



Strategic Energy Management Plan

December 2023



Senior Management Support:

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Signature: Original signed by J. Stewart

CONTENTS

EXECUTIVE SUMMARY	1
1.0 INTRODUCTION	5
2.0 OUR ORGANIZATION	7
3.0 OUR COMMITMENT	10
4.0 UNDERSTANDING OUR SITUATION	12
5.0 INITIATIVES AND PROJECTS	18
6.0 MONITORING AND REPORTING	24
7.0 APPENDIX A – EMA RESULTS	27
8.0 APPENDIX B – ASSET REGISTRY	30
9.0 APPENDIX C – 2022/23 ENERGY DATA	33
10.0 APPENDIX D – GUIDING POLICIES	35
11.0 APPENDIX E – PAST PROJECTS	37



EXECUTIVE SUMMARY

Purpose and Scope of this Plan

The purpose of this Strategic Energy Management Plan (SEMP) is to guide the North Vancouver School District's (NVSD's) energy management activities by providing a framework for reducing energy consumption and its associated environmental impact. This Plan is also one of the key deliverables for the BC Hydro Energy Manager program.

This scope of this Plan includes sites owned and operated by the NVSD, as well as Cheakamus Centre. Sites owned by the NVSD and leased in their entirety to others are outside the scope of this Plan, as are licensed facilities in separate buildings on NVSD sites.

Context for Strategic Energy Management

Our strategic energy management activities, guided by this SEM, directly support the NVSD's organizational vision and strategic objectives.

Our organizational vision clearly articulates the role that facilities play – *We strive to provide welcoming, safe, and sustainable facilities that enhance the learning and teaching environment.* A robust energy management program is an integral part of our overall approach to sustainable facilities.

Environmental Stewardship is one of the six pillars of the NVSD's 2021 - 2031 Strategic Plan, which makes the firm commitment to *lead on sustainable practices and nature-based learning to address environmental challenges*, and specifically identifies several key actions that support our strategic energy management activities:

- Bring an environmental lens to our decisions and our teaching practices
- Support environmental initiatives that champion sustainability
- Implement building and organizational infrastructure that reflects the values of environmental stewardship

By continuing to support strategic energy management, the NVSD is demonstrating environmental leadership, reducing our exposure to energy cost escalations and addressing the climate emergency.

Climate Action – Mitigation and Adaptation

In September 2019 the Board of Education declared a climate emergency. With approximately 90% of NVSD's organizational greenhouse gas emissions coming from building energy use, this SEM directly supports climate action.

In addition to reducing the emissions that contribute to climate change, the NVSD must also manage and adapt to climate-related risks that are already affecting our operations, such as wildfire smoke, rising temperatures, and extreme weather events. In many cases, the adaptation actions have a potential energy impact, further underscoring the importance of energy management as we look to the future.

COVID-19 Pandemic Impacts

The COVID-19 pandemic impacted many aspects of the NVSD's operations, placing considerable strain on financial and staff resources. Managing energy and associated costs remained a priority, but in response to provincial public health guidelines, the focus shifted from energy conservation to providing the safest possible learning environment in an energy-efficient manner. In September 2022 some of the mechanical systems measures, such as ventilation system runtime and outdoor air volumes were modified in an effort to better balance safety and utility costs. Systems are still running longer each day and providing more outdoor air than they did prior to the pandemic, but not to the degree they were during the past two fiscal cycles.

Completed Projects

The NVSD completed the following of energy-related projects in the last fiscal year:

- LED lighting and controls retrofits and Windsor Secondary and Seycove Secondary
- Continuous Optimization at Queen Mary Elementary and Ridgeway Elementary
- Cleveland Elementary heating plant upgrade
- Mountainside Secondary heating plant upgrade
- Electric vehicle charging station installation at four sites
- Development and implementation of a Sustainable Procurement Framework
- Addition of three fully-electric fleet vehicles (two cargo vans and a pickup truck)
- Lynnmour Elementary heating plant and ventilation system upgrade

Annual Utility Costs

In the 2022/23 fiscal year, the NVSD spent approximately \$2.0 million on energy, with 50% of total cost attributed to electricity and 50% attributed to fuel and district energy. Relative to the 2021/22 fiscal year, electricity costs in 2022/23 were down by around 3%, while fuel and district energy costs were down by around 7%. Overall, energy costs were approximately 5% lower in 2022/23.

Key Performance Indicators

Energy use per student and energy cost per student decreased in 2022/23 by 15% and 6% respectively. Water use per student decreased in 2022/23 by 6%, compared to 2021/22, but is still up compared to pre-pandemic levels which is attributed to the increased handwashing in schools.

KPI	2018/19	2019/20	2020/21	2021/22	2022/23
Energy use KPI - ekWh/FTE student	1,596 ekWh	1,617 ekWh	1,793 ekWh	1,853 ekWh	1,581 ekWh
Energy cost KPI - \$/FTE student	\$102	\$99	\$112	\$130	\$122
Water use KPI - m ³ /FTE student	3.85	3.10	3.77	4.25	4.01

Energy Savings Relative to 2009/10

The NVSD previously had an organizational target to achieve 20% energy savings, relative to our 2009/10 baseline, by June 2020. Although this target is no longer a focus for the NVSD, we continue to track our annual energy savings relative to the baseline year as a useful performance indicator.

As of June 30th, 2023 the measured annual energy savings for all facilities (excluding leased locations) was 13.4%, a significant increase compared to 2021/22. Annual electricity savings increased from 22.3% to 25.1% and annual natural gas savings increasing slightly from -6.8% to 6.2%, representing a decrease in annual consumption relative to the 2009/10 baseline year.

Energy Type	2019/20 Actual	2020/21 Actual	2021/22 Actual	2022/23 Actual
Electricity	30%	26.9%	22.3%	25.1%
Fuel and District Energy	9.2%	-8.0%	-6.8%	6.2%
Total (relative to 2009/10)	16.8%	5.3%	4.4%	13.4%

The primary reason for the dramatic change in natural gas consumption is the relaxation of the operational measures previously implemented as part of the NVSD's COVID-19 response. Additionally, 2022/23 was the first fiscal cycle with new Handsworth and the upgraded Mountainside fully operational.

Greenhouse Gas Emissions

Emissions figures are reported on a calendar year basis in line with the provincial methodology. The COVID-19 operational changes were in effect for the majority of the 2022 calendar year and had a dramatic impact on our emissions profile, with our building-related emissions now 2% higher than our 2007 baseline of 4,104 tCO₂e. This is largely due to the increase in energy required for space heating and ventilation. With the relaxation of these operational changes in late 2022 and the reduction in natural gas consumption observed in the 2022/23 fiscal year, we expect 2023 calendar year emissions to be less than the 2007 baseline.

Year	2016	2017	2018	2019	2020	2021	2022
Emissions (tCO ₂ e)	3,145	3,843	3,189	3,825	3,998	3,990	4,184
Reduction relative to 2007 (tCO ₂ e)	959	261	915	279	106	114	-80
Reduction relative to 2007 (%)	23%	6%	22%	7%	3%	3%	-2%

Ongoing Initiatives and Projects

We are implementing the recommendations of our most recent BC Hydro Energy Management Assessment (EMA) that took place in March 2022. The Assessment utilized a “Plan, Do, Check, Act” framework and identified key focus areas and priority action items, along with a detailed task list.

We are working on a range of energy-related projects that support our strategic energy management goals:

- Heating plant upgrade at Cleveland Elementary
- Carson Graham heat pump upgrade
- Sherwood Park heating plant upgrade
- LED lighting and controls retrofits at Queensbury Elementary and Brooksbank Elementary
- Endotherm water treatment pilot at three schools
- 5th floor lighting system upgrade at the Education Services Centre
- District-wide projector upgrade
- Windsor Secondary envelope upgrade
- Electric vehicle charging stations at two locations
- Addition of more fully electric fleet vehicles
- Design of the new fully-electric Cloverley Elementary School

1.0 INTRODUCTION

1.1 Purpose of this Plan

The purpose of this Strategic Energy Management Plan (SEMP) is to guide the North Vancouver School District’s (NVSD’s) energy management activities by providing a framework for reducing energy consumption and its associated environmental impact. This Plan is also one of the key deliverables of the BC Hydro Energy Manager program.

By implementing the actions detailed in this SEM, the NVSD is demonstrating leadership through innovation and accountability for the resources we use. Further, the NVSD is reducing our exposure to energy cost escalations, making our properties more resilient to climate change, and reducing our reliance on the province’s energy infrastructure.

1.2 Scope of this Plan

The scope of this Plan includes sites owned and operated by the NVSD. Although a third-party management company operates it, Cheakamus Centre is also within the scope of the Plan. Sites owned by the NVSD and leased in their entirety to others are outside the scope of this Plan, as are licensed facilities in separate buildings on NVSD sites. The following table details specific inclusions and exclusions.

In Scope	Out of Scope
<ul style="list-style-type: none"> NVSD elementary schools NVSD secondary schools Education Services Centre / Artists for Kids NVSD Maintenance Workshops Cheakamus Centre Closed NVSD schools (e.g. Cloverley Elementary) Licensed facilities within school buildings (e.g. North Shore Neighborhood House Kids Club at Westview Elementary) 	<ul style="list-style-type: none"> Schools leased to others (e.g. Westover Elementary) Licensed facilities in separate buildings (e.g. Learning Together daycare on Sutherland Secondary site) Eslha7an Learning Centre

1.3 BC Hydro Energy Manager Program

The NVSD is proud to participate in the BC Hydro Energy Manager Program. With the support of BC Hydro, the NVSD employed a contract Energy Manager (Prism Engineering) from February 2011 to February 2017. In March 2017, the NVSD employed a full-time Manager of Sustainability, Energy, and Environmental Planning.

We currently have a two-year Energy Manager agreement with BC Hydro that is in effect from April 1, 2022, until

March 31, 2024, and commits the organization to implementing a strategic approach to energy management. To receive financial support from BC Hydro, the NVSD must meet the following key program deliverables:

- hire or designate a full-time Energy Manager
- develop an annual Strategic Energy Management Plan
- hold quarterly meetings with company stakeholders and BC Hydro representatives
- have the Energy Manager attend training events and Energy Manager Forums
- implement energy conservation projects that result in 225,000 kWh of electricity savings per year
- support low-carbon electrification that results in 75,000 kWh year of additional consumption per year
- participate in an Energy Management Assessment (EMA) every two years
- plan for Greenhouse Gas reductions in line with Clean BC requirements
- work towards adopting the Energy Star Portfolio Manager benchmarking tool

1.4 Time Periods Referenced

Because our energy management program includes a range of short, medium, and long-term initiatives that are subject to both internal (NVSD) and external (BC Hydro, Provincial) funding and reporting requirements, this Plan includes references to multiple fiscal cycles. A summary of each cycle, and its relevance to our energy management activities, is provided below.

July 1 st – June 30 th	April 1 st – March 31 st
<p>NVSD Fiscal Year</p> <ul style="list-style-type: none"> - Organizational energy reduction target reporting - Energy performance benchmarking - Budget information - Key performance indicators 	<p>BC Hydro Fiscal Year</p> <ul style="list-style-type: none"> - Energy conservation project lists <p>Ministry of Education Project Funding</p> <ul style="list-style-type: none"> - Annual Facilities Grant (AFG) - School Enhancement Program (SEP) - Carbon Neutral Capital Program (CNCP) - Building Envelope Program (BEP)

Organizational greenhouse gas emissions figures are reported on a calendar year basis in line with the provincial methodology.

2.0 OUR ORGANIZATION

The North Vancouver School District provides kindergarten, elementary and secondary education to approximately 16,500 students throughout the City and District of North Vancouver and employs almost 2,900 staff. The current (2022/23) annual operating budget is approximately \$213 million with additional capital project and grant funding provided by the Ministry of Education and Child Care for new construction, renovations and improvements.

