CVRD

Cowichan Valley Regional District

2013 Corporate Strategic Energy Management Plan

Partnering with:

BC hydro

powersmart

Senior Management Support:

Name: Jacob Ellis

Position: General Manager, R.S. Dept

Signature:

TABLE OF CONTENTS

1 SUMMARY & RECOMMENDATIONS

1.1 PURPOSE

The Strategic Energy Management Plan (SEMP) clearly defines the goals and objectives of the Cowichan Valley Regional District in reducing energy consumption, in a manner that is consistent with:

- The CVRD Corporate Strategic Plan;
- The 2012 CVRD Corporate GHG Inventory and Emission Reduction Plan; and the
- BC Hydro Powersmart Partner Program agreement;

1.2 GOALS

The goal of the Strategic Energy Management Plan (SEMP) is to help the CVRD:

- Become more efficient with energy use;
- Reduce waste and greenhouse gas emissions;
- Seek environmentally neutral sources of heating, cooling, and energy;
- Reduce pollution; and
- Lead by example in energy conservation and environmental practices.

1.3 TARGET

To achieve these goals, the SEMP examines historical energy consumption and patterns, determines where the CVRD is at in its current environment and shows what the organization is planning to do for the upcoming 3-5 years in terms of energy conservation opportunities.

The SEMP explores the opportunities for energy reduction at the building level through empirical analysis of existing building energy intensity and compares these buildings against similar building types across the CVRD, B.C. and against various National and North American benchmarks. This analysis showed that there is a possibility for 20% reduction in electrical energy use and 13% reduction in fossil fuel use, resulting in an overall total potential reduction of 16% energy reduction.

To verify results of this top-down comparison analysis, the SEMP also quantifies potential energy reduction possibilities on the building level based on a high level examination of potential energy savings. This approach showed a 13% potential reduction in electrical energy use and a 21% reduction in fossil fuel use, with a total potential of 15% total energy reduction.

Based on this information, the SEMP sets a target of 15% energy reduction by 2018 from a combination of electricity and fossil fuels across the organization.

1.4 RESULTS

Meeting the 15% energy reduction target by 2018 will result in over $500,000 in avoided energy costs and over 700 tonnes in Greenhouse Gas reductions ($21,000 in avoided carbon offsets) in those five years.

1.5 NEXT STEPS

In order to meet the energy consumption reduction targets set in this plan, the CVRD must lay out a plan of action targeting energy reductions across the functions for the next 5 years. This action plan is developed through identified energy reduction projects across the organization with specific energy goals for each function.

As a first step, engineering analyses need to be performed across all the major facilities in order to generate energy saving implementation plans with comprehensive list of projects, required investment and

expected energy savings through the program. These plans provide an essential roadmap to energy saving projects allowing funds to be set aside within upcoming budget cycles. Furthermore, these plans will allow the CVRD to access valuable custom incentive programs from BC Hydro and Fortis BC that provide up to 75% of project capital costs.

An engineering analysis of the Island Savings Centre has been completed and it is recommended that the following buildings have energy studies completed in 2013:

Location	Estimated Cost
Cowichan Lake Sports Arena	$13,273
Kerry Park Recreation Centre	$13,378
Shawnigan Lake Community Centre/Elsie Miles	$7,433
Ingram Street Office	$8,320
Bing's Creek Waste Management	$6,126
Honeymoon Bay Fire Hall	$3,300
Total Estimated Cost	$52,000

B.C. Hydro provides incentive funding of up to 50% for Energy Studies, resulting in a balance of $26,000 to be funded by the CVRD.

1.6 RECOMMENDATIONS

The SEMP provides recommendations designed to assist the CVRD in integrating energy management into the day to day operations of the organization and to help achieve the targets set in in the Strategic Energy Management Plan (SEMP). These have been summarized in table 1.

Table 1 - Recommendations Summary Table

ACTION AREA	RECOMMENDATION
Plans and Actions	1. Perform engineering analyses in 2013 on all major CVRD facilities with the objective to: a. Identify energy conservation opportunities (potential savings and payback). b. Create opportunities for utility partner incentives and government grants. c. Develop a multi-year upgrade plan with measurable targets and capital investment requirements.
Targets and Reporting	1. Collect data from each billing cycle that can be used to create baselines and ongoing targets for evaluating energy intensity. 2. Adopt a software-based approach to managing energy consumption and billing data so staff members are able to spend time analyzing and understanding energy use rather than number crunching data. 3. Review ongoing energy use, including monthly energy use, billing review of energy accounts consumption and charges by utilities operators. These review should include: a. **Monthly** energy consumption and expense and provide notes on any out of normal activity. b. **Quarterly** progress dashboards on energy consumption, expenditure, and the progress on function targets that build to overall division targets for division managers. c. **Biannual** reports on energy consumption, expenditures and progress on targets to the Senior Management Team. 4. Report on the CVRD's energy consumption and greenhouse gas emissions annually. Staff will be made aware of their respective division's energy consumption so that energy efficiency and performance can be assessed and action taken.
Training and Awareness	• Commit to work with staff to continue education efforts to help them better understand energy consumption and the means by which individuals can influence reductions through prudent use of resources. • Train building operator as part of building audits/re-commissioning so the hand over process and operation of building systems is most efficient. • Provide, Life-Cycle Cost Analysis (LCCA) training to staff members that are involved in the evaluation, decision-making and presentation of potential energy projects.

ACTION AREA	RECOMMENDATION
Operational	1. Task CVRD department and division managers with meeting the SEMP reduction targets. Energy usage in their respective buildings, facilities, vehicles and by their operations should be considered. 2. Direct that department and division managers review with the Energy Analyst, through the budget process, all new energy consuming initiatives including building and construction projects as well as programs and services provided to the community. 3. Coordinate each division, responsible for electrical and fossil fuel accounts, with the energy analyst to outline and implement investment opportunities. 4. Minimize all non-essential lighting and other electrical, mechanical, and thermal loads during non-business hours.
Leadership	• Communicate its energy management efforts and provide energy use information at public locations such as recreation centres and other public buildings. • Commit to using a recognized energy efficiency standard for all new construction and major renovations. • Ensure building commissioning on all new construction and major renovations to ensure installed equipment and controls operate as engineered. • Undertake building re-commissioning (of adequate detail depending on its use), once every 5 years.
Financial	1. Explore the cost and benefit of utilizing full time staff support to coordinate, implement and oversee corporate energy management. Also explore how this position might provide support for municipal energy management. *Staff have been exploring new mechanisms for continually funding energy efficiency projects. One funding mechanism that is gaining popularity across the public sector is the concept of a revolving fund. Below are two examples that are tailored for the regional district context and being explored further by staff.* 2. Within each CVRD Function that emits GHG emissions (as defined by the UBCM Traditional Services Boundaries), a revolving climate action revolving fund be set aside, equivalent to the previous year provincial carbon offset from the Function's emissions to underwrite energy/GHG reduction programs for that function to reduce natural resource use, energy consumption and emissions of greenhouse gases. E.g. Recycling and Waste Management Division could use these funds to leverage a composting program that can be used to offset its GHG emissions from its operations. 3. That within each CVRD Function that consumes energy, a revolving energy conservation fund be established within its annual budget. These funds will then be invested in energy efficiency upgrades and projects that decrease energy use, thereby lowering operating expenses. These operational savings are returned to the function's own fund and then reinvested in additional projects identified in its plan. Savings generated by reducing operating costs are tracked and used to repay the fund (thus providing ongoing capital for future projects).

2 INTRODUCTION

The purpose of this plan is to provide the CVRD with a framework for integrating energy performance into its management practices. The plan is intended to accomplish the following:

- Assist the CVRD in making better use of its existing energy-consuming assets.
- Create transparency and facilitate communication on the management of energy resources.
- Promote energy management best practices and reinforce good energy management behaviours.
- Assist CVRD facilities in evaluating and prioritizing the implementation of new energy-efficient technologies.
- Provide a framework for promoting energy efficiency throughout the region.
- Facilitate energy management improvements for greenhouse gas emission reduction projects.
- Allow integration with other organizational management systems such as environmental, and health and safety.

The plan does this by examining historical data consumption and patterns, determining where the organization is at in its current environment and showing what the organization is planning to do for the upcoming 3-5 years in terms of energy efficiency opportunities. This document addresses the following key areas:

a. **CVRD background information** – by examining the unique context in which this energy management plan is to operate a bespoke solution becomes possible outlined to suite the unique operating characteristics of the buildings and community.
b. **Commitment** – The CVRD has already made strong commitments to environmental performance and energy reduction. This area highlights these objectives and illustrates how this plan serves to meet those objectives.
c. **Our Situation** – You can't manage what you don't measure. This section of the plan is a snap shot of current energy use, costs and a breakdown across the CVRDs facilities of energy use.
d. **Opportunities** – This area examines two approaches to discovering energy efficiency potential for the organization. The top-down approach looks at CVRD buildings compared to each other, to historical energy use, and to Building Energy Performance Indices. The bottom – up approach looks at each building individually and identifies potential projects available to reduce energy. Combined, these techniques give an overall energy reduction potential and the ability to set goals and targets for energy use reduction.
e. **Our Actions** – By monitoring past actions, the CVRD is able to verify annually the effectiveness of its energy management program. It can identify actual, avoided and accumulated savings from energy projects. This process allows the CVRD to examine its success and adjust its plan accordingly each year.
f. **Planned Actions** – This area describes upcoming projects, projected savings and required capital investments. This section provides the essential planning for upcoming annual budgets for divisions responsible for those projects.

This strategic energy management plan is a living document and is intended to be updated annually to reflect on the current performance of the organization and to adjust to the changing needs and opportunities facing the CVRD.

3 OUR ORGANIZATION

In the regional district context, the concept of fiscal equivalence has strong and far reaching implications on how energy management strategies come into play.

> *Fiscal equivalence: The legislation for regional districts requires a close matching between the benefits and costs of services. The intent is that residents "pay for what they get". In practice, this can mean that each service that is delivered by the regional district has a cost recovery formula. To this end, the legislation provides a wide range of cost recovery tools including taxes, charges and fees and the flexibility to vary these. As well, it requires that each service be separately accounted for in the budget and accounts of the regional district.*[1]

The implications for the energy management strategy are that an overall budget or general fund cannot be developed from savings from individual energy projects. Savings from energy projects must be reinvested into measures within that function. Furthermore, overall rankings of buildings and targeting do not serve to set a pecking order for project priority in terms of capital budget but only in energy management resource and to identify opportunities.

This can be seen as a unique advantage for the regional district. Other organizations may have a general energy projects fund in which projects are ranked and prioritized on their potential savings opportunities. The CVRD has the opportunity to make significant reductions across many different opportunities simultaneously because of the distributed nature of its funds. It is able to address large projects such as recreation centres while at the same time improving energy efficiency across its smaller infrastructure without having to juggle budgets.

The key to being able to advance on energy projects across the various functions of the regional district is the **development of energy efficiency reserves and revolving funds set at the function level in order to provide a continuous fund mechanism to continually perform energy conservation measures within the function.**

The implementation of strategic plans for each function's managing division will allow for rapid increase in energy efficiency combined with significant cost and GHG emissions reductions.

[1] Primer on Regional Districts, 2006, B.C. Ministry of Community Services

3.1 ORGANIZATIONAL PROFILE

Organization Profile						
PEOPLE	Sector	Regional District Government				
	Number of Employees	Total: 348 Fulltime: 158		Number of Sites	17+ Buildings 40+ Water Management Sites	
OPERATIONS	Energy Management Issues / Obstacles	▪ Staffing resources ▪ Low priority on the agenda ▪ Complexity of governmental processes and departments ▪ Annual budget cycle and regional district functions				
	Core Business Metrics	1. Per square meter building space (m^2) 2. Per cubic meter of water (m^3) (in development) 3. Per cubic meter of effluent (m^3) (in development) 4. Per recreation centre patron (In development but currently unavailable)				
	Business Year	January 1st			December 31st	
	Budget Cycle	January 1st			December 31st	
	Maintenance Cycle	January 1st			December 31st	
		2011	2012	2013	2014* *(projected)*	2015* *(projected)*
	Maintenance & Repair Budget	$774,748	$808,040	$841,479	$840,000	$840,000
	Energy Efficiency Projects	N/A	$195,378	$272,495	$267,266	$207,943
	Utilities budget	$995,642	$1,017,892.00	$1,101,702	$1,180,000	$1,180,000

*Projected budgets and energy efficiency savings will be refined and updated as more accurate information becomes available from facility engineering analyses in Fall 2013.

3.2 FACILITY PROFILE

Table 2 - 2012 CVRD Energy Consumption Profile

Area	Size	Size2	Annual Energy Consumption (ekWh)	Annual Energy Cost ($)	Energy Intensity
Parks, Recreation, & Culture	**m^2**	**ft2**	**ekWh**	**$**	**$ekWh/m^2$**
Island Savings Centre	15,270	164,310	5,678,531	$ 346,024	372
Kerry Park Rec. Centre	4,089	44,000	2,270,818	$ 157,775	555
Cowichan Lake Sports Arena	5,112	55,000	1,763,106	$ 134,508	345
Honeymoon Bay Hall	502	5,400	271,837	$ 28,938	542
Mesachie Lake Community Hall	409	4,400	106,126	$ 11,713	260
Youbou Community Hall	1,348	14,500	218,767	$ 23,596	162
Lake Cowichan Hall	1,013	10,900	208,970	$ 22,667	206
Shawnigan Lake Comm.Hall	1,124	12,097	164,726	$ 17,099	147
Parks		-	101,837	$ 11,628	-
Water Management Services	**m^3**	**m3**	**ekWh**	**$**	**$ekWh/m^3$**
Water Services	1,422,969	1,422,969	1,159,767	$ 111,672	0.82
Sewer Services	1,712,073	1,712,073	861,127	$ 85,742	0.50
CVRD Administration	**m^2**	**ft2**	**ekWh**	**$**	**$ekWh/m^2$**
Ingram Street Office (incl. Parking Lot)	2,305	24,802	696,264	$ 60,707	302
Recyling and Solid Waste Management	**m^2**	**ft2**	**ekWh**	**$**	**$ekWh/m^2$**
Bing's Creek	1,394	15,000	405,900	$ 38,979	291
Peerless, Lake Cowichan		-	56,235	$ 6,353	-
Public Safety	**m^2**	**ft2**	**ekWh**	**$**	**$ekWh/m^2$**
Honeymoon Bay Fire Hall	335	3600	48,880	$ 5,143	146
Mesachie Lake Fire Hall	251	2700	33,089	$ 3,816	132
Youbou Fire Hall	460	4950	48,960	$ 5,109	106
Sahtlam Fire Hall	335	3600	65,376	$ 6,950	195
North Oyster Fire Hall	335	3600	71,763	$ 8,600	214
Malahat Fire Hall	353	3800	68,029	$ 7,360	193
Emg. Services Container		-	4,191	$ 371	-
Street Lighting		-	**ekWh**	**$**	-
Critical		-	151,417	$ 63,421	-
Ornamental		-	49,009	$ 4,603	-
Transit		-	**ekWh**	**$**	-
Koksilah Road Bus Shelter		-	1,513	$ 210	-

3.3 KEY PERFORMANCE INDICATORS

Having the correct performance indicators is essential to good energy management. There are many factors affecting energy use and thus it is important to measure consumption of energy against a metric that does not exaggerate usage or savings but instead accurately represents the driving use of energy.

The CVRD shall use the following key performance indicators to evaluate energy performance of its buildings and infrastructure. Building square footage is appropriate for most general buildings with standard occupancy and schedules like office, fire halls and smaller community hall buildings.

The three larger recreation centres have energy use that can vary greatly and be controlled in relation to building occupancy levels. On these large scale facilities, relating energy use to annual patronage gives a more accurate and dynamic indication of energy use related to the buildings purpose. The CVRD Parks, Recreation, and Cultural division is currently in the process of evaluating door counters to be employed at the facilities.

The Water Management Division utility sites are best evaluated using a key performance indicator that compares energy usage to volume of water or effluent passed through the system. This allows operators to see how efficiently the system is running compared to its historical usage as well as to other similar systems. The Water Management Division has begun to collect this information for many of its sites and automation of data collection will aid in the efficiency of this process.

Key Performance Indicator *(2010-2012)*			
Variable	**Totals**		
	2010	**2011**	**2012**
Building Square Footage (m^2)	33,316	34,607	34,607
Water Cubic Meters (m^3)	1,269,462	1,291,064	1,422,969
Effluent Cubic Meters (m^3)	1,021,835	1,544,876	1,712,073
Rec. Centre Patronage (patrons)	-	-	-

Notable changes in Key performance Indicators:

- In 2010 the CVRD completed a major renovation of the Cowichan Lake Recreation Arena, adding 13,000ft^2 to the facility
- In 2010 renovations and construction at the Bing's Creek Complex added approximately 6000ft^2 to the complex
- Water Management Division took on 3 new water systems (Bald Mountain, Dogwood Ridge, Arbutus Ridge) and 2 new sewer systems (Bald Mountain, Arbutus Ridge) in 2010
- Water Management Division took on 1 new water system (Douglas Hill) and 1 new sewer system (Brulette) in 2011

4 OUR COMMITMENT

Since 2007, the Cowichan Valley Regional District has been committed to reducing energy consumption, pollution and greenhouse gas emissions (GHG) from its operations. It has demonstrated this through its commitment to the following initiatives:

1. **2007 BC Climate Action Charter:** As a signatory to the BC Climate Action Charter, the CVRD has committed to reducing its corporate and community GHG emissions.

2. **2007 Federation of Canadian Municipalities:** The CVRD joined the federal Partners for Climate Protection (PCP) program
3. **2010 Corporate Strategic Plan**: This plan identifies the importance of energy conservation and emissions reductions in the Healthy Environment, Service Excellence, and Sustainable Infrastructure sections.
4. **2010 Partnership with the Cowichan Energy Alternatives:** The CVRD has partnered with the Cowichan Energy Alternatives and Biodiesel Co-Operative to recycle waste vegetable oil into locally produced, carbon neutral biodiesel.
5. **2011 BC Hydro Energy Management Assessment**: BC Hydro and the CVRD completed a diagnostic review resulting in the identification of the current state of energy management and development of an energy management position at the CVRD.
6. **2012 CVRD Corporate GHG Emissions Inventory and Reduction Plan:** The CVRD adopted this plan that identifies action items to move towards GHG and energy use reduction.

Beyond the corporate portfolio of buildings and facilities, the CVRD is taking action on sustainable community planning. Energy and environmental considerations have been included in Official Community Plans, the development of a Green Building Policy and regional community energy mapping and modeling initiatives.

4.1 CORPORATE GREENHOUSE GAS INVENTORY & EMISSIONS REDUCTION PLAN 2012

In the recently adopted 2012 Corporate Greenhouse Gas Inventory and Emissions Reduction Plan, the following initiatives identify corporate energy management commitments.

