FY2012
Strategic Energy Management Plan

College of New Caledonia
BRITISH COLUMBIA • CANADA

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Contents

1. EXECUTIVE SUMMARY

Effectively managing the College of New Caledonia's energy and continuing to develop an energy conservation culture has never been more crucial. Fiscal Year (FY) 2011 saw a BC Hydro conservation-driven rate restructuring that could significantly increase electricity costs. It also saw the introduction of the requirement for all BC Public Sector Organizations to purchase carbon offsets at $25 per tonne of carbon dioxide equivalents to neutralize their operational carbon emissions. The ongoing support of all stakeholders – the Province, Management, Faculty, Staff, and Students – will be imperative to be able to meet CNC's FY2013 energy reduction targets of 7% for electricity and 32% for natural gas.

This Strategic Energy Management Plan (SEMP) provides an update on the status of the CNC Energy Management Program that began in partnership with BC Hydro in December 2008. The SEMP summarizes the performance results of the Program's first two years of operation, fiscal years 2010 and 2011. It also provides the energy management strategy for FY2012.

Program Status

Energy Management Program progress is measured against performance in the baseline year, FY2009, the year preceding the start of the Program. In FY2010 (the first year of the Energy Management Program), CNC Prince George Campus buildings consumed a total of 14,413,000 equivalent kilowatt hours (ekWh) of electricity and natural gas at a cost of $694,000. In FY2011 CNC Prince George consumed 15,545,000 ekWh of electricity and natural gas at a cost of $712,300.

From FY2009 (the baseline year) to FY2010, total building energy (electricity and natural gas) consumption intensity (ekWh/m^2) improved by 6% and cost intensity ($/$m^2$) improved by 10%. The significant cost savings amounting to approximately $77,000 are due to a combination of reduced energy consumption and favourable natural gas prices in FY2010. In FY2011 total energy consumption intensity deteriorated by 2% and cost intensity improved by 8%, both as compared to FY2009, the baseline year. The deterioration in consumption intensity is largely attributed to natural gas consumed by Prince George Technical Education Centre construction. These results do not account for year-to-year weather variations (a significant driver in energy consumption).

During the first year of the Energy Management Program (FY2010), energy consumption per Student Full Time Equivalence (FTE) and energy cost per FTE improved by 8% and 14% respectively. This trend resulted from a combination of a higher FTE, lower total energy consumption, and favourable natural gas prices in FY2010 as compared to FY2009. During the second year of the Energy Management Program (FY2011) energy consumption per FTE deteriorated 3% and cost per FTE improved by 8%, both as compared to FY2009. This trend is largely due to the increased natural gas consumption associated with PG TEC construction. These FTE metrics do not account for year-to-year weather variations.

Accounting for weather variations, both electricity and natural gas performance in all Prince George Campus buildings – Main Campus, Student Residence, Brink Building, and Nicholson Building – deteriorated in aggregate by 4.7% for electricity and 5.3% for natural gas during the first year of the Energy Management Program (FY2010). In FY2011, electricity performance improved by 8.2% but

natural gas performance deteriorated by 11.9%, both as compared to the FY2009 baseline year. The poor natural gas performance is largely attributed to natural gas consumed by PG TEC construction. To more accurately assess Main Campus performance, PG TEC construction natural gas consumption will be deducted from Main Campus consumption once the construction consumption is reconciled with the construction contractor.

Energy reduction targets have been set for achieving a 7% improvement in building electricity performance and 32% improvement in building natural gas performance by the end of FY2013. By the end of FY2011, CNC had exceeded its FY2013 electricity reduction target by 2% but remained 23% above its FY2011 natural gas reduction target largely due to PG TEC construction.

Despite modest funding, several energy efficiency projects were undertaken in FY2011. Since the Program began and to the end of FY2011, CNC has avoided approximately 526,500 ekWh in energy consumption, $28,000 in costs, and 52 tonnes of equivalent carbon dioxide greenhouse gas emissions.

CNC has begun to engrain an energy conservation culture into its policies and procedures. Energy performance considerations have been included in several project tenders including Med Rad, a classroom lighting upgrade, and rooftop unit replacement. Work has also begun to ensure that CNC's existing preventative maintenance program aligns with energy management objectives.

FY2012 Strategy

The FY2012 energy efficiency project budget has been set at $300,000. Due to the 2012 phase-out of T12 lamps, the majority of this budget will be allocated toward lighting upgrades in Prince George and Regional Campuses. Once completely implemented, the Prince George T12 lighting retrofit is expected to save 370,000 kWh/yr ($25,000/yr).

