*Vancouver School Board*

*Strategic Energy Management Plan (SEMP): 2013/14 – 2017/18*

# 2017/18 (5th Year) Update Report

*With the support of:*

BC Hydro
Power smart

***June 30, 2018***

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Note: This document presents the close out of a five-year plan cycle on energy management. It also includes preliminary projects for the coming 2-3 years. During the 2018/19 school year a new multi-year SEMP will be created by the VSB

# Summary

The Vancouver School Board has engaged in energy conservation measures for a number of years. Over the past decade the District has initiated a number of energy saving activities and achieved savings of seven (7) GWhs annually of electricity consumption. These savings represent an avoided cost of $760,000 annually.

This document provides an update to the end of year five of a five year program of activities to reduce energy use, manage rising electricity costs, and reduce greenhouse gas emissions from 2013/2014 to 2017/2018. It includes a summary analysis of the energy consumption of VSB schools at present, and a project list of identified activities to be implemented.

**Energy Savings**

The electricity savings expected from projects in each year of the plan are in the range of 500,000 750,000 ekWh (see Figure S-1).

These savings continue into subsequent years after implementation and the avoided cost of these conservation efforts will last many years. The avoided costs savings from the measures identified to-date are in the range of $ 380,000 annually by the fifth year (see figure S-2).

**Figure S-1: Estimated Annual Energy Savings by Year of Project Implementation**

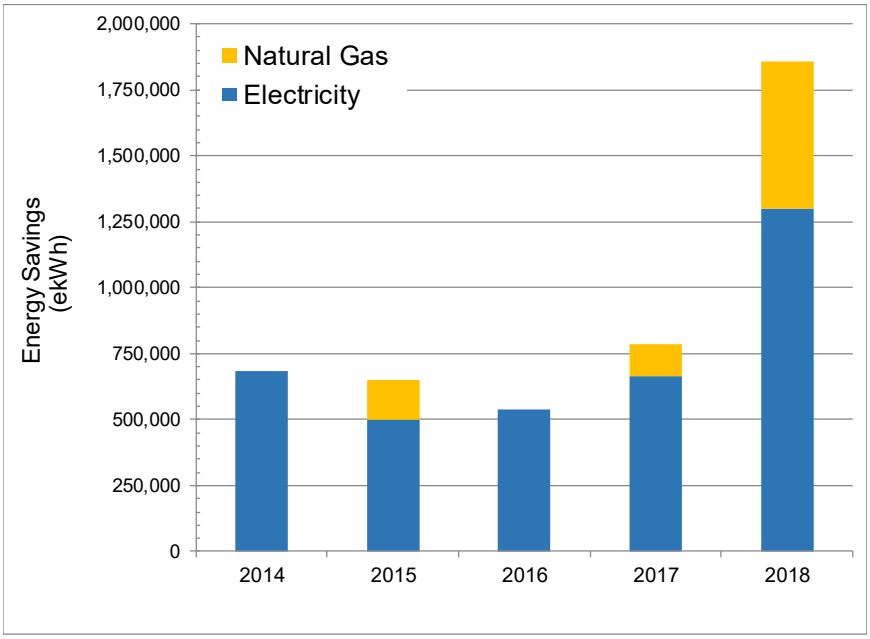
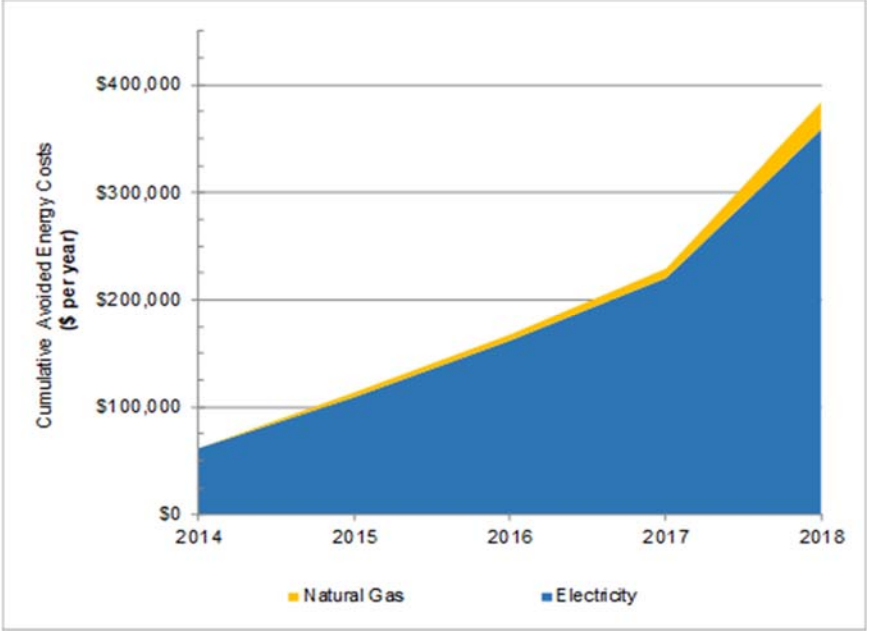


**Figure S-2: Annual Energy Cost Savings**




**Progress on Reduction Targets**

This plan defines target reductions from 2013/14 to 2017/18 (five years) of:

- 10% reduction of electricity use
- 5% reduction of natural gas consumption.

Progress towards these targets is shown separately for electricity (Figure S-3) and natural gas (Figure S-4). To-date projects have been identified (though not all funded) that will achieve the reduction target for electricity.

Reductions in natural gas have been challenging to achieve because capital funding (e.g. CNCP) has not typically been available.

**Figure S-3: Progress towards Electricity Reduction Target**

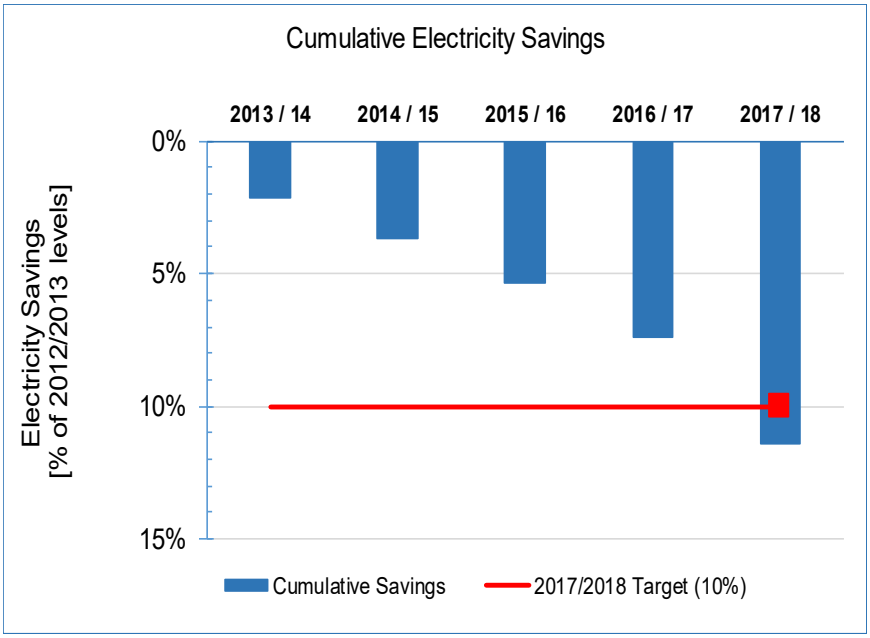
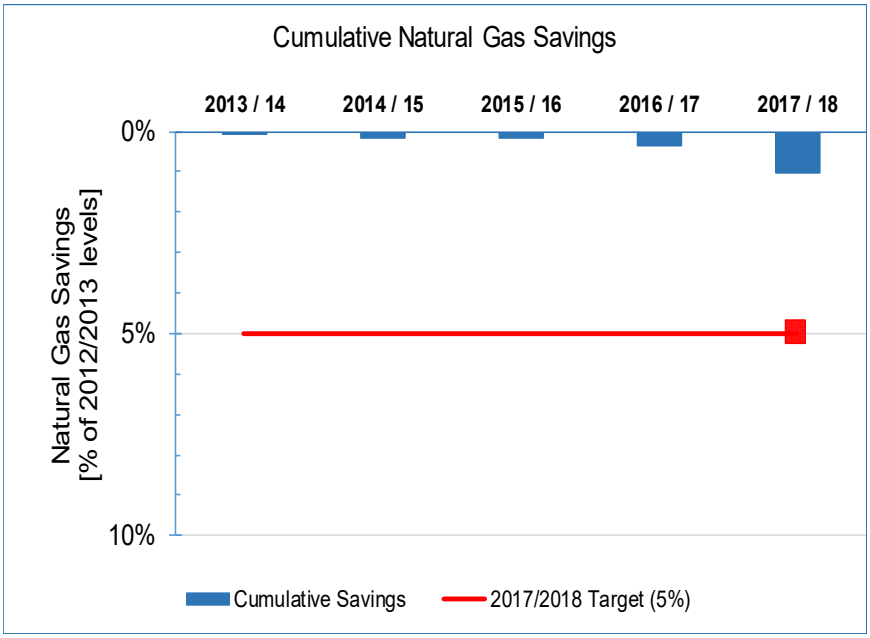



**Figure S-4: Progress towards Natural Gas Reduction Target**



## Summary of Actions



## Acknowledgements

This plan was developed by Vancouver School Board staff with the support of the Energy Manager Program of BC Hydro.

# Contents

# Acronyms and Abbreviations

| | |
|---|---|
| BEPI | "Building Energy Performance Index". A measure of the energy used by a building - on a "per floor area" basis (typically kWh/ft^2). BEPI is a common energy metric used in building operations and can include all energy use – heating, lighting, systems, and plug loads, or can be analyzed for one component, or one fuel only. |
| CNCP | Carbon Neutral Capital Program. A grant fund available to school districts. It currently dispenses about $5 million per year across the province for projects that reduce carbon emissions, and improve energy efficiency. |
| C.Op. | "Continuous Optimization" - a program of BC Hydro to improve the energy efficiency of existing buildings through a review of operating issues. Commonly thought of as a 'tune-up' for buildings. BC Hydro provides 50% cost share funding for many of the activities of the program. |
| ekWh | equivalent kWh. The energy use converted into kWh for a common presentation as in a BEPI value. One GJ of natural gas consumption converts to 278 ekWh. |
| EMIS | Energy Management Information System (EMIS): A software (and possible a piece of equipment) applied to a utility meter to obtain near real time information of the energy consumption of the facility. Historically, utility consumption information was only available through monthly billing records. |
| DDC | Direct Digital Control: A computerized control system for a building. |
| GJ | "Giga Joule" – literally, a billion joules. A measure of energy – most often used with natural gas or other heating fuels. A GJ is about the energy contained in a tank of gas for a passenger car. |
| kW | kilo-watt (thousands of Watts) a measure of how fast energy is consumed (not how much). A kilo-Watt is *approximately* the power used by a counter-top kettle or a microwave oven |
| kWh | kilo watt-hour. "thousands" of watt-hours. A measure of energy consumed - but not how fast it is consumed. A kWh is equivalent to 100 Watt light bulbs turned on for one hour. |
| LEED | Leadership in Energy and Environmental Design. A rating system of the design and construction of buildings. |
| NCP | New Construction Program. A BC Hydro incentive program to encourage the construction of high efficiency buildings. |
| PSPX | Power Smart Express. A program of BC Hydro whereby incentives can be provided swiftly for direct change outs of equipment for more efficient equipment. |
| Power Smart | A program of BC Hydro to encourage energy conservation through education and incentives. |
| SEMP | Strategic Energy Management Plan. This document. |
| VBE | Vancouver Board of Education, Also School District #39, or VSB. |
| VSB | Vancouver School Board, Also School District #39 or VBE |
| W | Watt (W) - a measure of how fast energy is consumed. |

# 1 Introduction

The Vancouver Board of Education (VBE) is committed to continuously improve the energy efficiency and environmental performance of its operations and activities. The District has worked to reduce energy consumption for many years.