INITIATIVE ONE - CORPORATE LEADERSHIP

- *Establish an energy conservation policy that defines specific long term goals/timelines, medium term objectives and measurable annual targets.*
- *Require each CVRD Division to develop an emission reduction plan for their operational activities to assist the CVRD in meeting its commitments.*
- *Create a formal incentive program where an executive sponsor recognizes employees for direct participation in the energy conservation program.*
- *Create a Climate Action Reserve Fund to support Energy Efficiency projects.*

INITIATIVE TWO: BUILDING OPERATIONS AND CONSTRUCTION

- *Commit to building the most energy efficient and environmentally friendly facilities using a certified standard.*
- *Require an evaluation of alternative energy sources for new construction and major renovations.*
- *Require commissioning on all new construction and major renovations.*
- *Require monitoring, targeting and reporting procedures on all major CVRD buildings.*
- *Eliminate #2 heating oil as a fuel source for heating in CVRD facilities.*

INITIATIVE FOUR: INFRASTRUCTURE

- *Conduct energy efficiency focused operational reviews of infrastructure annually.*
- *Evaluate energy recovery opportunities and carbon offset potential for facilities, and waste management programs.*

4.2 RELATION TO THE CVRD CORPORATE STRATEGIC PLAN

In B.C. and around the world, energy resources are a subject of high priority and concern for energy security, environmental pollution, and health. The CVRD has a role to play in serving the public's interest in making its best effort to continue to provide its services at the most cost effective and efficient manner. At the core of many of its services is energy and its related costs, security, and environmental impact. The CVRD can show leadership by optimizing energy use in its services and become a leader in developing regional energy conservation and environmental programs.

This Strategic Energy Management Plan and the CVRD Corporate Energy Policy aim to serve specific goals laid out in the CVRD Corporate Strategic Plan. Listed below are areas of the corporate strategic plan that this plan relates to:

- VISION STATEMENT: *The Cowichan Region celebrates diversity and will be the most livable and healthy community in Canada.*
- MISSION STATEMENT: *We serve the public interest through leadership, cooperation, and innovation, with a focus on community priorities and strengths.*
- CORPORATE STRATEGIC PLAN: The 2010 CVRD Corporate Strategic outlines the following items related to its corporate energy management.

HEALTHY ENVIRONMENT

LEAD BY EXAMPLE

- *Develop a green facilities retrofit policy to guide how CVRD facilities will be renovated to meet green standards.*
- *Develop a plan to ensure the CVRD complies with the BC Climate Action Charter by 2012.*

SERVICE EXCELLENCE

AN EFFICIENT, HIGH PERFORMANCE, INNOVATIVE ORGANIZATION

- *Increase accountability with regular performance reporting to the Board.*
- *Review organizational processes and streamline where appropriate to improve efficiency and reduce costs.*
- *Actively pursue green initiative partnerships with external agencies to better leverage dollars, information and time.*

FINANCIAL STABILITY

- *Actively pursue alternative funding sources including grants and partnerships.*

- *Develop a long term financial management plan that addresses the lifecycles costs of CVRD assets and maintains adequate capital/operating reserves to strengthen financial stability.*
- *Create strategic opportunities reserves to leverage grant funding.*

SUSTAINABLE INFRASTRUCTURE

COMMUNITY INFRASTRUCTURE PLANNED FOR CURRENT AND FUTURE GENERATIONS

- *Create a geographic information system (GIS) asset management system and build an up-to-date inventory and assessment of CVRD assets, including their condition and replacement costs for each asset.*
- *Develop a lifecycle program for all infrastructure assets together with preventative maintenance programs to extend the lifecycle.*
- *Perform condition audits and life cycle assessment on paths, parks, civic buildings and underground assets.*

WELL MAINTAINED PUBLIC FACILITIES

- *Upgrade the Kerry Park Recreation Centre and Cowichan Lake Sports Arena.*
- *Develop a long-term funding strategy including a capital reserve fund policy for maintaining and replacing infrastructure assets.*
- *Conduct energy efficiency audits of all CVRD facilities and equipment.*
- *Establish consistent quality and maintenance standards for CVRD facilities.*

5 UNDERSTANDING OUR SITUATION

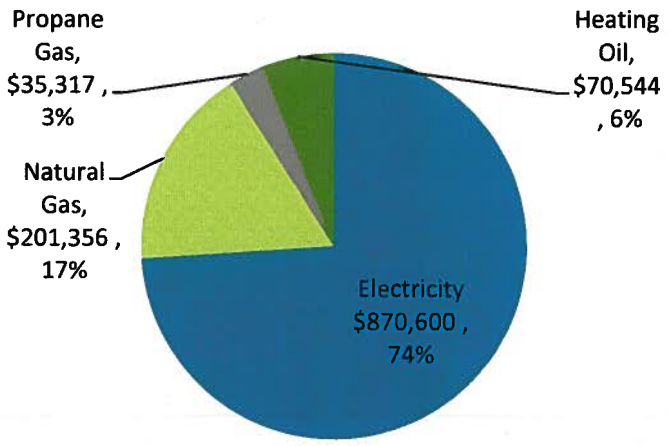
5.1 ENERGY COSTS

Energy Costs for the CVRD are summarized in the following tables and charts. Total energy costs have been increasing since 2009 due to various factors including price increases, carbon tax increases, expansion of services and aging equipment and infrastructure. The cost of electricity has increased 35% and heating oil costs have increased over 40% over the last 5 years.

Table 3 - 2007-2012 Energy Expenditures

Year	Electricity	Natural Gas	Propane	Heating Oil	Total
2007	$ 548,982 63%	$ 248,743 28%	$ 32,299 4%	$ 43,677 5%	$ 873,701 100%
2008	$ 554,784 69%	$ 169,966 21%	$ 30,666 4%	$ 44,097 6%	$ 799,513 100%
2009	$ 592,346 70%	$ 185,698 22%	$ 31,842 4%	$ 30,459 4%	$ 840,345 100%
2010	$ 756,398 72%	$ 233,637 22%	$ 33,310 3%	$ 30,482 3%	$ 1,053,828 100%
2011	$ 771,989 69%	$ 240,293 21%	$ 53,078 5%	$ 60,209 5%	$ 1,125,569 100%
2012	$ 870,599 74%	$ 201,356 17%	$ 35,317 3%	$ 70,544 6%	$ 1,177,816 100%

Figure 1- 2012 Energy Cost



5.2 2012 TOTAL ENERGY CONSUMPTION

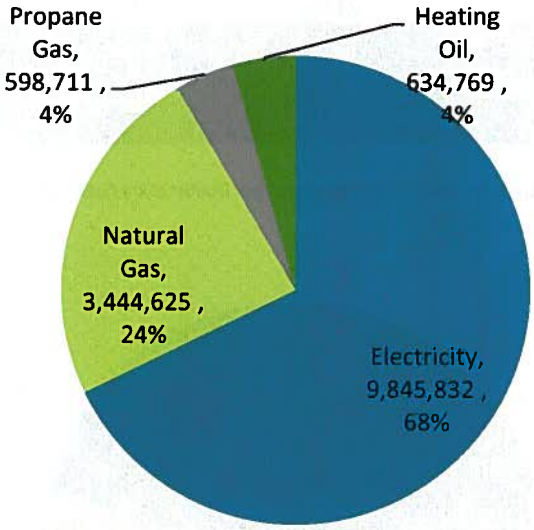
Energy Consumption through CVRD operations has grown since 2008 with the expansion of services in the Water Services Division, the expansion of Bing's Creek Waste Management Complex and the

renovation at Cowichan Lake Sports Arena. Over the past three years however, overall energy consumption has remained relatively steady with an overall decrease of 1% in 2012 over 2011 levels.

Table 4 - Energy Use 2007-2012

Year	Electricity (kWh)	Natural Gas (ekWh)	Propane (ekWh)	Heating Oil (ekWh)	Total (ekWh)
2007	8,519,245	4,367,167	485,456	561,799	13,933,666
2008	8,272,769	2,984,083	460,917	481,877	12,199,646
	-3%	-32%	-5%	-14%	-12%
2009	8,168,404	3,260,278	478,597	433,815	12,341,094
	-1%	9%	4%	-10%	1%
2010	9,569,747	4,101,944	500,664	360,218	14,532,573
	17%	26%	5%	-17%	18%
2011	9,247,312	4,491,130	716,528	590,249	15,045,219
	-3%	9%	43%	64%	4%
2012	9,845,832	3,535,189	598,711	634,769	14,614,501
	6%	-21%	-16%	8%	-3%

Figure 2 - 2012 Energy Consumption

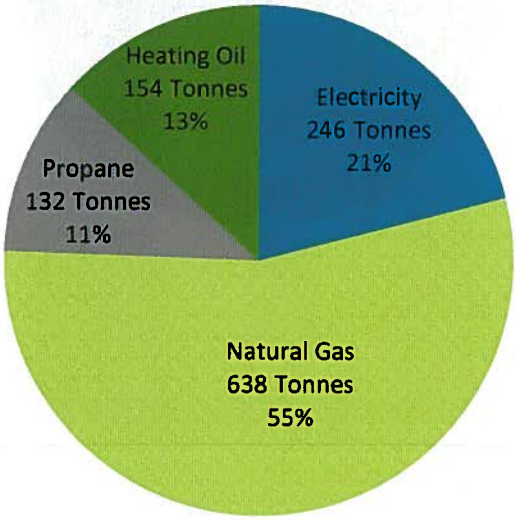


5.3 TOTAL EMISSIONS

The CVRD has made strong commitments to the reductions in corporate Greenhouse Gas (GHG) Emissions as described in Section 3.1 of this report. GHG emissions from buildings occur through primary energy use of fossil fuels on site as well as source emissions from electricity consumption. From 2007-2012, the CVRD has seen a net decrease in overall GHG emissions, coming solely from the reduction in Natural Gas consumption. All other fuels and electricity has increased.

	GHG Emissions (Tonnes of CO2e)				
Year	Electricity	Natural Gas	Propane	Heating Oil	Total
2007	212.98	789	106.63	136.88	1,245
2008	206.82	539	101.24	117.41	964
	-3%	-32%	-5%	-14%	-23%
2009	204.21	589	105.12	105.70	1,004
	-1%	9%	4%	-10%	4%
2010	239.24	741	109.97	87.77	1,178
	17%	26%	5%	-17%	17%
2011	231.18	811	157.39	143.81	1,343
	-3%	9%	43%	64%	14%
2012	246.15	638	131.51	154.66	1,171
	6%	-21%	-16%	8%	-13%
Change since Base Year	16%	-19%	23%	13%	-6%

Figure 3 - 2012 GHG Emissions from Buildings by Fuel Type



5.4 ENERGY USE BREAKDOWN

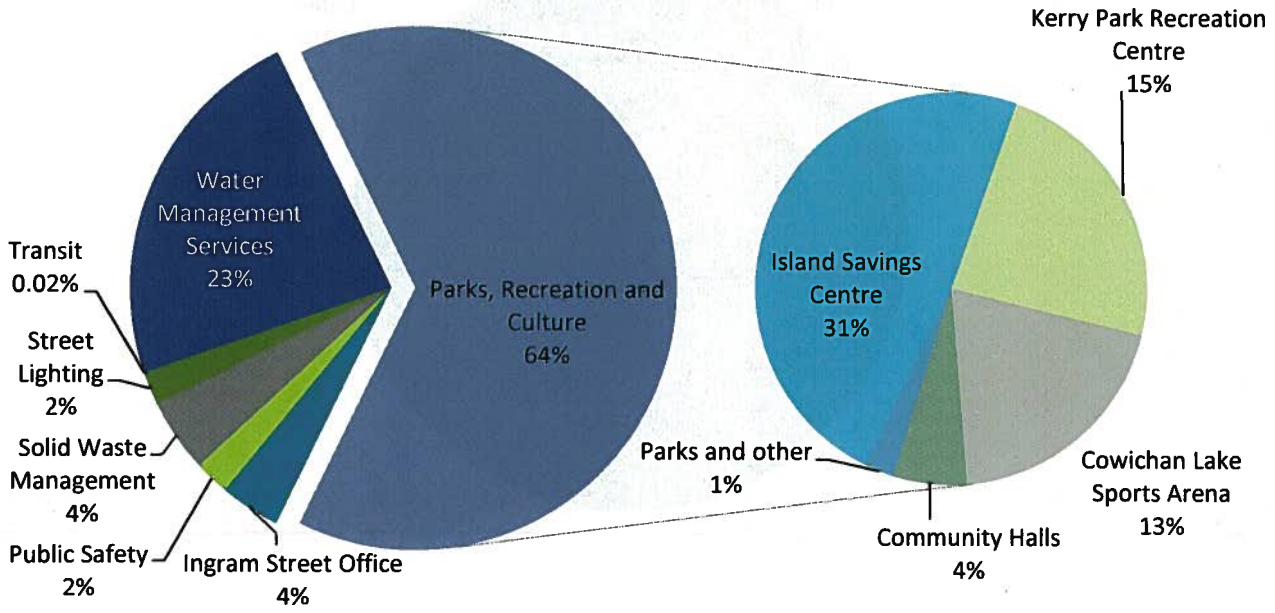
ELECTRICITY

The following table and chart shows the breakdown of electrical energy consumption across the CVRD operations. The largest consumer of electricity is the Parks, Recreation and Culture Department. Figure 3 shows the further breakdown of the electricity consumption from this department. The three recreation centres consume the majority of electricity with the ISC at 31%, Kerry Park at 15%, and Cowichan Lake Arena at 13%.

Table 5 - 2012 Electricity Consumption by CVRD Area

Reporting Group	Energy Consumption (kWh)	Percentage of Total	Expenditure ($)	Percentage of Total
CVRD Administration	363,324	4%	32,806	4%
Parks, Recreation, & Culture	6,349,305	64%	467,229	54%
Public Safety	215,247	2%	23,122	3%
Recycling and Solid Waste Management.	449,000	5%	43,892	5%
Street Lighting	200,426	2%	68,024	8%
Transit	1,513	0%	210	0.02%
Water Management Services	2,267,017	23%	235,315	27%
Total	**9,845,832**	**100%**	**$870,600**	**100%**

Figure 4 - 2012 CVRD Electricity Consumption Breakdown (kWh)



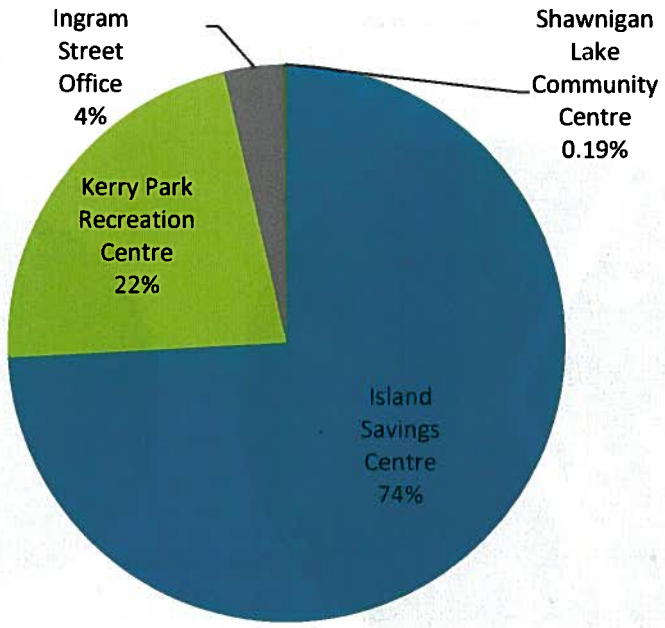
NATURAL GAS

The majority of natural gas is consumed at the ISC recreation centre (51%) followed by Kerry Park Recreation Centre (40%). Natural gas is consumed here for both heating, domestic hot water, and arena dehumidification. The Ingram street office consumes a further 8% for heating and domestic hot water, with the remaining 1% consumed by Shawnigan Lake Community Centre, Brulette, and Buena Vista Place Water Systems.

Table 6 - 2012 CVRD Natural Gas Usage

Location	Energy Consumption (ekWh)	Expenditure ($)	Percentage of Total Expenditure
Island Savings Centre	2,620,331	$146,715	73%
Kerry Park Recreation Centre	785,458	$44,604	22%
Ingram Street Office	122,100	$9,141	5%
Shawnigan Lake Community Centre	6,646	$600	0.3%
Brulette Place (Water Management)	515	$160	0.08%
Buena Vista Place (Water Management)	139	$134	0.07%
Total	**3,535,189**	**$201,354**	**100%**

Figure 5 - Natural Gas Consumption



PROPANE

Propane is consumed at all three recreation centres for ice resurfacing, however it is also consumed for building heating, dehumidification, and hot water at the Cowichan Lake Sports Arena. Consumption for ice resurfacing has been left out of this plan as the focus is on building energy consumption.

Table 7 - 2012 CVRD Building Propane Consumption

Building	Energy Consumption (ekWh)	Expenditure ($)	% of Total Expenditure
Cowichan Lake Sports Arena	499,685	$31,385	100%
Total	499,685	$31,385	**100%**

Note: Propane consumption for building and hot water heating only. Does not include propane consumption for vehicles (Ice Resurfacing)

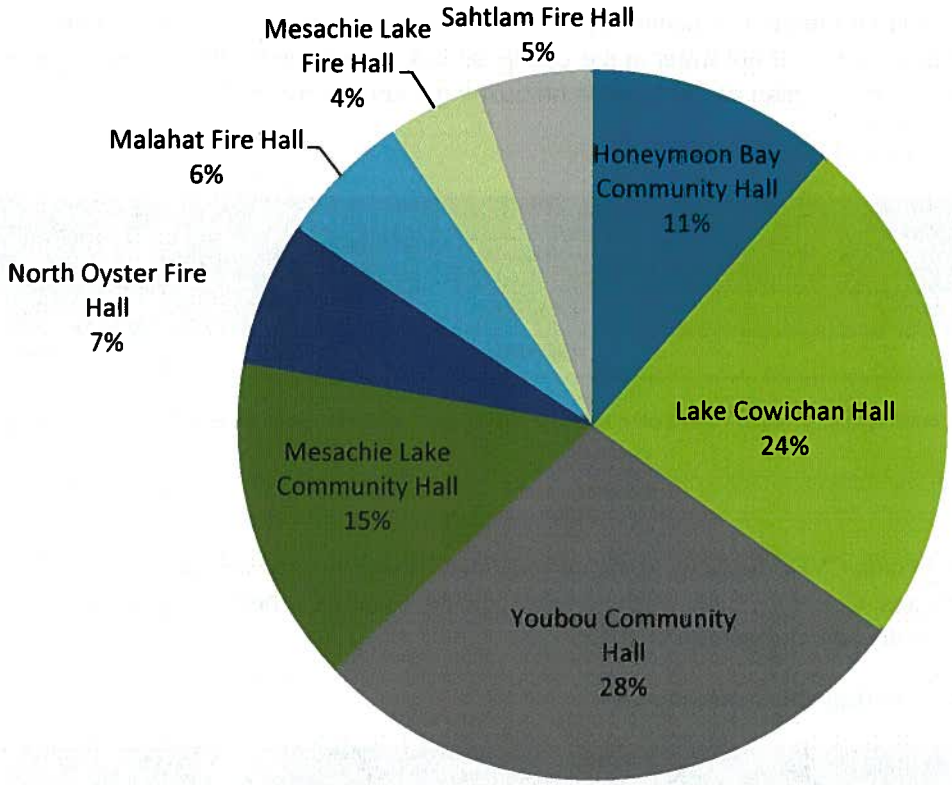
#2 HEATING OIL

Heating oil is consumed in nine CVRD facilities at the current time. These building are located in areas without access to natural gas. Currently, fuel switching to electric heat pumps is being considered with the four community halls currently being upgraded in 2013.