In May 2011, CNC applied to the Provincial Government for $1.2 million funding to upgrade the Prince George Power Plant and peripheral HVAC systems/controls. This project represents the largest energy conservation opportunity for the College and will be integral in meeting the FY2013 natural gas reduction targets. Annual boiler plant and chiller plant savings have been estimated at 7,600 GJ and 85,000 kWh, respectively, and total approximately $70,000 per year in operational cost savings. If the project proceeds, CNC will ensure that energy efficiency forms the cornerstone for all related system designs.

Guided by the BC Hydro report generated through CNC's October 2010 Energy Management Assessment, CNC will focus efforts in the following Five Critical Areas:

- Policy
- Targets / Reporting
- Plans / Actions
- Teams / Committees
- Employee Awareness / Training

In FY2012 CNC will extend the Energy Management Program to Regional Campuses and will investigate the feasibility of establishing a revolving fund to help finance future energy efficiency projects.

2. FY2011 ENERGY PERFORMANCE ANALYSIS

FY2009 – the year prior to initiating CNC's Energy Management Program – is used as the baseline period against which progress toward meeting Program objectives will be measured. This section provides an analysis of CNC fiscal year-on-year energy performance from the following perspectives:

- Raw energy consumption and cost
- Weather-normalized performance
- Aggregate Prince George Campus target attainment

In each case, the analyses are provided on a building-specific level as well as aggregated for the entire Prince George Campus.

2.1 Raw Energy Consumption & Cost

Energy consumption in CNC buildings is strongly influenced by ambient outdoor air temperature. Analyses presented in this section are "raw" in the sense that they ***do not account for variations in weather*** over the period of analysis. Weather variations are taken into account in the next section (Weather-Normalized Performance).

Table 1 presents electricity consumption (kWh/yr), cost ($/yr), consumption intensity (kWh/m^2/yr), and cost intensity ($/$m^2$/yr) for FY2009 through FY2011 (to date). Changes in consumption intensity and cost intensity as compared to the baseline year (FY2009) are also presented. Tables 2 and 3 provide the same information for natural gas and total energy (electricity plus natural gas), both in terms of equivalent kilowatt hours (ekWh).

As shown in Table 1, electricity consumption and electricity consumption intensity (kWh/m^2) decreased in all buildings during the first year of the Energy Management Program (FY2010) as compared to the baseline year (FY2009). In aggregate, the electricity consumption and electricity consumption intensity improved by 2% from FY2009 to FY2010. Despite the decreased electricity consumption, electricity costs and electricity cost intensities ($/$m^2$) increased in aggregate by approximately 2% in FY2010 over FY2009. Electricity consumption and electricity consumption intensity improved in all buildings in FY2011 as compared to both the baseline year (FY2009) and FY2010. In aggregate, the electricity consumption intensity and the electricity cost intensity both improved by 8% in FY2011 as compared to the baseline year (FY2009).

As shown in Table 2, natural gas consumption and natural gas consumption intensity (ekWh/m^2) improved significantly from FY2009 to FY2010 in all buildings: ranging from 3% in the Main Campus to 44% in the Brink Building. In aggregate, the natural gas consumption and natural gas consumption intensity improved by 8% during the first year of the Energy Management Program. Due to lower natural gas prices, this decrease in consumption translated to an aggregate 23% decrease in natural gas cost and natural gas cost intensity from FY2009 to FY2010. As compared to FY2009, FY2011 natural gas consumption and consumption intensity improved significantly in the residence (8%) and in the Brink Building (37%). However, these metrics deteriorated slightly (3%) in the Nicholson building and dramatically (17%) in the Main Campus. The dramatic increase in the Main Campus is attributed to a

combination of natural gas consumed for the Prince George Technical Education Centre (PG TEC) construction as well as a colder FY2011 winter compared to those in FY2009 and FY2010 (discussed in Section 2.2). In aggregate, natural gas consumption and consumption intensity increased by 9% in FY2011 as compared to FY2009. Due to favourable natural gas prices, natural gas cost and cost intensity were in aggregate 7% lower in FY2011 as compared to FY2009.