The scope of our energy management program does not include energy use directly billed to others at the NVSD's leased locations (see Appendix B for a list of locations).

2.1 Organizational Profile

The NVSD at a Glance					
P E O P L E	Sector	K-12 Education (School District)			
	Number of Students	2013/14	15,042	2018/19	15,758
		2014/15	15,082	2019/20	15,822
		2015/16	15,980	2020/21	15,942
		2016/17	15,705	2021/22	16,185
		2017/18	15,777	2022/23	16,434
Number of Staff	2,908 employees (full-time and part-time): 136 administrators and management, 1,229 teachers, and 1,543 other staff				
O P E R A T I O N S	Number of Sites Owned (details in Appendix B)	42 Total - 25 elementary schools - 7 secondary schools - 3 support facilities (Education Services Centre, Cheakamus Centre, Lucas Centre) - 2 closed sites (Cloverley Elementary, Leo Marshall Curriculum Centre) - 4 leased elementary schools (excluded from the scope of this Plan) - 1 leased daycare site			
	Energy Management Issues / Obstacles	Aging buildings and mechanical systems Ministry grants insufficient to address lifecycle issues No dedicated building operations staff Emerging reactive/unscheduled maintenance issues More stringent ventilation requirements			
	Core Business Metrics	Total energy cost Energy use per square meter Energy use per student			
	Fiscal Year	July 1 st to June 30 th			
	Budget Cycle	Budget requests are required by March			

2.2 Operating Budget Summary

The following table presents a breakdown of the NVSD’s Facilities and Operations budgets for the current fiscal year and the two prior.

Budget Item	2021/22	2022/23	2023/24
Facilities Operations Budget (Labour, Supplies, Contracts, and Utilities)	\$17,505,859 out of \$206,430,859 overall (≈8.5% of NVSD budget)	\$18,291,148 out of \$213,338,434 overall (≈8.6% of NVSD budget)	\$19,227,898 out of \$236,847,295 overall (≈8.1% of NVSD budget)
Utilities Budget	Total \$2,370,000 (≈13.5% of facilities)	Total \$2,565,000 (≈14.0% of facilities)	Total \$2,580,650 (≈13.4% of facilities)
Electricity	\$1,000,000	\$1,050,000	\$1,050,000
Natural Gas	\$650,000	\$750,000	\$800,750
District Energy	\$125,000	\$150,000	\$121,500
Propane	\$10,000	\$20,000	\$17,500
Carbon Offsets	\$125,000	\$135,000	\$135,000
Water	\$110,000	\$110,000	\$118,000
Sewage	\$150,000	\$150,000	\$162,400
Garbage and Recycling	\$200,000	\$200,000	\$175,000

2.3 Other Funding Sources

In addition to its annual operating budget, the NVSD is eligible to receive funding for specific types of projects, including the Annual Facility Grant (AFG), School Enhancement Program (SEP), Carbon Neutral Capital Program (CNCP), and Building Envelope Program (BEP).

Energy efficiency and conservation projects are generally funded using the AFG, which has been in the order of \$3.8 million in recent years and has not increased with the pace of construction escalation. This presents a challenge as the limited AFG must address lifecycle renewal of building systems and components, meaning energy projects may be deferred when higher priority issues, such as life safety issues or water leakage, arise.

As a point of reference, the Ministry of Education and Child Care’s asset management tool indicates that over \$90 million in investment is needed to address all of the NVSD’s asset renewal requirements.

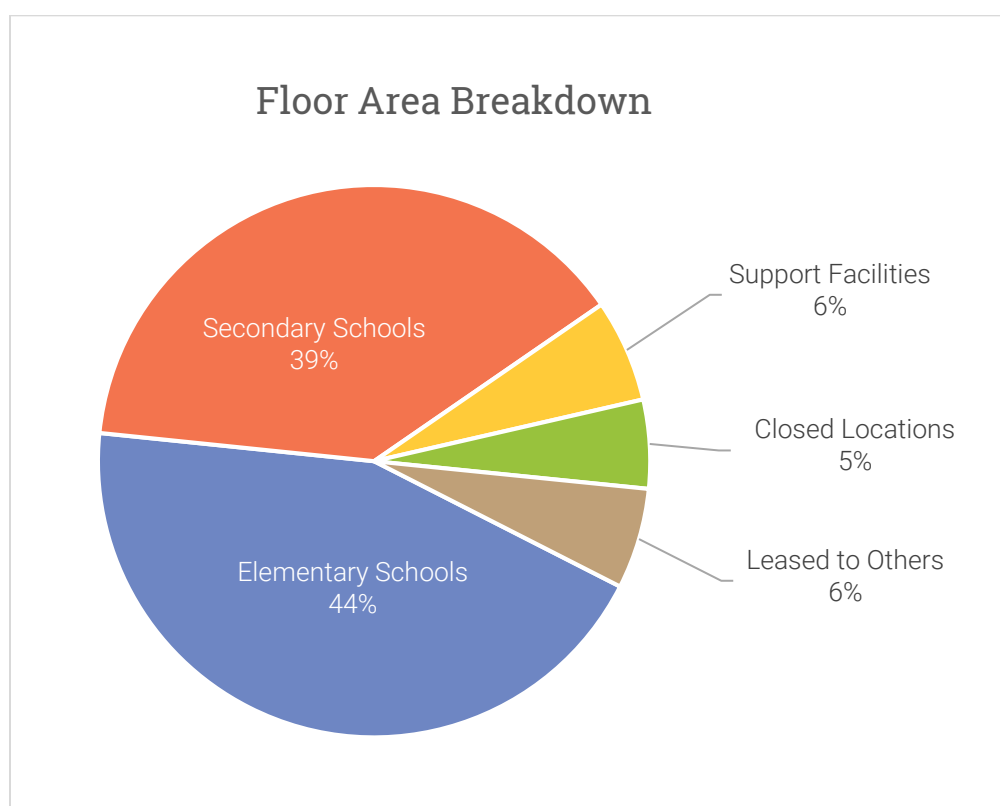
In 2022/23 the NVSD established a Climate Action Fund of approximately \$70,000 per year to support energy- and emissions-related initiatives across the school district. This fund can be used to support school-based efforts, educational initiatives, and minor capital projects that advance our strategic energy management goals.

2.4 Facility Profiles

As of September 2022, the NVSD owns 42 sites consisting of 25 elementary schools, 7 secondary schools, and 3 support facilities. Two sites are currently closed and five complete sites are leased to others. Appendix B provides details of NVSD’s sites.

Properties leased to others in their entirety are outside the scope of this SEMP, as are licensed buildings (typically child care facilities) on NVSD property. Appendix C provides details on the annual energy consumption, cost and intensity for each of NVSD's operated facilities.

The following graph shows an approximate breakdown of total floor space by building type.



3.0 OUR COMMITMENT

The North Vancouver School District's vision is to *provide world-class instruction and a rich diversity of engaging programs to inspire success for every student and bring communities together to learn, share and grow*. The NVSD's Ten-Year Strategic Plan, Two-Year Operating Plan, Sustainability Policy and Senior Executive's commitment to energy management underlines the importance of providing leadership in environmental education and sustainability.

3.1 Strategic and Operational Plans

Environmental Stewardship is one of the six pillars of the NVSD's 2021 - 2031 Strategic Plan, which makes the firm commitment to *lead on sustainable practices and nature-based learning to address environmental challenges*, and specifically identifies several key actions that support our strategic energy management activities:

- Bring an environmental lens to our decisions and our teaching practices
- Support environmental initiatives that champion sustainability
- Implement building and organizational infrastructure that reflects the values of environmental stewardship

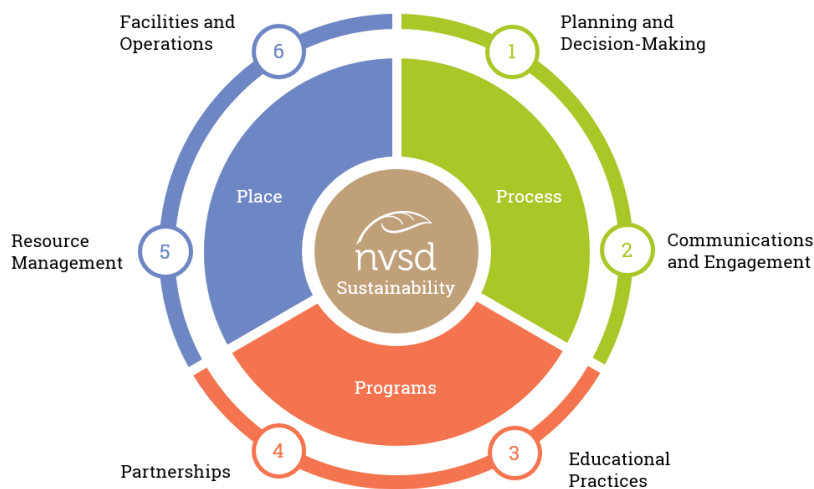
3.2 Organizational Sustainability

In 2011 the NVSD adopted a Sustainability Policy (see Appendix D) that commits the organization to maintaining and operating its facilities in a sustainable manner. In 2017 the NVSD launched its district-wide Sustainability Strategy, which includes strategic priorities within three broad areas of the NVSD community:

Process: The structures that guide how we plan, act, share, and celebrate.

Programs: Educational practices and partnerships that support a sustainable school district.

Place: The natural and built environments that support the NVSD community.



3.3 Energy Management Team

The NVSD embraces a team approach to energy management that brings together a variety of stakeholders. The table below lists key members of the NVSD energy management team.

Name	Position	Role
Jacqui Stewart	Secretary Treasurer	Executive sponsor of program
Jim MacKenzie	Director of Facilities and Planning	Facilities and Planning lead
Mike Chapman	Assistant Director of Facilities and Planning	Facilities and Planning co-lead
Luke Smeaton	Manager of Sustainability, Energy and Environmental Planning	Energy management program lead
Jeff Jackson	Maintenance Manager	Operations and maintenance lead
Helena Drury	Director of Financial Services	Budget management
Lisa Della Vecchia	Communications Manager	Internal and external communications
Teodora Dotzeva	Director of Information and Communications Technology (ICT)	ICT program lead

3.4 Energy Management Partners

Our utility partners, BC Hydro and Fortis BC, support the NVSD’s energy management program through training, program funding, and project incentives.