Table 8 - 2012 CVRD #2 Heating Oil Consumption

Building	Volume (L)	Energy Consumption (ekWh)	Expenditure ($)	Percentage of Total
Youbou Community Hall	14553	156,847	$17,010	28%
Lake Cowichan Hall	12122	130,650	$14,226	23%
Mesachie Lake Community Hall	7681	82,781	$9,184	15%
Honeymoon Bay Community Hall	5877	63,345	$6,736	11%
Malahat Fire Hall	3169	34155	$3,728	6%
North Oyster Fire Hall	3393	36,570	$4,822	8%
Sahtlam Fire Hall	2728	29,405	$3,141	5%
Mesachie Lake Fire Hall	2210	23,820	$2,606	4%
Total	**51733**	**557,573**	**$61,453**	**100%**

Figure 6 – 2012 Oil Usage



6 SAVINGS OPPORTUNITY ASSESSMENT

Assessing the potential energy savings of the CVRD buildings is an important step required to set achievable targets based on actual opportunities. Targets for energy conservation can come from two approaches.

1. Top Down – The top down approach looks at the performance of buildings of similar type as well as historical performance of the building or more generally at the overall building stock. Using these building energy performance indexes (BEPIs) it is possible to see buildings within the portfolio that are low performers compared to the rest. From this data it is possible to assess potential savings possible (based on how other buildings are performing) and set targets.
2. Bottom Up – This approach starts by looking at individual energy efficiency opportunities in the buildings and then aggregating them together to form an overall building target, then an overall organizational target.

The benefit of the Top-Down approach is that it is relatively quick to perform and produces a number to target. In addition, it gives context within the built environment of how well your building performs to its peers. The weakness however is that it can be very broad-based and generalized, not taking into account

the specific uses of the buildings and the unique circumstances that may surround them. In using the Top Down approach over and under- estimating performance potential is possible.

The Bottom-Up approach is much more accurate because actual energy savings are calculated from identified energy conservation projects that are identified through audits. All of these measures are then aggregated into an overall reduction target. While much more accurate, this approach is more costly as it involves auditing the buildings. However, audits would be required anyway through the Top Down approach in order to identify the opportunities to bring the buildings to its targets.

The best approach to take is a combined one that uses the Top-Down to initially set targets, benchmark and compare sites. Once initial targets are set, the Bottom-Up is undertaken to establish real opportunities and aggregate them to a more refined ongoing overall target with specific projects and budgets set to achieve the goals.

This section examines the Top Down opportunities for the CVRD by examining building energy intensity across the portfolio of buildings and compares to the portfolio, historical, and building indexes.

6.1 INTENSITY BENCHMARKING

Electricity, natural gas, propane and heating oil intensities have been created to analyze the consumption of energy per square foot of building area for each facility. This allows for the comparison of energy consumption at similar facilities and provides a building energy performance index (BEPI). E.g. comparing recreation centres, community halls, fire halls. Further, energy intensities allow a building to be compared to its own historic energy use.

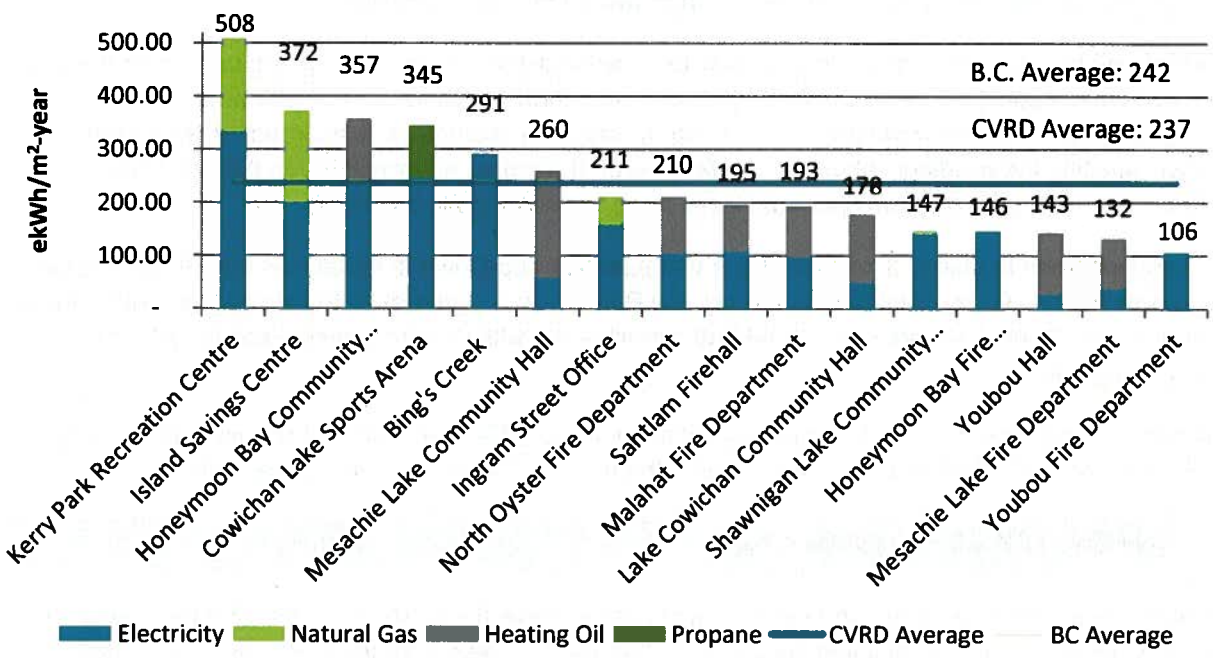
CVRD Energy use can be broken down into several categories for comparison as all energy consumption is from buildings as water management services make up a significant portion of electricity use.

CVRD BUILDING TOTAL ENERGY INTENSITY

The CVRD operates a significant number of different types of services that consume energy. In addition, because of the functional nature of regional district budgets, it makes most sense to analyze and compare buildings and units across similar functions. This will provide a more relevant comparison of energy use across functions and allow a better understanding of unique opportunities within those groupings.

Figure 7 shows the 2012 building energy consumption per square meter of building space for the 16 main CVRD buildings. This comparison shows how energy consumption of buildings within the CVRD compare to one another as well as the provincial average. Note that this provides a very general comparison as building use, hours of operation, age, and equipment varies across this portfolio.

Figure 7 - 2012 Building Energy Consumption Index

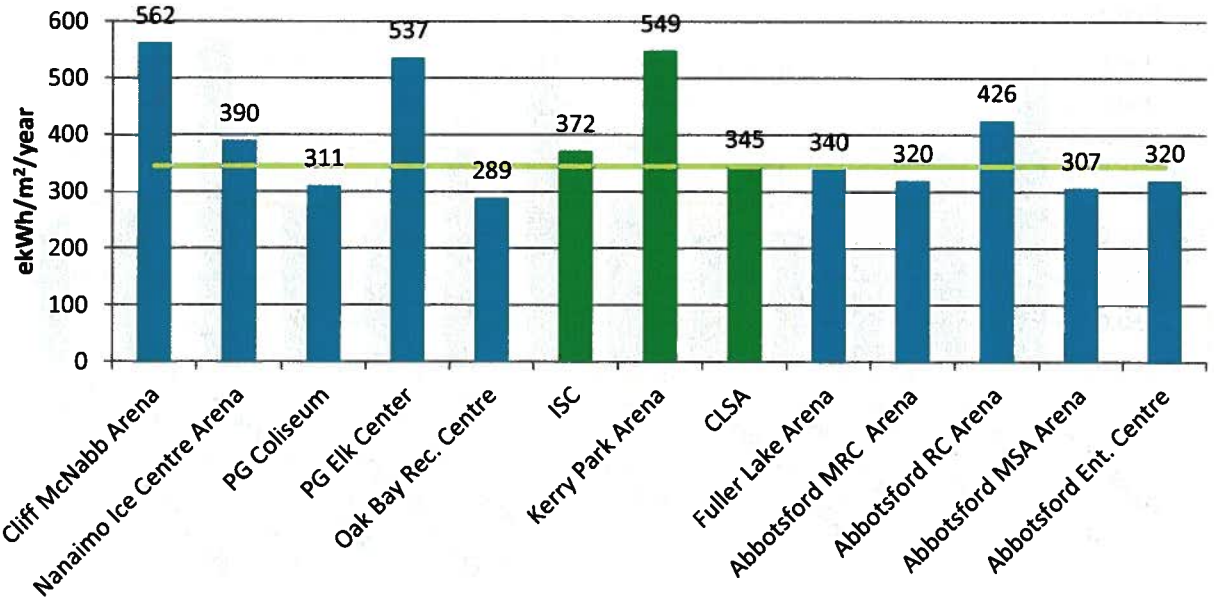


RECREATION CENTRE COMPARISON

The CVRD operates three large recreation centres in the Cowichan Valley which are the largest single consumers of electricity, natural gas, and propane. These multi-function facilities have unique operating and scheduling characteristics given their specialized functions and mechanical equipment.

In 2012, the three recreation centres consumed 54% of the total electricity, 76% of the total natural gas and 85% of the total propane consumption at the CVRD. Targeting the three recreation centres offers the greatest opportunities for energy savings and greenhouse gas reductions. In addition, these public facilities are a direct link to the communities they serve and can serve as a gateway to greater community energy savings through education and awareness.

Figure 8- 2012 Rec. Centre Total Energy Performance Comparison



As can be seen from Figure 8, the Kerry Park Arena is the highest energy use per unit area of the 3 arenas, with ISC following in second and Cowichan Lake Sports Arena the lowest. This is as expected given the upgrade histories of these facilities. Comparing energy intensity across various similar facilities across Vancouver Island and the Lower Mainland, the above chart demonstrates that there is possibility for improvements even at the recently renovated Cowichan Lake Sports Arena.

Figure 9 examines the same recreation facilities but focuses solely on electricity consumption. Each of the facilities has high electricity intensity due to having ice arenas but there is large variation in the intensity of electrical energy across the facilities. Island Savings Centre has the lowest intensity of the CVRD buildings with CLSA second and KPRC the greatest. In examining thirteen similar facilities across the province a target of 186 ekWh/m^2/year (the average of the facilities after removing outliers) was established. This shall be set as the 3 year (2016) target for the three CVRD Recreation Facilities. This is an overall 20% decrease in electricity use and a $112,000 reduction in annual electricity cost.

Figure 9- 2012 Rec. Centre Total Electricity Performance Comparison

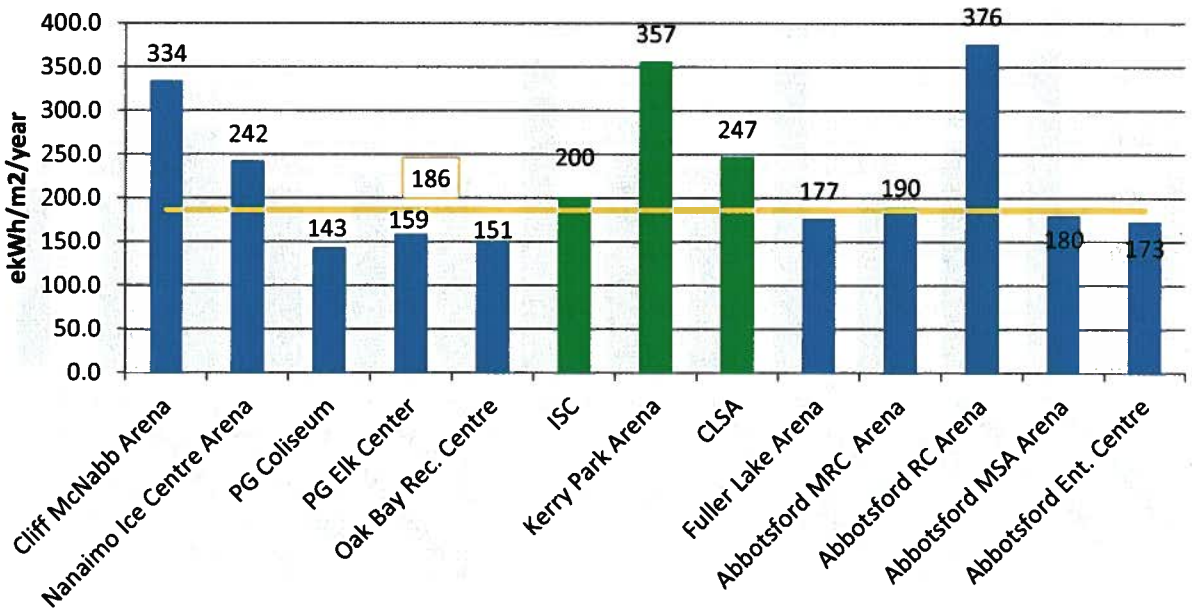
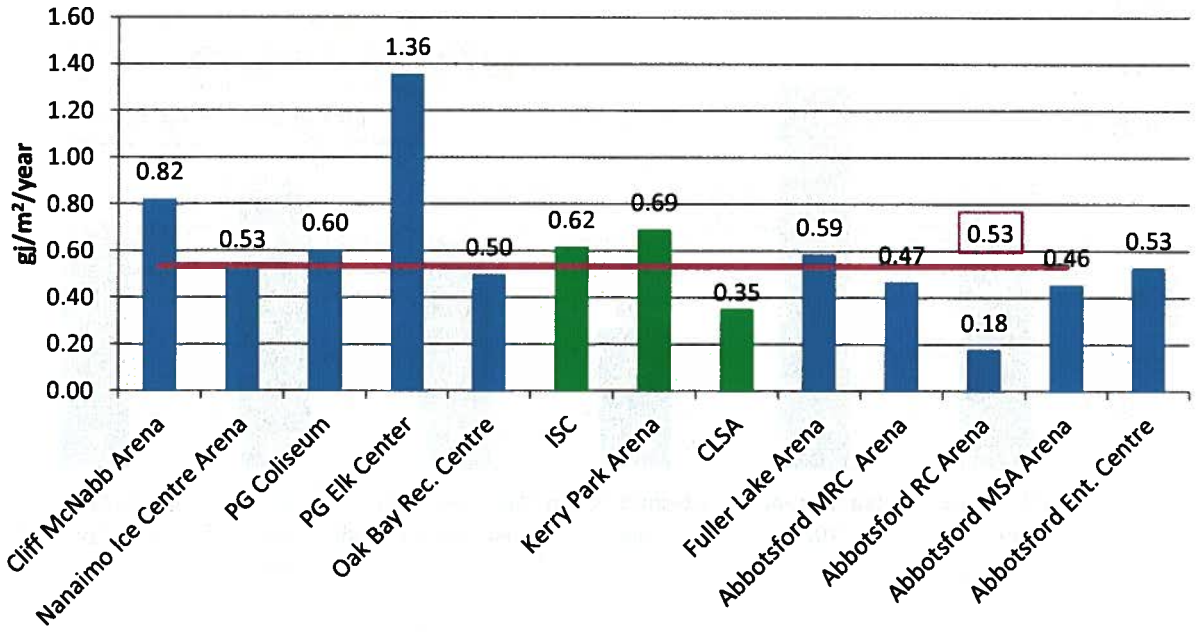


Figure 10 compares the consumption of natural gas and propane used at facilities for heating, hot water, dehumidification and other heating purposes. Both ISC and KPRC have higher than average consumption. CLSA has a low propane use intensity. Reducing natural gas intensity at ISC and KPRC to a target of 0.50GJ/m^2/year will reduce CVRD natural gas consumption by 20% (2382GJ/year) and result in an estimated cost savings of $28,500 in fuel costs and a reduction of 119 tonnes of CO_2e.

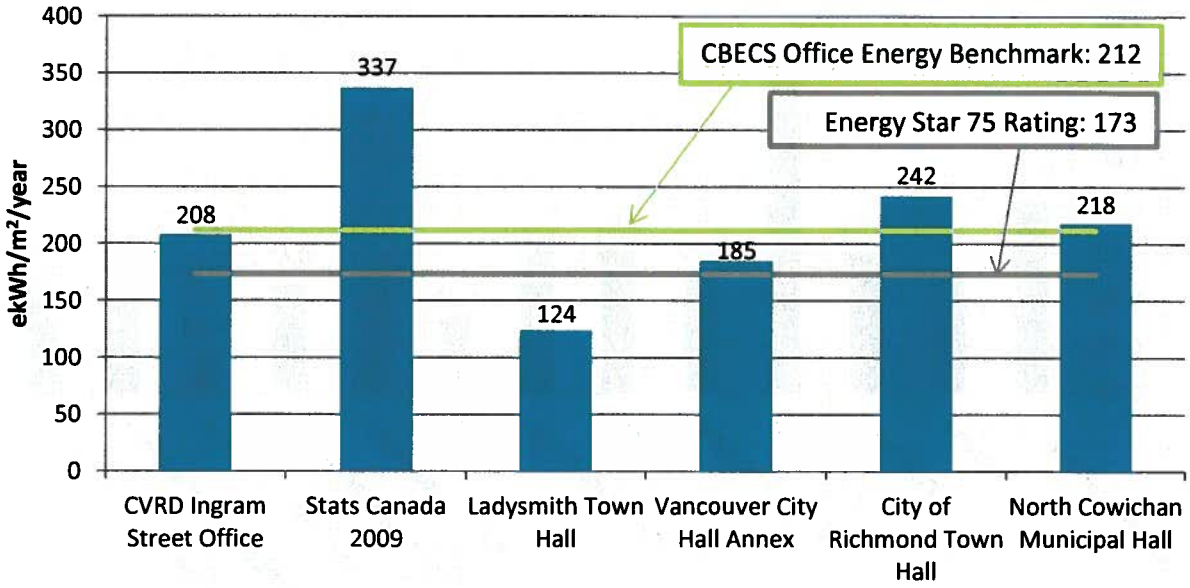
Figure 10 - 2012 Rec. Centre Total Fossil Fuel Performance Comparison



INGRAM STREET OFFICE

The Ingram Street office is the administrative hub of the CVRD and is a 2,305m^2 office building housed over 3 floors. It was constructed in 2003. This building has been compared to various building energy performance databases and is shown to be a good performer, scoring around the median for building of similar size, and use. Figure 6 shows the Ingram Street office in comparison to other office buildings and against the CBECS (Commercial Building Energy Consumption Survey) database as well as the Statistics Canada office building database. The CVRD office scores well below the average Canadian office building from the Statistics Canada database which does not take into account for building age but rather size and occupancy. The CBECS database intensity of 212 ekWh/m^2 is the median standard set from 12,000 buildings surveyed across the United States for buildings of similar use and size as the Ingram Street Office. The CVRD office performs just slightly better than the average.