Table 3 combines data presented in Tables 1 and 2 into the total energy analysis. CNC used 6% less total energy and paid 10% less for energy in FY2010 as compared to FY2009. In FY2011, total energy consumption compared to FY2009 increased by 2% while total energy cost decreased by 8%. Aggregate total energy consumption intensity was 340 ekWh/m^2 in FY2009, 321 ekWh/m^2 in FY2010, and 346 ekWh/m2 in FY2011, all considerably below the national and provincial averages[1] of 394 and 364 ekWh/m^2 respectively. Note that this metric does not take weather variability into consideration.

Table 4 summarizes raw energy consumption and cost data in terms of CNC's key performance indicator: Student Full Time Equivalence (FTE). From FY2009 to FY2010, performance improved by 8% and 14% in terms of consumption/FTE and cost/FTE respectively. In FY2011, consumption performance deteriorated by 3% as compared to FY2009. This is likely due to increased Main Campus natural gas consumption used for PG TEC construction and a colder FY2011 winter. In spite of this trend, FY2011 cost performance improved by 8% compared to FY2009 due to favourable natural gas prices.

Figure 1 shows that percentages of electricity and natural gas consumed remained essentially unchanged from FY2009 to FY2010. The percentage of natural gas consumed in FY2011 increased by 5% over FY2010 due largely to natural gas consumed by PG TEC construction and a colder FY2011 winter. Natural gas accounted for 7% less of the FY2010 total energy costs as compared to FY2009 due to lower natural gas prices in FY2010. FY2011 electricity versus natural gas percentage cost distribution was the same as that of FY2009.

Figure 2 summarizes energy consumption by building and commodity since FY2009. As expected, Main Campus accounts for the lion's share of both electricity and natural gas consumption. In aggregate, electricity consumption has decreased in each successive year. Natural gas consumption decreased from FY2009 to FY2010, but increased in FY2011 compared to FY2009. This is likely due to a combination of natural gas consumed during PG TEC construction and a colder winter in FY2011. Figure 3 translates and presents this consumption data as costs. Aggregate electricity costs rose marginally from FY2009 to FY2010 then dropped in FY2011. Despite increased natural gas consumption in FY2011, costs remained below those in FY2009 due to favourable commodity prices.

Figures 4 and 5 display the percentage breakdowns by building of energy consumption and cost respectively. By building, percentage electricity consumption and cost remained the same from FY2009 through to FY2011. Main Campus percentage natural gas consumption increased slightly from FY2009 to FY2010 (from 84% to 85%) then more in FY2011 (to 87%) due largely to PG TEC construction and a colder winter in FY2011. Main Campus percentage total energy consumption increased one percent per

[1] Commercial and Institutional Consumption of Energy Survey Summary Report – June 2007, Natural Resources Canada's Office of Energy Efficiency

year since FY2009 (from 87% to 89%) while total Main Campus energy cost increased one percent (from 86% to 87%) during that period.

Note again that analyses presented in this section do not account for variations in weather over the period of analysis.

TABLE 1: ELECTRICITY CONSUMPTION, COST & INTENSITIES BY BUILDING

Utility Meter Location	Area (m2)	ELECTRICITY CONSUMPTION								ELECTRICITY COST							
		Electricity Consumption (kWh)			Electricity Consumption Intensity (kWh/m2)			Change from FY2009		Electricity Cost ($)			Electricity Cost Intensity ($/m2)			Change from FY2009	
		FY09 (baseline)	FY10	FY11	FY09 (baseline)	FY10	FY11 (to date)	FY10	FY11	FY09 (baseline)	FY10	FY11	FY09 (baseline)	FY10	FY11	FY10	FY11
Main Campus (including Residence)	37,972	5,911,200	5,769,600	5,467,200	156	152	144	-2%	-8%	$ 341,324	$ 347,124	$ 313,193	$ 8.99	$ 9.14	$ 8.25	2%	-8%
Nicholson Building	1,427	180,720	176,760	173,520	127	124	122	-2%	-4%	$ 14,934	$ 15,069	$ 14,237	$ 10.47	$ 10.56	$ 9.98	1%	-5%
John A Brink Trades & Technology Centre	5,472	552,600	546,480	504,360	101	100	92	-1%	-9%	$ 39,169	$ 40,443	$ 36,396	$ 7.16	$ 7.39	$ 6.65	3%	-7%
AGGREGATE	**44,871**	**6,644,520**	**6,492,840**	**6,145,080**	**148**	**145**	**137**	**-2%**	**-8%**	**$ 395,427**	**$ 402,635**	**$ 363,826**	**$ 8.81**	**$ 8.97**	**$ 8.11**	**2%**	**-8%**

