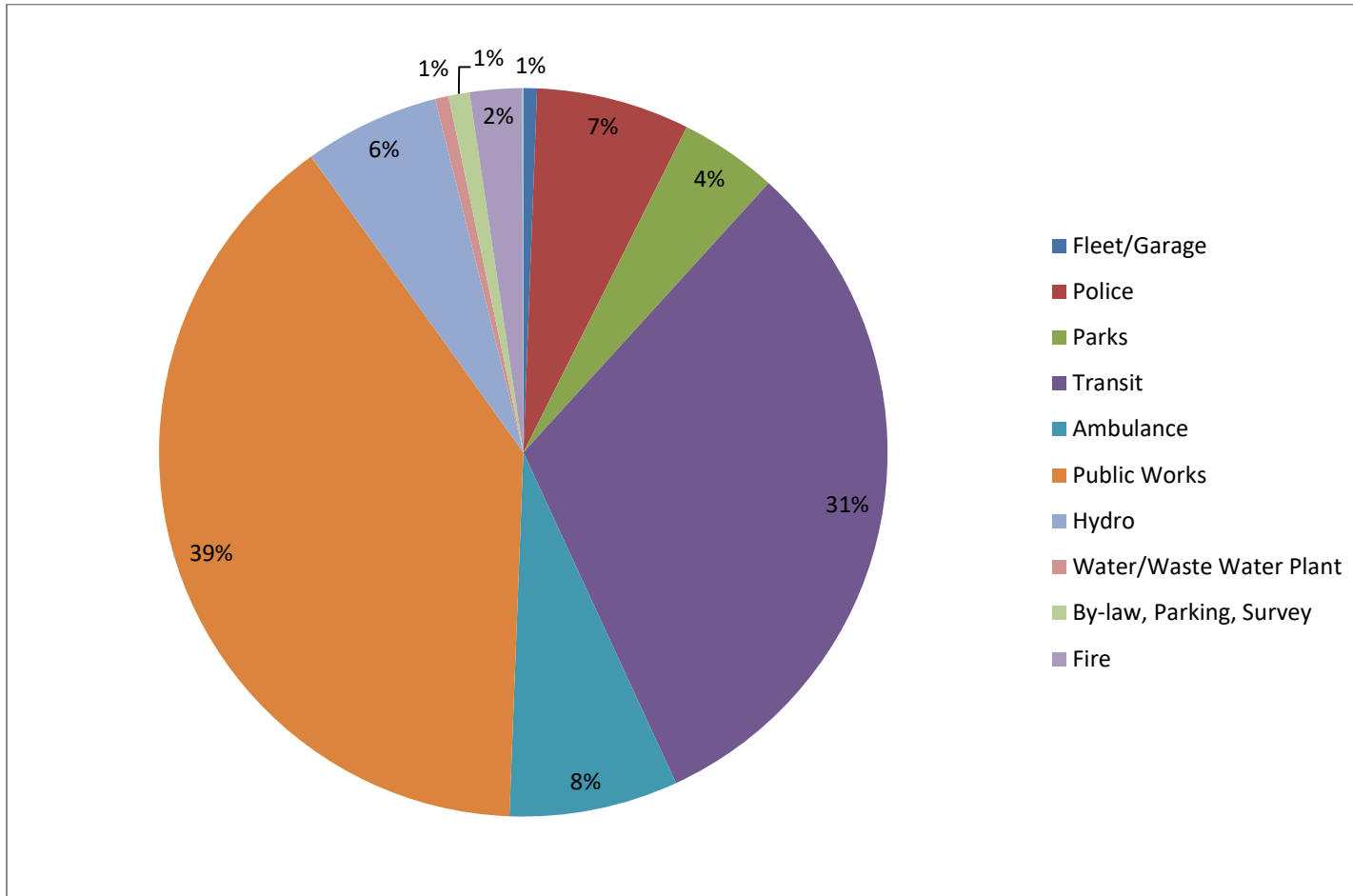


Figure 10 presents the transportation fuel used by the various functions in North Bay during 2022. Detailed annual consumption of transportation fuel data is provided in Appendix 2.3.