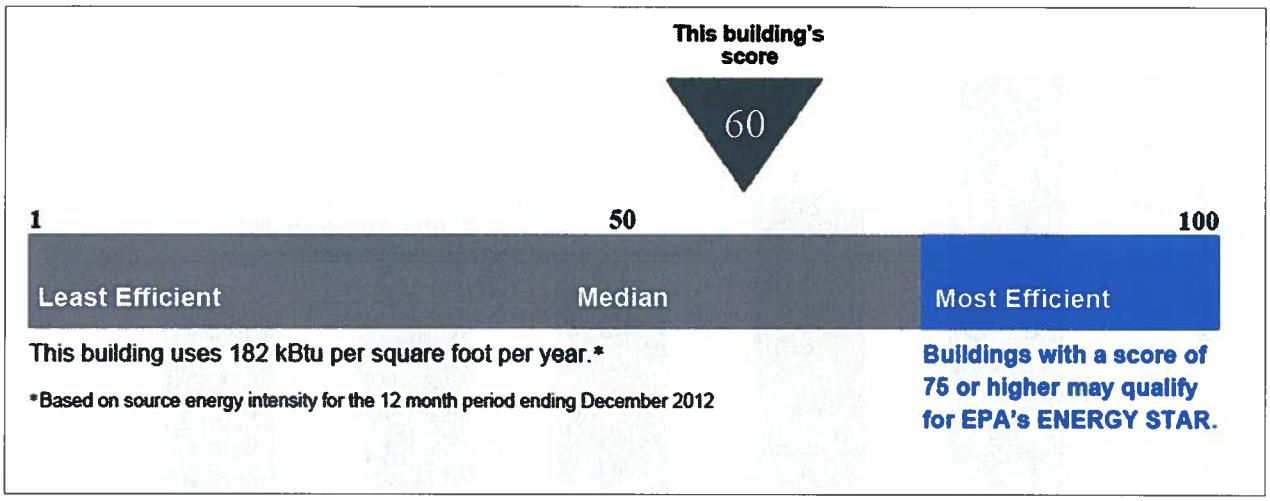
Figure 11 - 2012 Ingram Street Performance



The Ingram Street Office building has also been compared using the Energy Star Portfolio Manager™ tool and has scored within the 60th percentile of office buildings meaning the building performs better than 60% of similar buildings in the database. The Energy Star standard and Portfolio Manager is being adopted by the Office of Energy Efficiency, Natural Resources Canada as the national benchmarking standard in June 2013. Within the Energy Star system, a score of 75 and above demonstrates superior energy management. T**argeting this performance requires reducing energy consumption at the Ingram Street Office by 86,656 ekWh/year (38 ekWh/m^2). This also results in an energy cost reduction of approximately $7,000/year.**

This is an excellent and reachable standard for the CVRD to strive for in energy performance for this building, demonstrating to the community building energy conservation possibilities. Energy Star is already a recognized performance indicator used by appliances and will be easily understood by the community. Figure 11 shows the familiar appliance energy use scale applied to building performance.

Figure 12 - Ingram Street Energy Star Building Score



COMMUNITY HALLS

There is significant opportunity to decrease energy consumption at the CVRD operated community halls. The worst performer in 2012 was the Honeymoon Bay hall followed by Mesachie Lake Hall. These halls have a mixture of heating system components and in the past energy consumption has gone unchecked. In 2013, heating oil will be removed from four of the halls to be replaced with air source heat pumps with offsite temperature monitoring and control. **Total energy consumption at the four Cowichan Lake area halls is expected to decrease by 60%, reducing the annual operating costs by $33,345, and GHG emissions by 89 tonnes Co_2e each year.**

The Shawnigan Lake Community Centre is also slated for heating system upgrades replacing the current electric furnace with air source heat pumps, decreasing electrical consumption for heating by up to 40% and saving 46,166kWh and reducing operating costs by $4386 each year at current electricity cost.

Total potential energy use reduction for the community halls is currently estimated at over 363,258 ekWh of energy and $37,731 per year in avoided costs.

Figure 13 - 2012 Community Hall Energy Consumption Intensity

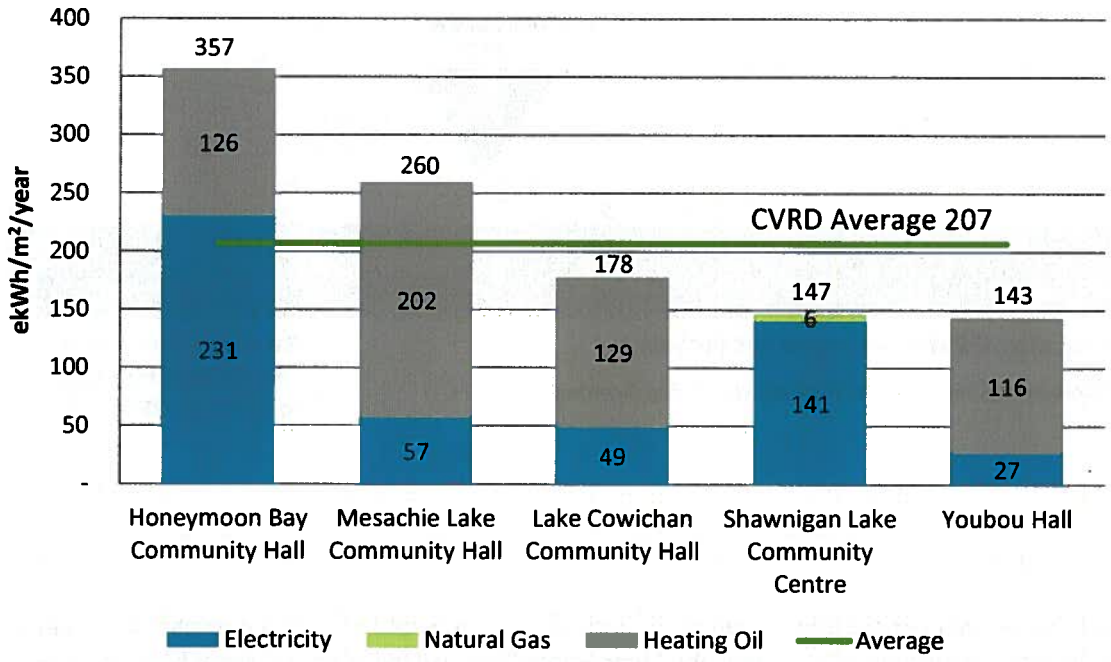


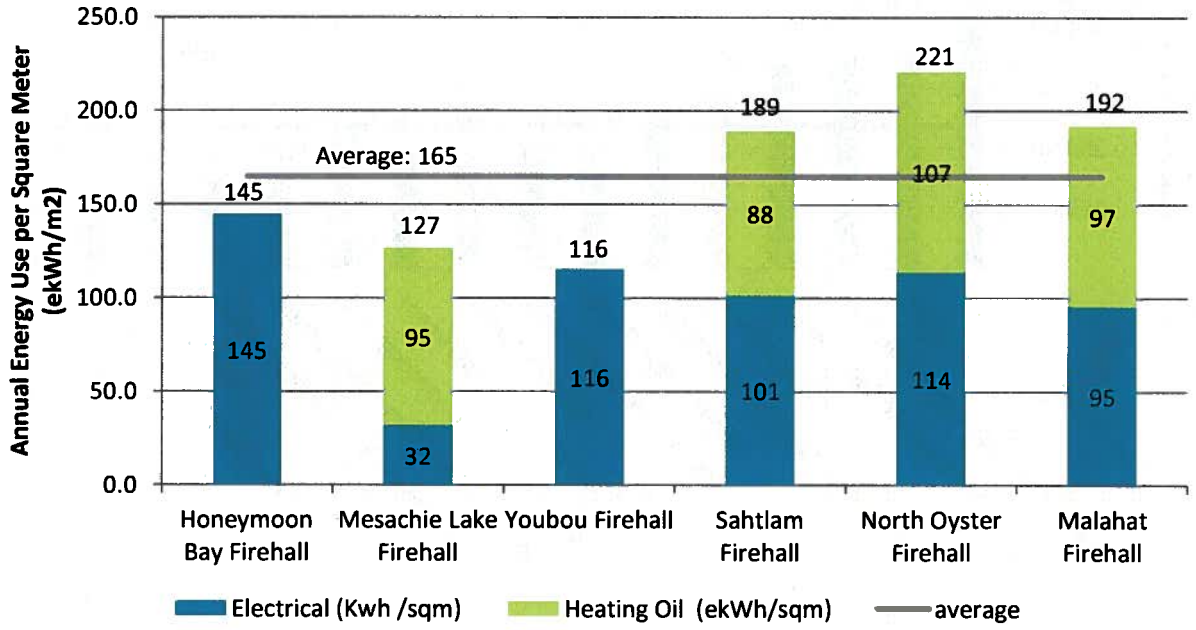
Table 9 – Estimated Potential Energy Savings from HVAC upgrades

Location	Current Intensity	Target Intensity	% Savings	Energy Savings (ekWh)	Annual Operating Savings
Honeymoon Bay Community Hall	357	137	62%	110,346	8,461
Mesachie Lake Community Hall	260	138	47%	49,669	6,038
Lake Cowichan Community Hall	178	101	43%	78,390	9,261
Youbou Hall	143	107	25%	78,687	9,585
Shawnigan Lake Community Hall	147	106	28%	46,166	$4,386
Total			**33%**	**363,258**	**$37,731**

FIRE HALLS

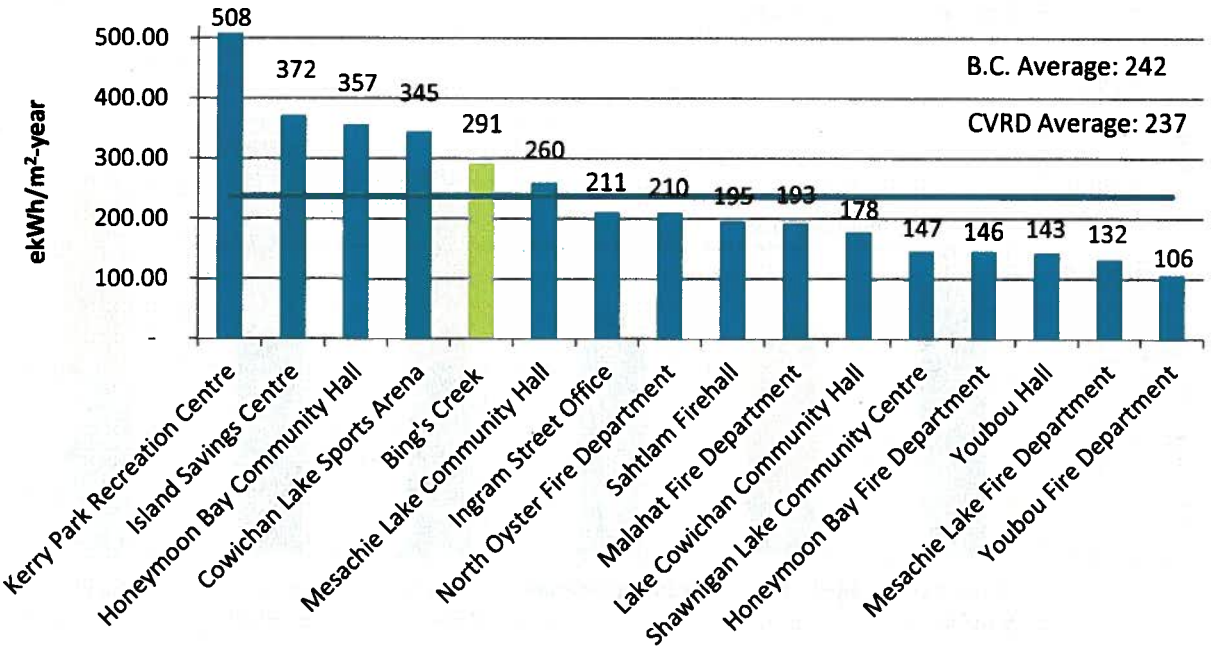
While Public Safety only accounts for 2% of the total CVRD energy consumption, there is still opportunity to reduce energy use at these facilities, particularly by fuel switching from fossil fuel based heating to higher efficiency equipment and cleaner sources. The largest energy use intensity for the CVRD operated fire halls is found at the Sahtlam, North Oyster and Malahat fire halls. Heating is the single largest energy cost factor for the fire halls. The CVRD is currently investigating the budget requirements and energy savings potential for upgrading the HVAC systems for all of the halls with a focus to eliminate oil consumption.

Figure 14 – CVRD Fire Halls 2012 Annual Energy Use Index



BING'S CREEK WASTE MANAGEMENT COMPLEX

The Bing's Creek Waste Management complex has an energy intensity of 291kWh/m^2 in 2012. This is 20% higher than the provincial average and 23% higher than the CVRD average. A preliminary site audit has shown that there are many opportunities to reduce energy consumption at this complex in lighting and HVAC and setting a target of 237kWh/m^2 is achievable through targeted energy conservation measures. **This target will reduce annual electricity usage by 75,276kWh and annual cost by $7151.**



WATER MANAGEMENT SITES

The CVRD adopts and operates water and sewer systems on behalf of communities in the electoral areas. These systems together are responsible for almost a quarter of the total CVRD electricity consumption. This is divided among 20 water and 15 sewer services with 62 electrical accounts.

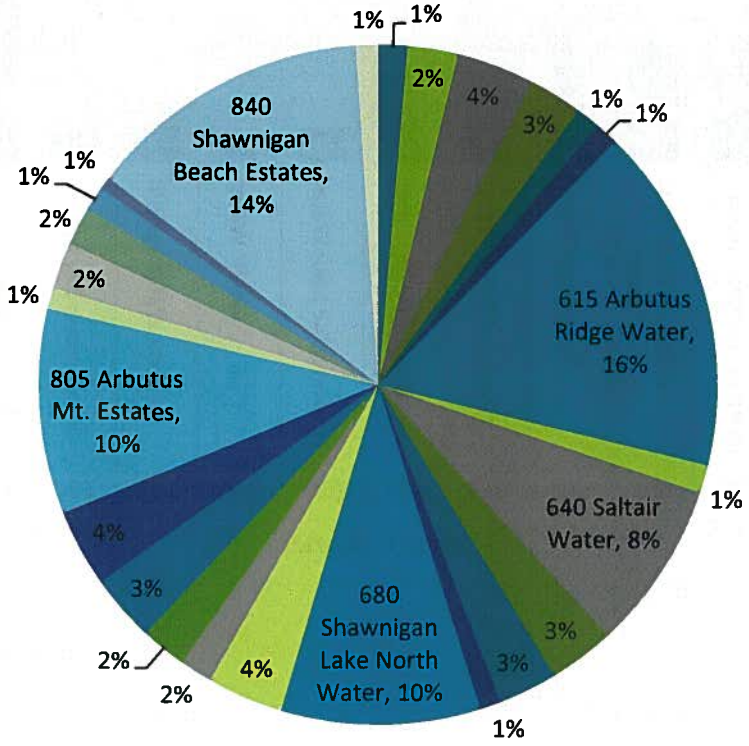
In reviewing these CVRD functions for energy conservation measures (ECMs) it is important to examine gross energy consumption of each system as well as relative energy consumption and cost compared to volume of water or effluent processed. Figure 15 shows the relative energy use of each system, showing that there are 5 larger systems with many smaller systems.

However, it is also important to note that each individual system is unique in design, circumstance and operation. Furthermore each system is made up of multiple component units each potentially with multiple electrical metering. Therefore, energy conservation within these systems will involve careful monitoring, targeting, and verification of energy and working closely with senior operators to identify energy conservation opportunities.

The five largest single metered sites are the Arbutus Ridge Water pumps, Arbutus Mountain Sewer site, Shawnigan Beach Estates Decca Road Water pump station, Saltair Water, and Shawnigan Beach Estates Lagoon. These 5 sites account for 40% of the Water Management electricity use.

A useful comparison is to monitor and track energy consumption of systems over time and compare each system to its own historical performance baseline. This analysis can indicate systems that need attention and have energy conservation opportunities.

Figure 15 – Water Management Gross Energy Consumption



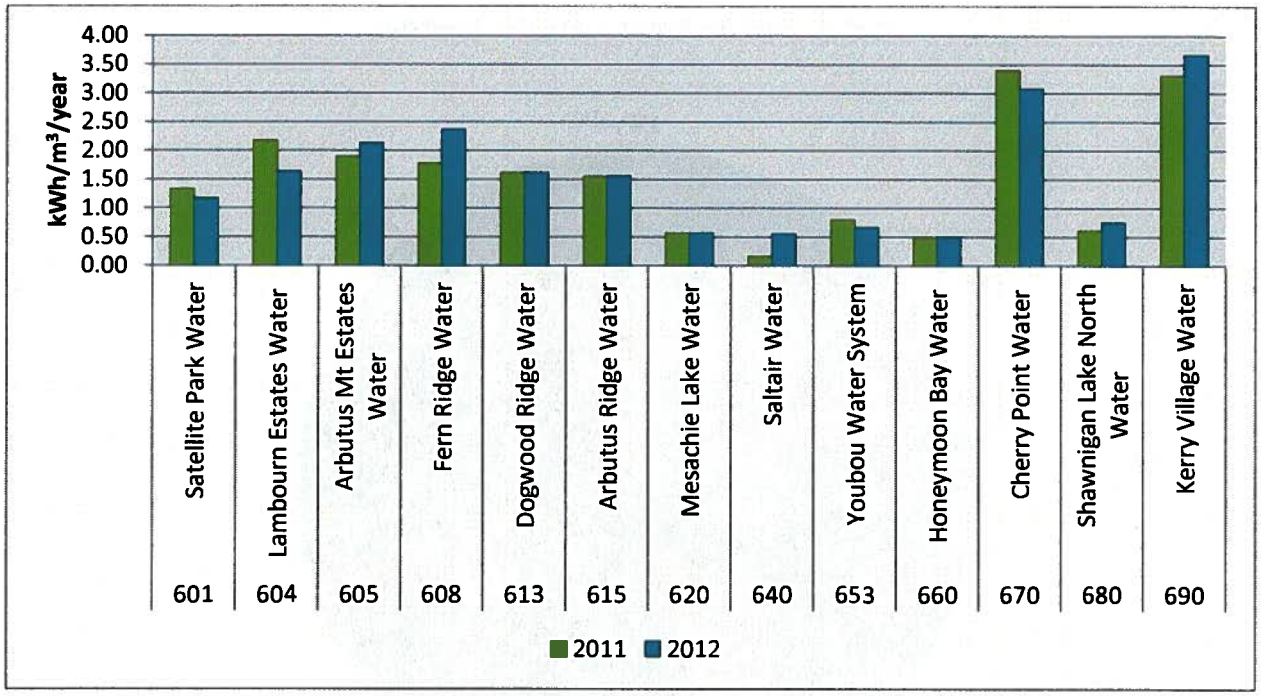
WATER SYSTEMS

Table 10 - 2008-2012 Water System Energy Intensity

	# of Systems	Energy (kWh)	Volume (m^3)	Energy Intensity (kWh/m^3)
2008	14	503,525	873,599	0.45
2009	14	564,990	927,991	0.56
2010	17	899,947	1,269,462	1.1
2011	18	1,159,767	1,291,064	1.40
2012	18	1,500,796	1,442,969	1.56

Figure 16 shows energy use per cubic meter of water through each system for 2011 and 2012. From the Figure 16, the increase in per unit energy consumption indicates that there may be energy conservation measures available at 605, 608, 640, 680, and 690.