TABLE 2: NATURAL GAS CONSUMPTION, COST & INTENSITIES BY BUILDING

Utility Meter Location	Area (m2)	NATURAL GAS CONSUMPTION								NATURAL GAS COST							
		Natural Gas Consumption (ekWh)			Natural Gas Consumption Intensity (ekWh/m2)			Change from FY2009		Natural Gas Cost ($)			Natural Gas Cost Intensity ($/m2)			Change from FY2009	
		FY09 (baseline)	FY10	FY11	FY09 (baseline)	FY10	FY11	FY10	FY11	FY09 (baseline)	FY10	FY11	FY09 (baseline)	FY10	FY11	FY10	FY11
Main Campus (excluding Residence)	35,724	6,964,362	6,770,806	8,137,890	195	190	228	-3%	17%	$ 310,257	$ 244,660	$ 296,650	$ 8.68	$ 6.85	$ 8.30	-21%	-4%
Residence	2,248	193,972	174,056	177,833	86	77	79	-10%	-8%	$ 9,972	$ 7,265	$ 7,746	$ 4.44	$ 3.23	$ 3.45	-27%	-22%
Nicholson Building	1,427	401,806	372,778	412,972	282	261	289	-7%	3%	$ 20,355	$ 15,836	$ 17,303	$ 14.26	$ 11.10	$ 12.13	-22%	-15%
John A Brink Trades & Technology Centre	5,472	1,069,333	602,889	670,833	195	110	123	-44%	-37%	$ 35,182	$ 23,454	$ 26,765	$ 6.43	$ 4.29	$ 4.89	-33%	-24%
AGGREGATE	**44,871**	**8,629,473**	**7,920,528**	**9,399,529**	**192**	**177**	**209**	**-8%**	**9%**	**$ 375,766**	**$ 291,216**	**$ 348,464**	**$ 8.37**	**$ 6.49**	**$ 7.77**	**-23%**	**-7%**

TABLE 3: TOTAL ENERGY CONSUMPTION, COST & INTENSITIES BY BUILDING

Utility Meter Location	Area (m2)	TOTAL ENERGY CONSUMPTION								TOTAL ENERGY COST							
		Total Energy Consumption (ekWh)			Total Energy Consumption Intensity (ekWh/m2)			Change from FY2009		Total Energy Cost ($)			Total Energy Cost Intensity ($/m2)			Change from FY2009	
		FY09 (baseline)	FY10	FY11	FY09 (baseline)	FY10	FY11	FY10	FY11	FY09 (baseline)	FY10	FY11	FY09 (baseline)	FY10	FY11	FY10	FY11
Main Campus (including Residence)	37,972	13,069,534	12,714,462	13,782,923	344	335	363	-3%	5%	$ 661,553	$ 599,049	$ 617,589	$ 17.42	$ 15.78	$ 16.26	-9%	-7%
Nicholson Building	1,427	582,526	549,538	586,492	408	385	411	-6%	1%	$ 35,289	$ 30,906	$ 31,540	$ 24.73	$ 21.66	$ 22.10	-12%	-11%
John A Brink Trades & Technology Centre	5,472	1,621,933	1,149,369	1,175,193	296	210	215	-29%	-28%	$ 74,351	$ 63,897	$ 63,161	$ 13.59	$ 11.68	$ 11.54	-14%	-15%
AGGREGATE	**44,871**	**15,273,993**	**14,413,368**	**15,544,609**	**340**	**321**	**346**	**-6%**	**2%**	**$ 771,193**	**$ 693,851**	**$ 712,290**	**$ 17.19**	**$ 15.46**	**$ 15.87**	**-10%**	**-8%**

TABLE 4: KEY PERFORMANCE INDICATOR – STUDENT FULL TIME EQUIVALENCE

Fiscal Year	Studend FTE*	Consumption			Cost		
		Total Consumption	ekWh/Student FTE	Change From FY2009	Total Cost ($)	$/Student FTE	Change From FY2009
FY2009	2,825.45	14,940,410	5,288	--	$ 771,193	$ 273	--
FY2010	2,954.00	14,413,368	4,879	-8%	$ 693,851	$ 235	-14%
FY2011	2,852.07	15,544,609	5,450	3%	$ 712,290	$ 250	-8%