This document is the 2018 update at the end of 'Year 5' of a five-year Strategic Energy Management Plan (SEMP) designed to identify and track initiatives that will reduce energy consumption, manage energy costs, and reduce GHG emissions from VSB operations.

## 1.1 Objectives

The objectives of the strategic energy management plan (SEMP) are to:

- Define a multi-year strategy for managing energy and implementing energy conservation activities;
- Define an action plan list to compile and track actions over many years.

# 2 Context for Energy Management

## 2.1 VBE Policy Support for Energy Management

Several Board policies and District activities support energy management. These include:

- **VSB Sustainability Framework:** In 2010 the board endorsed a Sustainability Framework that included a vision that "*the Vancouver School Board will be the greenest, most sustainable school district in North America*".[1] The Framework identifies energy conservation and reduction of greenhouse gas emissions as "key result areas".
- **VSB2021 Strategic Plan**: The Board's 2021 strategic plan supports energy management – primarily through Goal #4 with actions to "manage school district resources effectively," and to "implement a long term financial model"
- **VSB Environmental Sustainability Plan:** In May 2018, the Board of Trustees approved an Environmental Sustainability Plan. This document includes actions for resource conservation and climate change. Specific support for energy management is included under the Goal "Reduce energy consumption and greenhouse gas emissions" which includes actions:
    - Action 8: Maintain an active energy management program
    - Action 9: Develop a Climate Change Adaptation Strategy

[1] Available at www.vsb.bc.ca/sites/default/files/publications/SUSTAINABILITY%20FRAMEWORK%202.pdf

## 2.2 Provincial Drivers for Energy Management

The Province has several initiatives that promote energy management and conservation. These include:

- **Carbon Neutral Public Sector**: As a public sector organization in BC, the VBE is required to be carbon neutral through the purchase of carbon offsets. Offset purchases by the VSB are typically in the range of $375,000 annually. Actions that reduce fossil fuel energy consumption will reduce the cost of carbon offset purchases by the District.

- **Ministry of Education's Climate Action Charter:** The VSB is a signatory to this charter – a partnership agreement between school boards and the Ministry of Education. Among other initiatives, it provides for the return of carbon tax paid on natural gas and vehicle fuels to the District. The carbon tax rebate flows to general revenue.

- **Carbon Neutral Capital Program:** The Carbon Neutral Capital Program (CNCP) is a Ministry of Education capital funding pool supporting energy efficiency activities for the K-12 sector. This fund distributes about $5 million annually through a competitive application process.

## 2.3 Business Drivers for Energy Management

Energy management is a component of good facility operating practices. A number of drivers encourage energy management and conservation within the district including:

- **Cost Management:** Management of energy results in better management of energy utility costs.

- **Infrastructure and asset management:** Energy management is aligned with good infrastructure management practices.

- **Instructional Comfort**: A co-benefit of energy management is that properly tuned and functioning heating and lighting systems provide better functioning buildings, which lead to better occupant comfort, reduced occupant complaints, and a better learning environment.

## 2.4 BC Hydro Energy Management Partnership

The District is engaged in the BC Hydro Energy Manager program for the K-12 educational sector. The Energy Manager program provides financial and technical support to energy managers across many sectors - including more than 10 different school districts.

The BC Hydro partnership is accomplished by an agreement between the District and BC Hydro identifying the responsibilities of each participant and the funding commitments. A component of this partnership is the development of this strategic energy management plan (SEMP).

## 2.5 Energy Management Objectives

Energy management activities must meet a number of objectives. These are to:

- Minimize annual energy, carbon tax, and carbon offset purchase costs,
- Reduce total energy consumption,
- Optimize up-front capital costs for new and retrofit facilities,
- Reduce total greenhouse gas emissions, and
- Minimize long term maintenance and operational staff burden and cost of (energy related) facilities.

Achieving all of these objectives is not always straight forward or similarly aligned. Efforts for energy management must be designed to work to optimize these objectives as much as possible.

Medium term targets (~5 years) are set for energy conservation through the SEMP process. Annual targets for electricity conservation are developed each year in consultation with BC Hydro.

# 3 Current Status and Organizational Profile

## 3.1 Organizational Profile

The VSB operates a large "fleet" of schools as well as associated support facilities. A summary of key annual operating statistics is shown in Table 1.

**Table 1: Operating Statistics for the VSB**

| | Item | 2017/2018 | Units |
|---|---|---|---|
| People | Secondary Students | ~ 20,500 | number |
| | Elementary Students | ~ 28,000 | number |
| | Other learning program students | ~ 4,000 | number |
| | Employees | ~ 6,000 | number |
| Facilities | Secondary Schools (number) | 18 | number |
| | Secondary Schools (area) | 335,600 | square meters |
| | Elementary Schools (number) | 88 | number |
| | Elementary Schools (area) | 388,40 | square meters |
| | Other facilities and sites | 7 | number |
| Budget (2014/2015) | Total District operating budget | ~ $ 493 | millions of $ per year |
| | Operations Group Budget | ~$ 32 | millions of $ per year |
| | Maintenance Budget | ~ $13.0 (mte),<br>~ $10.2 (AFG) | millions of $ per year |
| Energy Use (2015/2016) | Electricity Consumption | 31,200,000 | kWh per year |
| | Electricity expenditure | $ 3.67 | millions of $ per year |
| | Natural Gas Consumption | 318,000 | GJ per year |
| | Natural Gas spending | $ 2.82 | millions of $ per year |

## 3.2 Past Energy Management

The District has implemented a number of energy management activities over the past 5 – 10 years and achieved substantial reductions in energy use. These have primarily focused on electricity but have included some heating fuel actions including:

- Dozens of projects to replace older inefficient lighting systems ("T12s") with more efficient fixtures, lamps, and ballasts. Many of these projects have received incentive funds through BC Hydro.
- Designing new facilities, and seismic rebuild projects to new high energy efficiency standards.
- Replacement of selected older boilers and heating plants to more efficient newer systems.
- Installation of power management software to turn off computers and monitors when not in use.
- Upgrading of attic insulation and air leakage sealing in selected schools.

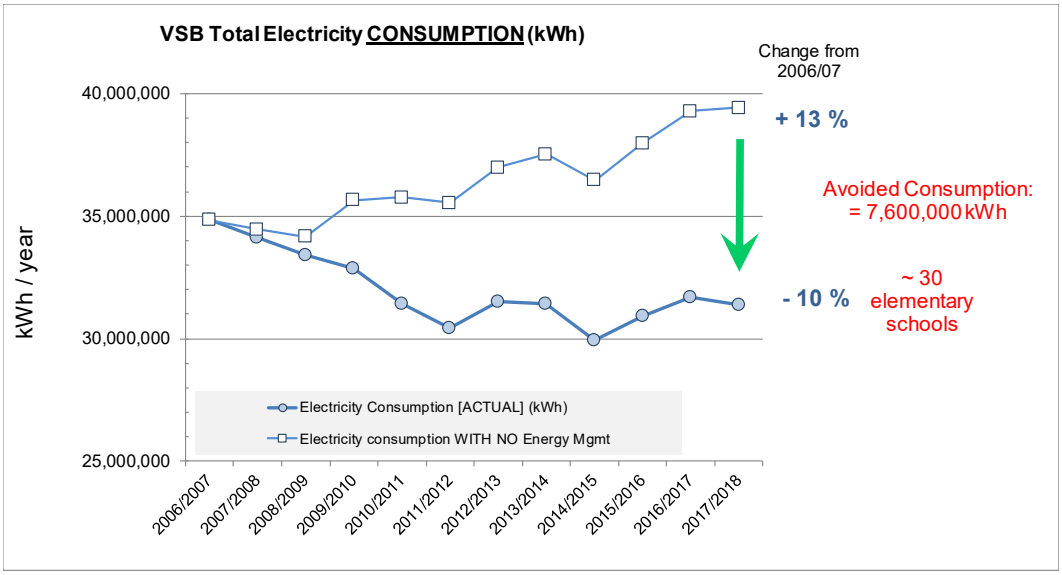
These efforts have resulted in energy reductions in the range of ~7 GWh of electricity consumption. At current prices, this represents over $ 760,000 annual in avoided costs.[2]

## 3.3 Energy Consumption Trends

Past energy management activities have been very successful in reducing energy consumption - particularly electricity as far back as 2001/02. More concerted efforts were made in the past decade – and since 2006/07 total district electricity consumption has declined by 10% - even while new facilities have added substantial new load to the system. Without any conservation efforts consumption would have been as much as 13% higher than the baseline. This gap of about 23% represents the avoided consumption due to conservation.

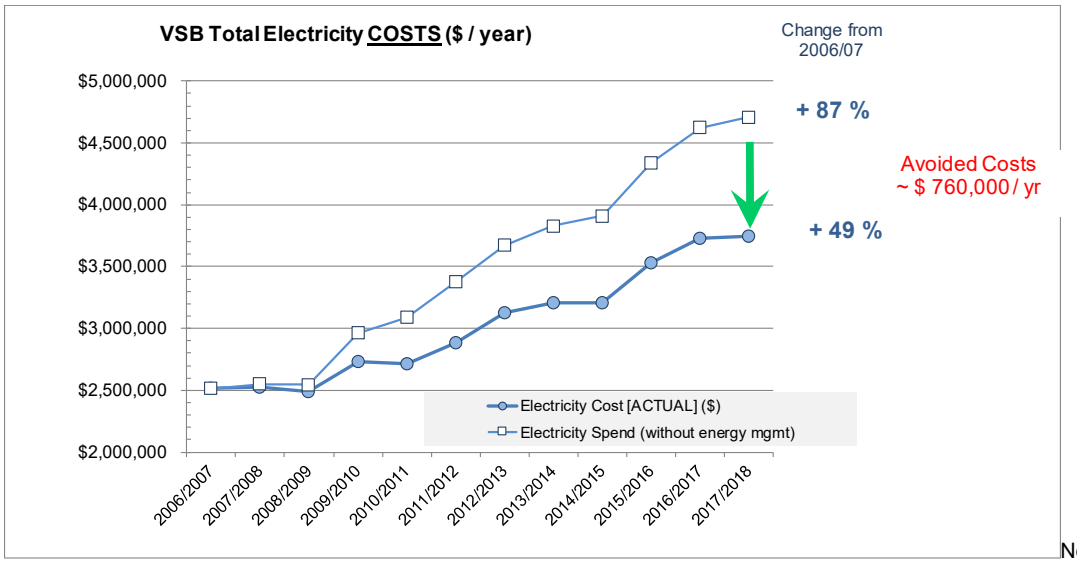
2 Energy conservation activities result in reductions of consumption of electricity. However, in some years the reduced consumption is offset by new electrical load being brought on-line (e.g. a new school). As well, electricity consumption reductions are often offset by rising costs per unit of electricity. As a result, in spite of conservation activities, energy spending does not always decrease. To reflect this and avoid confusion with absolute value budget reductions, the costs savings achieved through conservation are called "avoided costs".