Name	Position	Organization	Role
Aron Garrecht	Key Account Manager	BC Hydro	Primary contact at BC Hydro
Vladimir Kostka	Key Account Manager	Fortis BC	Primary contact at Fortis BC

3.5 Broader Stakeholder Engagement

The NVSD’s energy management program includes a range of activities aimed at engaging and supporting a broad range of stakeholders in our learning community. Examples include:

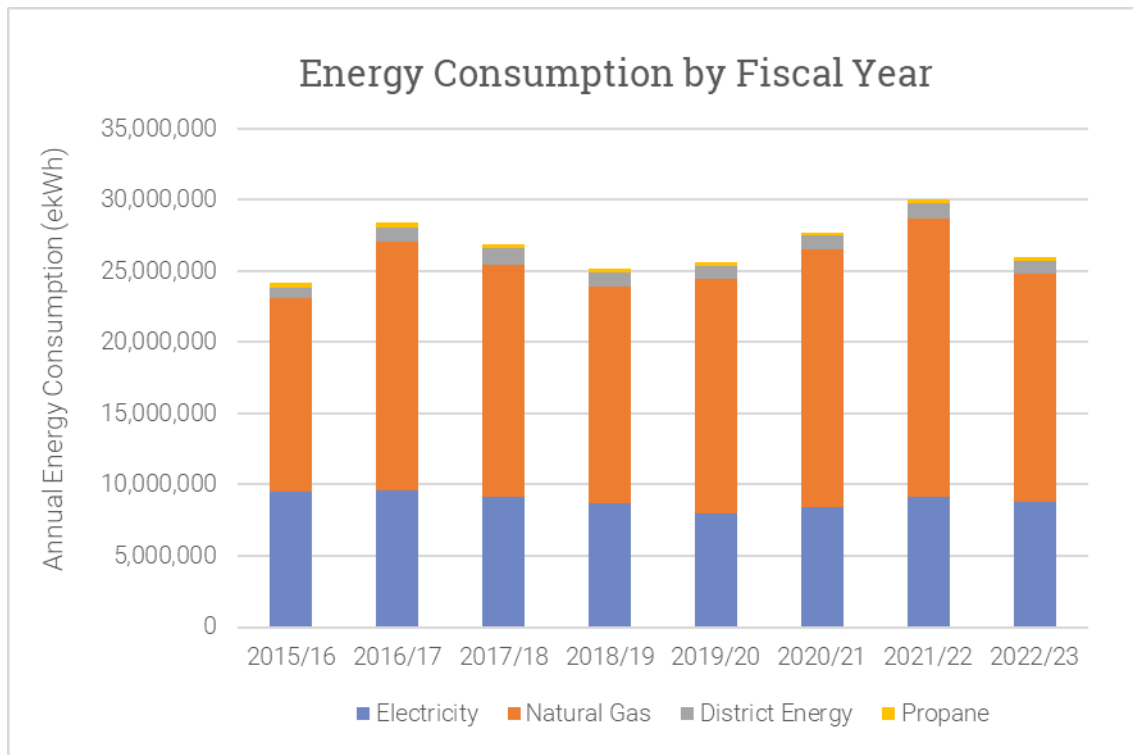
- Publishing a quarterly NVSD Sustainability Newsletter that provides information about energy projects.
- Supporting individual staff and students with class projects related to energy.
- Supporting Green Team and Environment Club with initiatives such as “lights out lunch” and “cozy clothes day”.
- The NVSD Sustainability Committee that includes stakeholders from The North Vancouver Teacher’s Association (NVTa) that represents teachers, The Canadian Union of Public Employees (CUPE) that represents custodial staff, trades, and education assistants, the North Vancouver Administrators’ Association (NoVA) that represents school Principals and Vice Principals, North Vancouver Parent Advisory Council (NVPAC) that represents parents.

4.0 UNDERSTANDING OUR SITUATION

4.1 Energy Consumption and Costs

The total electricity, fuel (natural gas and propane), and district energy (Lonsdale Energy) consumption and costs for the last two years are summarized below. Equivalent kilowatt-hours (ekWh) have been used to combine the electrical (kWh), district energy (kWh), natural gas (GJ) and propane fuel (litres) energy in a comparable unit¹.

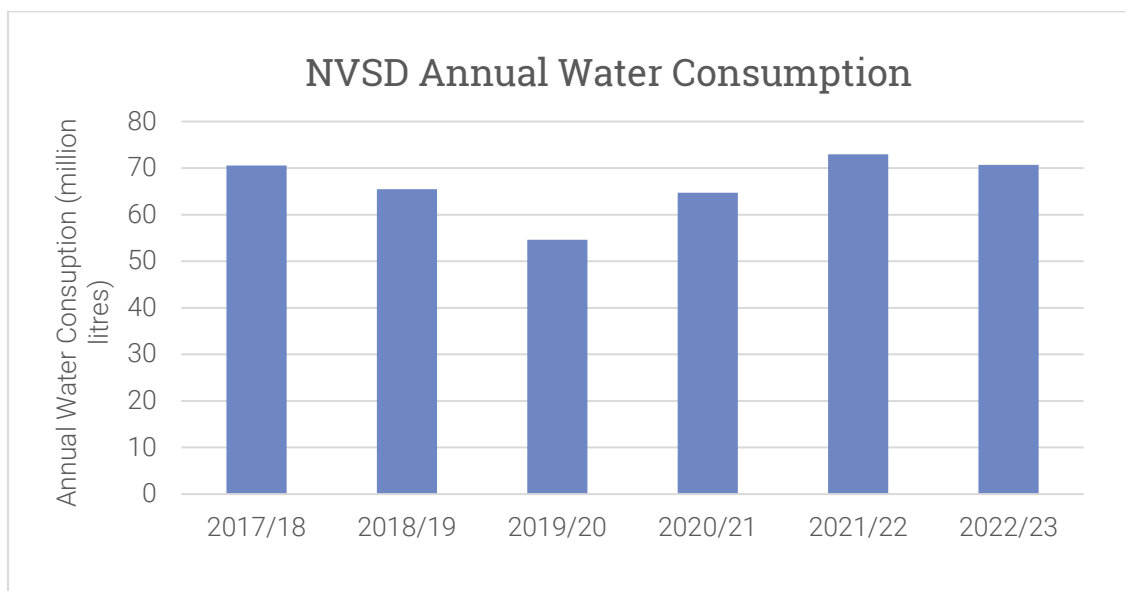
Utility	2021/22		2022/23	
	Consumption	Cost	Consumption	Cost
Electricity	9,174,919 kWh	\$1,045,983	8,761,919 kWh	\$1,009,941
Natural Gas	19,472,222 ekWh	\$892,604	16,006,111 ekWh	\$832,582
District Energy	1,084,203 ekWh	\$139,475	950,657 ekWh	\$134,379
Propane	252,138 ekWh	\$25,443	259,431 ekWh	\$24,785
Total	29,983,482 ekWh	\$2,103,505	25,977,869 ekWh	\$2,001,687



¹ This SEMP uses equivalent kilowatt-hours, or ekWh, to represent the electrical, fuel, and district energy use in equivalent units. Electricity and district energy are billed in kWh, natural gas billed in gigajoules (one GJ of natural gas is equivalent to 277.78 kWh), and propane billed in litres (one L of propane is equivalent to 7.38 kWh).

4.2 Water Consumption

The total water consumption for school district facilities (enrolling schools, Education Services Centre, and Lucas Centre) is shown below. Water consumption was trending downwards from 2017/18 to 2019/20 and then increased in 2020/21 and 2021/22 due to the increased handwashing and cleaning in schools in response to the COVID-19 pandemic. Water consumption reduced slightly in 2022/23 compared to 2021/22 but is still up compared to pre-pandemic levels.

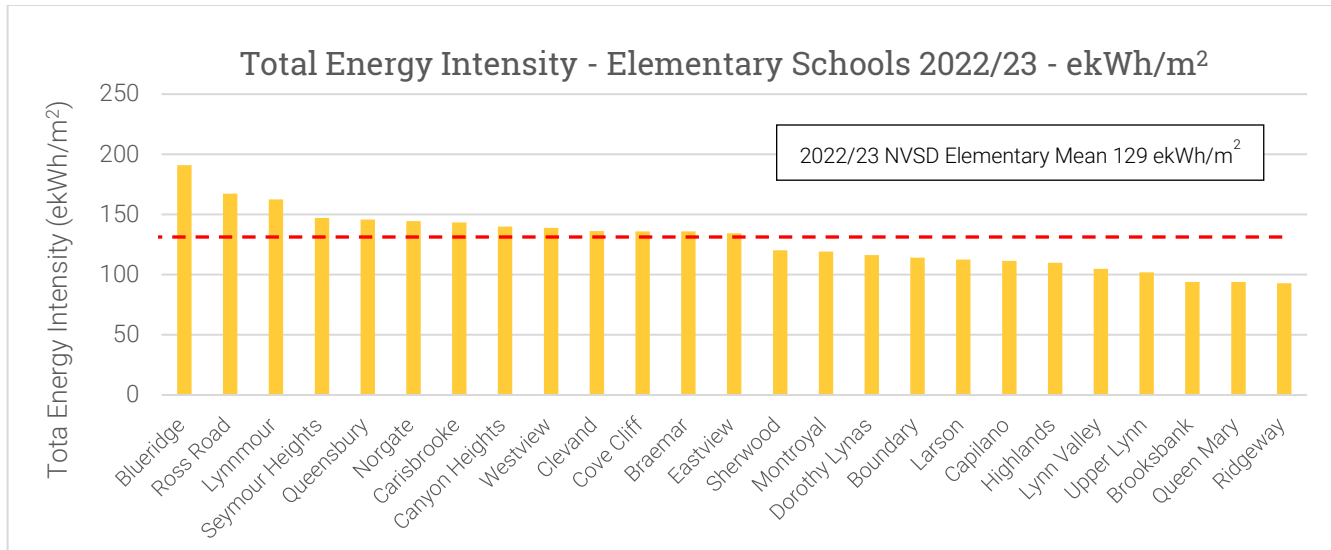


4.3 Key Performance Indicators

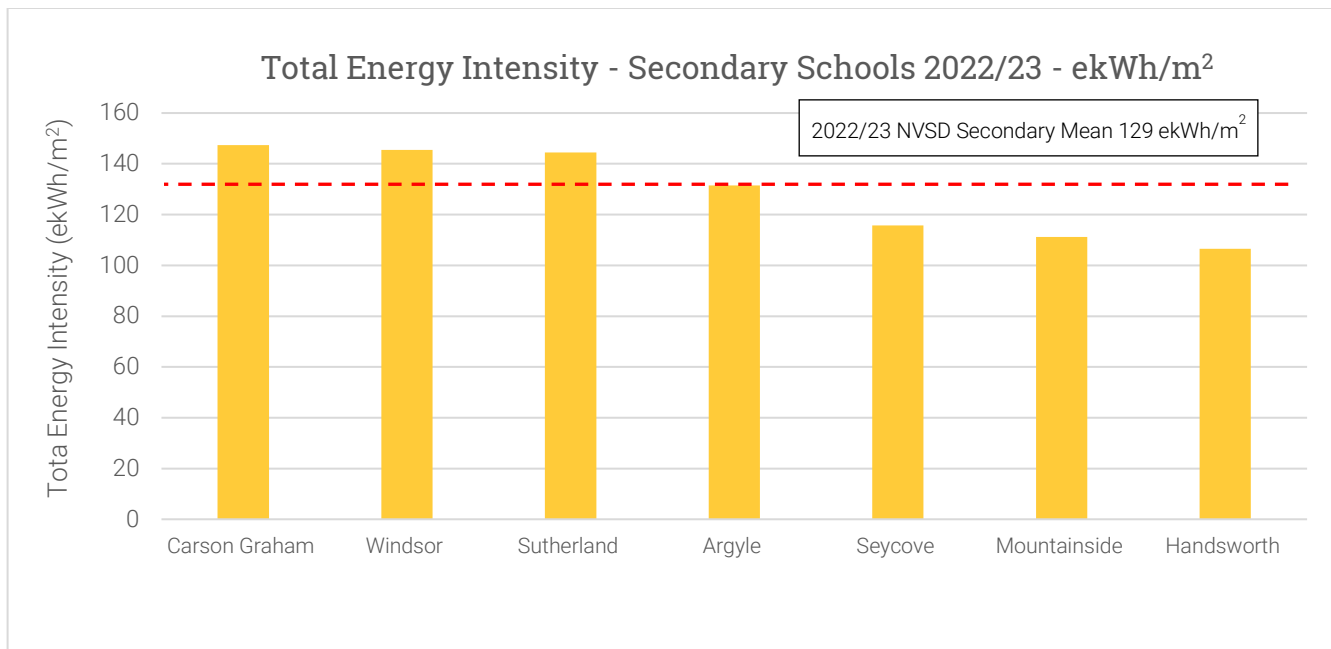
Energy

The following graphs summarize the Building Energy Performance Intensities (BEPIs) for several building types to compare energy performance. Graphs present combined energy use (electricity, natural gas, propane, and district energy) normalized by building area.