* - Full Time Equivalence

FIGURE 1: ENERGY CONSUMPTION & COST BREAKDOWN BY FUEL BY FISCAL YEAR

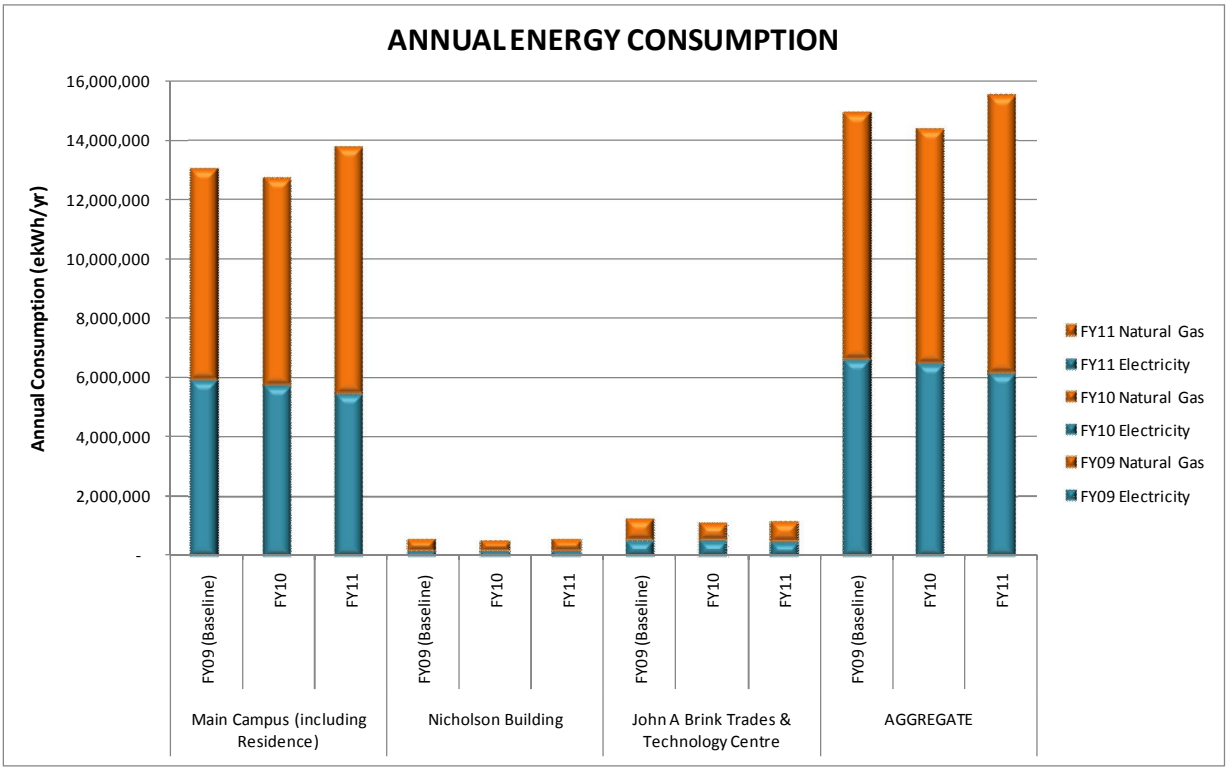