**Figure 1: Historical Electricity Consumption**




A similar comparison can be made for electricity costs. (Figure 2)..presents a history of electricity spending. From 2006/07 the District spending on electricity has increased by 49% - in spite of conservation efforts. This is because the unit cost of electricity ($ per each kWh) is increasing faster than conservation efforts. Without any conservation efforts, consumption would have been as much as 87% higher. This gap of about 38% represents the avoided cost due to conservation.

**Figure 2: Historical Electricity Costs**




Note:
2017/18 data not yet complete so is not included

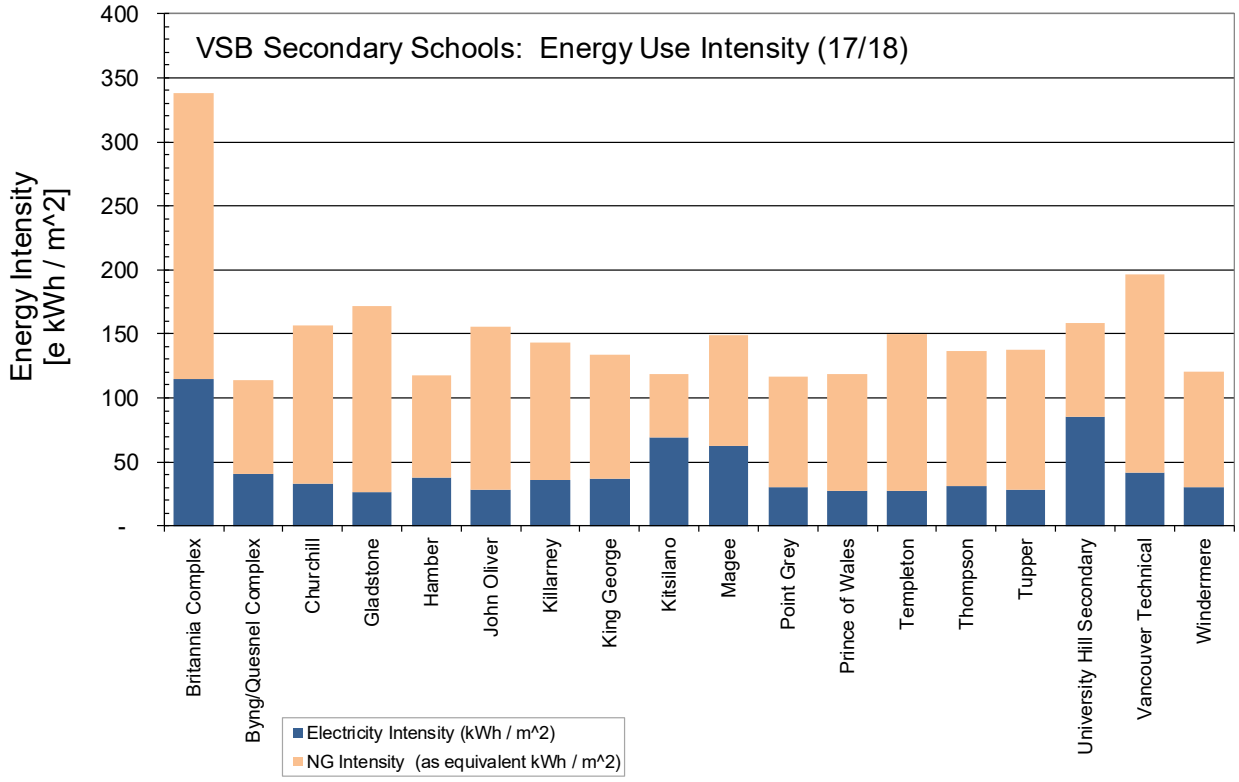
## 3.4 Current Building Performance

A commonly used measure of building energy efficiency is the "energy use intensity". This metric is the energy use "per square meter" of floor area. This metric is commonly called a Building Energy Performance Index (BEPI).

### 3.4.1 Secondary Schools

The District operates 18 secondary schools, averaging about 18,000 m^2 each (about 190,000 square feet). Energy use intensities (BEPI values) range from 120 to 220 ekWh/m^2 – with an exception for the Britannia Complex which includes community center facilities (see Figure 3).

**Figure 3: Energy Consumption Intensity: Secondary Schools**




Notes: 1) Britannia center includes both the schools and community facilities.
2) Kitsilano includes parts of a phased construction period.

### 3.4.2 Elementary Schools

The District operates 91 elementary schools, averaging about 4,100 square meters (about 43,000 square feet). BEPI values range from 75 to 250 kWh/m^2 (Figure 4). Note that this is for the total of both electricity and natural gas for the 2016/17 year.

### 3.4.3 Energy Studies and Evaluations

A number of schools have had energy studies performed and many of the resulting energy conservation measures (ECMs) have been implemented. Studies for projects completed since 2013/2014 ("Year 1") are shown in Table 2. Most of the studies have been for lighting upgrades, and to a lesser degree BC Hydro's New Construction Program (NCP) which promotes energy efficient lighting and whole building energy modeling studies.

**Table 2: Energy Conservation Projects from 2013/14 to 2017/18**

| **Site(s)** | **Study** | **Project Status** *[Year project was executed and claimed or planned]* | **Savings** *[kWh /yr unless otherwise noted]* |
|---|---|---|---|
| **Projects 2013/14 (Year1)** | | | |
| RobertAx / Byng / Shaughnessy / McBride | Lighting study 2011/12 – 2012/13 | 2014 | 146,000 |
| TechumAx / Mount Pleasant / Oppenheimer / MaquinnaAx | Lighting study 2011/12 – 2012/13 | 2014 | 176,000 |
| Tupper B Building | Lighting study 2012/13 | 2014 | 62,700 |
| Van Tech | Lighting study 2012/13 | 2014 | 101,000 |
| Macdonald | Lighting study 2012/13 | 2014 | 56,500 |
| Tyee / Selkirk / Laurier | Lighting study 2012/13 | 2014 | 74,000 |
| Sexsmith | Energy efficient lighting design (EELD) | 2014 | 34,000 |
| Douglas | Energy efficient lighting design (EELD) | 2014 | 28,000 |
| **Projects 2014/15 (Year 2)** | | | |
| Moberly | Lighting study 2013/14 | 2015 | 51,000 |
| Carnarvon | Lighting study 2013/14 | 2015 | 52,400 |
| Champlain Heights | Lighting study 2013/14 | 2015 | 54.000 |
| Queen ElizabethAx / Total Education | Lighting study 2013/14 | 2015 | 50,000 |
| Champlain HeightsAx | Lighting study 2013/14 | 2015 | 58,000 |
| LaurierAx / GaribaldiAx | Lighting study 2013/14 | 2015 | 43,000 |
| U-Hill Secondary | Energy efficient lighting design (EELD) | 2015 | 31,000 |
| Norma Rose | Whole Building Design | 2015 | 158,000 |
| Fraser | Boiler Plant upgrade | 2015 | ~95 GJ /yr |
| Tyee | Boiler Plant upgrade | 2015 | ~42 GJ / yr |
| Moberly | Boiler Plant upgrade | 2015 | ~400 GJ / yr |
| **Projects 2015/16 (Year 3)** | | | |
| DougAx / Kerr Gym / McKechnie Gym | Lighting study 2014/15 | 2016 | 55,000 |
| Lord A & B Buildings | Lighting study 2013/14 | 2016 | 56,000 |
| Workshop | Lighting study 2013/14 | 2016 | 47,000 |
| Magee | Lighting study 2014/15 | 2016 | 186,000 |
| Britannia | Lighting study 2014/15 | 2016 | 187,000 |
| **Projects 2016/17 (Year 4)** | | | |
| Ed Center | Lighting study 2014/15 | 2017 | 228,000 |
| Queen VictoriaAx / South Hill / Byng (ext) / VanTech) | Lighting study 2014/15 | 2017 | 90,000 |
| Queen Mary | Energy efficient lighting design (EELD) | 2017 | 42,500 |
| Kerrisdale / Hastings (ext) / Dickens(ext) | Lighting study 2015/16 | 2017 | 52,463 |
| McKechnie / DickensAx / Collingwood(ext) / Cook(ext) | Lighting study 2015/16 | 2017 | 57,176 |

| Site(s) | Study | Project Status *[Year project was executed and claimed or planned]* | Savings *[kWh /yr unless otherwise noted]* |
|---|---|---|---|
| Elsie Roy / Maquinna / Collingwood(int) | Lighting study 2015/16 | 2017 | 109,534 |
| L'Ecole Seismic replacement | Replacement school | 2017 | ~ 400 GJ |
| Gordon Seismic Replacement | Replacement School | 2017 | ~ 1,260 GJ |
| Cook (int) / Hastings(int) / Cunnigham(ext) | Lighting study 2015/16 | 2017 | 75,796 |
| **Projects 2017/18 (Year 5)** | | | |
| Cunningham (int) / TillicumAx | Lighting study 2016/17 | PE File 2018 | 76,073 |
| Crosstown | Energy efficient lighting design (EELD) | 2018 | 32,750 |
| McBride | Boiler Plant | 2018 | ~500 GJ |
| McBride | Lighting study 2016/17 | PE File 2018 | ~74,801 |
| Strathcona | HVAC and Boiler upgrades | 2018 | ~ 1000 GJ |
| Strathcona | Lighting study 2017/18 | study underway | tbd |
| Roberts / Shaughnessy / Fraser / Ideal Mini | Lighting study 2016/17 | 2018 | ~133,800 |
| Tecumseh / Norquay | Lighting study 2016/17 | 2018 | ~96,600 |
| U-Hill Elementary | Lighting study 2016/17 | 2018 | ~50,325 |
| Van Horne / Nootka | Lighting study 2016/17 | 2018 | ~64,300 |
| Carr | Lighting study 2016/17 | PE File 2018 | ~41,300 |
| Kitsilano | Whole Building Design | NCP/2018 | ~760,000 |