Figure 16 – 2011/2012 Energy Cost per Cubic Meter Water (Entire System)



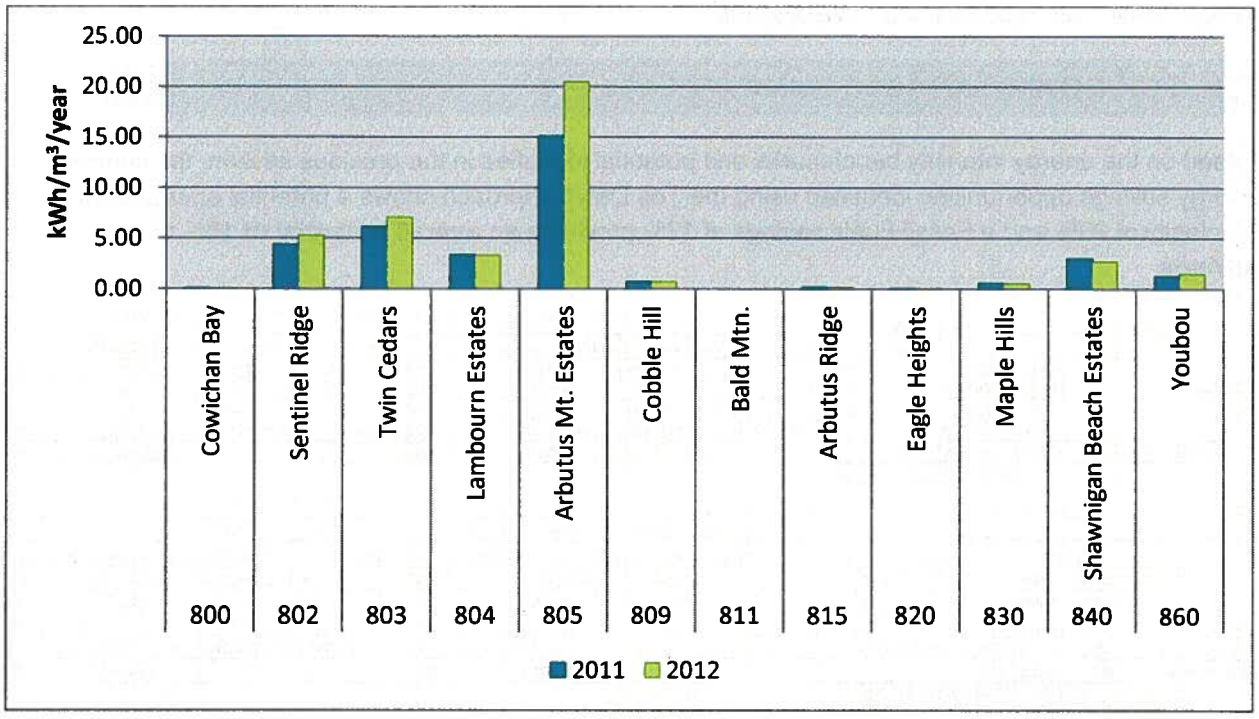
SEWER SYSTEMS

Table 11 - 2008-2012 Sewer System Energy Intensity

	# of Systems	Energy (kWh)	Volume (m^3)	Energy Intensity (kWh/m^3)
2008	9	351,943	879,462	3.39
2009	10	575,339	919,002	7.37
2010	12	792,633	1,021,835	2.32
2011	12	861,127	1,544,876	2.05
2012	12	1,103,321	1,712,073	3.93

Each of the CVRD Sewer systems is a unique in its process, operation and energy consumption. A useful analysis of the systems is to examine year on year change of energy consumption to cubic meter of effluent pumped through the system. In several cases, there has been an increase in energy consumption over the 2011 to 2012 year. Examination of systems 802, 803, and 805 should be investigated including verifying flow data and process changes.

Figure 17– 2011/2012 Energy Cost per Cubic Meter Effluent (Entire System)



COST INTENSITY FOR HEATING

In 2012, the CVRD consumed almost 59,000L of heating oil with an annual expenditure of $70,543.75. This consumption represents a premium cost to communities in the buildings using #2 heating oil as a fuel source. Table 11 shows the relative costs of fuels for heating given current pricing and heating equipment efficiencies.

In these locations it makes strong economic and environmental sense to switch from heating oil furnaces to alternative sources such as electric air-source heat pumps (ASHP). Operating costs for an ASHP will cost in the range of 65%-75% less than the current cost of heating with oil. In addition, environmental, safety, and emissions issues are also avoided.

Table 12 - Relative cost of heating

Type	Cost/GJ Input	Seasonal Efficiency*	Cost per GJ Output	Total Cost/GJ Output (after GHG cost)	Current Environmental Impact (kg CO_2e/GJ delivered)
Natural Gas	$12.5	0.85	$14.8	$16.05	50.16
Heating Oil	$30	0.70	$43	$46	67.68
Propane	$19	0.80	$24	$25.50	61.014
Electric Resistance	$25	1.00	$25	$25.17	6.9
Electric Heat Pump	**$25**	**1.8**	**$12.5**	**$12.67**	**3.45**

*Seasonal efficiencies based on medium efficiency equipment

6.2 TOP DOWN TARGETS SUMMARY

Based on the energy intensity benchmarks and potential identified in the previous section, the current energy savings opportunities identified using the Top Down approach shows a potential energy savings in Electricity of 20% and a Fossil Fuels savings of 13%,providing **an overall potential of 16% energy savings**.

		Electricity									
Site	m^2	kWh	Intensity	Vs. Avg.	Target KWh	KWh Reduced	Percentage	Vs. DB	Target KWh	KWh Reduced	Percentage
Rec	24,848	5,806,980	234	33	1,918,155	830,625	14%	48	4,621,789	1,185,191	20%
Community	4,396	383,007	87	(14)	163,971	109,851	29%	18	113,031	160,791	42%
Fire	2,075	212,147	102	1	146,069	22,935	11%	(37)	46,440	2,440	1%
Office	3,699	769224	208	107.1146546	138479.8878	267420.1122	35%	84.95061153	454985.6877	314238.3123	41%
Total Summary	**35,018**	**7,171,358**				**1,230,832**	**17%**			**1,662,661**	**23%**
		Target	20%								

		Natural Gas/Propane/oil									
Site	m^2	ekWh	Intensity	Vs. Avg.	Target ekWh	KWh Reduced	Percentage	Vs. DB	Target KWh	KWh Reduced	Percentage
Rec	157	3,905,475	157	9	2,929,025	476,764	12%	18	2,743,416	662,373	17%
Community	100	440,269	100	(16)	379,435	54,188	12%	(39)	56,760	26,021	6%
Fire	60	123,900	60	(37)	67,106	3,569	3%	(79)	-	-	0%
Office	33	122100	33.00829104	0	0	0	0%	-105.795709	115250.929	6849.070632	6%
Total Summa	**350**	**4,591,744**				**534,521**	**12%**			**695,243**	**15%**
		Target	13%								

7 OUR ACTIONS

The CVRD will conserve energy through identifying and adopting, specific, quantifiable targets and completing energy reduction projects to meet those targets. The CVRD will target a 15% reduction in the CVRD's overall energy consumption in the period from 2013-2018 with a stretch target of 20%. This overall reduction will be made up of fossil fuel and electricity reductions as identified in the CVRD Energy Management Plan.

7.1 QUARTERLY GOALS AND OBJECTIVES

Total Energy Savings are summarized in the following table and graphs. Total cumulative savings includes both the actual cumulative savings and **cost avoidance** - *the expense that would have occurred at current utility rates without reducing consumption.*

ELECTRICITY

For 2012, the CVRD had an increase in electrical consumption over the previous year, except in quarter two of 2012 which saw a 5% decrease in energy. However, this was overshadowed by the electrical rate increase of 8.23% in 2012. This meant actual savings were unavailable, but the overall avoided costs for that quarter were $10,127.

Overall rising electrical rates and increased consumption over the other three quarters resulted in an actual cost increase of $98,610. While the CVRD has undertaken numerous electrical savings projects, there is also growth in infrastructure including new water and sewer systems with high volume throughput.

Further, aging equipment and unregulated electrical use for heating at several facilities has resulted in higher energy use.

Table 13 - Quarterly Electrical Energy Consumption

	Consumption				Actual Savings					Total Savings
	2011		2012							
Quarter	kWh	2011 Expenditure	kWh2	2012 Expenditure	kWh Comparison	kWh % reduction	$	Cumulative Savings	Avoided Costs	Total Cumalative Savings
Q1	2,418,325	190,126	2,977,942	250,461	(559,617)	-23%	(60,335)	(60,335)	0	(60,335)
Q2	2,124,847	186,720	2,016,006	187,581	108,841	5%	(861)	(61,196)	10,127	(51,068)
Q3	2,152,350	186,236	2,276,489	207,557	(124,139)	-6%	(21,322)	(82,517)	0	(72,390)
Q4	2,551,790	208,908	2,575,395	225,001	(23,605)	-1%	(16,093)	(98,610)	0	(88,483)
Total	**9,247,312**	**771,990**	**9,845,832**	**870,600**	**(598,520)**	**-25%**	**(98,610)**	**(98,610)**	**10,127**	**(88,483)**

NATURAL GAS

Natural gas consumption has been reduced over every quarter of 2012 over 2011, resulting in an overall 7.8% reduction in natural gas consumption and $93,046 in total cumulative (actual + avoided costs) savings.

The CVRD does not monitor or energy-track any of the natural gas consuming facilities so it is difficult to identify why energy consumption decreased. Heating degree days from 2011 to 2012 is very similar for the area so a large difference caused by weather is unlikely. In order to continue this positive trend in energy reduction, monitoring and tracking energy consumption and energy efficiency projects across the natural gas accounts must continue.

	Consumption				Actual Savings					Total Savings
	2011		2012							
Quarter	ekWh	Expenditure ($)	ekWh	Expenditure ($)	ekWh Reduced	ekWh % reduction	$ Savings	Cumulative Savings ($)	Avoided Costs ($)	Total Cumalative Savings ($)
Q1	1,655,349	83,630	1,197,452	67,085	457,898	28%	16,546	16,546	25,653	42,199
Q2	782,476	39,625	611,654	34,905	170,821	22%	4,720	21,265	9,748	56,666
Q3	557,186	31,179	533,879	31,345	23,308	4%	(165)	21,100	1,368	57,869
Q4	1,496,118	85,859	1,192,204	68,022	303,914	20%	17,837	38,937	17,340	93,046
Total	**4,491,130**	**240,293**	**3,535,189**	**201,356**	**955,941**		**38,937**	**38,937**	**54,109**	**93,046**

PROPANE

Propane consumption at CVRD facilities in 2012 were lower in each quarter compared to 2011. Total actual savings from propane use reduction were $17,102. Avoided Costs for the 2012 year over the previous year was $17,979, resulting in a total cumulative savings of $35,081.

Propane reductions were realized at the Cowichan Lake Sports Arena as 2011 consumption for heat and domestic hot water were reduced as issues with heat pumps and controls were overcome in the 2012 period.

Table 14 - Quarterly Propane Consumption

	Consumption				Actual Savings					Total Savings
	2011		2012							
Quarter	Litres	2011 Expenditure	Litres	2012 Expenditure	Volume Comparison (L)	L %	$ Savings	Cumulative Savings	Avoided Costs	Total Cumulative Savings
Q1	33,587	$ 17,771	27,136	$ 14,592	6,451	19%	$ 3,179	$ 3,179	$ 3,469	$ 6,648
Q2	22,287	$ 11,792	11,287	$ 6,069	11,000	49%	$ 5,723	$ 8,902	$ 5,915	$ 18,286
Q3	15,761	$ 8,475	13,896	$ 7,592	1,865	12%	$ 883	$ 9,785	$ 1,019	$ 20,188
Q4	30,099	$ 16,185	16,232	$ 8,869	13,867	46%	$ 7,317	$ 17,102	$ 7,576	$ 35,081
Total	**101,734**	**54,224**	**68,551**	**37,122**	**33,183**	**1**	**$ 17,102**	**$ 17,102**	**$ 17,979**	**$ 35,081**

HEATING OIL

#2 Oil is consumed for heating at four CVRD fire halls and four community halls. In 2012, quarterly consumption of oil was higher in the first half of the year and lower in the latter half. Actual savings for the 2012 from reduction in oil usage was $1948. Heating oil use at several of the CVRD community halls is being eliminated in 2013 with upgrades to more efficient air source heat pump systems. 2013 heating oil numbers will be decreased with a corresponding (but smaller) increase in electrical energy consumption.

Table 15 - Quarterly Oil Consumption

	Consumption				Actual Savings					Total Savings
	2011		2012							
Quarter	Volume (L)	Expenditure ($)	Volume (L)	Expenditure ($)	L Reduced	L % reduction	$ Savings	Cumulative Savings ($)	Avoided Costs ($)	Total Cumalative Savings ($)
Q1	26,002	$ 27,147	27,631	$ 32,878	(1,629)	-6%	$ (5,731)	$ (5,731)	$ (6,486)	$ (12,217)
Q2	3,998	$ 4,673	4,601	$ 5,774	(603)	-15%	$ (1,101)	$ (6,832)	$ (1,592)	$ (14,910)
Q3	4,202	$ 4,806	2,530	$ 2,972	1,672	40%	$ 1,834	$ (4,998)	$ 1,045	$ (12,032)
Q4	20,564	$ 23,583	15,032	$ 16,637	5,532	27%	$ 6,946	$ 1,948	$ 3,084	$ (2,002)
Total	**54,765**	**$ 60,209**	**49,794**	**$ 58,261**	**4,971**	**0**	**$ 1,948**	**$ 1,948**	**$ (3,950)**	**$ (2,002)**

7.2 ANNUAL GOALS AND OBJECTIVES

The Cowichan Valley Regional District has undertaken many energy projects in previous years before energy monitoring and tracking was undertaken. These projects include high efficiency motor controls on pump stations, major lighting retrofits, heat recovery, and boiler upgrades. However, faced with rising energy costs over the past 5 years, the CVRD has not realized actual energy savings since 2008. However, the actions that have been performed by facilities have resulted in reductions below baselines in electricity, natural gas and propane. In 2011 and 2012, reductions in energy use below BC Hydro baselines on medium and large accounts resulted in $32,916 and $50,828 in credits respectively. Cumulatively, reductions in usage have resulted in $368,164 in avoided costs over the past five years – energy costs that would have been borne had the energy conservation measures not been implemented.

Table 16 - Annual Energy 2007-2012

		Actual Savings					Total Savings
Year	Total ekWh Consumption	ekWh Comparison savings from previous year	% reduction	$ saved	Actual Cumulative Savings	Avoided Costs	Total Cumulative Savings
2007	13,933,666	-	-	$ -	$ -	$ -	$ -
2008	12,199,646	1,734,020	12%	$ 74,188	$ 74,188	$ 156,984	$ 231,172
2009	12,341,094	(141,448)	-1%	$ (40,832)	$ 33,356	$ 42,287	$ 75,644
2010	14,532,573	(2,191,479)	-18%	$ (213,483)	$ (180,127)	$ 61,674	$ (230,434)
2011	15,045,218	(512,645)	-4%	$ (71,741)	$ (251,868)	$ 32,916	$ (224,224)
2012	14,614,501	430,717	3%	$ (52,247)	$ (304,115)	$ 74,302	$ (336,180)
Total				**$ (304,115)**	**$ (628,567)**	**$ 368,164**	**$ (484,023)**

7.3 ANNUAL ENERGY INTENSITY BY KEY PERFORMANCE INDICATORS

The following tables show energy intensity for the electricity and the various fossil fuel sources consumed. While energy intensity at some facilities have dropped, the overall patterns show that there is not a consistent decline in energy consumption. Rather, the energy intensity seems to fluctuate up or down annually without any consistent trend.

ELECTRICITY

Building electrical consumption intensity is shown in Table 10. Over the past 6 years, each year has shown a reduction in energy intensity against the 2007 baseline energy intensity of 220.42kWh/m^2/year. Building construction and expansion projects in 2009 and 2010 at Cowichan Lake Sports Arena and Bing's Creek increased overall building square footage. In 2012, Electrical energy intensity per square meter of building area is 6% lower than in 2007. This reduction in energy intensity can be attributed to ongoing energy efficiency projects by operations staff each year as well as general good maintenance and operations. While, energy intensity has shown a decrease against the 2007 baseline year, year on year energy intensity has shown fluctuations both above and below previous year usage.

Table 17- 2007-2012 CVRD Building Energy Intensity

Electricity						
Year	2007	2008	2009	2010	2011	2012
Weather (Heating Degree Days)						
Heating Degree Days	2318	2459	2399	2172	2380	2342
Heating Degree Days Change from 2007	0%	6%	3%	-6%	3%	1%
Energy Intensity (ekWh/m^2/year)						
Combined Building Area (m^2)	32,851	32,851	32,851	34,060	34,640	34,640
Electrical Energy Consumption (kWh)	7,240,996	7,080,593	6,661,667	7,447,848	6,820,498	7,165,514
Electricity Intensity (ekWh/m^2/year)	**220**	**216**	**203**	**219**	**197**	**207**
Year on Year Change	0%	-2%	-6%	8%	-10%	5%
Change From Baseline Year (2007)	0%	-2%	-8%	-1%	-11%	-6%
Cost Intensity ($/$m^2$/year)						
Total Annual Cost	$ 412,044.91	$ 418,676.20	$ 420,379.66	$ 512,094.52	$ 488,951.30	$ 543,054.70
Cost Intensity ($/$m^2$/year)	**$ 12.54**	**$ 12.74**	**$ 12.80**	**$ 15.04**	**$ 14.12**	**$ 15.68**
Year on Year Change	0%	2%	2%	20%	13%	25%
*Ingram Street Office; CLSA; ISC; KPRC; Community Halls: Honeymoon Bay, Lake Cowichan, Mesachie Lake, Shawnigan Lake, Youbou; Firehalls:Honeymoon Bay, Malahat, Mesachie Lake, North Oyster, Sahtlam, Youbou; Bing's Creek Waste Management Complex						

NATURAL GAS

Natural gas is consumed in four of the main CVRD facilities including the Ingram Street office, Island Savings Centre, Kerry Park Recreation Centre, and Shawnigan Lake Community Centre. Over the past six years there has been a significant reduction in natural gas consumption with the 2012 Natural Gas intensity 19% lower than the 2007 baseline year. This may be largely due to the closure of the Aquannis pool at Island Savings Centre in 2008. As is the case with electricity, year on year fluctuations are also the case for natural gas with energy intensity fluctuating between 25% above and below the previous year. While weather related fluctuations exist, the patterns of energy usage do not follow the annual changes in heating days for the region. 2012 natural gas consumption was 18% of that consumed in 2011 and the lowest since 2009.

Table 17 - 2007-2012 Natural Gas Usage

Natural Gas						
Year	2007	2008	2009	2010	2011	2012
Weather (Heating Degree Days)						
Heating Degree Days	2318	2459	2399	2172	2380	2342
Heating Degree Days Change from 2007	0%	6%	3%	-6%	3%	1%
Energy Intensity (ekWh/m^2/year)						
NG Energy Consumption (GJ)	15,722	10,743	11,737	14,767	15,569	12,727
NG Energy Consumption (ekWh)	4,367,167	2,984,083	3,260,278	4,101,944	4,324,583	3,535,189
Combine Building Area (m^2)	22,789	22,789	22,789	22,789	22,789	22,789
NG Intensity (ekWh/m^2/year)	**192**	**131**	**143**	**180**	**190**	**155**
Year on Year Change	0%	-32%	9%	26%	5%	-18%
Change from Baseline (2007)	0%	-32%	-25%	-6%	-1%	-19%
*Buildings: Ingram Street Office; ISC; KPRC; SLCC						

HEATING OIL

Heating Oil is consumed at four CVRD fire halls and four community halls. Oil consumption intensity has fluctuated with 2012 being 4% lower than 2007. However, as with other energy in the CVRD there is no consistent downward trend of usage. There is large potential to reduce energy consumption in this area and should be addressed through high efficiency heating upgrades and better controls.