FIGURE 2: ENERGY CONSUMPTION BREAKDOWN BY BUILDING

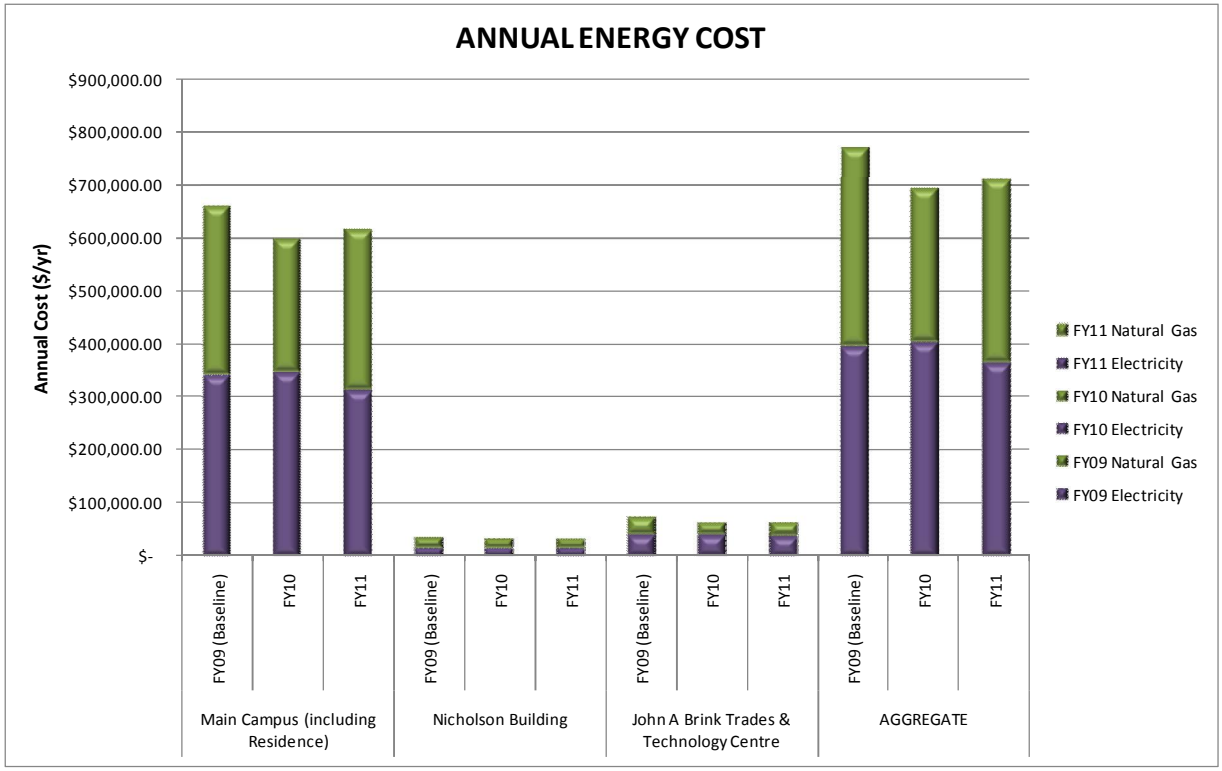
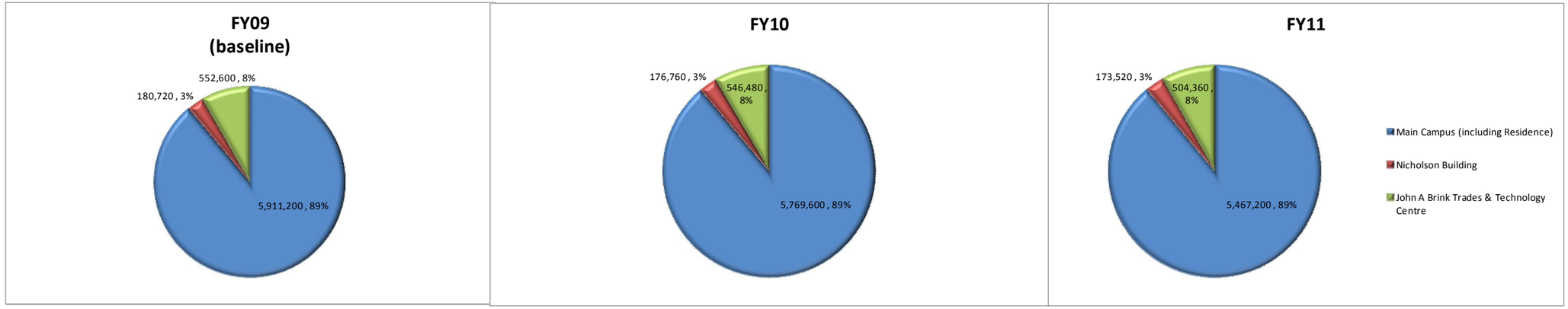
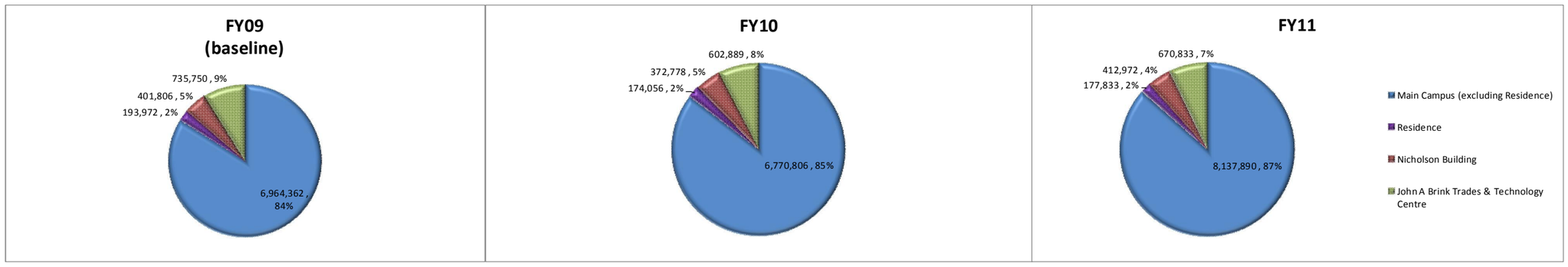