**Figure 10:** Breakdown by Function of 2022 Transportation Fuel Consumption





## 2.4 Isometrics

Accurately comparing energy consumption from year-to-year requires an appreciation of external factors such as weather and climatic influences. For example, hot summers drive up the demand for air conditioning, cold winters increase demand for heating, damp weather reduces water pumping but can increase pumping at sewage lift stations and at the landfill.

Heating Degree Days (days that average less than 18°C) and Cooling Degree Days (days that average greater than 18°C) can be examined to help understand energy demand at City buildings.

**Table 8:** Average Temperature at North Bay Airport

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Yearly Average
<b>2010</b>	-10.6	-8.9	1.8	7.5	14.2	15.9	20.6	19.3	12.5	6.1	0.5	-8.2	5.9
<b>2011</b>	-8.2	-10.5	-5.9	3.2	12.6	16.6	20.7	18.9	14.7	8.5	2.5	-6.2	5.6
<b>2012</b>	-9	-7	2	4	14	18	20	19	13	7	-1	-7	6.1
<b>2013</b>	-11.6	-11.1	-3.9	1.7	11.7	15	18.3	17.2	12.2	7.2	-3.3	-13.3	3.3
<b>2014</b>	-15.6	-13.3	-10.6	1.7	11.1	16.7	16.7	16.7	12.8	6.7	-3.9	-7.2	2.7
<b>2015</b>	-16.4	-19.2	-7.9	3.4	12.1	14.7	18.5	18.6	17.1	5.6	3.3	-0.5	4.1
<b>2016</b>	-10.5	-11.5	-3.4	-0.1	11.9	15.8	19.1	20	14.7	7.3	3.2	-8.3	4.9
<b>2017</b>	-8.7	-6.5	-8.3	5.8	10.3	15.2	18.4	16.2	15	10.2	-2.6	-15.7	4.1
<b>2018</b>	-12	-9.7	-5.3	-1.7	12.9	16	20.9	19.2	13.9	4.1	-4.7	-8.2	3.8
<b>2019</b>	-16	-11	-6.8	1.9	8.7	15.2	20.1	17.2	12.9	6.9	-4.6	-7	3.1
<b>2020</b>	-8.3	-9.5	-2.4	2.1	9.9	16.8	20.7	17.1	11.7	4.4	2.1	2.1	5.6
<b>2021</b>	-8.9	-10.5	-2.8	6.0	10.8	17.4	17.9	19.8	13.2	10.6	-0.6	-6.4	5.5
<b>2022</b>	-17.5	-12.6	-5	2.9	13.5	15.9	18.2	18.1	13.4	7.5	1	-5.3	4.2
<b>Monthly Average</b>	-11.8	-10.9	-4.5	3.0	11.8	16.1	19.2	18.3	13.6	7.1	-0.6	-7.0	