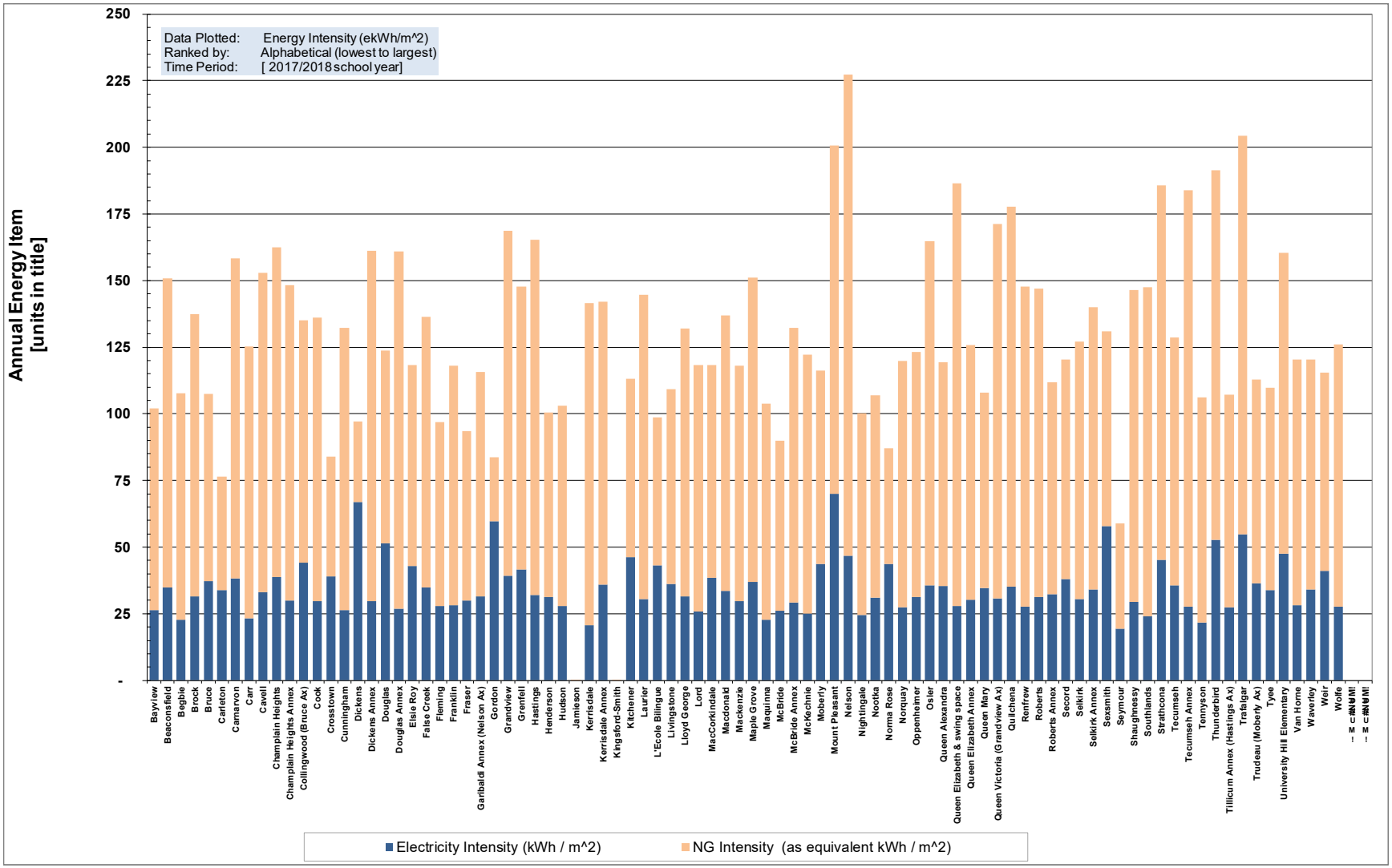
Projects identified for future years are summarized in Table 3. The district works to maintain a running 2-3 year list of project opportunities.

**Table 3: Future Energy Conservation Projects from 2018/19 and beyond**

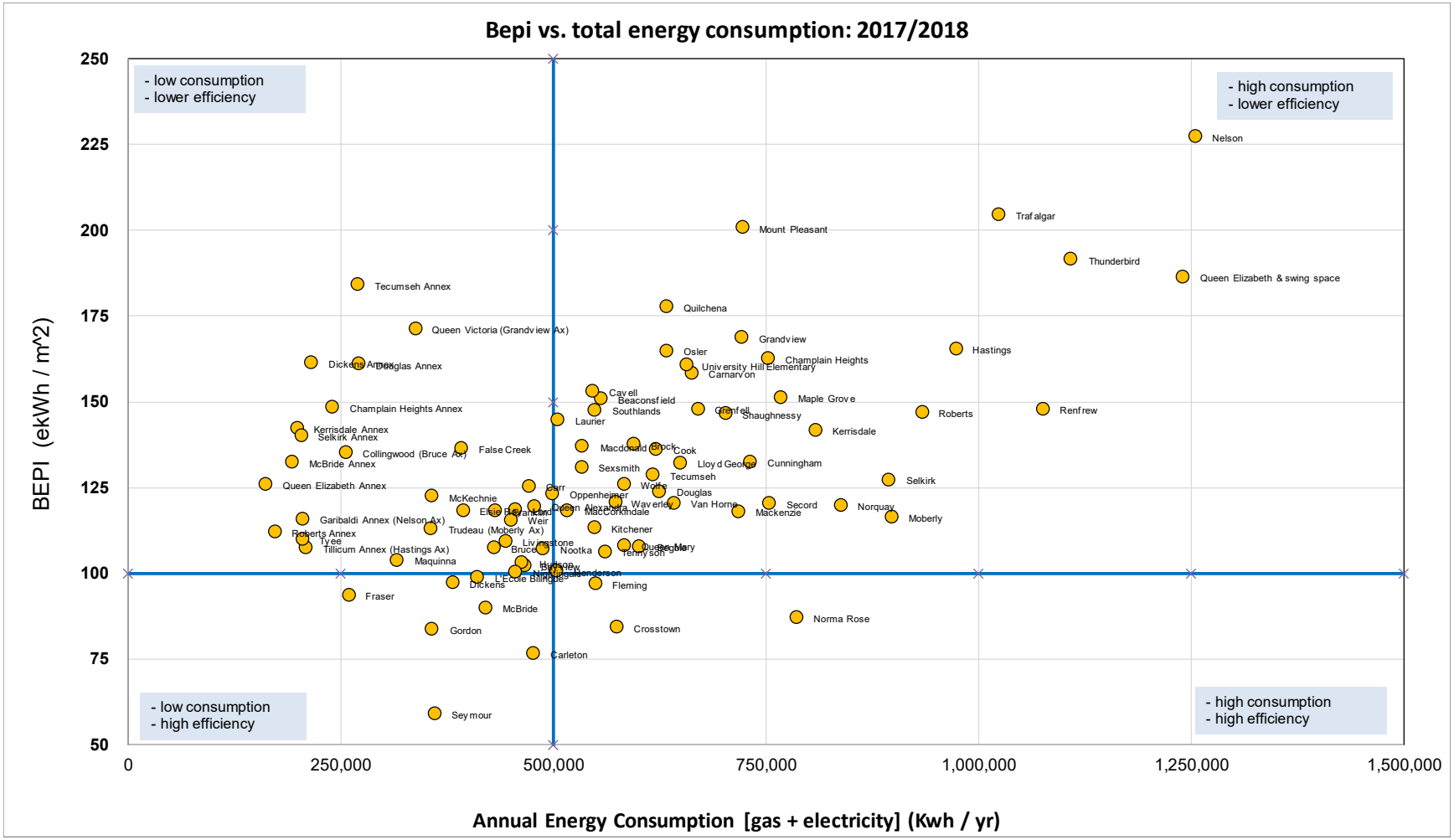
| Site(s) | Study | Project Status *[Year project was executed and claimed or planned]* | Savings *[kWh /yr unless otherwise noted]* |
|---|---|---|---|
| **Projects FUTURE (2018/19)** | | | **(NB kWh are incentivisable)** |
| NBfffffChurchill | Opp. Assessment 2017/18 | 2019 | 162,000 |
| Henderson | Opp. Assessment 2017/18 | 2019 | 76,000 |
| Grandview | Opp. Assessment 2017/18 | 2019 | |
| Beaconsfield | Opp. Assessment 2017/18 | 2019 | 50,000 |
| KerrisdaleAx | Opp. Assessment 2017/18 | 2019 | |
| Brock | Opp. Assessment 2017/18 | 2019 | 80,000 |
| MacCorkindale | Opp. Assessment 2017/18 | 2019 | |
| Quilchena | Opp. Assessment 2017/18 | 2019 | 32,000 |
| Osler | Opp. Assessment 2017/18 | 2019 | 34,400 |
| Jamieson | Lighting study 2016/17 | Possible 2019 PE File | tbd |
| **Projects FUTURE (2019/20 and beyond)** | | | |

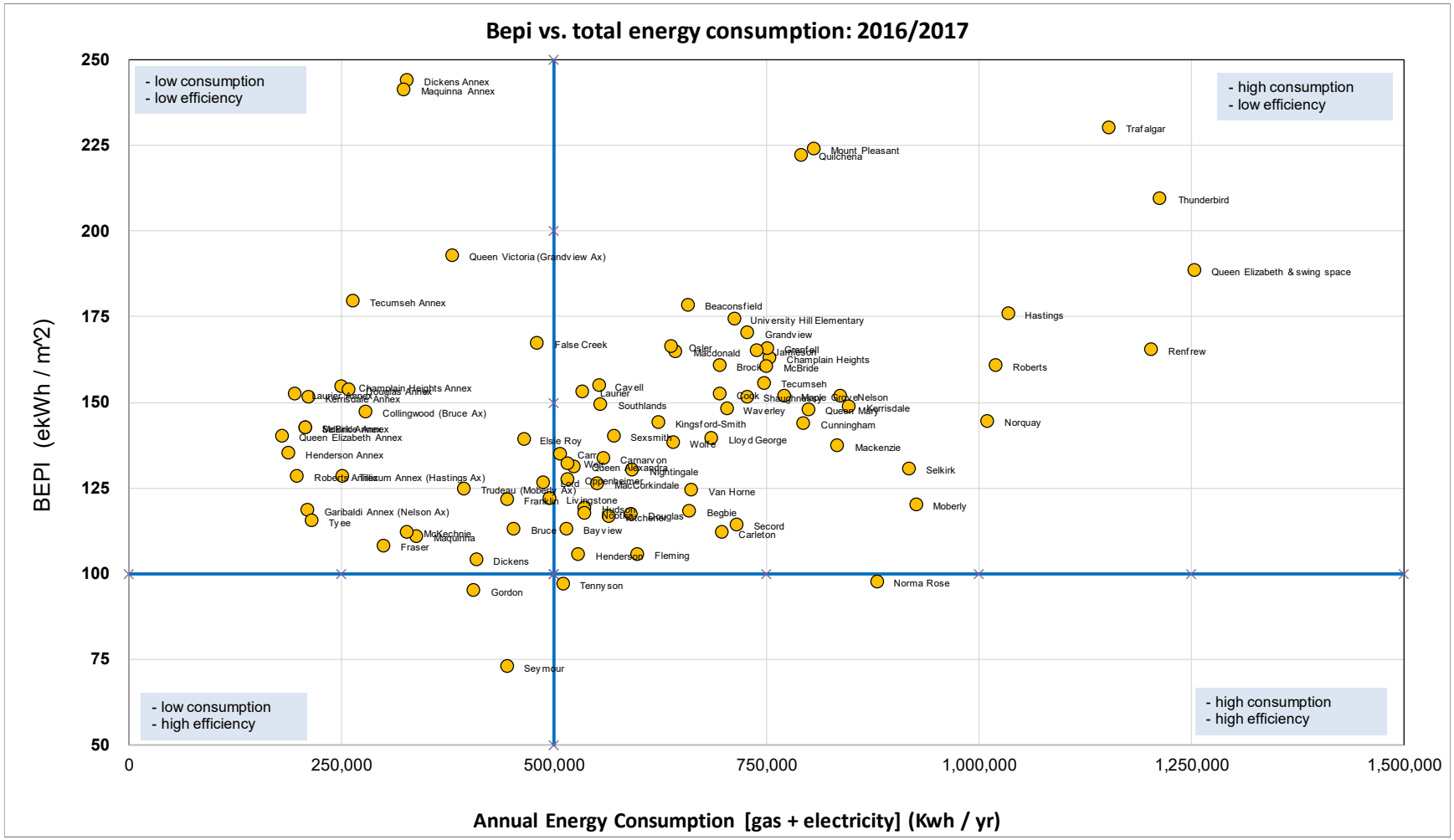
| **Site(s)** | **Study** | **Project Status** *[Year project was executed and claimed or planned]* | **Savings** *[kWh /yr unless otherwise noted]* |
|---|---|---|---|
| Nightingale | Opp. Assessment 2017/18 | ~2019 / 2020 | ~58,005 |
| Queen Elizabeth | Opp. Assessment 2017/18 | ~2019 / 2020 | ~66,597 |
| Trafalgar | Opp. Assessment 2017/18 | ~2019 / 2020 | ~50,104 |
| Jules Quesnel | Opp. Assessment 2017/18 | ~2019 / 2020 | ~48,212 |
| Secord | Opp. Assessment 2017/18 | ~2019 / 2020 | ~88,186 |
| SelkirkAx | Opp. Assessment 2017/18 | ~2019 / 2020 | ~19,222 |
| Thunderbird | Opp. Assessment 2017/18 | ~2019 / 2020 | ~50,000 |
| Bruce | Opp. Assessment 2018/19 | ~2020 / 2021 | tbd |
| McBrideAx | Opp. Assessment 2018/19 | ~2020 / 2021 | tbd |
| Seymour | Opp. Assessment 2018/19 | ~2020 / 2021 | tbd |
| | | | |
| Roberts | In design | 2019 | ~300 GJ |
| Hastings | In design | 2020 | ~300 GJ |
| Fleming | Boiler Plant | 2020 | ~300 GJ |
| Nelson | Boiler Plant | 2019 | ~300 GJ |
| Tennyson | Boiler Plant | 2022 | ~300 GJ |
| Van Tech | C.Opt - Study | 2021 | ~60,000 + ~800 GJ |
| U-Hill Sec | C.Opt - Study | 2021 | ~53,000 + ~200 GJ |
| Queen Alexandra | Lighting Study 2015/16 | ~2020 / 2021 | ~33,000 |
| Carleton | Opp. Assessment 2018/19 | ~2020 / 2021 | tbd |
| Trudeau | Opp. Assessment 2018/19 | ~2020 / 2021 | tbd |
| VPO Seismic Projects | Lighting studies | Studies to identify opportunities in seismic projects 2021-2025 | ~500,000 |