Table 18 - 2007-2012 Heating Oil Usage

Heating Oil						
Year	2007	2008	2009	2010	2011	2012
Weather (Heating Degree Days)						
Heating Degree Days	2318	2459	2399	2172	2380	2342
Heating Degree Days Change from 2007	0%	6%	3%	-6%	3%	1%
Energy Intensity (ekWh/m^2/year)						
Oil Consumtion (Litres)	52,126	44,710	40,251	33,422	54,765	49,796
Oil Consumption (ekWh)	561,798	481,877	433,814	360,217	590,248	536,689
Combined Building Area (m^2)	4,551	4,551	4,551	4,551	4,551	4,551
Oil Intensity (ekWh/m^2/year)	**123**	**106**	**95**	**79**	**130**	**118**
Year on Year Change	0%	-14%	-10%	-17%	64%	-9%
Change from Baseline (2007)	0%	-14%	-23%	-36%	5%	-4%
Cost Intensity ($/$m^2$/year)						
Annual Expenditure	$ 43,676.72	$ 44,096.97	$ 30,458.78	$ 30,482.27	$ 60,209.05	$ 58,262.13
Annual Cost Intensity ($/$m^2$)	**$ 9.60**	**$ 9.69**	**$ 6.69**	**$ 6.70**	**$ 13.23**	**$ 12.80**
Change in cost	0%	1%	-30%	-30%	38%	33%

*Buildings:Fire Halls:Malahat, Mesachie Lake, Sahtlam, NorthOyster; Community Halls:Honeymoon Bay, Mesachie Lake, Lake Cowichan, Youbou

PROPANE

Propane consumed at the Lake Cowichan Recreation Arena has decreased from 2011 to 2012. As the new arena extension was opened in 2011, there was higher than normal propane usage as building heating and domestic hot water systems were brought on line. Issues with heat pumps in 2012 also resulted in high back up propane consumption.

Table 19 - 2011-2012 Propane Usage

Propane		
Year	2011	2012
Weather		
Heating Degree Days	2380	2342
Heating Degree Days Change from 2007	3%	1%
Energy Intensity (ekWh/m^2/year)		
Consumtion (Litres)	99,604	71,073
Consumption (ekWh)	700,276	499,686
Combined Building Area (m^2)	5,112	5,112
Intensity (ekWh/m^2/year)	**137**	**98**
Change in energy use	0%	-29%
Cost Intensity ($/$m^2$/year)		
Annual Expenditure	$ 53,078.62	$ 38,537.14
Annual Cost Intensity ($/$m^2$)	**$ 10.38**	**$ 7.54**
Change in cost	0%	-27%
*Buildings:Cowichan Lake Recreation Arena		

COMBINED ANNUAL ENERGY

Table 19 shows total combined energy consumption for buildings from 2007 to 2012. (This does not include electricity use from Water Management division.) Since 2007 energy intensity has had both increases and decreases over the past 5 years. There was a dip in 2008 and 2009 with steady increase over 2010 and 2011. 2012 has shown a slight decrease in energy intensity from 2011. Comparing to the 2007 baseline year, the energy intensity for 2012 was 1% less. Conversely, cost intensity between 2007to 2012 has increased 27.8%.

Table 20 - 2007-2012 Combined Energy Consumption

Combined Energy						
Year	2007	2008	2009	2010	2011	2012
Weather (Heating Degree Days)						
Heating Degree Days	2318	2459	2399	2172	2380	2342
Heating Degree Days Change from 2007	0%	6%	3%	-6%	3%	1%
Energy Intensity (ekWh/m^2/year)						
Combined Building Area (m^2)	32,851	32,851	32,851	34,060	34,640	34,640
Energy Consumption (ekWh)	13,933,666	12,199,646	12,341,094	14,532,573	15,045,219	14,614,501
Energy Intensity (ekWh/m^2/year)	**424**	**371**	**376**	**427**	**434**	**422**
Year on Year Change	0%	-12%	1%	14%	2%	-3%
Change From Baseline Year (2007)	0%	-12%	-11%	1%	2%	-1%
Cost Intensity ($/$m^2$/year)						
Total Annual Cost	$ 873,701	$ 799,513	$ 840,345	$ 1,053,828	$ 1,125,569	$ 1,177,816
Cost Intensity ($/$m^2$/year)	$ 26.60	$ 24.34	$ 25.58	$ 30.94	$ 32.49	$ 34.00
Year on Year Change	0%	-8%	5%	21%	5%	5%
Change From Baseline Year (2007)	0%	-8%	-4%	16%	22%	28%

8 PLANNED ACTIONS

8.1 PROJECT SUMMARY

The following tables identify prospective, approved, ongoing and completed projects. These projects are a result of the initial energy audits completed by the Energy Manager in 2012. Further confirmation of energy savings, capital costs, incentives and value will be discovered through further energy audits for prospective projects.

Potential Projects								
Project Name	Description	Potential Electrical Svgs (kWh)	Potential Other Fuel Svgs	Potential Total Svgs (Energy + Operational)	Projected Total Cost	Potential BC Hydro Incentive	Projected Simple Pay Back	Next Steps
ISC arena weather seal change rooms and reduct heating for change rooms	weater strip all doors (new doors to be installed) and openings	51,989						New doors scheduled to be installed in 2013
ISC Arena Low e ceiling	Install low-e ceiling at arena	67,500		$ 5,737.50	$ 35,000.00	$ 10,000.00	4	convince CVRD of effectivenes of low e ceiling
ISC Brine Pump insulation	insulate Brine pumps to prevent heat gain	to be estimated						Discuss with facilities to fit into schedule
ISC Ice plant	heat recovery from ice plant for building heat, hot water and zamboni water	to be estimated	52,407	$ 3,930.50		Energy Study		Energy study to be completed in 2013
ISC Arena Lighting control	lighting level control							
ISC Theatre Lighting Project	Upgrade house lights and stage work lights from incandescent	11,904	-	$ 952.00		Yes		Work with Theatre staff to investigate appropriate lighting
ISC Boiler	boiler replacement		262,033	$ 19,652.48		fortis incentive		
ISC hot water	domestic hot water upgrade to Natural Gas direct fired tanks		131,017	$ 9,826.24		fortis incentive		estimate savings from upgrade to on-demand water heating. Need to identify hot water
ISC Gym/multipurpose	Motion sensor for heating and lighting/CO2 sensor for Outdoor Air	to be estimated	to be estimated					identify savings through 2013 energy Study
CLSA Low E	Install low-e ceiling at arena	67,500		$ 5,737.50	$ 35,000.00	$ 10,000.00	4	convince CVRD of effectivenes of low e ceiling
CLSA arena weather seal	weather strip all doors and openings	to be estimated	to be estimated					confirm budget and time to do this with Rob Frost
CLSA pipe insulation	insulation of all pipes and heating equipment	to be estimated	to be estimated					to be estimated with 3E plus software the benefit of insulation of pipes and tanks
CLSA propane Hot water heater	Hot water heater for zamboni and old showers (estimated 30% savings)		55,113	$ 4,273.00	$ 15,000.00	$ -	3.5	calculate propane use and efficiency of current system; identify cost savings and opportunities of upgrading to
CLSA recommissioning	Recommissioning of HVAC, hot water system, and lighting controls + operator training and procedures	74,542	44,988	$ 11,702.20	$ 30,800.00	$ 8,566.83	1.9	identify potential for C.Ops program by completing BC Hydro Opportunities assesment form completed
CLSA Brine Pump	Insulate Brine pumps to prevent heat gain	to be estimated	to be estimated					Discuss with facilities to fit into schedule
Kerry Park Arena Low E	Install low-e ceiling at arena	67,500		$ 5,737.50	$ 35,000.00	$ 10,000.00	4	convince CVRD of effectivenes of low e ceiling
Kerry Park Arena Weather seal	Weather strip all doors and openings	to be estimated	to be estimated					confirm budget and time and value in updating existing structure
Kerry Park New Build	New construction/ rennovation project possibly in next couple years	222,804	94,258			New Construction Energy Design		ensure Energy efficiency is top of the list and Hydro/fortis program is taken advantage of
Ingram Street Energy Star/Office of the Future	Office of the Future program target energy star rating of 75	88,248	20,169	$ 8,251.19	$ 40,295.89	$ 15,000.00	3	review automated controls and potential to reduce lights on in unoccupied areas and plan to
Firehalls Lighting	Upgrade lighting at firehalls from T-12	to be estimated	to be estimated			PSP Express / Project Implementation Funding		estimate potential savings and incentives
Youbou Fire Hall	Bay Heating system	5,000	-	$ 475.00	$ 7,000.00	$ 2,500.00	9.47	Upgrade unit heaters to ductless split heat pump
Mesachie Fire Hall	Heating system upgrade with building envelope improvements		7,146			FCM - Green Municipal Fund / UBCM -		explore grants and funding opportunities; identify costs and financial benefits
Sahtlam Fire Hall	Heating system upgrade with building envelope improvements		8,822			FCM - Green Municipal Fund / UBCM -		explore grants and funding opportunities; identify costs and financial benefits
Malahat Fire Hall	Heating system upgrade with building envelope improvements		10,247			FCM - Green Municipal Fund / UBCM -		explore grants and funding opportunities; identify costs and financial benefits
Honeymoon Bay Fire Hall	Heating system upgrade with building envelope improvements	19,727	-	$ 1,822.77	$ 20,500.00	$ 10,000.00	5.78	explore interest with Public Safety and identify potential
Bing's Creek	Occupancy Sensor on heaters and lighting in operations buildings	5,000		$ 400.00				
Bing's Creek	Heatpump upgrades	20,000		$ 1,600.00				Heating audit with HVAC
Bing's Creek	Lighting Upgrade - exterior pole lights and building lights	40,000		$ 3,200.00		PSP Express / Project Implementation Funding		identify energy use and perform discovery audit for this locations; work with Water division on identifying projects
CVRD Street Lighting	Look at ECM for street lighting throught CVRD holding	to be estimated	to be estimated					
Water Division - Arbutus Mountain	Energy reduction strategy	60,000		$ 5,550.00	$ -	$ -	0	
Water Division	Lift station upgrades	to be estimated	to be estimated					
Total		801,714	686,198	$ 68,847.88	$ 218,595.89	$ 66,065.83	4.088907768	

Approved Projects

Project Name	Description	Est Electrical Svgs (kWh)	Fuel Svgs (eKwh)	Energy + Operational)	Est Total Cost	or Other Incentive	Simple Pay Back	Next Steps	Est Start Date
SLCC	electric furnace to heat pump upgrade + controls upgrade	48,845		$ 4,884.50	$ 65,000.00	$ 25,000.00	8	estimate energy savings of heating system for funding	2013
ISC Arena Compressor Motors	Replace 2 1970s 75HP motors with new High efficiency Motors	37,282		$ 3,305.00	$ 16,000.00	$ -	5		2014
ISC Arena Compressor Upgrade	Upgrade compressors with Mcyom Exchange	79,573		$ 8,000.00	$ 85,000.00	$ 28,000.00	7.13	quantify BC Hydro Grant	2013
Elsie Miles School	Heating system upgrade from Oil to							estimate energy savings of heating	2013
Elsie Miles School	Lighting upgrade	8,822		$ 1,638.09	$ 9,000.00	$ 3,600.00	3		2014
Totals		174,522	-	$ 16,189.50	$ 166,000.00	$ 53,000.00	6.98		

Projects In Progress

Project Name	Description	Electrical Svgs (kWh)	Other Fuel Svgs (kWh)	Total Svgs (Energy + Operational)	Total Cost	BC Hydro or Other	Simple Pay Back	Status
ISC LED Lighting	LED Screw-in greater than or equal to 450 lumen and less than 1000 lumen	1,440		$ 172.40	$ 1,440.00	$ 410.66	6.0	in progress
ISC Lighting	100 x T-12 lighting upgrade for service areas of ISC to4' 30 W or less T8, 2 lamps, electronic ballast	17,040		$ 1,648.40	$ 5,000.00	$ 1,737.34	2.0	in progress
Kerry Park Lighting	T-12 lighting upgrade for service areas of Kerry Park	4,544	-	$ 318.08	$ 520.00	$ 160.00	1.1	Complete
SLCC	T-12 to T-8	2,533		$ 240.64	$ 2,450.00	$ 467.11	8.2	In progress
SLCC	T-12 to T-8	4,703		$ 446.79	$ 3,500.00	$ 867.18	5.9	in progress
SLCC	T-12 to T-8	1,355		$ 128.73	$ 1,200.00	$ 246.12	7.4	In progress
SLCC	Lighting motion sensors	3,408	-	$ 310.13	$ 475.00	$ 356.25	0.38	in progress
SLCC	T-12 lighting upgrades	8,571	-	$ 779.96		$ 1,208.56		in progress
Lake Cowichan Centennial Community Hall	Heating system and building envelope upgrades	3,500	79,244	$ 10,357.09	$ 61,900.00	$ 39,616.00	2	tender process
Lake Cowichan Community Hall & Youbou Community Hall	Lighting Upgrade in main hall T-12 HO to t5 HO	14,282		$ 1,142.56	$ 7,910.10	$ 3,488.43	3.87	complete
Youbou Community Hall	Heating system and building envelope upgrades	-	104,167	$ 12,745.91	$ 100,700.00	$ 64,448.00	3	tender process
Honeymoon Bay Community Hall	Heating system and building envelope upgrades	125,095	31,944	$ 12,314.28	$ 64,500.00	$ 41,280.00	2	tender process
Mesachie Lake Hall	Heating system and building envelope upgrades	-	53,056	$ 6,563.42	$ 22,900.00	$ 14,656.00	1	tender process
Total		186,471	268,411	$ 47,168.37	$ 272,495.10	$ 168,941.65	4	

Behavioural/ Education Programs (If Applicable)

Project Name	Description	Electrical Svgs (kWh)	Total Svgs (Energy + Operational)	Total Svgs (Energy + Operational)	BC Hydro Incentive	Objectives	Date Started	% Complete	Projected Completion Date
Energy Efficient Ice Arena	Workshop on energy efficiency at Ice Arenas;					To engage facility operators in identifying potential savings at Ice Arenas from simple low/no cost behavioral changes to major redesign and updating of components. Raise	November 21/22 2012	100	November 21/22 2012
CVRD employee awareness stage 1	Home Energy Efficiency awareness campaign					To begin to make employees aware of energy use and their ability to control it	January 7 2013		January 13 2013
CVRD employee awareness stage 2	Workplace Energy Awareness - spot the savings					Engage employees in a workplace spot the savings energy investigation	Fall 2014		March 15 2013
CVRD Managers - energy efficiency financing	Communicate with managers about how to calculate					To teach managers the concept of LCC and means of energy efficiency financing	to be approved		
CVRD Facilities Operations	DDC Controls training for energy efficiency					Building operators energy efficiency training to learn to use DDC as a tool and be able to reduce energy waste in buildings	to be approved		
Totals									

Past/Completed Projects							
Project Name	Description	Electrical Svgs (kWh)	Other Fuel Svgs	Total Svgs (Energy + Operational)	Total Cost	BC Hydro Incentive	Simple Pay Back
ISC	24 x LED Replacement for Halogen	6,952		$ 556.16	$ 1,650.00	$ 1,058.97	1.06
ISC	18 x xLED replacement for 100 w Halogen	5,214		$ 417.12	$ 1,260.00	$ 940.89	0.77
ISC	55 x LED replacement for 100w Halogens at theatre	15,932		$ 1,274.56	$ 4,500.00	$ 2,874.96	1.27
ISC lighting upgrade	lighting upgrade in all public areas and motion sensor controls for lighting and hvac	173,305	0	$ 14,730.93	$ 180,298.86	$ 58,544.66	8.27
Cowichan Lake	Lighting upgrades lake cowichan hall, CLS arena, Honey Moon Bay	61,201	0	$ 3,978.00		$ 14,325.69	N/A
Kerry Park Appliance Upgrades	Refrigerator upgrades	14,145	0	$ 947.00		$ 5,258.62	N/A
Kerry Park Lighting upgrade	lighting upgrade in all public areas and motion sensor controls for lighting	18,158	0	$ 1,543.43		$ 4,219.27	N/A
Kery Park Boilers	Replace boiler with 3 wall hung Viessmann boilers	-	60000	$ 2,500.00			N/A
Ingram Street	58 Occupancy Sensors	26,448		$ 2,115.84	$ 4,444.48	$ 3,333.36	0.53
Ingram Street	Lighting retrofits - LED lamps	10,450	0	$ 836.00	$ 3,224.80	$ 1,647.83	1.89
Shawnigan Lake Community Centre	Lighting retrofits	6,673	0	$ 533.84		$ 1,930.00	N/A
CLSA Lighting upgrade	Project: Lighting Controls, Lumazorb ceiling, Variable speed drives on brine pumps	125,700	0	$ 10,056.00		$ 18,327.00	N/A
CLSA Heat Recovery Condensor	Heat recovery condensor	135,000	0	$ 10,800.00		$ 20,250.00	N/A
Water management	Radcliffe Road/Macfarlane	93,000	0	$ 7,440.00		$ 32,013.00	N/A
Totals		692,178		$ 57,728.88	$ 195,378.14	$ 164,724.25	0.53

8.2 BOTTOM UP TARGETS

Based on the estimated energy savings identified in the project summary there is an overall potential for 15% in energy.

Savings	Electrical	Fossil Fuel	Total
Potential Energy Savings (ekWh)	1,250,768	979,609	2,230,377
2012 Total Energy	9,845,832	4,768,669	14,614,501
Savings %	13%	21%	**15%**

*Note that these are based on rough estimates of project energy savings and need to be confirmed through energy audits of sites.

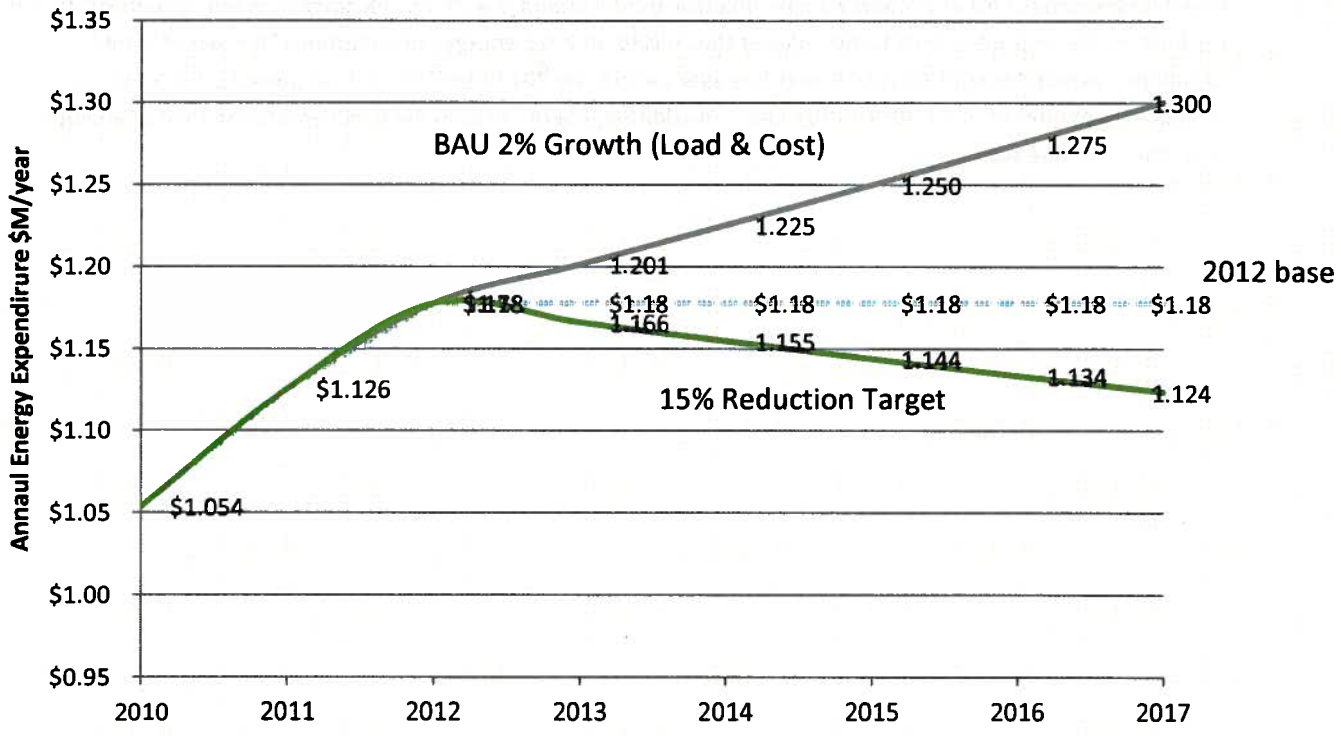
8.3 FINANCIAL PROJECTIONS

Based on the project list in Section 7.1, the financial model assumes a 2% annual growth in energy expenditure for the base model and sets a 15% target against this, based on 2012 energy consumption. This model shows a cumulative avoided cost of $589,075 over five year period. By 2017 the CVRD will be paying $ 1.12M vs. the projected expenditure of $1.30M in that year. In addition, energy savings created continue to deliver avoided costs over the life of the systems.