FIGURE 3: ENERGY COST BREAKDOWN BY BUILDING

ELECTRICITY (kWh/yr)



NATURAL GAS (ekWh/yr)



TOTAL ENERGY (ekWh/yr)

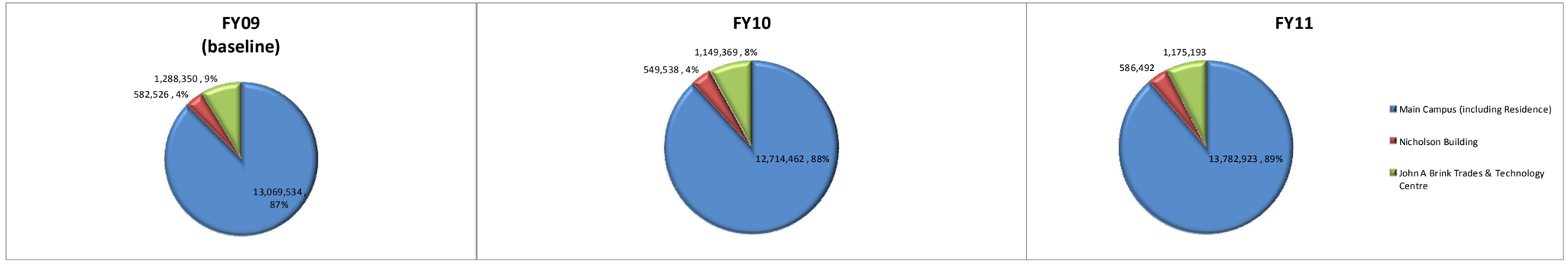
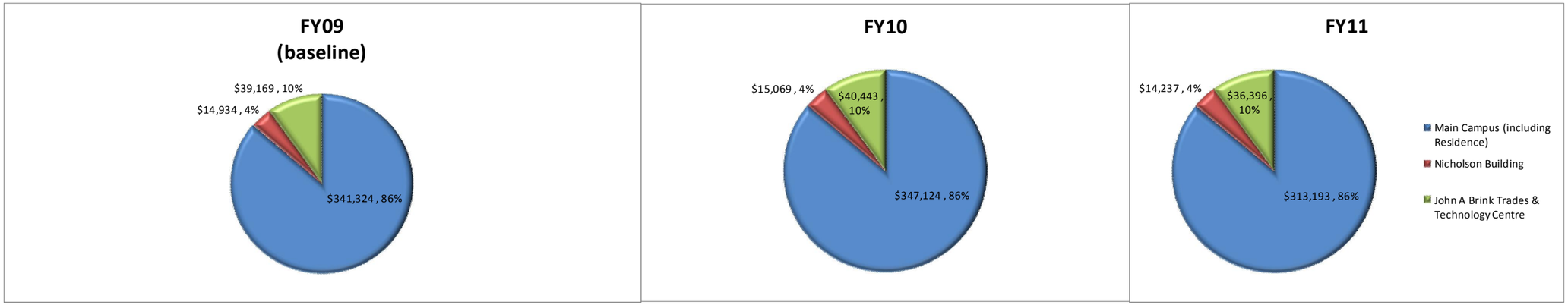
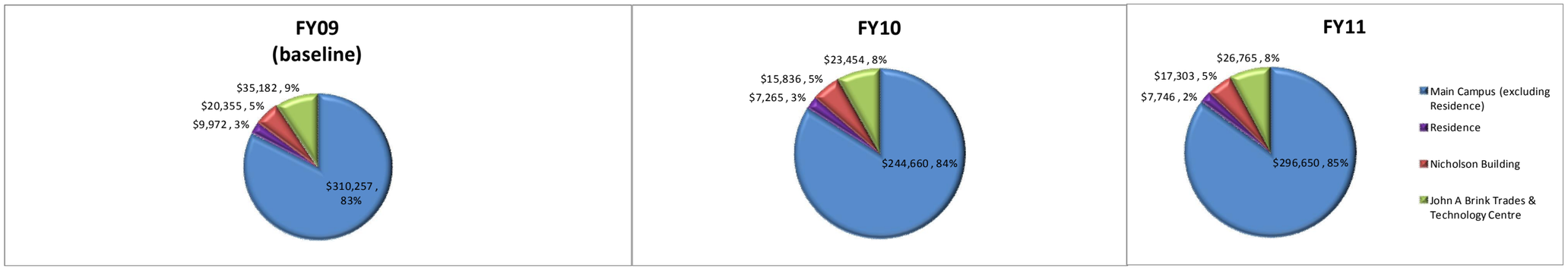