**Table 9:** Heating Degree Days at North Bay Airport (number of degrees Celsius that the mean temperature is below 18°C)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Yearly Average
<b>2010</b>	789	670	429	390	335	88	47	18	85	254	402	596	341.9
<b>2011</b>	875	960	783	622	388	120	42	11	47	151	354	530	406.9
<b>2012</b>	837	704	502	429	148	64	20	41	172	339	561	757	381.2
<b>2013</b>	890	793	679	487	202	102	48	64	174	327	613	945	443.7
<b>2014</b>	1002	854	849	478	216	70	70	73	178	340	628	761	459.9
<b>2015</b>	996.4	1041	778	438.8	191.1	100.6	37.1	27.4	68.8	358.5	426.8	481.2	412.1
<b>2016</b>	854.9	856.7	663.4	542.1	201	85.7	24.1	9.2	75.6	213.9	324.8	473.3	360.4
<b>2017</b>	427.9	417.1	709	269.5	170.2	66.9	15.8	59	114.2	203.9	411.1	875.6	311.7
<b>2018</b>	928.4	775.9	720.7	592.2	173.8	75	8.9	16.5	145.5	415.8	680.3	813	445.5
<b>2019</b>	1042.2	811.4	770.3	483.5	288.4	92.2	7	42.7	154.9	320.9	677.9	775.3	455.6
<b>2020</b>	814.9	796.5	632.5	476.8	272.7	75.6	5.6	60.2	188.8	409.2	475	475	390.2
<b>2021</b>	834.7	797.5	645.4	361.3	227.3	49.0	35.6	18.3	145.7	230.5	558.9	756.3	410.4
<b>2022</b>	1099.9	856.9	712.1	453.4	159.7	82.9	28.9	31.3	141.2	283.9	510.3	722.1	423.6
<b>Monthly Average</b>	876.3	794.9	682.5	463.4	228.7	82.6	30	36.3	128.8	296	509.5	689.3	

**Table 10:** Cooling Degree Days at North Bay Airport (number of degrees Celsius that the mean temperature is above 18°C)

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Yearly Average
<b>2010</b>	0	0	0	12	70	57	168	131	25	2	0	0	38.8
<b>2011</b>	0	0	0	1	37	73	171	113	50	14	0	0	38.3
<b>2012</b>	0	0	5	0	33	64	98	53	19	1	0	0	22.8
<b>2013</b>	0	0	0	1	26	23	76	41	8	2	0	0	14.8
<b>2014</b>	0	0	0	0	10	47	34	38	16	1	0	0	12.2

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Yearly Average
<b>2015</b>	0	0	0	0	8.1	1.6	52.7	44.9	43.1	0	0	0	12.5
<b>2016</b>	0	0	0	0	11.7	21.6	55.4	61.9	2.1	0	0	0	12.7
<b>2017</b>	0	0	0	0	0.7	1.6	24.8	11.6	30.4	0	0	0	5.8
<b>2018</b>	0	0	0	0	15.3	16	99.7	55	23.8	0	0	0	17.5
<b>2019</b>	0	0	0	0	0	7	73.6	18.3	1.9	0	0	0	8.4
<b>2020</b>	0	0	0	0	22.8	40.8	89.1	31.4	0.9	0	0	0	15.4
<b>2021</b>	0	0	0	0	11.2	30.4	31.3	72.4	0.5	2.0	0	0	12.3
<b>2022</b>	0	0	0	0	21.6	19	34.1	35.4	13.5	0	0	0	10.3
<b>Monthly Average</b>	0.0	0.0	0.4	1.1	20.6	31	77.5	54.4	18	1.7	0.0	0.0	

Tables 8, 9, and 10 show that the weather in 2022 was cooler than it was in 2010. It was also cooler in temperature in 2022 relative to 2021. This impacts energy demands.

**Table 11: Monthly and Annual Precipitation in millimeters**

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Yearly Average
<b>2010</b>	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>2011</b>	62.8	60.6	73.4	133.4	51.6	90.2	62.8	43.2	79.4	126.8	106.4	81.4	81.0
<b>2012</b>	82.2	44	57	70	23.8	115.4	61.8	145.8	102	126	54.2	79.9	80.2
<b>2013</b>	72.4	37.6	32.8	90.2	57.4	59.2	82.3	91.7	68.8	102.9	63.7	31	65.8
<b>2014</b>	69.3	24.4	55.9	67.3	49.3	175.8	241.8	88.9	86.4	77.2	58.4	22.6	84.8
<b>2015</b>	0.9	3.8	20.4	74.2	79.1	57.4	53	92.3	45.2	85.7	66.5	69.1	54.0
<b>2016</b>	54.1	43.2	109	24.3	48.8	52.9	77.6	105.8	67.9	33.6	22.7	26.5	55.5
<b>2017</b>	14.2	36.8	16.1	106	92.8	86.1	71.1	149.4	70.1	104.9	59.5	41.3	70.7
<b>2018</b>	38.2	34.5	11.2	51.9	71.3	27.8	25.1	119.5	121.5	89.8	56.1	52.7	58.3
<b>2019</b>	66.9	70	60	144.7	132.1	107.5	81.4	45.2	146.2	156.8	100.4	53.9	97.1
<b>2020</b>	56.2	37.1	113.3	69.6	76	61.2	99.3	124	151.3	120	68.6	86.4	88.6