## Figure 4: Energy Consumption Intensity: Elementary Schools



## Figure 5: Energy Intensity vs. Energy Consumption




Bepi vs. total energy consumption: 2016/2017
- low consumption
- low efficiency
- high consumption
- low efficiency
- low consumption
- high efficiency
- high consumption
- high efficiency
BEPI (ekWh / m^2)
Annual Energy Consumption [gas + electricity] (Kwh / yr)
250
225
200
175
150
125
100
75
50
0
250,000
500,000
750,000
1,000,000
1,250,000
1,500,000
Dickens Annex
Maquinna Annex
Trafalgar
Mount Pleasant
Quilchena
Thunderbird
Queen Victoria (Grandview Ax)
Queen Elizabeth & swing space
Tecumseh Annex
Beaconsfield
University Hill Elementary
Hastings
Grandview
False Creek
Renfrew
Champlain Heights
McBride
Roberts
Champlain Heights Annex
Collingwood (Bruce Ax)
Cavell
Tecumseh
Nelson
Southlands
Waverley
Kingsford-Smith
Cunningham
Norquay
Queen Elizabeth Annex
Elsie Roy
Sexsmith
Lloyd George
Mackenzie
Henderson Annex
Carnarvon
Selkirk
Nightingale
Van Horne
Moberly
Garibaldi Annex (Nelson Ax)
Begbie
Bruce
Bayview
Secord
Carleton
Fraser
Dickens
Henderson
Fleming
Tennyson
Norma Rose
Gordon
Seymour

# 4 Going Forward: Strategic Actions

This section provides an overview of the identified actions for reducing energy. A separate project spreadsheet is used to track actions.

Note: The June 2018 version of this plan represents an update to the one established in June 2014. Update comments are included to indicate activity to the end of June 2018 ("Year 5" of the plan).

Note that while 2013/2014 is shown as "Year 1" of the plan activity, it is also the year the plan was developed and so many actions were developed during that year with implementation to be in a subsequent year.

## Action Area: Existing Facility Upgrades

### Action 1: Lighting upgrades

Over the past decade the VSB has replaced a number of older lighting systems ("T12s") with newer "T8" systems which include more efficient starting controls (ballasts).[3] The district still has a number of facilities with aging T12 lighting systems that would be beneficial to replace (and that aren't on the seismic renewal list). Changing out this old lighting has co-benefits of improving the classroom lighting quality, and enabling staff to install seismically restrained lighting to improve safety. As well, there are cases where other lighting changes can be made such as replacing fluorescents with LED lighting.

This action will aim to:

- complete a change out of T12 lighting systems for facilities that are not pending seismic upgrading over the five years of this plan.
- Upgrade older T8 systems, where appropriate. [New in Y2]

Updates:

| | |
|---|---|
| Y1: June 2014: | Lighting projects were completed in 2013/14 with savings of ~700,000 kWh |
| Y2: June 2015: | Projects underway in 2014/15 have savings estimated at 475,000 kWh. |
| Y3: June 2016: | Projects for 2015/16 targeted for 525,000 kWh.<br>Achieved 578,000 kWh. |
| Y4: June 2017: | Projects for 2016/17 targeted for 550,000 kWh.<br>Achieved 606,500 kWh. |
| Y5: June 2018: | Projects for 2017/2018 targeted for 500,000 kWh<br>Achieved 650,000 + kWh (total) of which 513,000 kWh were BCHydro 'Recognizable / incentivized |

[3] Fluorescent bulb tubes are referred to by their diameter in eights of an inch – T12s" are 1 ½ inches in diameter and T8s are 1 inch in diameter. Within each size there are different wattages of bulbs, and newer control ballasts.

## Action 2: Exterior lighting retrofits

New LED technologies have recently been coming to market that can provide exterior lighting with substantially lower power consumption. These may also have additional benefits of reduced maintenance or replacement due to a longer life span. The VSB has been pilot testing some exterior LED technologies. Not all products have been suitable or sufficiently durable but there is an emerging comfort with LED in exterior lighting applications.

This action will:

- implement a facilities review and develop a business case to retrofit exterior lighting through the District over a three year period.

| Updates: | |
|---|---|
| Y1: June 2014: | No activity. |
| Y2: June 2015: | At present external lighting is addressed when internal lighting projects are implemented at a site. |
| Y3: June 2016: | Continue to address external lighting with internal retrofit projects. |
| Y4: June 2017: | Exterior lighting retrofits fully included with interior retrofit projects. "Exterior only" retrofits deferred to future years. |
| Y5: June 2018: | Exterior lighting retrofits fully included with interior retrofit projects. "Exterior only" retrofits deferred to future years. |

## Action 3: Occupancy sensor retrofits

Most existing facilities have manual switches which rely on occupants to operate.[4] Retrofitting occupancy sensors may have a business case in cafeteria, multi-purpose areas, and some classrooms. This action will:

- pilot test occupancy sensor retrofits for classroom and other spaces, and if promising
- develop a business case for a wider occupancy sensor retrofit initiative.

| Updates: | |
|---|---|
| Y1: June 2014: | No activity |
| Y2: June 2015: | Occupancy sensors retrofits not implemented. Evaluation during Magee lighting study indicated that these have high cost and poor economics as retrofits. |
| Y3: June 2016: | No sites planned as retrofits. |
| Y4: June 2017: | No sites planned as retrofits. |
| Y5: June 2018: | No sites planned as retrofits. |

## Action 4: Tankless water heater deployment

'Tankless' (or 'instantaneous') water heaters provide hot water when it is needed – as opposed to 'tank' systems which have a heater maintaining a large volume of heated water regardless of

[4] Since about 2007 any gymnasium lighting projects have included motion sensors. Classroom level occupancy sensors have not been implemented with the most classroom retrofit projects.

whether there facility is occupied. The VSB has begun the deployment of tankless water heaters at several locations. Some of the new schools are being built with tankless water systems from the outsete. This action will:

- encourage the use of tankless systems for future water heating retrofits and new build applications.

| Updates: | |
|---|---|
| Y1: June 2014: | Installed two sites (Fraser and Tyee) |
| Y2: June 2015: | Installed one site (NRP) |
| Y3: June 2016: | No installations |
| Y4: June 2017: | Installed at two sites (Selkirk and L'Ecole Bilingue) |
| Y5: June 2018: | No installations. Comiitted for Fleming new school ( 3 ), Selkirk Annex ( 2 ) and McCorkindale ( 2 ) |

## Action 5: Boiler replacement

The majority of existing boilers within the district are considered "at or beyond" their manufacturer's specified service life - though all functioning boilers are well maintained, regularly inspected and meet BC Safety Authority requirements. As most schools operate for ~40-60 hours / week, there is rarely a viable business case to replace a *functioning* older boiler for a newer one on the basis of energy savings alone. However, replacements are made based on facility renewal, or available CNCP funding, as well as in future seismic retrofits.