In 2022/23, the BEPIs for the NVSD's elementary schools ranged from 93 to 191 ekWh/m², with a mean of 129 ekWh/m² (shown by the dashed red line on the chart). This represents a reduction in average annual BEPI of approximately 13%, compared to the average in 2021/22.



The NVSD's secondary schools have more consistent BEPIs compared to the elementary schools, ranging from 107 to 148 ekWh/m², also with a mean of 129 ekWh/m² (shown by the dashed red line on the chart). This represents a reduction in average annual BEPI of approximately 14%, compared to the average in 2021/22.



Two common key performance indicators (KPIs) used by BC school districts are the energy use per full-time equivalent (FTE) student and energy cost per FTE student per year. The following table compares these KPIs from the 2017/18 fiscal year through to 2022/23.

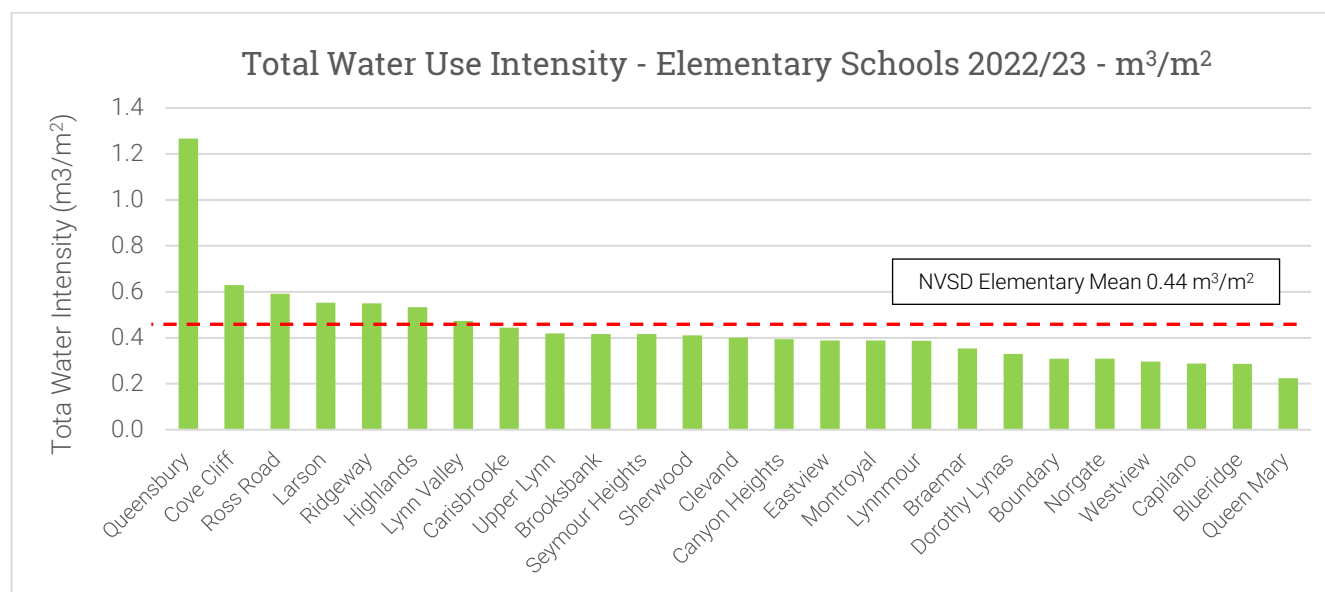
	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
FTE Students	15,777	15,758	15,822	15,942	16,185	16,434
Total Energy (ekWh)	26,857,150	25,151,940	25,586,368	27,726,714	29,983,482	25,977,869
KPI: ekWh/student	1,702	1,596	1,617	1,739	1,853	1,581
Total Energy Cost	\$1,681,083	\$1,611,996	\$1,561,096	\$1,787,367	\$2,103,505	2,001,687
KPI: \$/student	\$107	\$102	\$99	\$112	\$130	\$122

Energy use per student and energy cost per student decreased in 2022/23 by 15% and 6% respectively.

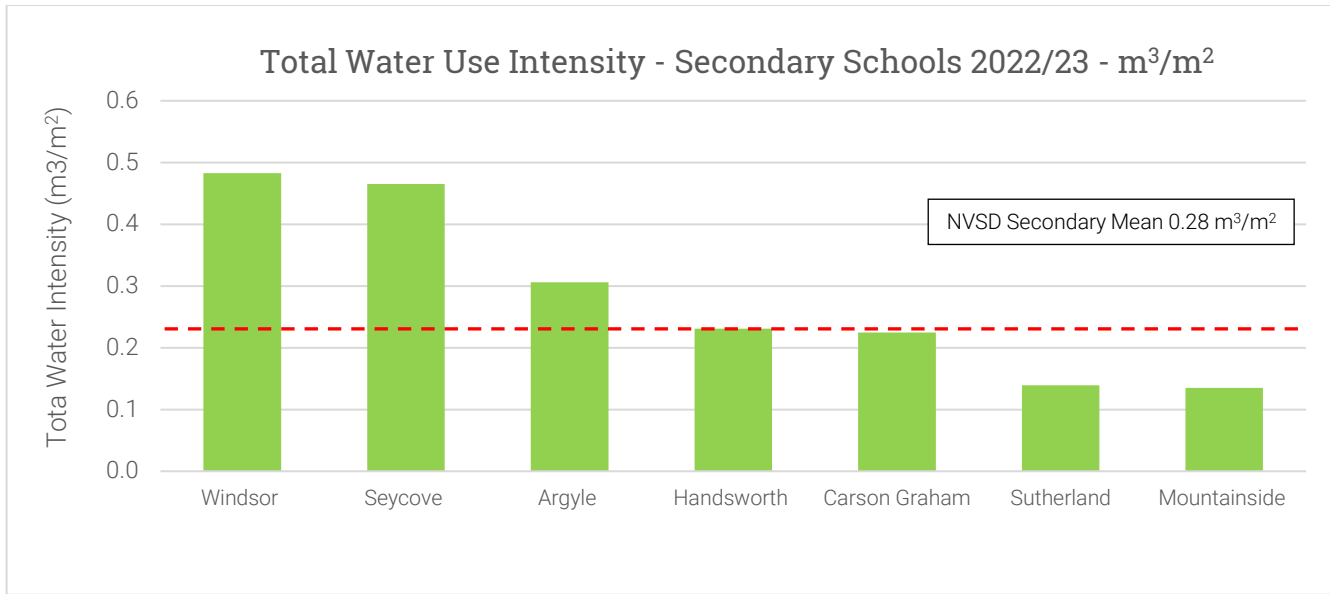
Water

The total water use intensity for NVSD elementary schools is shown below, with the units of cubic meters of water consumed per square meter of building floor area.

In 2022/23, the water use intensities of NVSD's elementary schools ranged from 0.22 to 1.27 m³/m², with a mean of 0.44 m³/m² (shown by the dashed red line on the chart). The high water use at Queensbury Elementary was the result of ongoing plumbing issues that the maintenance team resolved towards the end of the 2022/23 fiscal cycle.



The NVSD's secondary schools have water use intensities ranging from 0.13 to 0.48 m³/m², with a median of 0.28 m³/m² (shown by the dashed red line on the chart).



A newer KPI used by the NVSD is water use per full-time equivalent (FTE) student. The following table compares this KPI from the 2017/18 fiscal year through to 2021/22.

	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23
FTE Students	15,777	15,758	15,822	15,942	16,185	16,434
Total Water Use (m³)	70,576	65,473	54,611	64,683	72,930	70,700
KPI: m³/student	4.05	3.85	3.10	3.77	4.25	4.01

Water use per student decreased in 2022/23 by 6%, compared to 2021/22, but is still up compared to pre-pandemic levels which is attributed to the increased handwashing schools.

4.4 Organizational Targets

BC Hydro Energy Targets

The BC Hydro Energy Manager Program conservation target for the current year is 225,000 kWh of electricity. The BC Hydro low-carbon electrification target is 75,000 kWh of additional consumption.

Sites in Portfolio Manager

As part of the BC Carbon Neutral Government program, all NVSD sites are in Energy Star Portfolio Manager.

Greenhouse Gas Emissions

The NVSD is using the *Clean BC* targets, 40% by 2030 and 80% by 2050, to guide our emissions reduction efforts.

4.5 Prioritizing Opportunities

With so many projects competing for funding, the NVSD has adopted a comprehensive integrated approach to prioritizing opportunities.

All projects requiring funding from either the Annual Facility Grant (AFG), School Enhancement Program (SEP), Carbon Neutral Capital Program (CNCP), and/or Building Envelope Program (BEP) are entered into the NVSD Computerized Maintenance Management System to create a dynamic register of requirements.

Members of the NVSD Facilities and Planning team meet several times per year to review the register and prioritize projects for implementation by balancing a range of considerations, including:

- Lifecycle renewal requirements (e.g. imminent equipment failure)
- Inclusion and accessibility
- Improvements in occupant comfort and/or experience (e.g. better system controls)
- Emissions reductions
- Functional requirements (e.g. reconfiguration of teaching space or replacement of gymnasium floors)
- Energy cost reductions
- Emergent code-related issues (e.g. fire alarm or public address system upgrades)

5.0 INITIATIVES AND PROJECTS

This section summarizes energy management initiatives and projects. Past projects, those completed prior to the 2022/23 Annual Facilities Grant cycle, are summarized in Appendix E.

5.1 Strategic Initiatives

The NVSD's seventh and most recent Energy Management Assessment (EMA) took place in March 2022 and provided key focus areas and priority action items, along with a detailed task list. A summary of progress on recommended actions is provided below.

Focus Area	Action Item	Status
Executive Involvement	Have executive sponsors promote success stories and work towards engaging employees on energy efficiency and sustainability.	Ongoing – Energy Manager is regularly engaging with senior staff in the organization, including Learning Services.
	Increase transparency of energy use by publicly disclosing performance through Building Benchmark BC.	Complete – NVSD participated in 2021 and 2022 Building Benchmark BC programs.
Policy/Charter & Goals	Update existing sustainability policy document with energy and GHG reduction goals. Consider including ongoing training for sustainability in policy.	In progress - New Sustainability Policy going to review committee in January 2024.
	With the help of HR, develop an online training module for new employees and add to existing training system. It will act to update their knowledge and to make them aware of the district's sustainability policy and goals. It can also be used to reinforce the knowledge of existing employees in their annual training.	In progress – NVSD <i>Sustainability 101</i> training material drafted.
Planning & Budgeting	Develop a comprehensive register of projects. This would include small and large projects across departments to ensure all energy saving measures can be prioritized, tracked, and quantified.	Ongoing – Projects are identified and managed in the computerized maintenance management system IMPAK.
	Work with Key Account Manager on advocacy to the Ministry of Education and Child Care for the financial support electrification efforts.	Ongoing – NVSD is collaborating with BC Hydro and other school districts on advocacy efforts.