	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Yearly Average
<b>2021</b>	22.9	46.7	44.8	48.8	19.4	142.5	169.6	73.0	186.4	127.1	66.4	94.5	86.8
<b>2022</b>	12.4	23.9	101.1	84.3	112.5	101.1	120	106.3	129.6	66.7	45.7	33.4	78.1
<b>Monthly Average</b>	46	38.6	57.9	80.4	67.8	89.8	95.5	98.8	104.6	101.5	64.1	56.1	

Table 11 shows a decrease in precipitation in 2022 compared to previous years, and a decrease compared to the baseline (2011). The peak year for precipitation is 2019.

### Appendix 3: Energy Intensity per Building

**Table 12:** Energy Intensity of Facilities (2022)

Facility	Energy Intensity (kWh/sqm)
Aquatic Center	237.9
City Hall	195.2
Fire Station #1	136.5
Fire Station #2	94.4
Fire Station #3	77.7
Fire Station #4	82.8
Lee Park Building	210
Memorial Gardens Arena	369.0
Merrick Landfill	7424.8
Parking Garage	80.9
Pete Palangio Arena	270.2
Public Library	81.7
Public Works	87.6
Sewage Plant	208.2
Transit Station	131.3
Water Treatment Plant	345.2
West Ferris Arena	115.0

Table 12 illustrates the energy intensities for the City of North Bay’s facilities in 2022 to show which facilities use the most energy per square meter.

### Appendix 4: Greenhouse Gas Emissions Reductions

**Table 13:** Summary of Annual Energy Consumption and GHG Emissions from 2007-2022

2007	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Total Quantity Used	23,093,113	1,359,460	1,489,778		
Total GHG Produced (tons CO <sub>2</sub> e)	17,181	2,641	15,346	35,168	35,168

2008	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Total Quantity Used	22,190,198	1,525,287	1,492,901		
Total GHG Produced (tons CO <sub>2</sub> e)	15688	2935	15198	33,821	68,989
Reduction Quantity Achieved	902,915	-165,827	-3,123		
Percent Reduction Achieved	3.91%	-12.20%	-0.21%		
GHG Reduction Achieved (tons)	1,493	-294	148	1,347	1,347

2009	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Total Quantity Used	21,726,052	1,396,585	1,413,296		
Total GHG Produced (tons CO <sub>2</sub> e)	15,360	2,687	14,387	32,435	101,424
Reduction Quantity Achieved	1,367,061	-37,125	76,482		
Percent Reduction Achieved	5.92%	-2.73%	5.13%		
GHG Reduction Achieved	1,821	-46	959	2,733	4,080

2010	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Total Quantity Used	21,839,169	1,246,338	1,398,238		
Total GHG Produced (tons CO <sub>2</sub> e)	15,440	2,398	14,234	32,073	133,497
Reduction Quantity Achieved	1,253,944	113,122	91,540		
Percent Reduction Achieved	5.43%	8.32%	6.14%		
GHG Reduction Achieved	1,741	243	1,112	3,095	7,175

2011	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Total Quantity Used	22,491,553	1,427,922	1,381,524		
Total GHG Produced (tons CO <sub>2</sub> e)	15,902	2,748	14,064	32,714	166,211
Reduction Quantity Achieved	601,560	-68,462	108,254		

2011	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Percent Reduction Achieved	2.60%	-5.00%	7.30%		
GHG Reduction Achieved	1,279	-107	1,282	2,454	9,629