When boilers are replaced, this action will:

- ensure that all new boilers are the most efficient possible for the expected operating conditions
- maximize uptake of Fortis incentive programs for more efficient boilers and heating equipment.

| Updates: | |
|---|---|
| Y1: June 2014: | Incentives received for new boilers / heat plants at 3 sites (Fraser, Tyee, and Moberly) funded by CNCP grants |
| Y2: June 2015: | No installations |
| Y3: June 2016: | No installations |
| Y4: June 2017: | Boiler incentives received for one site (L'Ecole Bilingue)<br>Incentive applications underway for McBride & Strathcona<br>Future applications being prepared for Nelson, Fleming, and Tennyson. |
| Y5: June 2018: | Boiler incentives received for McBride & Strathcona<br>CNCP funding declined for Hastings and Roberts<br>Future applications being prepared for Nelson, Fleming, and Tennyson. |

## Action 6: Explore the opportunity for a Fortis-funded Energy Specialist

Fortis BC provides funding support for an energy specialist person to work within a school district. Energy specialist activities are directed towards using natural gas more efficiently and the

suitability for funding is dependent upon having suitable gas saving opportunities. The Fortis program requires a commitment to implement a minimal amount of energy conservation activities during each year. This action will:

- work with Fortis BC to determine if an energy specialist position is viable for the VSB.

| Updates: | |
|---|---|
| Y1: June 2014: | No activity |
| Y2: June 2015: | Insufficient projects |
| Y3: June 2016: | Insufficient projects. No CNCP funds approved |
| Y4: June 2017: | Reviewing opportunities – VPO and proposed CNCP projects ahead may reach threshold for funding. |
| Y5: June 2018: | Reviewing opportunities – VPO projects ahead may reach threshold for funding. |

## Action Area: Operational Efficiencies

### Action 7: Operator engagement in energy management

The VSB system includes operators located at each school. Many of the operators are very skilled at managing their building system for energy efficiency and these operators represent a resource for energy management. This action will:

- increase the understanding of energy efficiency opportunities through staff training and engagement,
- engage with operators to improve the energy efficiency of existing schools, and
- provide support to and engagement with building operators for the newer energy systems being built at new schools.

| Updates: | |
|---|---|
| Y1: June 2014: | |
| Y2: June 2015: | NRCan “Spot the Energy Savings” workshop presented to ~30 operators in 2014/15<br>Established monthly review sessions for the new NRP school to proactively address issues of energy management and equipment operation with the building operator. |
| Y3: June 2016: | New school operator engagement for Kitsilano Secondary Phase 1. |
| Y4: June 2017: | New school operator engagement initiated for Queen Mary, General Gordon, L’Ecole Bilingue, and Crosstown. |
| Y5: June 2018: | Continued support for debugging issues at Crosstown and Gordon elementary. |

## Action 8: Continuous Optimization ("C.Op.") Program initiative

The VSB has applied and been accepted for 18 buildings to be entered as part of the BC Hydro Continuous Optimization ("C.Op.") program. The program provides a process for a "tune-up" of a building's automation and control system. The process includes baseline tracking and energy studies and so takes about 18-36 months for each building. It is anticipated that the lessons learned will be transferable to other facilities in the district.

This action will:

- Implement the C.Op. program in phases.

| Updates: | |
|---|---|
| Y1: June 2014: | No Activity |
| Y2: June 2015: | DDC upgrades being completed. |
| Y3: June 2016: | DDC upgrades being completed. |
| Y4: June 2017: | Sites reviewed and re-screened and not pursued<br>Two large sites identified and being pursued as part of "C.Op.2" initiative. |
| Y5: June 2018: | C.Opt program for 2 sites initiated spring 2018. |

## Action 9: DDC system upgrades and network connections

Direct Digital Controls (DDCs) are automation systems that control the various components of a building operations. Many existing schools have partial, or aging DDC systems - typically only accessible at the school site. About 20 sites have hardware, associated programming, and internet connection to allow for building information to be viewed remotely (e.g. from the workshop or head office via a "local area network" or LAN). Improved communications and connectivity will allow maintenance, operations, and energy management staff to better understand building operations, to diagnose problems, and to more proactively manage energy consumption.[5]

The action will:

- upgrade DDC and communications systems with a goal that all (non-steam heated) facilities be LAN connected by the end of the seismic capital program.

| Updates: | |
|---|---|
| Y1: June 2014: | No Activity |
| Y2: June 2015: | CNCP funding to upgrade five sites received in Feb 2014 - completing in 2015. |
| Y3: June 2016: | CNCP funding to upgrade 15 sites completed in 2016 |
| Y4: June 2017: | CNCP funding to upgrade 9 sites (+ 5 FDK portables) awarded in Feb 2017 to be completed in 2017/18. |
| Y5: June 2018: | AFG funding to upgrade 1 site awarded in March 2018 – completion 2017/18. |

[5] For 2014 the VSB has been awarded approximately $180,000 from the Province's Carbon Neutral Capital Program (CNCP) to upgrade DDC components and connect six more schools to the LAN network.

### Action 10: EnerTracker software

Specialized software now exists to obtain near real-time energy consumption data from electrical smart meters at all schools), and automated natural gas meters (at selected schools). These allow short term (next day) feedback of energy use. Under a pilot project, Fortis BC will cover the costs of this software on gas meters for selected accounts. This action will:

- install and use EnerTracker' software where possible on suitable schools through the BC Hydro C Op. and Fortis EnerTracker programs.
- utilize the EnerTracker software at new schools constructed until these have been fully commissioned.

| Updates: | |
|---|---|
| Y1: June 2014: | No activity |
| Y2: June 2015: | EnerTracker software installed at ~22 sites in 2014.<br>Smart meter data used to estimate strike savings in the fall of 2014.<br>Evaluating smart meter data for use as a demand management tool. |
| Y3: June 2016: | Program has been extended. Further review in 2016. |
| Y4: June 2017: | Program ended December 2016. Tool was not widely used as the implementation of the MyHydro smart meter portal also provides data. |
| Y5: June 2018: | No activity. |

## Action Area: Planning and Capital Development

As enrollment-based and seismic-driven capital projects are implemented, there is an opportunity to address energy efficiency in these projects - beyond what may be required by the Vancouver Building Bylaw. Actions identified for this area are described below.

### Action 11: Develop energy specific guidance material for new school construction

In the development of recent new school construction, the mandate for energy efficiency has produced individually creative designs. However, it has also resulted in schools with 'unique features' that are new technologies, or not widely developed in the District. As an operator of a 'fleet' of facilities, with a mobile building engineer staff, the District could benefit to define more consistent goals and approaches into facility design. This action will:

- define a set of goals and objectives that the VSB would like to achieve for energy use in new facilities, and the implications for heat plant equipment.
- provide guidance to future school designers for any desired, or required, or excluded elements for design.

| Updates: |
|---|

| | |
|---|---|
| Y1: June 2014: | No activity |
| Y2: June 2015: | Informal review of current practices to date. |
| Y3: June 2016: | Continued involvement with newly created Vancouver Project Office (VPO). |
| Y4: June 2017: | Input to electrical and mechanical standards updates including energy use intensity targets |
| Y5: June 2018: | Development of HVAC 'owner's requirements' and continued updates to the mechanical standards. |

## Action 12: Provide ongoing support for energy management in new facilities

The energy manager is a resource to the PDR and design facilities development design teams, and provides input to the many facility projects.

This action will:

- encourage the inclusion of energy management considerations into PDR reports, and subsequent facility design.

| Updates: | |
|---|---|
| Y1: June 2014: | initiated |
| Y2: June 2015: | Ongoing as required. |
| Y3: June 2016: | Continuing. |
| Y4: June 2017: | Continuing. |
| Y5: June 2017: | Continuing. |

## Action 13: Passive and renewable energy technologies

A number of emerging technologies have the potential to augment the energy systems of existing facilities. This could include solar panels for electricity or hot water production, 'solar walls' for pre-heating building intake air, advanced air leakage sealing techniques, designed shading systems to reduce solar gain, and others. The improved design of buildings can reduce the need for heating and cooling systems - allowing for smaller systems. These technologies are likely to have the best business case in new facilities rather than as retrofits.

This action will:

- promote and pursue innovative passive design and renewable energy technologies in new and existing schools.

| Updates: | |
|---|---|
| Y1: June 2014: | No specific activities |
| Y2: June 2015: | Earth tubes included in design at L'Ecole Bilingue seismic project. |
| Y3: June 2016: | Possible application for enhanced building envelope at other sites. |
| Y4: June 2017: | Reviewing implications of Vancouver Green Buildings plan to VSB developments. |
| Y5: June 2018: | North-South air intake strategy being pursued at Nelson |

### Action 14: Engage new schools in the BC Hydro New Construction Program

BC Hydro's New Construction Program (NCP) provides incentives for the construction of new buildings that are intended to encourage efficient design through building energy modeling and lighting design. The VSB has accessed these programs for some school construction projects. This program may be valuable when deployed for specific schools.

This action will:

- continue to pursue opportunities to utilize the BC Hydro incentive programs for new construction, and
- work with BC Hydro to define a compliance mechanism that meets the VSB project cycle.

| Updates: | |
|---|---|
| Y1: June 2014: | Initiated |
| Y2: June 2015: | Completed submissions for new schools through the "New Construction Incentive Program" for Douglas and Sexsmith elementary schools, Norma Rose Point School, and U-Hill secondary.<br>Developed applications for Kitsilano Secondary and International Village elementary. |
| Y3: June 2016: | Queen Mary lighting design project agreement w/ BC Hydro. |
| Y4: June 2017: | No further sites planned – programs have been capped. Existing projects will be completed. |
| Y5: June 2018: | No change. |

## Action Area: Information Technology

IT infrastructure is deployed throughout the district. This includes:

- A primary IT and server area at the head office (Ed Center);
- A local server at each school site;
- Computer labs at each secondary school (range from two and seven) – some general and some dedicated to specific programs or software;
- Computer labs generally at each elementary school;
- A PC located in each classroom for teacher / classroom use;
- Smart boards and iPad/tablet carts; and
- Wi-Fi access.

In the past several years, the District has implemented a number of energy saving activities including:

- Elimination of cathode ray tube monitors (through a natural replacement cycle);

- Installation of power management software; and
- Server virtualization at the Ed Center server group to reduce the number of servers used.

Current initiatives in IT infrastructure for the District include:

- Reduction and elimination of computer labs in elementary schools. This is driven by educational desires.
- Transition of teacher desktops to laptops. Replacement cycles will likely result in desktop machines being replaced by laptop units over the next several years.
- Widespread adoption of mobile devices - both District (e.g. iPad carts) and student personal devices.

The future deployment of official VSB devices is not clear as there are many issues to be addressed. Regardless it is expected that the use of mobile devices will only increase.

From an energy use perspective, the largest gains in IT have been recently achieved – CRT elimination, power management software.

## Action 15: IT as a tool for communication and behavior change

This action will seek to utilize IT tools to assist in developing communication and behavioral change tools. These opportunities are not well defined at present but may include:

- providing special projects with energy or other information (e.g. data for energy challenges etc.); and
- upgrading the greenboard website or other portal communication tools.
- Achieving “Program Enabled” (PE) projects with BC Hydro.

The deployment of IT as a tool depends upon on reliable and sustainable IT infrastructure.

| Updates: | |
|---|---|
| Y1: June 2014: | Plan development – no initiatives implemented |
| Y2: June 2015: | Participated in social media pilot project through BC Hydro. |
| Y3: June 2016: | Continued blog postings to highlight energy management activities. |
| Y4: June 2017: | Continued blog postings to highlight energy management activities. |
| Y5: June 2018: | Continued blog postings to highlight energy management activities. |

# Action Area: Behavioral Change

Behavioral and awareness opportunities represent an opportunity for the VSB to promote energy conservation within the schools.

## Action 16: Promote BC Hydro educational programs

BC Hydro has developed a number of curriculum modules regarding energy awareness, safety, and conservation. Over the past several years, teachers from dozens of schools have had a teacher attend a workshop session as a professional development activity and many of them have subsequently delivered this material in their classrooms.

This action will:

- engage with schools and teachers to deliver BC Hydro program initiatives into schools.

| Updates: | |
|---|---|
| Y1: June 2014: | Existing programs – primarily at elementary level are ongoing. |
| Y2: June 2015: | Existing programs ongoing. Exploring with BC Hydro to increase the promotion of their school programs. |
| Y3: June 2016: | Existing programs ongoing |
| Y4: June 2017: | Existing programs ongoing. Energy Ambassadors not offered in 2016/17. |
| Y5: June 2018: | Existing programs reduced. Energy Ambassadors not offered in 2017/18. |

## Action 17: Leverage programs of the nonprofit sector

The VSB has worked with the non-profit group “Destination Conservation” for several years and provided some support for their modules that focus on energy conservation and water reduction.