Table 21 - Financial Projections

		Actual Savings					Total Savings
Year	Total ekWh Consumption	ekWh Comparison savings from previous year	% reduction	$ saved	Actual Cumulative Savings	Avoided Costs	Total Cumulative Savings
2007	13,933,666	-	-	$ -	$ -	$ -	$ -
2008	12,199,646	1,734,020	12%	$ 74,188	$ 74,188	$ 156,984	$ 231,172
2009	12,341,094	(141,448)	-1%	$ (40,832)	$ 33,356	$ 42,287	$ 75,644
2010	14,532,573	(2,191,479)	-18%	$ (213,483)	$ (180,127)	$ 61,674	$ (230,434)
2011	15,045,218	(512,645)	-4%	$ (71,741)	$ (251,868)	$ 32,916	$ (224,224)
2012	14,614,501	430,717	3%	$ (52,247)	$ (304,115)	$ 74,302	$ (336,180)
2013	14,176,066	438,435	3%	$ 18,894	$ (285,222)	42,449.87	$ (274,836)
2014	13,750,784	425,282	3%	$ (4,285)	$ (289,507)	43,298.86	$ (235,822)
2015	13,338,261	412,524	3%	$ (27,927)	$ (317,433)	44,164.84	$ (219,584)
2016	12,938,113	400,148	3%	$ (52,042)	$ (369,475)	45,048.14	$ (226,578)
2017	12,549,969	388,143	3%	$ (76,639)	$ (446,114)	45,949.10	$ (257,268)
Total				**$ (446,114)**	**$ (2,336,318)**	**$ 589,075**	**$ (1,698,111)**

Figure 18- Financial Projections



9 RECOMMENDATIONS

As the CVRD embarks on a strategic approach to energy management, certain organizational opportunities and financial strategies exist that can assist in the adoption and integration of energy management into the culture of the organization. 2013 is the first year with a formal energy management

program at the CVRD, several key actions need to be accomplished in order to progress along the path of strategic reductions of energy consumption for the organization.

9.1 PLANS AND ACTIONS

In order to meet the energy consumption reduction targets set in this plan, the CVRD must lay out a plan of action targeting energy reductions across the functions for the next 5 years. This action plan is developed through identified energy reduction projects across the organization with specific energy goals for each function (Bottom Up approach – section 6).

To achieve this, engineering analyses need to be performed across all the major facilities in order to generate a comprehensive list of projects, required investment and expected energy savings through the program. The study also provides as an essential roadmap to energy saving projects allowing funds to be set aside within upcoming budget cycles.

Through this process, upgrades to existing mechanical systems, lighting, appliances and other related systems to higher efficiency standards (i.e. Energuide, Energy Star) should be considered where the change offers a simple payback of 8 years or less. A lifecycle cost analysis should be done to determine the advantage of switching to higher efficiency replacement systems for projects, where simple payback is greater than 8 years. Attractive incentives (up to 75% of the project cost) from BC Hydro and Fortis BC can assist to reduce the payback.

In 2013 an engineering analysis of the ISC has been completed and it is recommended that the following additional buildings have analyses completed:

Location	Estimated Cost
Cowichan Lake Sports Arena	$13,273
Kerry Park Recreation Centre	$13,378
Shawnigan Lake Community Centre/Elsie Miles	$7,433
Ingram Street Office	$8,320
Bing's Creek Waste Management	$6,126
Honeymoon Bay Fire Hall	$3,300
Total Estimated Cost	$52,000

B.C. Hydro provides incentive funding of up to 50% for Energy Studies performed by Powersmart Alliance Engineering Consultants with a further 50% possible funding if the recommended energy measures are performed.

9.2 TARGETS

Both the Top-Down and Bottom-Up approaches were employed to develop initial targets for the CVRD energy management program. These estimates are in the 15%-16% range and as better data comes through more detailed audits, these will be refined to meet identified opportunities. **Based on both these approaches, a target of 15% reduction in energy consumption intensity over the next 5 years.**

9.3 REPORTING

Communication, awareness and understanding of energy use is a key factor in establishing long term energy savings. By using the right tools and communicating energy use at consistent intervals, staff quickly learn to identify a normal operating range for the performance of their buildings. Quarterly reporting to Division Managers allows close tracking and management of progress against targets while a bi-annual agenda item to senior management serves to reinforce the importance of the endeavour over time. The following are reporting recommendations:

- That data be collected from each energy use billing cycle that can be used to create baselines and ongoing targets for evaluating energy intensity.

a. For the Water Management Division the energy intensity metric is kWh/m^3 of water and kWh/m^3 of effluent. These indicators should be developed for each electric metered system component that rolls up to a system or function energy intensity metric.

b. For recreation, each of the community centres and arenas should install door counters to measure patronage data for monthly and annual access. Once this data is available, the energy intensity metric for these centres will be a combination of energy per patron (ekWh/patron) and energy per area (ekWh/m^2). For the interim period ekWh/m^2 will be used.

c. For the remainder of CVRD buildings, ekWh/m^2 will be used as the standard energy intensity metric.

- That the CVRD adopt a software-based approach to managing energy consumption and billing data so staff members are able to spend time analyzing and understanding energy use rather than manipulating data to create reports. Custom monthly energy dashboards should be made available to key operations staff and division managers. All medium and large accounts and all accounts with annual electrical expenditures of $15,000 or greater should be included in the energy monitoring program. Other individual accounts can be included as necessary as recommended by staff. Funding for energy monitoring should be sourced from annual utility budgets as part of the energy conservation initiative.

- That ongoing energy use reviews be undertaken including monthly energy use billing review of energy accounts consumption and charges by utilities operators. Energy consumption information will be made available with energy consumption for the current month, energy and demand expenditure for the month, energy performance indicator and progress on target, and comparison of current month to same month for the previous year. These review should also include:

a. **Monthly** energy consumption and expense and provide notes on any out of normal activity.

b. **Quarterly** progress dashboards on energy consumption, expenditure, and the progress on function targets that build to overall division targets for division managers.

c. **Biannual** reports on energy consumption, expenditures and progress on targets to the Senior Management Team.

- Report on the CVRD's energy consumption and greenhouse gas emissions annually. Staff will be made aware of their respective division's energy consumption so that energy efficiency and performance can be assessed and action taken.

9.4 TRAINING AND AWARENESS

The following recommendations are intended to assist the CVRD in integrating energy management into the day to day operations of the organization and to raise the awareness of opportunities to reduce energy use.

1. Commit to work with staff to continue education efforts to help them better understand energy consumption and the means by which individuals can influence reductions through prudent use of resources. To help accomplish this, the CVRD may introduce incentives, both fiscal and behavioral, intended to encourage staff to use the least amount of energy necessary to achieve personal, professional and operational tasks.

2. That building operator training in energy management be included as part of building audit/re-commissioning.

3. Life-Cycle Cost Analysis (LCCA) training be provided to staff members that are involved in the evaluation, decision-making and presentation of potential energy projects. This shall allow staff to understand LCCA, how and when to apply it, how to evaluate the outcomes, its limitations and how to communicate LCCA and its value to others. This will be of particular benefit in areas such as major HVAC and refrigeration equipment where it is often installed in buildings remains in use for 20 to 30 years. Evaluation of energy equipment upgrades and projects can be a complex matter and moving beyond simple payback methods is often required to provide a sound decision-making platform.

9.5 OPERATIONAL

In order to realize targets set out in this plan, staff need to be engaged and management need to set the tone for the program.

1 Task CVRD department and division managers with meeting these reduction targets. Energy usage in their respective buildings, facilities, vehicles and by their operations should be considered.

2 Direct that department and division managers review with the Energy Analyst, through the budget process, all new energy consuming initiatives including building and construction projects as well as programs and services provided to the community.

3 Coordinate each division, responsible for electrical and fossil fuel accounts, with the energy analyst to outline and implement investment opportunities by:

   a. Completing site assessments in which potential energy projects are identified along with energy savings, capital cost, and payback are developed

   b. Evaluating which investments make the best use of available money taking into account the energy management plan and operational requirements of the function.

   c. Considering upgrades to existing mechanical systems, lighting, appliances and other related systems to higher efficiency standards (i.e. Energuide, Energy Star) where the change offers a simple payback of 8 years or less.

   d. Undertaking a lifecycle cost analysis will be done to determine the advantage of switching to higher efficiency replacement systems for projects, where simple payback is greater than 8 years.

4 Minimize all non-essential lighting and other electrical, mechanical, and thermal loads during non-business hours.

9.6 LEADERSHIP

As a governmental body, the CVRD is a leader in change and energy conservation and GHG emissions reductions initiatives should serve to lead by example and educate the area's communities into the financial and environmental benefits of its programs and set the bar for standards and procedures.

1. Communicate its energy management efforts and provide energy use information at public locations such as recreation centres and other public buildings.
2. Commit to using a recognized energy efficiency standard for all new construction and major renovations by designing and building to a minimum target Energy Star 75 rating.
3. Ensure building commissioning on all new construction and major renovations to ensure installed equipment and controls operate as designed.
4. Undertake building re-commissioning (of adequate detail depending on its use), once every 5 years.

9.7 FINANCIAL IMPLICATIONS

Energy Management is a process that reduces operational costs for the organization over time through energy conservation, efficiency improvements and awareness. As such, many of these objectives require financial investment and staffing capacity to integrate this process into the culture of the CVRD. With the size of the organization and annual expenditure on energy, is recommended that the CVRD explore the cost and benefit of utilizing full time staff support to coordinate, implement and oversee corporate energy management. Also, it should explore how this position might provide support for municipal energy management.

Sources of Funding

The following are current sources of funds and incentives available for the energy management objectives:

1. The annual Climate Action Revenue Incentive Program (CARIP) rebate received from the provincial government is conditional on the CVRD being a signatory to the Climate Action Charter. This rebate is currently used for the overall management of the CVRD Greenhouse Gas Emissions (GHG) reduction and implementation of the SEMP. It is recommended that this rebate continue to be used for this function.

2. BC Hydro provides significant incentives and support programs to assist organizations to reduce their electrical consumption. The CVRD has received over $300,000 in incentives from BC Hydro over the last 4 years including partial funding for the Energy Analyst position. It is recommended that the CVRD continue its partnership with BC Hydro to reduce electrical consumption by accessing incentives and programs.

3. FortisBC has similar programs to BC Hydro and while the CVRD has a limited number of natural gas accounts, there is still significant opportunity to leverage investment dollars with incentives and support to reduce operating costs and significantly reduce GHG emissions from buildings.

4. Community Works Fund (CWF) – the purpose of the CWF is to provide the local governments with a source of stable, long-term funding for **environmentally sustainable local government infrastructure and capacity building projects**. These funds are meant for projects that are smaller in scale, and represent local priorities. In addition, the allocation to the CVRD must demonstrate a benefit to electoral areas. This is another source of funding that can assist projects in buildings in the CVRD.

Alternate Mechanisms for Financing Energy Projects

In addition, staff have been exploring new mechanisms for funding energy efficiency projects and several mechanisms are presented here for further investigation. One funding mechanism that is gaining popularity across all sectors is the concept of a *revolving* fund. With a revolving fund, savings generated from energy projects are used to reinvest into a fund that is used to fund or leverage the next energy project. Below are two examples that have been created specifically for the regional district context and operate on the function level.

1. Within each CVRD Function that emits GHG emissions (as defined by the UBCM Traditional Services Boundaries), a revolving climate action revolving fund be set aside, equivalent to the previous year provincial carbon offset from the Function's emissions to underwrite energy/GHG reduction programs for that function to reduce natural resource use, energy consumption and emissions of greenhouse gases. E.g. Recycling and Waste Management Division could use these funds to leverage a composting program that can be used to offset its GHG emissions from its operations.
2. That within each CVRD Function that consumes energy, a revolving energy conservation fund be established within its annual budget. These funds will then be invested in energy efficiency upgrades and projects that decrease energy use, thereby lowering operating expenses. These operational savings are returned to the fund and then reinvested in additional projects. Savings generated by reducing operating costs are tracked and used to repay the fund (thus providing ongoing capital for future projects). E.g. In 2012, the Island Savings Centre reduced energy use below baseline levels earning a B.C. Hydro credit of $32,298. With a revolving fund in place, this savings amount would be allocated to its energy efficiency revolving fund to continue further energy projects. This fund will be developed in coordination with the CVRD Energy Management Plan with a view to leverage funding for projects defined by energy studies that build to the 2020 energy efficiency target.

9.8 2013 TIMELINE AND REQUIRED ACTIONS

May 15th, 2013 – Q3 Energy Manager Presentation

May 25th, 2013 – Draft SEMP and Policy due to BC Hydro

May, 2013 – Energy Audit of Island Savings Centre

June, 2013 - Senior Management Approval of SEMP and Policy Required

June/July 2013 - CVRD Board Approval of SEMP and Policy Required

June–October, 2013 – Audits of remaining CVRD facilities

July/August, 2013 – Heating System Upgrades at Cowichan Lake Community Halls

August 2013 – BC Hydro Year One, Energy Management Assessment (EMA) at CVRD

September 2013 – Q4 Energy Manager Presentation

September-December 2013 – Budget preparations for 2014 Energy Projects across all Divisions

Winter 2013 – Energy Plan presentations to Commissions

10 APPENDIX

Number of stakeholders	27+	Energy Manager	Kuan Jian Foo
Executive Support	Warren Jones, CAO	Energy Committee	N/A
Energy Volunteers	10		

10.1 LIST OF STAKEHOLDERS:

Name	Title	Organization	Contact Info
Cowichan Valley Regional District Communities	Electoral and Municipal Area Community members	None	none
CVRD Board of Directors	Board of Directors	CVRD	various
Warren Jones	CAO	CVRD	wjones@cvrd.bc.ca
Brian Dennison	General Manager – Engineering Services	CVRD	bdennison@cvrd.bc.ca
Ron Austen	General Manager – Parks, Recreation, and Culture	CVRD	rausten@cvrd.bc.ca
Jacob Ellis	General Manager – Regional Services	CVRD	jellis@cvrd.bc.ca
Mark Kueber	General Manager – Corporate Services	CVRD	mkueber@cvrd.bc.ca
Sharon Moss	Division Manager - Finance	CVRD	smoss@cvrd.bc.ca
Norm Olive	Division Manager - Capital Projects Management	CVRD	nolive@cvrd.bc.ca
Bob McDonald	Division Manager - Recycling and Waste Management	CVRD	bmcdonald@cvrd.bc.ca
David Leitch	Division Manager - Water Management Division	CVRD	dleitch@cvrd.bc.ca
Jim Wakeham	Division Manager - Facility, Fleet & Transit Management Division	CVRD	jwakeham@cvrd.bc.ca
Kirsten Schrader	Division Manager - Arts & Culture	CVRD	kschrader@cvrd.bc.ca
Kim Liddle	Division Manager - South Cowichan Recreation	CVRD	kliddle@cvrd.bc.ca

Linda Blatchford	Division Manager - Cowichan Lake Recreation	CVRD	lblatchford@cvrd.bc.ca
John Elzinga	Division Manager - Island Savings Centre	CVRD	jelzinga@cvrd.bc.ca
Brian Farquhar	Division Manager - Parks and Trails	CVRD	bfarquhar@cvrd.bc.ca
Sybille Sanderson	Division Manager - Public Safety	CVRD	ssanderson@cvrd.bc.ca
Kate Miller	Division Manager - Environmental Initiatives	CVRD	kmiller@cvrd.bc.ca
Keith Bird	Fire Chief	Honeymoon Bay Volunteer Fire Dept.	hbvfd@cvrd.bc.ca
Rob Patterson	Fire Chief	Malahat Volunteer Fire Dept.	MFireDept@cvrd.bc.ca
Gary Eve	Fire Chief	Mesachie Lake Volunteer Fire Dept.	geve@shaw.ca
Jason DeJong	Fire Chief	North Oyster Volunteer Fire Dept.	Jdj100@shaw.ca
Allan Reid	Fire Chief	Sahtlam Volunteer Fire Dept.	A_reid@shaw.ca
Orest Smycniuk	Fire Chief	Youbou Volunteer Fire Dept.	Orest-kim@shaw.ca
Angela Massey	CVRD – Senior Key Account Manager	BC Hydro	angela.massey@bchydro.com
Simon Vickers	BC Hydro Energy Manager Program	BC Hydro	Simon.vickers@bchydro.com

10.2 LIST OF ENERGY VOLUNTEERS

Name	Title	Organization	Contact Info
Brad Coleman	Facility Operations Coordinator	CVRD – North/Central Cowichan	(250) 746-7529
Tony Liddle	Facility Operations Coordinator	CVRD – South Cowichan	(250) 743-5922
Rob Frost	Facility Operations Coordinator	CVRD – Cowichan Lake Recreation	(250) 709-1397
Tod Lesergent	North/Central Cowichan Operations Lead-Hand	CVRD – North/Central Cowichan	tlesergent@cvrd.bc.ca
Dave Parker	Water Management Division – Senior Operator	CVRD – Water Management Division	dparker@cvrd.bc.ca

Todd Etherington	Water Management Division – Senior Operator	CVRD – Water Management Division	tetherington@cvrd.bc.ca
Lisa Daugenet	Engineering Technologist II	CVRD – Water Management Division	(250) 746-2541
Jason Adair	Solid Waste Operations Superintendent	CVRD – Recycling and Waste Management	(250) 746-2530
Graham Gidden	Parks and Trails Planner	CVRD – Parks and Trails	(250) 746-2639
Tracy Bowen	Accounting Supervisor	CVRD Finance	(250) 746-2573

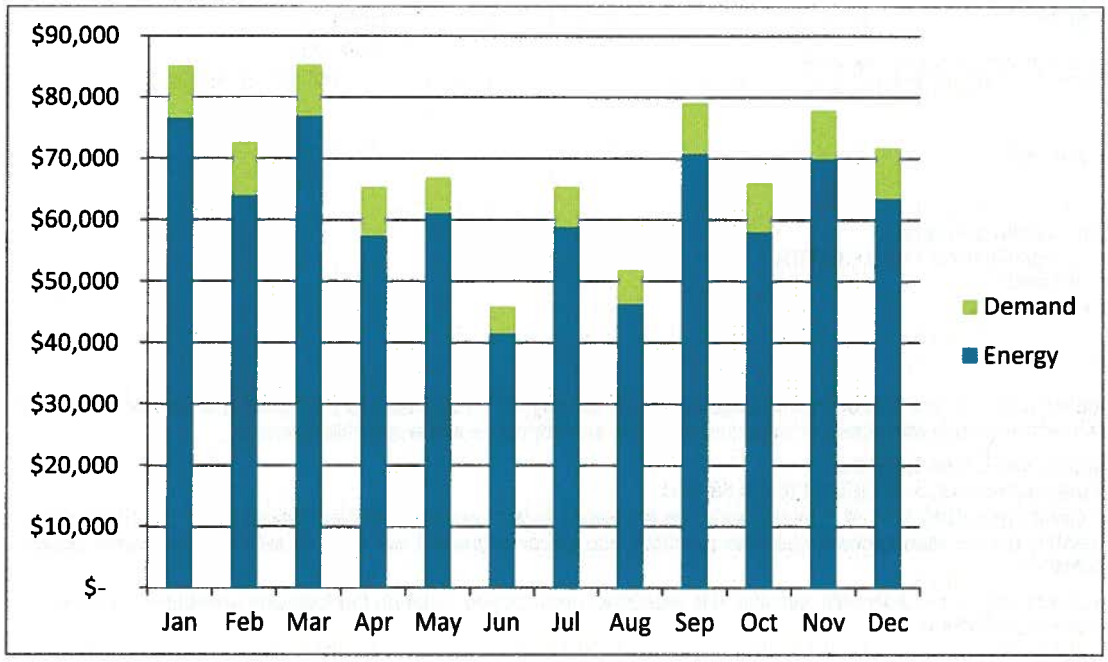
10.3 BASELINE ENERGY USE: ACCOUNT HISTORIES

Electrical Account History for 2012 shows that 86% of the cost of electricity is actual energy consumption, with 10% coming from power demand charges.