2012	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Total Quantity Used	22,525,177	1,433,250	1,354,793		
Total GHG Produced (tons CO <sub>2</sub> e)	15,925	2,758	13,792	32,475	198,686
Reduction Quantity Achieved	567,936	-73,790	134,985		
Percent Reduction Achieved	2.46%	-5.43%	9.06%		
GHG Reduction Achieved	1,256	-117	1,554	2,693	12,322

2013	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Total Quantity Used	19,755,591	1,433,045	1,339,073		
Total GHG Produced (tons CO <sub>2</sub> e)	13,967	2,758	13,632	30,357	229,043
Reduction Quantity Achieved	3,337,522	-73,585	150,705		
Percent Reduction Achieved	14.45%	-5.40%	10.10%		
GHG Reduction Achieved	3,214	-117	1,714	4,811	17,133

2014	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Total Quantity Used	20,098,157	1,701,498	1,425,511		
Total GHG Produced (tons CO <sub>2</sub> e)	14,209	3,274	14,512	31,995	261,038
Reduction Quantity Achieved	2,994,956	-342,038	64,267		
Percent Reduction Achieved	12.97%	-25.20%	4.30%		
GHG Reduction Achieved	2,972	-633	834	3,173	20,306

2015	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Total Quantity Used	20,785,245	1,417,109	1,639,764		
Total GHG Produced (tons CO <sub>2</sub> e)	14,695	2,727	16,693	34,115	295,153
Reduction Quantity Achieved	2,307,868	-57,649	-149,986		

2015	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Percent Reduction Achieved	9.99%	-4.20%	-10.10%		
GHG Reduction Achieved	2,486	-86	-1,347	1,053	21,359

2016	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Total Quantity Used	19,285,175	1,441,921	1,646,865		
Total GHG Produced (tons CO <sub>2</sub> e)	13,635	2,775	16,765	33,175	328,328
Reduction Quantity Achieved	3,807,938	-82,461	-157,087		
Percent Reduction Achieved	16.49%	-6.10%	-110.50%		
GHG Reduction Achieved	3,546	-134	-1,419	1,993	23,352

2017	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Total Quantity Used	18,846,553	1,748,034	1,725,667		
Total GHG Produced (tons CO <sub>2</sub> e)	13,325	3,364	17,567	34,256	362,584
Reduction Quantity Achieved	4,246,560	-388,574	-235,889		
Percent Reduction Achieved	18.39%	-28.60%	-15.80%		
GHG Reduction Achieved	3,856	-723	-2,221	912	24,264

2018	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Total Quantity Used	19,248,463	1,518,862	1,582,445	-	-
Total GHG Produced (tons CO <sub>2</sub> e)	13,609	2,923	16,109	32,641	395,225
Reduction Quantity Achieved	3,844,650	-159,402	-92,667		
Percent Reduction Achieved	16.64%	-11.73%	-6.22%		
GHG Reduction Achieved	3,572	-281.76	-763.29	2,527	26,791

2019	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Total Quantity Used	17,583,642	1,640,764	1,738,683		-
Total GHG Produced (tons CO <sub>2</sub> e)	12,432	3,174	17,700	33,306	428,531
Reduction Quantity Achieved	5,509,471	-281,304	-248,905		



2019	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Percent Reduction Achieved	23.85%	-20.69%	-16.71%		
GHG Reduction Achieved	4,749	-533	-2,354	1,862	28,653

2020	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Total Quantity Used	17,573,342	2,138,388	1,392,716		-
Total GHG Produced (tons CO <sub>2</sub> e)	12,424	4136	14,178	30,738	459,269
Reduction Quantity Achieved	5,519,771	-778,928	97,062		
Percent Reduction Achieved	23.90%	-56.60%	6.52%		
GHG Reduction Achieved	4,757	-1,495	1,168	4,430	33,083