Focus Area	Action Item	Status
Energy Team	Create a formal and cross functional climate action team. This team can include people from the custodial team, HR, communications, or other departments who may support energy savings/climate action initiatives.	Ongoing – NVSD Sustainability Committee meeting quarterly, Sustainability Leadership Workshop held in January 2023
	Hold regular energy team meetings in which projects are assigned to specific team members and team members are updated on program progress.	Ongoing
Employee Engagement	Engage custodial staff in efficient projects and behavioral campaigns like “turn-off”. This could be supported by delivering an engagement training workshop to custodial staff.	Ongoing
	Increase engagement of staff and students through climate action campaigns. This could include activities like paper conservation week, sweater days, and energy treasure hunts.	Ongoing
Training & Development	Integrate external energy training opportunities with annual staff education plans for staff closely engaged in conservation. When training is complete, ask employees to briefly report back to staff on what they learned to spread the knowledge.	Ongoing – District-wide professional development event with sustainability content held on December 2023
	Integrate periodic “energy moments” in staff meetings to upskill and/or increase awareness.	Ongoing
Procurement & Partnering	Formalize the criteria for procurement as it relates to areas like equity, GHG emissions, cost, sustainability, or other areas important to the district.	Ongoing - All RFPs now include sustainability requirements.
	Consider implementing process where the Energy Manager is consulted on procurement of equipment with high energy requirements.	Complete - Energy Manager is part of the procurement process for major purchases.
Audit, Review & Control	Increase employee awareness on the abundance of information stored on the OneDrive and Maintenance Management System.	Ongoing
Overall Effectiveness	Prioritize low-cost/no-cost measures. Given the size of the district, small changes to set points, schedules, etc., can lead to a significant level of energy savings while avoiding capital investment.	Ongoing

5.2 Projects Completed in AFG 2022/23

The following table summarizes the projects completed in the last Annual Facilities Grant cycle (AFG 2022/23).

Project Location / Description	Projected Completion	Potential Elec. Savings (kWh)	Added Elec. Load (kWh)	Potential Fuel Savings (GJ)	Projected Total Cost
Mountainside HVAC upgrade	31-Dec-22	-	-	600	\$500,000
Seycove LED lighting and controls	31-Mar-23	93,000	-	-	\$250,000
Windsor LED lighting and controls	31-Mar-23	87,000	-	-	\$300,000
Lynnmour heating plant upgrade	31-Mar-23	-	-	200	\$1,030,000
Seymour Heights LED lighting and controls	31-Mar-23	25,000	-	-	\$50,000
Ridgeway continuous optimization	31-Mar-23	1,100	-	39	\$7,500
Queen Mary continuous optimization	31-Mar-23	3,100	-	42	\$7,500
EV charging stations at four sites	31-Mar-23	-	100,000	-	\$50,000
Total		209,200 kWh	100,000 kWh	881 GJ	\$2,125,000

5.3 Projects in Progress for AFG 2023/24

The following table summarizes the projects in progress for the current Annual Facilities Grant cycle (AFG 2023/24).

Project Location / Description	Projected Completion	Potential Elec. Savings (kWh)	Added Elec. Load (kWh)	Potential Fuel Savings (GJ)	Projected Total Cost
Sherwood Park heating plant upgrade	31-Mar-24	-	20,000	521	\$350,000
Cleveland heating plant upgrade	31-Mar-24	-	20,000	625	\$350,000
Blueridge heating plant upgrade	31-Dec-23	-	TBD	200	\$350,000
Carson Graham heat pump replacement	30-Sept-24	-	180,000	1,300	\$800,000

Project Location / Description	Projected Completion	Potential Elec. Savings (kWh)	Added Elec. Load (kWh)	Potential Fuel Savings (GJ)	Projected Total Cost
Endotherm pilot – 3 sites	30-Dec-23	-	-	490	\$10,000
Windsor envelope upgrade Phase 1	31-Aug-24	-	-	100	\$2,000,000
Queensbury LED lighting and controls	31-Mar-24	20,000	-	-	\$80,000
Brooksbank LED lighting and controls	31-Mar-24	20,000	-	-	\$80,000
ESC 5 th floor lighting upgrade	31-Aug-23	5,000			\$3,000
Total		45,000 kWh	220,000 kWh	3,236 GJ	\$3,025,000

5.4 Potential Projects for AFG 2024/25

Project Location / Description	Projected Completion	Potential Elec. Savings (kWh)	Added Elec. Load (kWh)	Potential Fuel Savings (GJ)	Projected Total Cost
Argyle C-Op	31-Mar-25	200,000	-	TBD	\$20,000
Larson LED lighting and controls	31-Mar-24	25,000	-	-	\$90,000
Windsor envelope upgrade Phase 2	2025	-	-	50GJ	\$1,000,000
Total		225,000 kWh	0 kWh	50 GJ	\$1,110,000

5.5 Potential Projects for AFG 2025/26 and Beyond

Project Location / Description	Projected Completion	Potential Elec. Savings (kWh)	Added Elec. Load (kWh)	Potential Fuel Savings (GJ)	Projected Total Cost
Mountainside air source heat pump	TBD	-	TBD	454	\$150,000
Carisbrooke heating plant upgrade	TBD	-	TBD	625	\$350,000
Windsor heating plant upgrade	TBD	-	TBD	1,706	\$1,000,000
Seycove heating plant upgrade	TBD	-	TBD	500	\$800,000
Seymour Heights heating plant upgrade	TBD	-	-	417	\$350,000
Highlands LED lighting and controls	TBD	25,000	-	-	\$90,000
Ridgeway LED lighting and controls	TBD	25,000	-	-	\$90,000
Queen Mary LED lighting and controls	TBD	25,000	-	-	\$90,000
Sutherland LED lighting and controls	TBD	75,000	-	-	\$200,000
Carson Graham LED lighting and controls	TBD	75,000	-	-	\$200,000
Lynnmour LED lighting and controls	TBD	20,000	-	-	\$80,000
ESC re-lamping and lighting controls	TBD	20,000	-	-	\$40,000
Total		285,000 kWh		2,600GJ	\$3,440,000

5.6 Energy Management Engagement

Educators, staff and students play an important role in energy conservation efforts at the NVSD. They have direct control over much of the equipment that consumes energy in a school or classroom, including lights, computers and plug loads.

The NVSD scaled back its energy engagement efforts in recent years due to the COVID-19 pandemic and increased occupant sensitivity around building system operation, indoor environment quality, and ventilation rates. Engagement efforts have ramped back up for the 2023/24 school year with a campaign to reduce printing the copying as well as ongoing efforts to embed energy and sustainability-related considerations into our procurement processes

6.0 MONITORING AND REPORTING

6.1 Energy Savings Progress

The annual energy savings as of June 2023 for all facilities (excluding leased locations) was 13.4%, representing a decrease in energy consumption compared to 2021/22. The table below presents a breakdown of the savings, relative to our 2009/10 baseline.

Energy Type	2020/21 Actual	2021/22 Actual	2022/23 Actual
Electricity	26.9%	22.3%	25.1%
Fuel and District Energy	-8.0%	-6.8%	6.2%
Total	5.3%	4.4%	13.4%

The primary reason for the dramatic change in natural gas consumption is the relaxation of the operational measures previously implemented as part of the NVSD’s COVID-19 response. Additionally, 2022/23 was the first fiscal cycle with new Handsworth and the upgraded Mountainside fully operational.

6.2 Greenhouse Gas Emissions

Emissions figures are reported on a calendar year basis in line with the provincial methodology. Figures and targets are absolute values, not normalized for weather, student population, or size of our facilities portfolio. The table below shows building-related greenhouse gas emissions for the past six years in relation to NVSD’s 2007 baseline of 4,104 tCO₂e.

Year	2016	2017	2018	2019	2020	2021	2022
Emissions (tCO ₂ e)	3,145	3,843	3,189	3,825	3,998	3,990	4,184
Reduction relative to 2007 (tCO ₂ e)	959	261	915	279	106	114	-80
Reduction relative to 2007 (%)	23%	6%	22%	7%	3%	3%	-2%

The data shows the dramatic impact that the COVID-19 operational changes had on our emissions profile, with our building-related emissions now only slightly lower than they were in 2007. This is largely due to the increase in fuel and district energy required for space heating and ventilation.

With the relaxation of these operational changes in late 2022 and the reduction in natural gas consumption observed in the 2022/23 fiscal year, we expect 2023 calendar year emissions to be less than the 2007 baseline.

The NVSD is using the *Clean BC* targets, 40% by 2030 and 80% by 2050, to guide our emissions reduction efforts. The NVSD’s ability to achieve these targets depends largely on the funding provided by the Ministry of Education, so we must continue to advocate for the building and systems upgrade projects required to reduce our emissions.

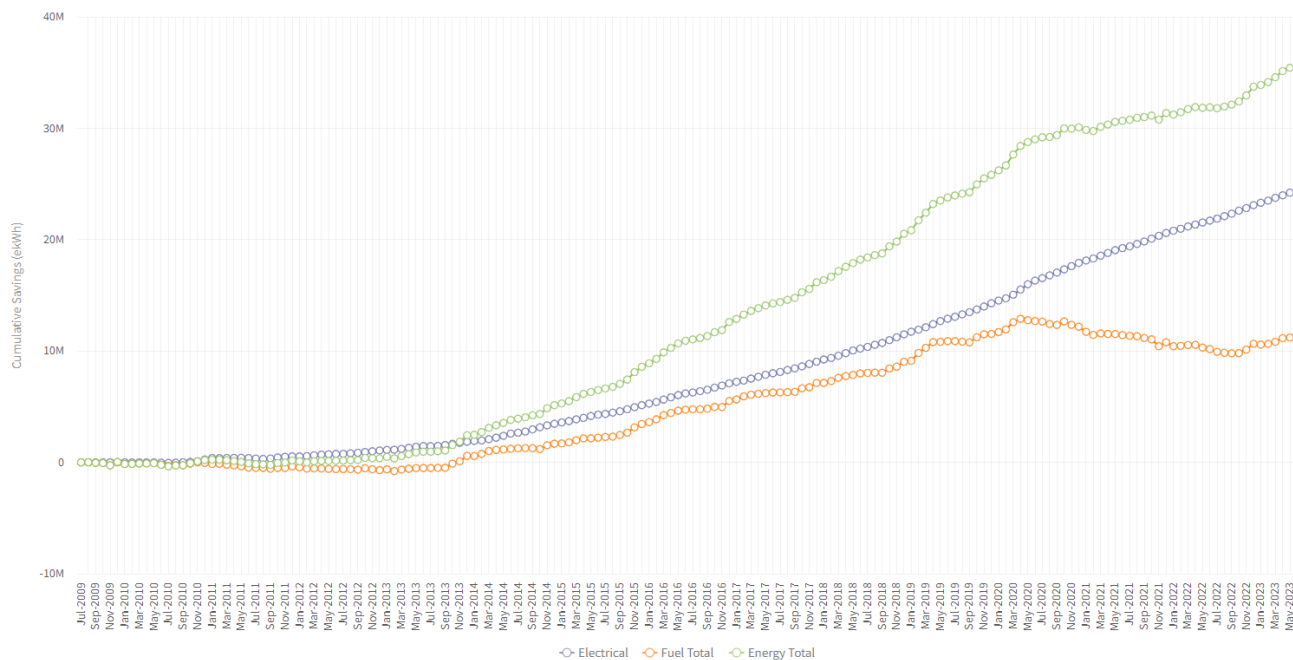
6.3 Cumulative Savings

The next figures illustrate trends in savings from where we stand as of fiscal year 2022/23 in terms of energy savings, avoided costs, and greenhouse gas emissions reduction.