Table 22 - 2012 B.C. Hydro Account History

Period	Energy	Demand	Power Factor	Tax	Total
Jan	$ 76,602	$ 8,632	$ 17	$ 9,585	$ 88,102
Feb	$ 63,997	$ 8,627	$ -	$ 7,784	$ 73,380
Mar	$ 76,949	$ 8,427	$ -	$ 9,305	$ 88,178
Apr	$ 57,443	$ 7,985	$ 144	$ 7,066	$ 66,546
May	$ 61,173	$ 5,855	$ 270	$ 7,542	$ 71,622
Jun	$ 41,472	$ 4,437	$ 227	$ 5,166	$ 48,712
Jul	$ 58,876	$ 6,613	$ 369	$ 7,289	$ 69,108
Aug	$ 46,354	$ 5,514	$ 392	$ 5,788	$ 54,459
Sep	$ 70,829	$ 8,336	$ 311	$ 8,760	$ 83,130
Oct	$ 58,078	$ 7,950	$ 323	$ 7,250	$ 68,233
Nov	$ 69,995	$ 7,948	$ 79	$ 8,654	$ 82,149
Dec	$ 63,507	$ 8,340	$ 92	$ 7,936	$ 74,619
Grand Total	$745,274	$ 88,666	$ 2,224	$92,124	$868,238
% of total	86%	10%	0%	11%	100%

Table 23 - Aggregate Electricity Cost Summary



10.4 ASSET REGISTRY

Asset registry under development for each location – Will be complete after Engineering Analyses.

10.5 STUDIES: ENERGY BREAKDOWN

Energy End Use breakdown in development for each location

10.6 CURRENT BUSINESS PRACTICE GAPS

EMA cover letter

Figure 19 - BC Hydro EMA Cover Letter

BC hydro
powersmart

reliable power,
at low cost,
for generations

September 9, 2011

Kate Lindsay
Senior Environmental Analyst
Cowichan Valley Regional District (CVRD)
175 Ingram Street
Duncan, BC V9L 1N8

Dear Kate,

Thank you for your time and that of your management team on July 15th. I appreciated your input and feedback and trust that you found the Energy Management Assessment (EMA) an informative and worthwhile exercise.

The diagnostic session revealed that:

- Your organization has a SEGEMA LR of 0.58; and
- Your current SEGEMA TBR of 0.36 signals some imbalance in your energy management approach and bringing key interrelated energy management business practices into better alignment will work to improve the overall energy performance

Based on the results of the diagnostic session, it is recommended that you focus on the following elements to continue to improve energy management:

(1) Policy
Establish an energy policy, sponsored by senior management, with guiding principles pertaining to energy management and expectations for the energy conservation initiative. Establish a formal incentive program that rewards actions from individuals or teams that contribute toward energy efficiency and/or meeting established targets.

(2) Targets / Reporting
Set energy intensity parameters and consumption reduction targets for all key departments that cascade up to an overall annual reduction target.

(3) Plans / Actions
Improve the baseline understanding of energy consumption and opportunities for savings for each major utility system. Utilize the improved understanding to develop technical project implementation plans that correlate potential savings to the established consumption reduction targets.

(4) Teams / Committees
Develop resource planning activities to ensure access to personnel with sufficient bandwidth to address energy management from a program-level perspective.

(5) Employee Awareness / Training
Proactively deliver regular energy intensity reports to departmental personnel for use in examining variances from established targets. Provide regular feedback to executive sponsors on progress towards established energy policy goals.

Included in this package are a detailed Energy Management System Action Plan and Diagnostic Report that outline these recommendations in further detail. Also included is a draft Energy Management Action Plan Timeline that can serve as a starting point for identifying the specific task items necessary for implementation of the recommended actions outlined and provide a template for managing the ongoing progress toward implementation. I will work with you to finalize the draft Action Plan Timeline.

BC Hydro would like to thank CVRD for your participation in the EMA diagnostic session, and we look forward to working with you in implementing these recommendations and supporting your energy management activities.

Sincerely,

Angela Massey
Key Account Manager

			BC Hydro Implementation Support Offerings	Mo 1	Mo 2	Mo 3	Mo 4	Mo 5	Mo 6	Mo 7	Mo 8	Mo 9	Mo 10	Mo 11	Mo 12
1.0	Policy														
	Establish an energy policy, sponsored by senior management, with guiding principles pertaining to energy management and expectations for the energy conservation initiative. Establish a formal incentive program that rewards actions from individuals or teams														
	1.1	Quantify the benefit of energy conservation activities conducted to date	Leadership Commitment Letter	C,B											
		>Specify numerous projects and activities undertaken to date	Energy Management on the Agenda Tool												
		>Specify the financial benefits as well as public image and marketability benefits													
	1.2	Outline the additional benefits possible by having an organization-wide directive for energy conservation		C,B											
		>Include financial benefits to organization													
		>Include positive impact to CVRD image													
	1.3	Review sample energy policy statements created by other organizations		C,B											
	1.4	Establish energy policy language with clear, quantifiable goals and timelines for the organization that pertain directly and exclusively to energy conservation		C-2.1											
		>Initial goals for energy can be based on existing knowledge of opportunities, comparison with performance metrics of other entities, or indicative scores resulting													
		>Should reflect organizational goals for carbon footprint													
Q1	1.5	Present energy policy and potential benefits (quantitative and qualitative) to an executive sponsor for signature				C									
		>May require modification as called out by leadership prior to signature													
	1.6	Establish the required administrative regulations that will provide guidance on the day-to-day implementation issues in support of the energy policy					C								
	1.7	Communicate energy policy to all of the organization and reinforce over time by creating regular reporting to management on the progress made toward goals in the						C							
Q2	1.8	Develop an acknowledgement program that provides executive sponsor recognition for employees or operational areas making significant contributions to the						C,B							
		>Name top performers in quarterly newsletter													
		>Name top improving areas in quarterly newsletter													
		>Present an annual (or period) top performer and most improvement award (ie, plaque, banner, etc) that the winner can display for the year (or period)													

				Mo 1	Mo 2	Mo 3	Mo 4	Mo 5	Mo 6	Mo 7	Mo 8	Mo 9	Mo 10	Mo 11	Mo 12
2.0	Targets / Reporting														
	Set energy intensity parameters and consumption reduction targets for all key departments that cascade up														
	2.1	Use existing understanding of opportunities to develop a	Benchmarking		C-1.4										
		>Utilize savings projections from results of technical	Interval Metering Data												
		>Isolate savings expected through retrofit projects from	Account History Report												
		>Bottom Up based on identified savings opportunities in	e.Points												
		>Top down based on desired reduction from overall													
Q1	2.2	Develop energy intensity metrics that are relevant to the organization (ie, kwh/sf, kwh/ recreation center patron, etc) for use in setting KPIs			C										
	2.3	Identify potential key areas to assign separate KPIs (ie,					C-3.1,3.2								
Q2	2.4	Use evolving understanding of site and system opportunities to develop KPIs per key area that build up to the overall program annual target						C,B-3.6,3.7							
		>Define "targets" as the level of performance below the current "expected level" metrics based on the desired percent reduction at each area													
		>For example, if the "expected level" metric is 3000													
		>Isolate savings expected through retrofit projects from													
		>Bottom Up based on identified savings opportunities in													
		>Top down based on desired reduction from overall													
	2.5	Capture KPI actual versus expected and target to								C					
Q3	2.6	Develop standard format for KPI reporting by key area										C,B			
Q4	2.7	Present monthly reports as agenda item in operations											C-5.3		

Yet to Start
In Progress
Pending
Complete

				Mo 1	Mo 2	Mo 3	Mo 4	Mo 5	Mo 6	Mo 7	Mo 8	Mo 9	Mo 10	Mo 11	Mo 12
3.0		Plans / Actions													
		Improve the baseline understanding of energy													
	3.1	Identify systems in key areas where energy analysis or upgrade activities have previously been performed	Commercial Strategic Energy Management Plan	C,B											
		>Call out specifically the extent of past analysis or upgrade activity for each system	Continuous Optimization for Commercial Buildings												
		>Call out known additional systems for analysis or upgrade opportunity	Energy Study Funding												
		>Call out operational, behavioral, instructional opportunities in addition to hardware opportunities	PSP Express												
		>Create Work scope for additional energy audits or analysis of opportunities	PSP Project Implementation Funding												
		>Work scope should consider automation, load management and rate reviews as appropriate	Commercial New Construction Program												
		>Work scope should include quantifying energy use and savings per system													
	3.2	Identify systems where no previous energy analysis or upgrade activities have been performed		C,B											
		>Create Work scope for additional energy audits or analysis of opportunities													
		>Work scope should consider operational, behavioral, instructional issues in addition to hardware issues													
		>Work scope should consider automation, load management and rate reviews as appropriate													
		>Work scope should include quantifying energy use and savings per system													
Q1	3.3	Identify and select qualified resources (internal, utility partner, third party, etc) to execute work scopes		C,B											
	3.4	Schedule and conduct energy baseline studies			C										
	3.5	Analyze energy baseline study results				C,B									
		>Identify opportunities for savings that meet investment criteria													
		>Investigate available utility rebate & support programs													
		>Compile business-case models for project justification													
	3.6	Use baseline study results to establish energy use / major system metrics						C,B-2.4							
	3.7	Use baseline study results to establish potential savings / energy system quantification						C,B-2.4							
	3.8	Review current long term strategy for the organization						C							
		>Ensure a cascading structure of site targets that role up to long-term goal in energy policy													
	3.9	Compile multi-year capital plan for approved energy projects							C,B						
		>Plan should identify each activity and capital project, outlining the steps to implementation, resources, budget, timeline, and responsible party													
		>Plan should depict how each project will contribute to the established energy reduction targets													
		>Utilize the BC Hydro Strategic Energy Management Plan template as necessary													
	3.10	Review draft prioritized energy plan with executive management to show contribution toward energy policy goals							C						
		>Adjust as needed based on management feedback													
Q2	3.11	Obtain management approval, as needed, to implement the projects in the final multi-year plan							C						
Q3	3.12	Execute plan								C					
Q4	3.13	Monitor and report on progress against the plan and objectives over time											C		

Yet to Start
In Progress
Pending
Complete

				Mo 1	Mo 2	Mo 3	Mo 4	Mo 5	Mo 6	Mo 7	Mo 8	Mo 9	Mo 10	Mo 11	Mo 12
4.0	Teams / Committees														
	Develop resource planning activities to ensure access to														
	4.1	Identify specific energy management tasks not receiving sufficient coverage	Workplace Conservation Awareness Program	C,B											
	4.2	Quantify the time commitment required to address the outstanding energy management tasks	Green Your Business Tips	C											
	4.3	Establish an outline of the general skill sets required to manage the outstanding energy management tasks	e.Catalog		C,B										
		>Make allowance for skill sets that can be provided or reinforced through training													
	4.4	Investigate the possible sources of "high-quality, low-cost" personnel (BC Hydro EM Program, underutilized employee, Student Intern, etc)				C,B									
	4.5	Prepare justification and obtain approval for new Energy Manager resource				C									
		>Identify and execute technical projects													
		>Coordinate energy management program activities													
		>Provide technical support to departmental areas													
	4.6	Conduct candidate selection process					C								
		>Prepare candidate selection criteria													
		>Advertise available position													
		>Schedule interviews with interested candidates													
		>Select most qualified candidates													
Q2	4.7	Outline training requirements needed (if any) for new resource							C,B						
	4.8	Identify sources of required training and deliver the training								C,B					
Q3	4.9	Assign to new resource energy management tasks not currently receiving sufficient coverage									C				

Yet to Start
In Progress
Pending
Complete

				Mo 1	Mo 2	Mo 3	Mo 4	Mo 5	Mo 6	Mo 7	Mo 8	Mo 9	Mo 10	Mo 11	Mo 12
5.0		Employee Awareness / Training													
		Proactively deliver regular energy intensity reports to													
	5.1	Construct energy trend analysis templates by overlaying operating parameters onto collected energy use data	Workplace Conservation Awareness Program							C,B-2.4.2.5					
		>Time based energy profiles per metered point	Green Your Business Tips												
		>Analyze for unnecessary coincidental demands	e.Catalog												
		>Analyze for energy consumption variance from expectation during specific time periods													
Q3	5.2	Develop data capture and information distribution plan										C-2.5.2.			
		>Consider participation in BC Hydro Continuous Optimization Program to improve energy measurement capabilities													
		>Capture KPI actual versus expected and target to determine ongoing site performance													
		>Establish a methodology for capturing operating data needed for normalizing energy use data, including operating hours and schedules, occupancy rates, weather, etc.													
		>Develop standard format for KPI reporting by key area													
		>Utilize captured energy data in energy awareness messaging													
	5.3	Present monthly reports as agenda item in operations and/or area meetings											C-2.7		
	5.4	Develop response procedure for out-of-variance in monthly report											C		
		>Augment report format to include corrective action taken on out of tolerance conditions													
	5.5	Identify persistent out of tolerance conditions												C	
	5.6	Target persistent out of tolerance conditions for further energy reduction possibilities												C	
	5.7	Create a summary reporting scorecard template with line items for each operating area and/or key system assigned energy KPIs													C,B
		>Report format should highlight the operating area or key system-level KPIs cascading to up to the overall target in relation to the energy policy goal													
		>Include a list highlighting projects and initiatives implemented at the operations level that are contributing towards individual KPI achievement													
		>Use captured meter data to construct comparison analysis template for evaluating similar areas over time													
		>Compare actual to same period in past and to target													
	5.8	Augment reports to include a list highlighting planned projects and initiatives aimed at under-performing areas													C
		>Include brief outline highlighting potential projects and initiatives for future years to indicate anticipated plan for meeting the energy policy goals over the long term													
Q4	5.9	Deliver summary reporting scorecard template to senior management on a bi-annual basis													C
		>Report should go to senior leadership that has signed/sponsored the energy policy													

Yet to Start
In Progress
Pending
Complete

11 BC HYDRO: ENERGY MANAGER 4TH QUARTER ASSESSMENT FORM

11.1 FOR BC HYDRO TO COMPLETE

<table>
<tr><td>File Number</td><td colspan="2">Cowichan Valley Regional District
PSI-11-4172</td></tr>
<tr><td>Quarter</td><td colspan="2">2</td></tr>
<tr><td>PSE Signature:
SEMP Completed</td><td></td><td>Date: 2013-06-26</td></tr>
<tr><td>Projects that used PS incentives:</td><td colspan="2">
<table>
<tr><th>PS Program Incentive</th><th>kWh</th></tr>
<tr><td>PSP</td><td></td></tr>
<tr><td>PSP Express</td><td></td></tr>
<tr><td>New Construction</td><td></td></tr>
<tr><td>Total</td><td></td></tr>
<tr><td>Behavioural Program (2%)</td><td></td></tr>
</table>
Turn around time for 4th Q review: _____days
</td></tr>
</table>

Energy Manager: Please complete appropriate year below

- Note: All areas (in your contract Year) must be covered in order to receive 4th quarter payment

11.2 YEAR 1: PLAN REQUIREMENTS

☑ c) Who do you need to engage to make you plan successful?	51		P.51-52 Sec. 10.1 & 10.2
2) A table that compares all your buildings in your portfolio ☑ a) BEPI	26	☐	☑ P.26 Sec.6.1
3) Explain what the opportunities are to become more efficient. ☑ a) Project List	45	☐	☐ P.45-48 Sec.8.1 Missing Behavioural/Organizational & Completed Projects sections - corrected
4) Outline the budget to implement projects ☑ a) No Budget? Can't forecast your budget? You must explain why not and what you intend to do about getting a budget.	7	☐	☐ P.7 Sec.3.1 blank, 2014 & 2015 not listed - corrected
5) Conclusion: How is your plan doing? ☑ a) Outlined kWh saved ☑ b) Actual total dollars saved to the organisation ☑ c) Outlined avoided cost ☑ d) Total dollars saved = Actual + Avoided Cost	Section 6 & 7 P.47-48	☐	☐ Because this is a first year plan, you won't necessarily have savings to show, suggest including summary table to show planned savings over years as projects in plan are implemented For example See SEMP template P.10 Sec. 5.2 corrected

11.3 YEAR 2 +: STRATEGIC ENERGY MANAGEMENT PLAN REQUIREMENTS

6 Critical Elements must be included in the Strategic Energy Management Plan	**Page number where the element is addressed in the SEMP**	**Energy Manager evaluation**	**PSE Agrees**
1) A purpose statement which answers the following questions: ☐ a) What is your kWh reduction target? ☐ b) What is the Key Performance Indicator for your organization? ☐ c) Who do you need to engage to make you plan successful?		☐	☐
2) A table that compares all your building in your portfolio ☐ a) BEPI- updated to the current year ☐ b) Explanation of Top 10 worst performing buildings		☐	☐
3) Explain what the opportunities are to become more efficient. ☐ a) Project List ☐ b) Initiative List: Behavioural and Organisational ☐ c) Studies: Outline which buildings have had studies completed.		☐	☐
4) Outline the budget to implement projects ☐ a) If No Budget? Can't forecast your budget? You must explain why not and what you intend to do about getting a budget.		☐	☐
5) Conclusion: How is your plan doing? ☐ a) Outlined kWh saved ☐ b) Outlined GHG tons saved ☐ c) Outlined total dollars saved to the organisation ☐ d) Outlined avoided cost ☐ e) Outlined total dollars saved		☐	☐
6) Senior Management Support ☐ a) Approval of the SEMP : Signature on the SEMP		☐	☐

11.4 TRACKING

	2nd Q Draft SEMP Submitted Date	Date PSE Coaching Comments Returned to EM	4th Q SEMP submitted date	Reviewed and Coaching comments returned to EM: Date	*If EM needed to resubmit :date	If PSE reviewed: Date
Energy Manager	2013-05-15					
PSE		2013-06-26				

11.5 PSE COACHING COMMENTS FOR IMPROVEMENTS (NOT REQUIRED FOR SIGN-OFF)

	Date: Duration	Date: Duration	Date: Duration	Date: Duration
Energy Manager contacted PSE for assistance				