2021	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Total Quantity Used	17,919,336	1,041,471	1,349,895		
Total GHG Produced (tons CO <sub>2</sub> e)	12,669	2,015	13,742	28,425	487,694
Reduction Quantity Achieved	5,173,777	317,989	139,883		
Percent Reduction Achieved	22.40%	23.39%	9.39%		
GHG Reduction Achieved	4,512	626	1,604	6,743	39,826

2022	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Annual Total	Cumulative Total
Total Quantity Used	19,337,166	928,418	1,595,264		
Total GHG Produced (tons CO <sub>2</sub> e)	13,671	1,796	16,240	31,546	519,240
Reduction Quantity Achieved	3,755,947	431,042	-105,486		
Percent Reduction Achieved	16.26%	31.71%	-7.08%		
GHG Reduction Achieved	3,510	845	-894	3,461	43,287

2007-2022 Cumulative	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Transportation Fuel (L)	Total
Total Quantity Used	324,297,932	23,398,352	23,966,413	
Total GHG Produced (tons CO <sub>2</sub> e)	230,132	45,109	244,159	519,400

Figure 11 illustrates the progress made in the reduction of GHG's generated by fossil fuel consumption by the City of North Bay from 2007 to 2022.

**Figure 11:** Annual Greenhouse Gas Emissions 2007-2022

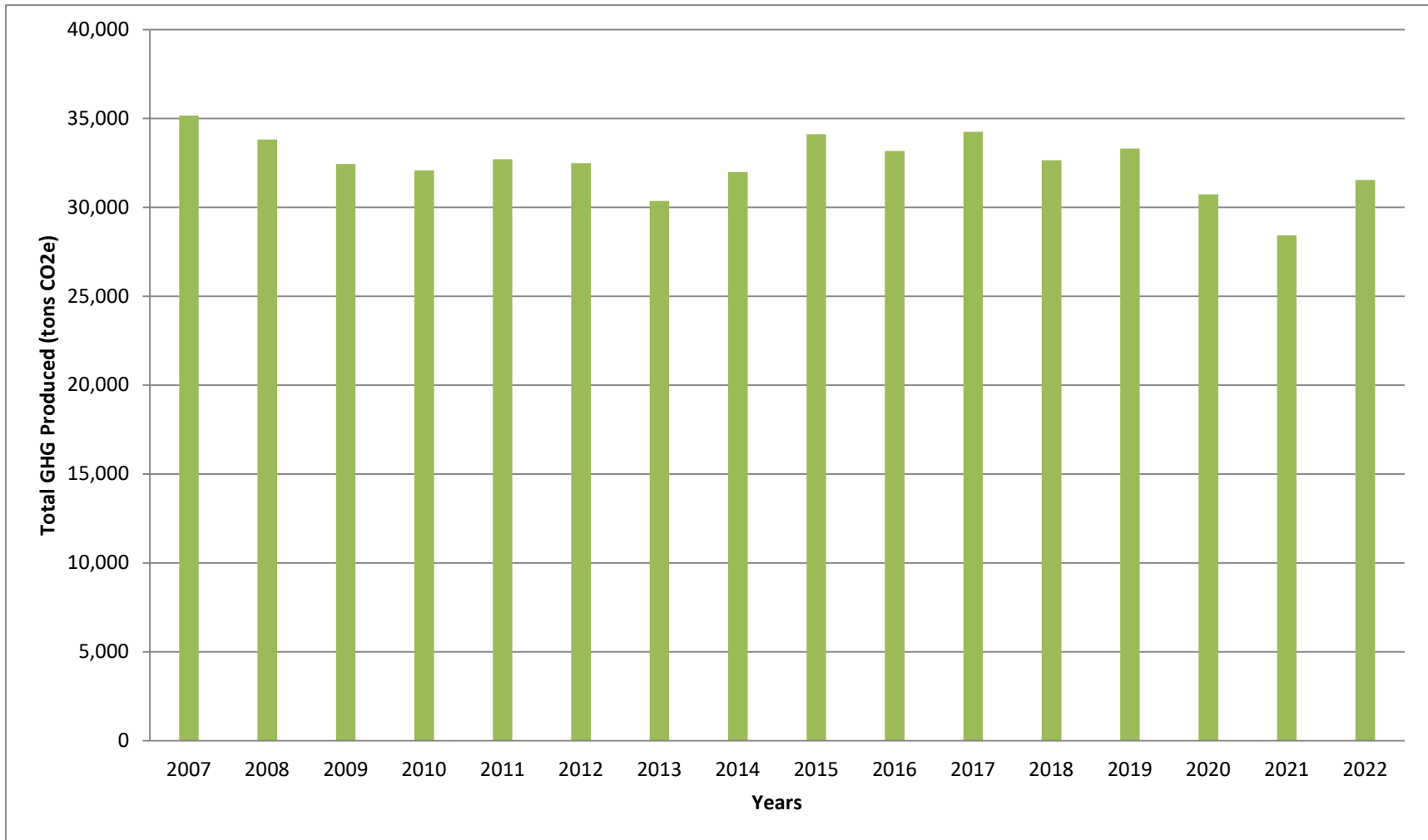
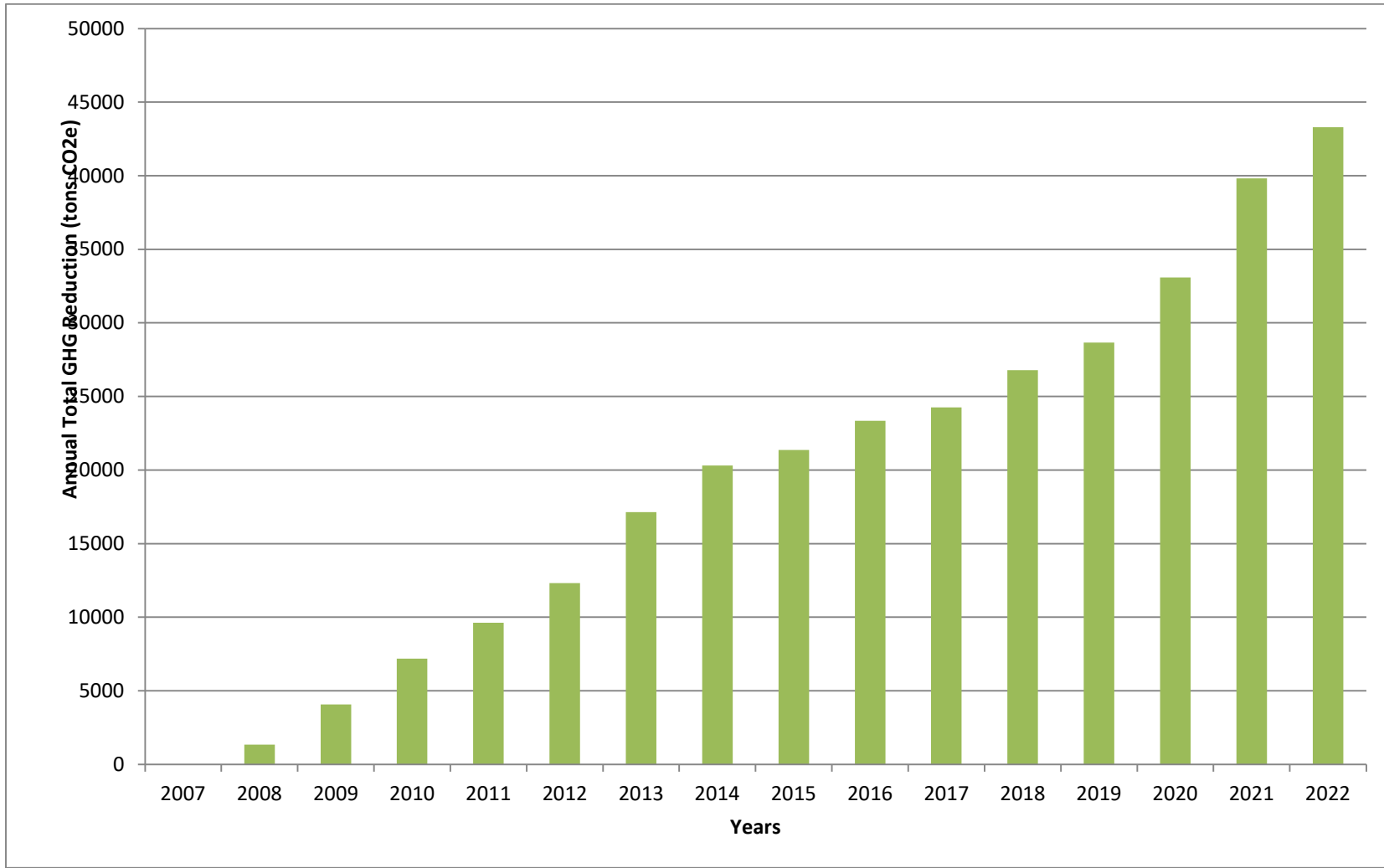