This action will:

- assist (where viable) local NGO involvement in VSB schools to promote energy and other resource conservation.

| Updates: | |
|---|---|
| Y1: June 2014: | Provided support to Destination Conservation in 2013/14. |
| Y2: June 2015: | No initiatives developed. |
| Y3: June 2016: | No initiatives developed. |
| Y4: June 2017: | No initiatives developed. |
| Y5: June 2018: | Supporting pilot initiatives on climate change with “Be the Change Earth Alliance” and the Center for Applied Landscape Planning (CALP) at UBC. |

## Action 18: Develop the Energy and Sustainability Group as a Resource

The energy and sustainability team includes the energy manager and other part time staff for carbon reporting, coordinating sustainability activities, and maintenance of utility information systems. This group can be better leveraged as a resource for supporting educational activities.

This action will:

- utilize existing networks for green and other initiatives to communicate activities about energy conservation
- proactively reach out to identify teachers and students and support them in their efforts to promote energy conservation
- provide access to VSB information and data for students that wish to utilize this information in their school projects.

| Updates: | |
|---|---|
| Y1: June 2014: | |
| Y2: June 2015: | Current efforts focused on building operations staff. |
| Y3: June 2016: | Continued work to expand role with school staff – particularly VPO and new projects. |
| Y4: June 2017: | Continued work to expand role with school staff. |
| Y5: June 2018: | Continued work to expand role with school staff.<br>Implementing detailed water metering to capture data for water conservation initiative. |

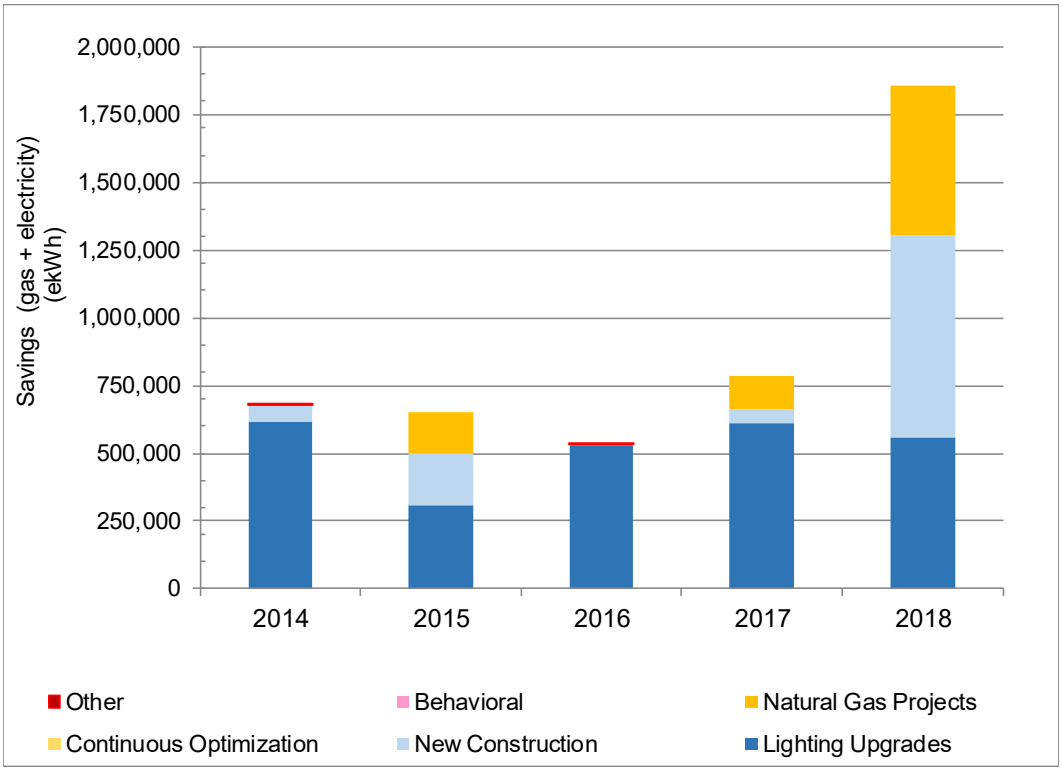
# 5 Energy Plan Impact

## 5.1 Energy Savings

The reductions achieved in each year of the plan are compiled: (i) according to the type of initiative (Figure 6 below) - generally corresponding to BC Hydro's Power Smart incentive programs, and (ii) according to the type of fuel conserved. (Figure 7). The savings shown are the annual savings achieved shown for the year in which the project is completed. The cumulative savings is the total of each of these individual year's activities.

Observations from these two figures include that: (i) lighting retrofit projects have been a mainstay of the conservation efforts to-date, and natural gas projects (including seismic upgrades) are a key part of achieving natural gas upgrades.

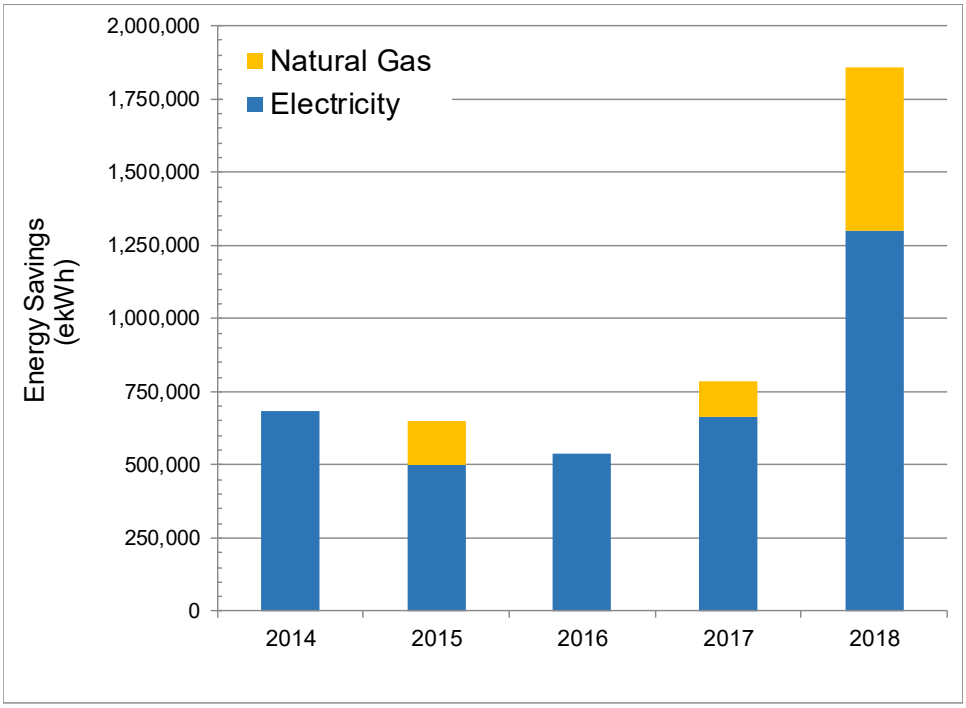
**Figure 6: Estimated Energy Savings Projects Implemented Each Year (by Activity Type)**




Notes to the legend:
1) Programs:
- Lighting upgrades are replacement of older inefficient lighting projects
- New Construction is a program of BC Hydro Power Smart.
- Continuous Optimization is a Power Smart program. Savings will occur beyond the 2018 year.
- Natural Gas Projects are those specifically directed at natural gas savings and include savings from seismic upgrades.
- Behavioral are savings achieved through staff and student behavior change.
- Other typically includes appliances and other programs.

2) The year shown represents BC Hydro's fiscal year ending March 31, which aligns with the district AFG funding cycle.
3) 2014 to 2017 values are actual, 2018 is forecast.

**Figure 7: Estimated Energy Savings Projects Implemented Each Year (by Energy Source)**




Notes to the legend:
1) 1 GJ of natural gas = 278 equivalent kWh (ekWh)
2) Natural Gas savings include savings from seismic upgrades.
3) 2014 to 2017 values are actual, 2018 is forecast.

## 5.2 Carbon Emissions Reductions

The actions defined at present are primarily focused on electricity conservation and to a lesser degree on natural gas. At the target level of reductions the district would save about 150 - 200 tonnes of GHG emissions annually.

## 5.3 Avoided Costs and Cost Savings

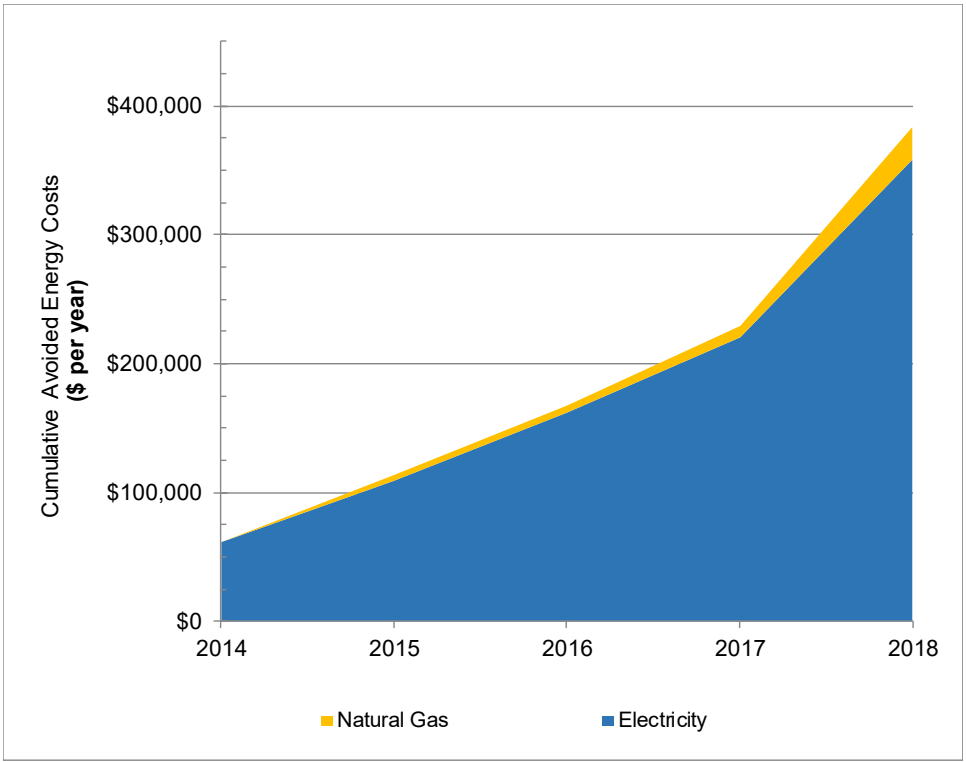
Each conservation activity will result in savings of energy and therefore utility costs. Some savings will be realized as actual utility bill reductions. Others will be 'avoided' costs where a future cost is reduced compared to what might otherwise happen. Examples of avoided costs include:

- a new facility built to a higher efficiency standard will avoid some of the consumption that might otherwise be required from a conventionally efficient facility, or

- costs that would result from rising commodity prices are tempered by the conservation effort.

Figure 8 shows the cumulative avoided cost savings from the measures identified - shown by fuel type. Based on the items identified, the District has achieve savings in the range of $220,000 annually by the end of the year Four (2017) and anticipate avoided costs of almost $400,000 by the end of year five.