Energy Savings

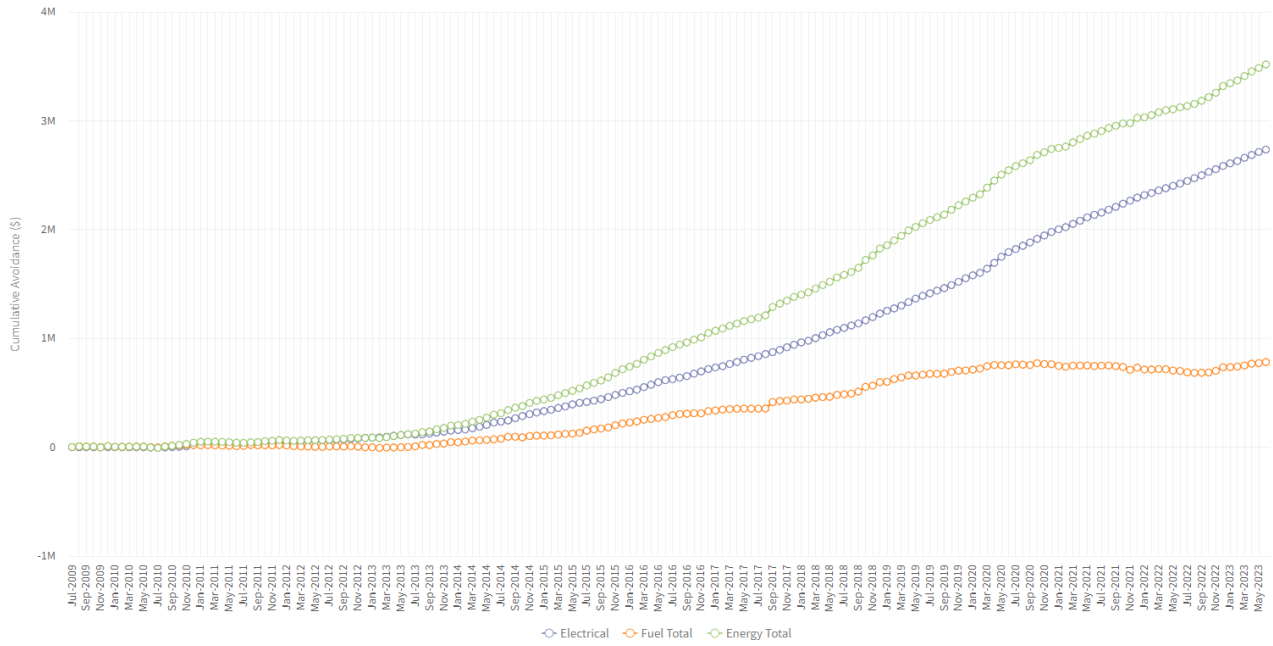
The cumulative savings shown in the figures and tables below are represented by equivalent kWh (ekWh) and are normalized for fluctuations in weather. Negative savings (below zero) on the graph represent an increase in consumption. These savings are calculated from the end of the baseline year (2009/10).

There has been steady electrical savings since the implementation of the Energy Management program with fuel trends have been improving since late 2013. The cumulative energy savings are since 2009/10 are 35,710,000 ekWh.



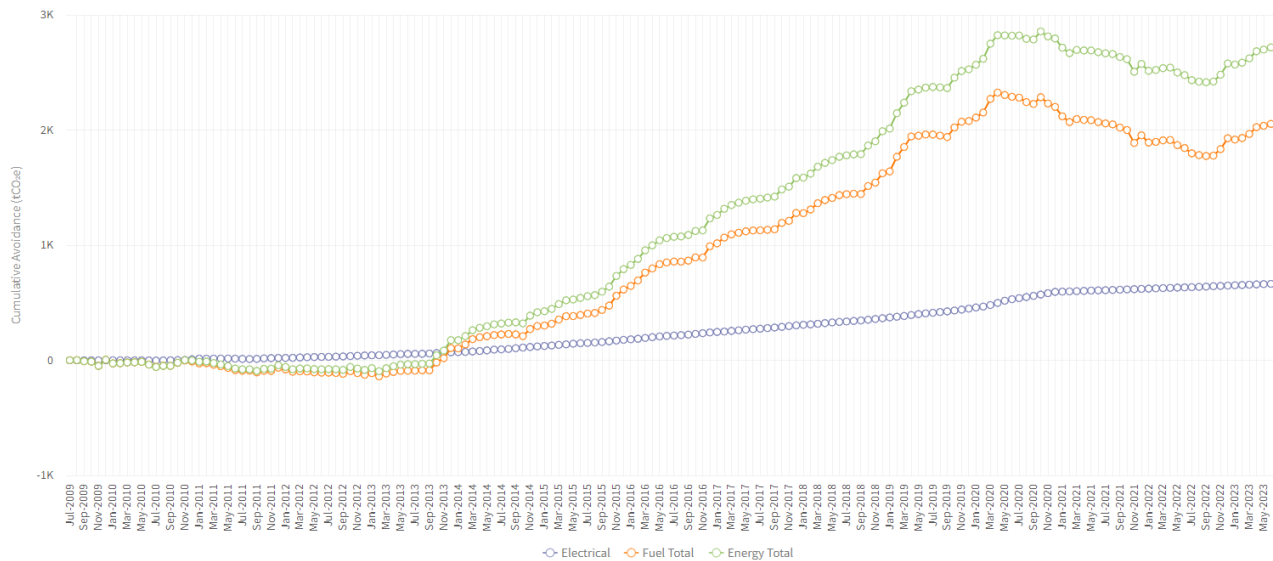
Avoided Costs

The cumulative avoided costs since the end of 2009/10 are more than \$3,520,000 (based on average costs of energy each month).



Avoided Emissions

The cumulative avoided emissions since the end of 2009/10 are more than 2,700 equivalent tons of carbon dioxide.

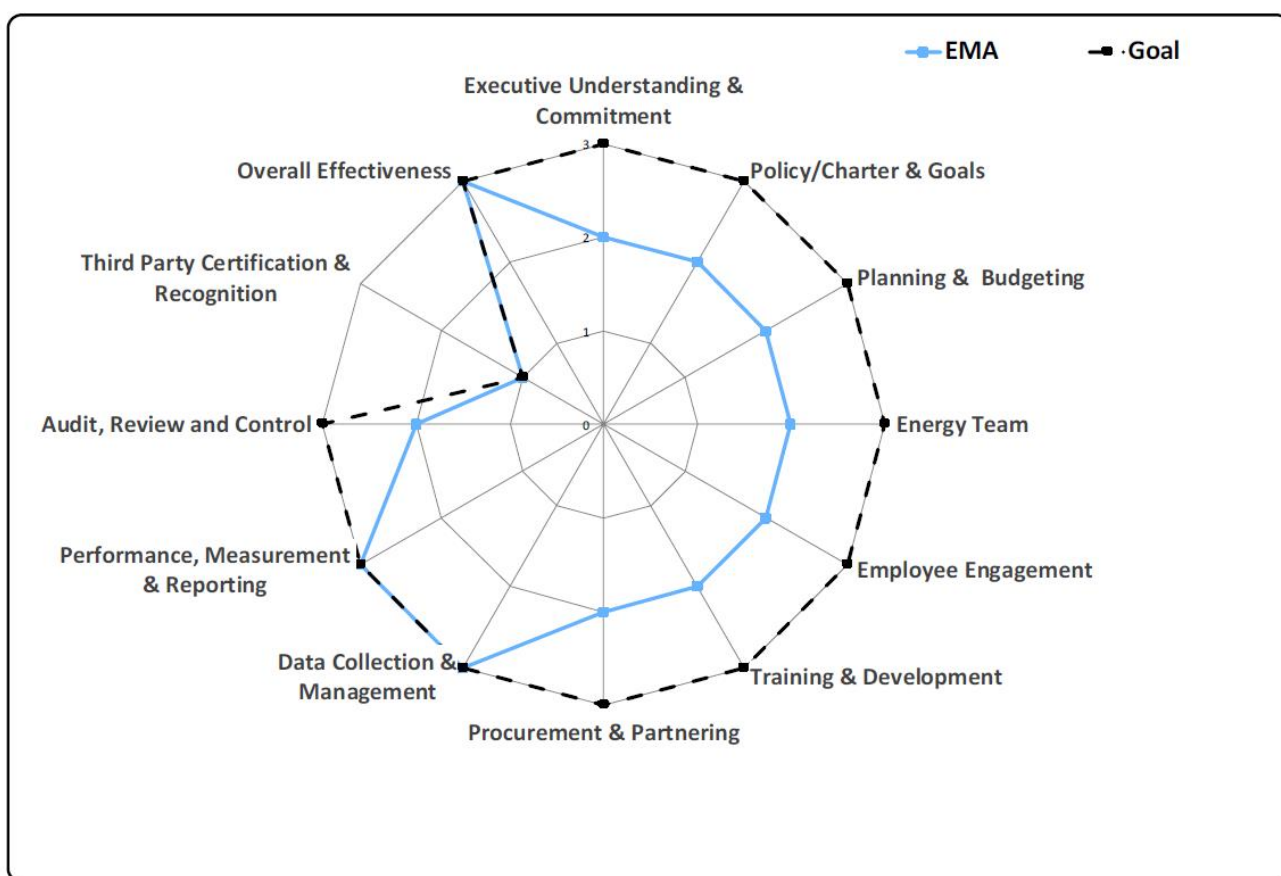


7.0 APPENDIX A – EMA RESULTS

BC Hydro Power Smart sponsors participation in the Energy Management Assessment (EMA) Workshop with the end goal of each commercial customer developing and implementing a long-term Strategic Energy Management Plan (SEMP).

7.1 Seventh EMA

The NVSD’s seventh and most recent EMA took place in March 2022 and followed a new format. The assessment identified the following five key focus areas and supporting priority action items.



7.2 Sixth EMA

The NVSD's sixth took place in January 2020 and followed a new format. The assessment identified the following five key focus areas and supporting priority action items.

Focus Area 1: Vision and Policy - Align energy management program efforts with the most current organizational objectives.

Focus Area 2: Scope and Charter - Establish an energy management program charter that can be supported by senior management.

Focus Area 3: Accountability Structure - Establish an accountability structure for energy performance improvement targets.

Focus Area 4: Financial Decision Making - Engage capital planning decision-makers to establish preferred project valuation approaches and formats for business case submittals.

Focus Area 5: Operational Integration - Update standard operating procedures to include energy-efficient operating instructions for all significant energy-using equipment.

7.3 Fifth EMA

The fifth EMA took place in June 2017 using the SEGEMA tool, which prompted NVSD staff with a series of structured questions to evaluate, identify and prioritize the critical energy-related business practices to target for improvement. The NVSD scored:

SEGEMA Scoring Summary			
Components	Level of Rigor (LR)	Balance Rating (TBR/CBR)	Definition
Overall	1.58	0.59	Strategic approach to EM with progress towards Operationally Integrated approach. Current EM business practices are somewhat unbalanced.
<i>Strategic</i>	<i>1.92</i>	<i>0.57</i>	
<i>Enabling</i>	<i>1.78</i>	<i>0.51</i>	
<i>Functional</i>	<i>1.20</i>	<i>0.45</i>	

7.4 Fourth EMA

The fourth EMA took place in July 2015, using the SEGEMA tool, and the NVSD scored:

SEGEMA Scoring Summary			
Components	Level of Rigor (LR)	Balance Rating (TBR/CBR)	Definition
Overall	1.55	0.60	Strategic approach to EM with progress towards Operationally Integrated approach.
<i>Strategic</i>	<i>1.98</i>	<i>0.51</i>	
<i>Enabling</i>	<i>1.75</i>	<i>0.50</i>	Current EM business practices are somewhat unbalanced.
<i>Functional</i>	<i>1.12</i>	<i>0.43</i>	

7.5 Third EMA

The third EMA took place in November 2013, using the SEGEMA tool, and the NVSD scored:

SEGEMA Scoring Summary			
Components	Level of Rigor (LR)	Balance Rating (TBR/CBR)	Definition
Overall	1.50	0.70	Strategic approach to EM with progress towards Operationally Integrated approach.
<i>Strategic</i>	<i>2.20</i>	<i>0.56</i>	
<i>Enabling</i>	<i>1.65</i>	<i>0.53</i>	Current EM business practices are somewhat unbalanced.
<i>Functional</i>	<i>0.97</i>	<i>0.48</i>	

7.6 Second EMA

The second EMA took place in November 2012, using the SEGEMA tool, and the NVSD scored:

SEGEMA Scoring Summary			
Components	Level of Rigor (LR)	Balance Rating (TBR/CBR)	Definition
Overall	1.31	0.59	Strategic approach to EM with initial progress towards Operationally Integrated approach.
<i>Strategic</i>	<i>1.70</i>	<i>0.11</i>	
<i>Enabling</i>	<i>1.54</i>	<i>0.56</i>	Current EM business practices are somewhat unbalanced.
<i>Functional</i>	<i>0.87</i>	<i>0.48</i>	

7.7 First EMA

The first EMA took place in May 2010, using the Star Rating from www.one-2-five.com. The key areas of focus for the Energy Manager were: Secure Leadership Commitment, Understand Energy Performance and Opportunities, Address Resourcing Needs, Develop Maintenance Procedures, Provide Energy Reporting and Feedback. The NVSD scored:

Overall Ranking: 1 Star, % Achievement: 17%, % required to reach next Star level: +4%

8.0 APPENDIX B – ASSET REGISTRY

8.1 Elementary Schools

Site	Main Building Area	Ancillary Area
Blueridge Elementary	3,360 m ²	-
Boundary Elementary	3,538 m ²	-
Braemar Elementary	4,196 m ²	-
Brooksbank Elementary	3,539 m ²	89 m ² (1 portable)
Canyon Heights Elementary	3,820 m ²	89 m ² (1 portable)
Capilano Elementary	4,224 m ²	-
Carisbrooke Elementary	3,734 m ²	-
Cleveland Elementary	4,231 m ²	178 m ² (2 portables)
Cove Cliff Elementary	2,753 m ²	178 m ² (2 portables)
Dorothy Lynas Elementary	3,681 m ²	927 m ² (1 demountable)
Eastview Elementary	4,364 m ²	-
Highlands Elementary	3,146 m ²	267 m ² (3 portables)
Larson Elementary	3,928 m ²	356 m ² (4 portables)
Lynn Valley Elementary	2,781 m ²	356 m ² (4 portables)
Lynnmour Elementary	2,717 m ²	-
Montroyal Elementary	3,324 m ²	-
Norgate Elementary	2,747 m ²	-
Queen Mary Elementary	4,210 m ²	178 m ² (2 portables)
Queensbury Elementary	2,669 m ²	89 m ² (1 portable)
Ridgeway Elementary	4,061 m ²	1,176 m ² (2 portables & 1 demountable)
Ross Road Elementary	3,774 m ²	267 m ² (3 portables)
Seymour Heights Elementary	2,794 m ²	89 m ² (1 portable)
Sherwood Park Elementary	5,171 m ²	-
Upper Lynn Elementary	4,380 m ²	-
Westview Elementary	2,694 m ²	-
Total Elementary Schools	94,075m²	

8.2 Secondary Schools

Site	Main Building Area	Ancillary Area
Argyle Secondary	12,815 m ²	-
Handsworth Secondary	13,036 m ²	-
Windsor Secondary	13,082 m ²	-
Seycove Secondary	8,898 m ²	445 m ² (5 portables)
Carson Graham Secondary	13,102 m ²	-
Mountainside Secondary	8,492 m ²	-
Sutherland Secondary	10,657 m ²	-
Total Secondary Schools	80,527 m²	

8.3 Support Facilities

Site	Main Building Area	Ancillary Area
Lucas Centre (partial building)	2,635 m ²	445 m ² (5 portables)
Education Services Centre	5,725 m ²	-
Cheakamus Centre	3,935 m ²	-
Total Support Facilities	12,740m²	

8.4 Closed Sites

Site	Main Building Area	Ancillary Area
Cloverley Elementary	2,507 m ²	-
Lucas Centre (partial building)	6,960 m ²	-
Leo Marshal Curriculum Centre	1,535 m ²	-
Total Closed Sites	11,093 m²	

8.5 Leased Sites

The following sites are owned by the school district but leased (in their entirety) and operated by others. They are not included in the scope of this Plan but are listed for reference.

Site	Main Building	Ancillary
Fromme Elementary (Leased to Cousteau School)	2,906 m ²	89 m ² (1 portable)
Maplewood Elementary (Leased to Kenneth Gordon Maplewood School)	2,438 m ²	445 m ² (5 portables)
Plymouth Elementary (leased to Lions Gate Christian Academy)	2,742 m ²	962 m ² (exterior gym)
Westover Elementary (leased to Brockton Preparatory)	2,111 m ²	-
Lonsdale Creek Day Care	313 m ²	-
Total Leased Locations	12,006 m²	

9.0 APPENDIX C – 2022/23 ENERGY DATA

Site	Electrical Consumption (kWh)	Electrical Cost	Fuel Consumption (GJ)	Fuel Consumption (ekWh)	Fuel Cost	Total Energy Consumption (ekWh)	Total Energy Cost
Argyle Secondary	664,450	\$82,137	3,647	1,013,000	\$51,248	1,677,450	\$133,385
Blueridge Elementary	114,656	\$13,437	1,939	538,646	\$28,341	653,302	\$41,778
Boundary Elementary	102,733	\$12,335	1,123	312,010	\$16,598	414,742	\$28,933
Braemar Elementary	106,110	\$12,993	1,713	475,798	\$25,069	581,908	\$38,062
Brooksbank Elementary	118,584	\$14,084	860	238,778	\$12,877	357,362	\$26,961
Canyon Heights Elementary	121,998	\$14,596	1,625	451,306	\$23,964	573,304	\$38,560
Capilano Elementary	106,584	\$12,892	1,426	396,187	\$21,882	502,771	\$34,774
Carisbrooke Elementary	89,784	\$11,327	1,640	455,652	\$24,082	545,436	\$35,409
Carson Graham Secondary	883,524	\$93,527	3,972	1,103,346	\$55,719	1,986,870	\$149,246
Cheakamus Centre	636,222	\$78,975	613	170,239	\$16,153	806,461	\$95,127
Cleveland Elementary	128,613	\$15,116	1,837	510,262	\$28,808	638,874	\$43,924
Cloverley Elementary	12,812	\$1,712	1	306	\$369	13,118	\$2,081
Cove Cliff Elementary	99,624	\$12,362	1,110	308,206	\$17,179	407,830	\$29,542
Dorothy Lynas v	149,952	\$18,188	1,417	393,622	\$21,031	543,574	\$39,219
Eastview Elementary	145,403	\$16,556	1,643	456,286	\$24,313	601,688	\$40,869
Education Services Centre	572,240	\$52,688	2,730	758,221	\$105,135	1,330,461	\$157,823
Handsworth Secondary	711,698	\$85,659	2,322	644,992	\$33,304	1,356,689	\$118,964
Highlands Elementary	165,257	\$19,531	820	227,663	\$12,209	392,920	\$31,740
Larson Elementary	147,882	\$17,212	1,267	351,916	\$19,045	499,798	\$36,257

Site	Electrical Consumption (kWh)	Electrical Cost	Fuel Consumption (GJ)	Fuel Consumption (ekWh)	Fuel Cost	Total Energy Consumption (ekWh)	Total Energy Cost
Lucas Centre	299,290	\$31,620	1,983	550,873	\$29,302	850,163	\$60,922
Lynn Valley Elementary	100,118	\$12,155	882	244,972	\$13,099	345,089	\$25,254
Lynnmour Elementary	236,404	\$26,348	905	251,297	\$13,321	487,701	\$39,669
Montroyal Elementary	90,162	\$10,624	1,120	310,985	\$16,516	401,147	\$27,140
Mountainside Secondary	268,326	\$29,239	2,469	685,930	\$35,202	954,256	\$64,441
Norgate Elementary	93,503	\$11,140	1,121	311,378	\$16,580	404,880	\$27,720
Queen Mary Elementary	225,980	\$27,105	693	192,436	\$29,244	418,416	\$56,350
Queensbury Elementary	77,792	\$9,522	1,167	324,087	\$17,570	401,879	\$27,092
Ridgeway Elementary	182,080	\$22,673	1,174	326,109	\$17,334	508,189	\$40,007
Ross Road Elementary	140,199	\$16,329	1,987	551,826	\$29,150	692,025	\$45,479
Seycove Secondary	406,307	\$48,581	2,473	686,830	\$37,034	1,093,137	\$85,615
Seymour Heights Elementary	94,710	\$11,118	1,304	362,156	\$19,542	456,866	\$30,659
Sherwood Elementary	129,184	\$16,782	1,775	492,955	\$26,321	622,139	\$43,103
Sutherland Secondary	607,120	\$67,378	3,762	1,045,114	\$52,800	1,652,234	\$120,179
Upper Lynn Elementary	141,583	\$16,518	1,168	324,425	\$17,323	466,008	\$33,841
Westview Elementary	99,869	\$12,016	1,092	303,330	\$16,178	403,199	\$28,194
Windsor Secondary	490,920	\$55,464	5,249	1,458,066	\$68,913	1,948,986	\$124,377

10.0 APPENDIX D – GUIDING POLICIES

NVSD POLICY 613: SUSTAINABILITY

In March 2011 the Board adopted Policy 613: Sustainability, as shown below.

Policy: The Board will strive to maintain and operate its facilities and services in a sustainable manner, and seek opportunities in its short- and long-term planning to reduce its environmental footprint. The Board is committed to working in ways that do not jeopardize current and future social, environmental, and economic resources. It will integrate economic, environmental, and social considerations into its decision-making.

Rationale: The Board recognizes that a sustainable approach to its services and operations is essential to fulfilling its mandate of preparing students for responsible citizenship and success in life. The Board values the contributions of students, staff, parents, and the community to reduce the environmental impacts of our learning communities. In collaboration with local, provincial, regional, and global communities, the Board will provide leadership in environmental education and sustainability practices.

Definition: This policy is built upon four pillars of sustainability:

- Support environmental education and sustainability initiatives
- Decrease dependencies upon the earth's finite resources
- Reduce waste and harmful emissions into the environment
- Respect green space through responsible stewardship

Administrative Procedures: In practice, the Board will:

Support environmental education and sustainability initiatives, and

- Encourage staff towards professional development that expands their understanding and capacity to teach sustainability principles and practices
- Support sustainability leadership to:
- Build capacity amongst students, staff, and parents as responsible contributors to their own environmentally-sustainable future
- Identify and implement effective sustainability initiatives and solutions
- Foster and celebrate successful sustainability initiatives within the School District
- Recognize and promote successful sustainability initiatives by students, staff and parents
- Support development of the Environmental Learning Centre (ELC) and associated educational programs
- Consider community partnerships that will assist the School District in achieving its sustainability goals.

Decrease dependencies upon the earth's finite resources, and:

- Develop and maintain a current, School District-wide Sustainability Plan that is progressive, transparent, and measurable
- Embed its commitment to sustainability in the Board's Strategic Plan
- Balance and broaden its decision-making to include considerations of ecological, economic and social well-being
- Consult with internal and external advisors for necessary guidance and consideration of sustainability issues
- Pursue solutions for sustainability challenges in partnership with its communities and governments.

Reduce waste and harmful emissions into the environment, and:

- Develop and operate its facilities and services in a sustainable manner
- Encourage sustainable initiatives that realize both cost-savings and reduce environmental impact
- Implement all legislative requirements to promote sustainability.

Respect green space through responsible stewardship, and:

- Evaluate existing and future green spaces on School District property to ensure due diligence and full consideration in land space decision-making
- Support the maintenance of healthy and diverse green spaces where the Board has a presence
- Support development of the Environmental Learning Centre (ELC) and associated lands
- Collaborate with local municipalities to create an integrated perspective on future community green spaces.

11.0 APPENDIX E – PAST PROJECTS

The following project list and engagement/communications plan encompass the technical, behavioural and organizational initiatives for NVSD completed prior to the 2022/23 Annual Facilities Grant (AFG) cycle.