Figure 12 illustrates the cumulative annual reduction of GHG's from 2007 to 2022. By 2022, the City has decreased the amount of GHG's generated by a total of 45,890 CO<sub>2e</sub> tonnes, an average of 3,059 CO<sub>2e</sub> tonnes per year.

**Figure 12:** Cumulative Reduction of GHG's from 2007 to 2022



## Appendix 5: Initiated, Completed, and Future Major Energy Projects

**Table 14:** The City of North Bay's Completed Major Energy Projects

Project	Costs	Savings Realized	Est. Simple Payback
Replace HPS Street lights with LED Fixtures (2013)	\$2,800,800	\$281,000/yr.	13 years
Replaced Decorative lights	\$200,000	\$37,500/yr.	6 years
Lighting & heating upgrades at YMCA Aquatics Center	\$750,000	\$75,000/yr.	10 years
EMP Mini-Hybrid on City Transit Buses	\$268,000	\$151,400/yr.	2 years
Cogeneration Project at Wastewater Treatment Plant	\$3,900,000	\$150,940/yr.	26 years
Driver Training using Smart Driver Program	\$50,000	30,000 L/yr.	2 years
Install Residential Water Meters (bill based on use)	\$6,063,576	500,000 kWh/yr.	
Replace Ellendale pumps with high efficiency motors	\$831,109.35	115,480 kWh/yr.	
Eliminate Janey Avenue Pumping Station		12,650 kWh/yr.	

**Table 15:** The City of North Bay's Initiated and Future Major Electricity Reduction Projects

Projects	Potential Savings
Continue with revamping/controls in City buildings	25,000 kWh/yr.
*Parking lot lighting review	Being Evaluated
Education and Awareness Training with AMO/LAS	Being Evaluated
Study Sewage Plant low lift pumping system	Being Evaluated
Study improved use of Building automation systems	Future Evaluation
Study to improve water distribution system	Future Evaluation

**Table 16:** The City of North Bay's Future Major Natural Gas Reduction Projects

Projects	Potential Savings
Insulate/Seal Garages at Public Works/Automatic Door Closure	25,000 m3
Insulate Roof of City Hall	10,000 m3

<b>Projects</b>	<b>Potential Savings</b>
<b>Insulate Roof at Fire Station #4</b>	5,000 m3

**Table 17:** The City of North Bay’s Initiated and Future Major Transportation Fuel Reduction Projects

<b>Projects</b>	<b>Potential Savings</b>
<b>*Reduce Idling</b>	35,000 L/year
<b>*Reduce Vehicle Weight</b>	10,000 L/year
<b>*Cull older inefficient vehicles/ Reduce fleet size</b>	7,600 L/year
<b>*Enhance vehicle preventative maintenance</b>	5,000 L/year
<b>*Improve traffic flows/automate signalization system</b>	Being Evaluated

Note: Projects marked with an asterisk (\*) are currently ongoing.