**Figure 8: Annual Avoided Energy Costs by Fuel Type**




## 5.4 Estimated Implementation Costs

Not all costs have been quantified and so current estimates are incomplete. However as a starting point, it is estimated that the capital requirements and incentives will be:

- Capital costs in the range of $ 3 million dollars over 5 years to implement.[6]
- BC Hydro incentive rebates estimated at about 350 k$ - 500 k$ over the five years from 2013/2014 to 2017/2018.

[6] For context, in the past 2-3 years, about 600 k$ annually of maintenance and AFG budget were spent on lighting retrofits as well as a one-time contribution of 350 k$ from the sustainability incentive pool.

## 5.5 Reduction Target 2013/14 to 2017/18

This SEMP proposes a conservation target of:

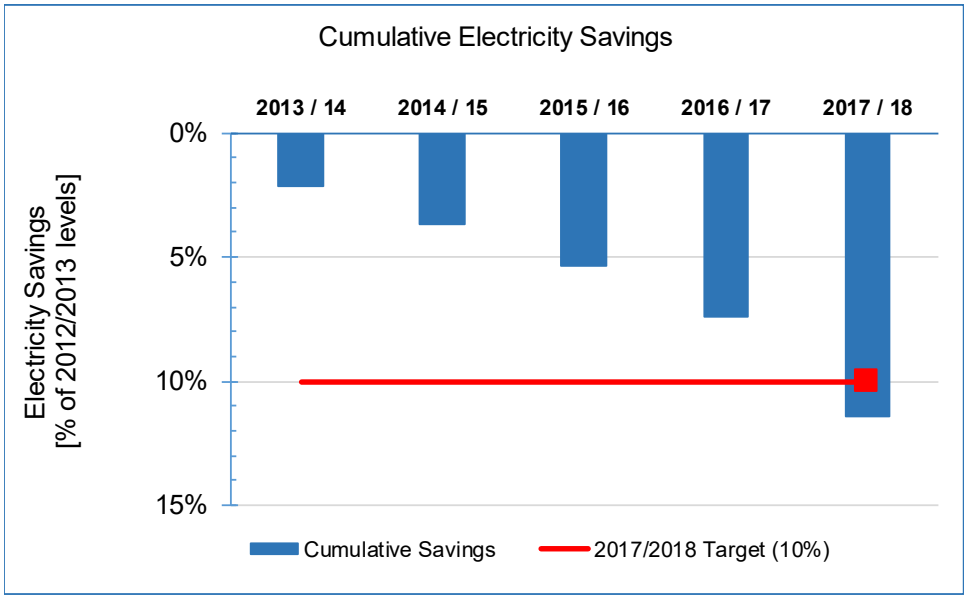
- **A 10% reduction of electricity use**
- **A 5% reduction of natural gas consumption.**

This target acknowledges that: (i) many projects have been completed prior to the 2012/13 base year, and that (ii) many of the site slated for seismic review may not be eligible for conservation projects in the time period. At the same time it is still ambitious given the current fiscal situation and will require some determined effort to achieve.[7]

## 5.6 Progress on Reduction Target

Progress on the reductions target is tracked annually. Electricity and natural gas reductions (completed and planned) are shown in Figure 9 and Figure 10, respectively. There have been identified sufficient electricity reduction projects to reach the target (NB funding is annual and not approved in advance). For natural gas reductions there have not been identified a sufficient number of reduction projects to reach the target at present.

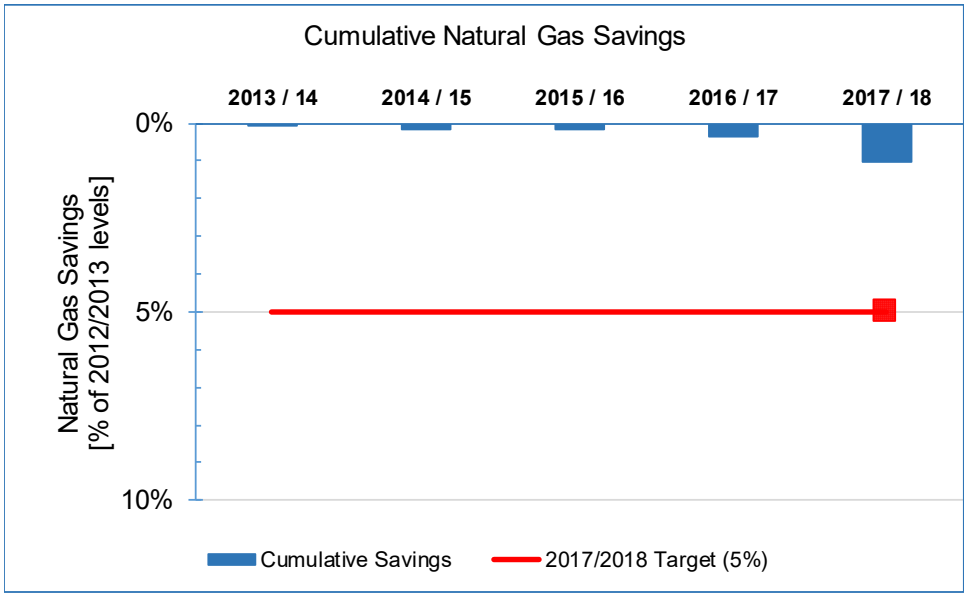
**Figure 9: Progress towards Electricity Reduction Target**




Notes: 1) 2012/2013 electricity consumption = 32,300,000 kWh.
2) 2014 to 2018 values are actuals.

[7] The 2013/14 version of this plan identified projects that resulted in only an 8.5% reduction in electricity, and a 1.5 % reduction in natural gas.

**Figure 10: Progress towards Natural Gas Reduction Target**




Note: 1) 2012/2013 natural gas consumption = 298,000 GJ (not weather adjusted).
2) Natural Gas savings include savings from seismic upgrades.
3) 2014 to 2018 values are actuals.

# 6 Implementation

## 6.1 Timing

This plan includes a number of multi-year initiatives as well as some defined scope / timeline initiatives. A schematic timeline of the implementation of the action in this plan is shown in Figure 11.

**Figure 11: SEMP Implementation Progress (to June 2018)**

| | SEMP Plan Year = | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
|---|---|---|---|---|---|---|
| | School Year = | 2013 / 2014 | 2014 / 2015 | 2015 / 2016 | 2016 / 2017 | 2017 / 2018 |
| | Status | Complete | Complete | Complete | Complete | Complete |
| **Action Area: Existing Facility Upgrades** | | | | | | |
| Action 1: | Lighting upgrades | | | | | |
| Action 2: | Exterior lighting retrofits | | | | | |
| Action 3: | Occupancy sensor retrofits | | | | | |
| Action 4: | Tankless water heater deployment | | | | | |
| Action 5: | Boiler replacement | | | | | |
| Action 6: | Explore the opportunity for a Fortis-funded Energy Specialist | | | | | |
| **Action Area: Operational Efficiencies** | | | | | | |
| Action 7: | Operator engagement in energy management | | | | | |
| Action 8: | Continuous Optimization ("C.Op.") Program initiative | | | | | |
| Action 9: | DDC system upgrades and network connections | | | | | |
| Action 10: | EnerTracker software | | | | | |
| **Action Area: Planning and Capital Development** | | | | | | |
| Action 11: | Develop energy specific guidance material for new school construction | | | | | |
| Action 12: | Provide ongoing support for energy management in new facilities | | | | | |
| Action 13: | Passive and renewable energy technologies | | | | | |
| Action 14: | Engage new schools in the BC Hydro New Construction Program | | | | | |
| **Action Area: Information Technology** | | | | | | |
| Action 15: | IT as a tool for communication and behavior change | | | | | |
| **Action Area: Behavioral Change** | | | | | | |
| Action 16: | Promote BC Hydro educational programs | | | | | |
| Action 17: | Leverage programs of the nonprofit sector | | | | | |
| Action 18: | Develop the Energy and Sustainability group as a resource. | | | | | |
| | | | | | | |
| | Initiated or Committed | | | | | |
| | Planned or in development | | | | | |

= Initiated or Committed
= Planned or in development

## 6.2 Resourcing

Sources of funds for energy management include:

- AFG capital funds for retrofits (e.g. lighting upgrades);
- Carbon Neutral Capital Program (CNCP) grants - potentially $600k annually – based on the stated intention that each SD would receive funds proportionate to their carbon offset purchase expenditure; and
- Incentives from utility companies for conservation reinvested into energy conservation (e.g. audits, studies, cost shared initiatives, retrofits);

## 6.3 Staff Roles and Responsibilities

Implementation of the SEMP will require the involvement of a number of the different groups within the organization. These are summarized in Table 4. It is important to note that there are many participants and that coordination and communication between groups is required to ensure smooth implementation.

**Table 4: Implementation Activities and Participants**

| Activity | Lead | Participants | Relevant Actions |
|---|---|---|---|
| Project List Review and Update | Energy Manager | Operations<br>Maintenance | All |
| Annual Project Planning | Energy Manager | Operations Manager<br>Maintenance Manager<br>Secretary Treasurer | All |
| Utilities database maintenance and updates | Operations | Energy Manager | All |
| Incentive & Funding Applications (e.g. Fortis, BC Hydro, CNCP) | Energy Manager | Maintenance<br>Operations<br>Facilities Planning | 1 - 7 |
| BC Hydro Incentive Project Management | Energy Manager | Maintenance (Elec) | 1,2,4 |
| Lighting Project Implementation | Maintenance (Electrical) | Maintenance | 1, 2, 3 |
| Heating & DHW System Upgrades | Maintenance (Mechanical) | Energy Manager<br>Operations | 4, 5 |
| Operational Improvements | Energy Manager | Operations<br>Maintenance | 6, 7, 8, 9, 10, 11 |
| New Facility Criterion | Energy Manager | Facilities Planning | 12, 13, 14 |
| Staff and Student Engagement | Energy Manager | Student Green teams<br>Teachers | 15, 16, 17, 18 |
| Annual Reporting | Energy Manager | Operations<br>Maintenance | All |

## 6.4 Stakeholder Engagement & Participation

Beyond the staff roles there are a number of players that can assist us to achieve a long-lasting culture of conservation. To-date most conservation activities have been 'hard-wired' through infrastructure. Going forward, there will be a greater emphasis on behavioral activities. This will require that students and staff are engaged in conservation activities. A brainstormed list of activities (none confirmed or defined fully) is highlighted in Table 5.

**Table 5: Potential SEMP Engagement Activities**

| Participant | Potential Activities |
|---|---|
| Students | Conservation Activities at classroom level<br>Promotional Events<br>Green Team Participation<br>Campaigns (e.g. earth hour, lights out) |
| Teachers | BC Hydro School Programs |

| Participant | Potential Activities |
|---|---|
| | Promotional Events |
| School Administration | Activity Support<br>Promotional Events |
| Parents and PACs | Awareness information<br>Possible do-at-home activities |
| School support staff | Support to school activities |

## 6.5 Reporting

The excel-based project list is updated frequently as a working tool in the energy manager program.

Progress will be reported through the quarterly BC Hydro quarterly meeting cycle, as well as annual reports to senior management and Committees of the VSB.