Project Location / Description	Approximate Completion	Estimated Elec. Savings (kWh)	Estimated Fuel Savings (GJ)	Approximate Total Cost
Upgrade to energy efficient fluorescent lighting - 27 locations	01-Sep-11	381,322	-	\$189,800
Canyon Heights, Carisbrooke, and Westview lighting upgrades	01-Sep-11	9,343	-	\$18,949
Lynn Valley lighting upgrade	01-Oct-11	4,978	-	\$50,000
Electrical outdoor lighting to DDC - various locations	01-Jun-12	-	-	\$11,000
Carson Graham solar hot water demonstration project	01-Sep-12	-	25	-
Copier measures (all locations)	01-Sep-12	27,342	-	-
Carson Graham new construction energy efficient lighting	01-Oct-12	56,345	-	-
NVOS ELC new construction energy efficient lighting	01-Oct-12	40,042	-	-
AFK/ESC new construction energy efficient lighting (3 floors)	01-Oct-12	34,591	-	-
Canyon Heights, Cove Cliff, and Ross Road DDC Optimization (mini C-Op)	01-Jan-13	50,207	140	-
Brooksbank, Cove Cliff, and Sherwood Park boiler plant upgrades	01-Mar-13	10,961	1,476	\$497,015
Ross Road, Carson Graham, and Larson lighting upgrades (PE file)	01-Mar-13	4,656	-	-
Lighting retrofits with LED and induction (various locations)	01-Apr-13	17,758	-	\$38,585
HVAC upgrade at Lynn Valley	01-Sep-13	25,672	28	\$100,000
Sutherland re-lamping	01-Sep-13	34,240	-	\$36,800
Blueridge, Old Board Office, Capilano, Carisbrooke, Norgate, Queen Mary (at Cloverley), and	01-Oct-13	14,780	282	-

Project Location / Description	Approximate Completion	Estimated Elec. Savings (kWh)	Estimated Fuel Savings (GJ)	Approximate Total Cost
Queensbury DDC Optimization (mini C-Op)				
WCA 10 Locations - Year 1 @ 2% savings	01-Oct-13	38,547	-	\$2,500
Argyle, Braemar, Canyon Heights, and Ross Road DDC Optimization	01-Dec-13	50,681	-	\$146,500
Queen Mary new construction energy efficient lighting	01-Jan-14	37,805	-	-
Argyle, Braemar, Boundary, Canyon Heights, Carisbrooke, Dorothy Lynas, and Ross Road DDC optimization (group 1)	01-Jan-14	196,829	-	\$52,055
Windsor, Handsworth, Seycove, and Sutherland C-Op	01-Feb-14	165,500	1,104	\$110,000
Mini C-Op schools completed in 2014 (All schools EXCEPT Keith Lynn, Monterey, Plymouth, Queen Mary, Ridgeway Annex)	01-Jan-15	61,298	780	-
Blueridge, Braemar, Brooksbank, Carisbrooke, Cleveland, Dorothy Lynas, Larson, Plymouth, Queen Mary, Queensbury, Seymour Heights, Sherwood Park, and Westview continued DDC Optimization (group 2a+b)	01-Jan-15	61,162	-	\$64,600
C-Op Argyle investigation (first 50%)	01-Feb-15	-	-	\$14,050
C-Op Carson Graham investigation (first 50%)	01-Feb-15	-	-	\$15,250
Green IT measures (all Locations)	01-Mar-15	66,767	-	-
Handsworth, Seycove, Sutherland, Windsor, Larson, Ross Road, Westview, and Canyon Heights lighting upgrades	31-Mar-15	73,000	-	\$172,919
Sutherland common area lighting controls	31-Mar-15	18,100	-	\$27,777
Larson boiler upgrade	30-Apr-15	19,900	540	\$144,500
Carson and Argyle C-Op EMIS year 1	31-Aug-15	-	-	\$4,150

Project Location / Description	Approximate Completion	Estimated Elec. Savings (kWh)	Estimated Fuel Savings (GJ)	Approximate Total Cost
Blueridge, Capilano, Dorothy Lynas, Handsworth, Lynnmour, Norgate, Ross Road, Sherwood Park, and Windsor continued DDC optimization (group 3)	30-Sep-15	24,901	-	\$7,238
WCA Year 3 @ 2% savings	01-Oct-15	74,611	-	\$2,000
Norgate heating pump upgrade	31-Oct-15	19,835	-	\$37,700
Boundary boiler plant and HVAC upgrade	01-Feb-16	7,107	600	\$545,300
Argyle C-Op investigation (second 50%)	01-Mar-16	-	-	\$14,050
Carson Graham C-Op investigation (second 50%)	01-Mar-16	-	-	\$15,250
Capilano, Cove Cliff, Dorothy Lynas, Eastview, Handsworth, Highlands, Lynn Valley, Ridgeway, Seymour Heights, Sutherland, Westview, and Windsor DDC optimization (group 4)	01-Mar-16	8,991	110	\$17,500
Upper Lynn boiler plant upgrade	01-Mar-16	-	297	\$140,000
Seycove LED exterior lighting	31-Mar-16	15,750	-	\$37,899
Sutherland LED exterior lighting	31-Mar-16	5,987	-	\$25,000
Windsor LED exterior lighting	31-Mar-16	11,922	-	\$45,020
Carson Graham C-Op - handoff	01-Apr-16	-	-	\$1,500
Carson Graham C-Op - implementation	01-Aug-16	98,000	241	\$43,000
Cleveland window replacement	01-Mar-17	-	200	\$580,000
Seycove Power Factor Correction	31-Mar-17	-	-	\$18,000
Carson Graham LED exterior lighting	31-Mar-17	16,000	-	\$40,000
Mountainside LED exterior lighting	31-Mar-17	5,000	-	\$8,000
Canyon Heights LED interior lighting and controls	31-Mar-17	35,000	-	\$166,693
Dorothy Lynas LED interior lighting and controls	31-Mar-17	33,000	-	\$158,415
Ross Road LED interior lighting and controls	31-Mar-17	33,000	-	\$106,748

Project Location / Description	Approximate Completion	Estimated Elec. Savings (kWh)	Estimated Fuel Savings (GJ)	Approximate Total Cost
Westview LED interior lighting and controls	31-Mar-17	22,000	-	\$71,359
Eastview boiler upgrade	31-Mar-17	700	415	\$232,000
Seycove, Sutherland, and Windsor C-Op -Extended Coaching Phase (year 2)	31-Mar-17	-	-	\$12,600
Carson and Argyle C-Op EMIS (year 2)	01-Sep-17	-	-	\$1,500
Carson Graham and Argyle C-Op EMIS (year 3)	31-Mar-18	-	-	\$2,000
Carson Graham C-Op - Coaching	01-Sep-17	-	-	\$4,000
Argyle C-Op - Implementation	21-Jul-17	19,000	321	\$7,200
Argyle C-Op - Handoff	31-Mar-17	-	-	\$1,500
Argyle C-Op - Coaching	28-Feb-18	-	-	\$4,000
Canyon Heights DDC optimization	31-Dec-17	5,700	54	\$7,611
Dorothy Lynas DDC optimization	31-Dec-17	7,000	76	\$9,020
Ross Road DDC optimization	31-Dec-17	6,100	79	\$7,766
Westview DDC optimization	31-Dec-17	4,600	31	\$5,603
Dorothy Lynas boiler upgrade	01-Oct-17	500	555	\$230,000
Montroyal boiler upgrade	01-Oct-17	500	360	\$240,000
Ridgeway Demountable LED interior lighting and controls	31-Dec-17	18,000		\$40,000
Sherwood Park LED interior lighting and controls	31-Mar-18	50,000		\$70,000
Cleveland LED interior lighting and controls	31-Mar-18	50,000		\$70,000
Capilano LED interior lighting and controls	31-Mar-18	45,000		\$78,000
Lynn Valley LED interior lighting and controls	31-Mar-18	20,000		\$67,000
Cove Cliff LED interior lighting and controls	31-Mar-18	42,000		\$75,000
Braemar LED interior lighting and controls	31-Mar-18	50,000		\$70,000

Project Location / Description	Approximate Completion	Estimated Elec. Savings (kWh)	Estimated Fuel Savings (GJ)	Approximate Total Cost
AFK/ESC Parking garage LED upgrade and LED track lighting (some de-lamping)	31-Mar-18	53,000		\$5,000
Cheakamus (NVOS) Cabin Upgrades (2 cabins)	31-Mar-18	10,000		\$80,000
Boundary LED interior lighting and controls	31-Mar-19	38,000		\$65,000
Carisbrooke LED interior lighting and controls	31-Mar-19	31,000		\$85,000
Eastview LED interior lighting and controls	31-Mar-19	42,000		\$80,000
Montroyal LED interior lighting and controls	31-Mar-19	21,000		\$60,000
Norgate LED interior lighting and controls	31-Mar-19	33,000		\$50,000
Upper Lynn LED interior lighting and controls	31-Mar-19	35,000		\$80,000
Ross Road Boiler and HVAC Controls Upgrade	31-Dec-18		456	\$230,000
Braemar Boiler and HVAC Controls Upgrade	31-Dec-18	14,500	423	\$310,000
Cheakamus geo-exchange well pump VFD upgrade	01-Jun-19	44,000	-	\$25,000
Larson level 2 South façade window upgrade	01-Sep-19	-	10	\$40,000
Capilano window replacement and envelope upgrade	01-Sep-19	-	100	\$900,000
Eastview window replacement and envelope upgrade	01-Sep-19	-	150	\$850,000
Cheakamus (NVOS) cabin upgrades (Cabin 1 and 2)	01-Sep-19	10,000	-	\$150,000
Capilano boiler and HVAC upgrade	01-Oct-19		315	\$290,000
Spakwus common area TLED retrofit	31-Mar-20	4,600	-	\$1,250
Blueridge gym and common area TLED retrofit	31-Mar-20	3,700	-	\$1,000

Project Location / Description	Approximate Completion	Estimated Elec. Savings (kWh)	Estimated Fuel Savings (GJ)	Approximate Total Cost
Larson gym and common area TLED retrofit	31-Mar-20	5,800	-	\$1,500
Queensbury gym and common area TLED retrofit	31-Mar-20	2,500	-	\$750
Seymour Heights gym and common area TLED retrofit	31-Mar-20	3,900	-	\$1,000
Lynnmour gym and common area TLED retrofit	31-Mar-20	2,900	-	\$750
Highlands gym and common area TLED retrofit	31-Mar-20	14,500	-	\$3,750
Brooksbank exterior lighting	31-Mar-20	2,800	-	\$750
Queen Mary gym TLED retrofit	31-Mar-20	14,500	-	\$3,750
Ridgeway gym TLED retrofit	31-Mar-20	6,000	-	\$1,500
Boundary exterior lighting	31-Mar-20	3,500	-	\$1,000
Carson common area and gym TLED retrofit	31-Mar-20	29,400	-	\$7,500
Sutherland gym and common area TLED retrofit	31-Mar-20	25,500	-	\$6,500
Mountainside gym TLED retrofit	31-Mar-20	15,900	-	\$4,000
Windsor gym TLED retrofit	31-Mar-20	5,300	-	\$1,500
Lucas Centre common area TLED retrofit	31-Mar-20	10,500	-	\$2,750
Norgate heating plant upgrade*	31-Oct-20	* N/A	304	\$450,000
AFK/ESC controls and HVAC improvements	31-Mar-21	125,000	-	\$1,500
Cheakamus cabin upgrade (Cabin 3)	31-Mar-22	5,000	-	\$250,000
Handsworth seismic replacement*	31-May-22	400,000	1,482	\$8,175,000
Total		3,244,830kWh	10,954GJ	\$17,227,672

* These low-carbon electrification pilot projects include new high efficiency boilers and supplementary heat pumps.