FIGURE 4: ENERGY CONSUMPTION PERCENTAGE BREAKDOWN BY BUILDING

ELECTRICITY ($/yr)



NATURAL GAS ($/yr)



TOTAL ENERGY ($/yr)

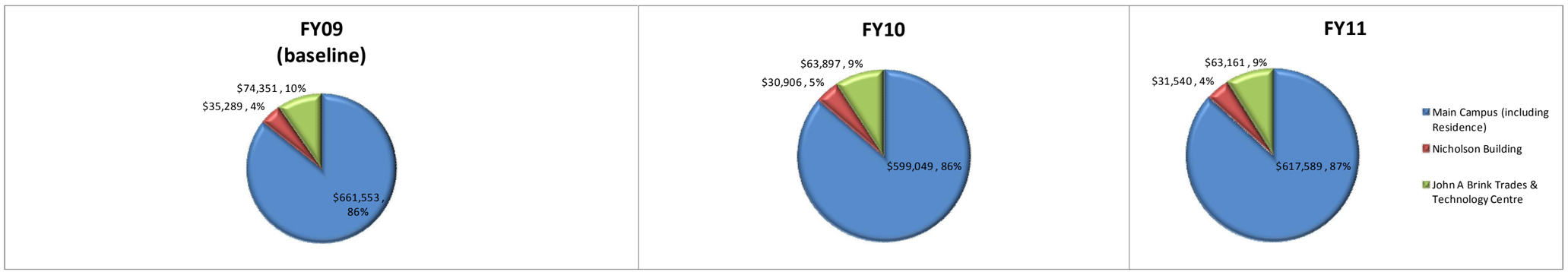


FIGURE 5: ENERGY COST PERCENTAGE BREAKDOWN BY BUILDING

2.2 Weather-Normalized Performance

Multi-variable regression analyses using historical CNC energy consumption data and Environment Canada weather data for Prince George Airport indicate that both electricity and natural gas consumption are driven by heating degree days[2] (HDD). Therefore energy consumption per square metre floorspace per HDD is used as the primary building energy performance index (BEPI).

Table 5 summarizes electricity performance (kWh/m^2/HDD) from the baseline year (FY2009) to present. These data are presented graphically in Figure 6. As demonstrated by the HDD data, of the three years, FY2011 was coldest and FY2010 was mildest. Electricity performance in all buildings deteriorated from FY2009 to FY2010 and in aggregate (weighted to floor space) by 4.7%. Weather-normalized electricity consumption was highest (worst performance) in the Main Campus. At least in part, this is due to the fact that most Residence space heating energy manifests on the Main Campus BC Hydro meter. Sub-metering the Residence electricity would allow for this energy consumption to be separately assigned to the Residence rather than to the Main Campus. Also, a significant percentage of Main Campus lighting is provided by inefficient T12 fluorescent lights. In FY2011, electricity performance improved in all buildings and in aggregate by 8.2% as compared to FY2009.

As shown in Table 6 and Figure 7, natural gas performance (ekWh/m^2/HDD) from FY2009 to FY2010 improved in the Residence and Brink Building, but deteriorated in the Main Campus and Nicholson Building. In FY2011 natural gas performance improved (as compared to FY2010) in all buildings except for in the Main Campus. Aggregated relative to floor space, natural gas performance in the three buildings deteriorated by 5.3% from FY2009 to FY2010 and by 11.9% in FY2011 as compared to FY2009. The deterioration in Main Campus performance in FY2011 is likely due to consumption associated with PG TEC construction. To better assess Main Campus natural gas performance *without* the influence of PG TEC construction, attempts will be made to remove PG TEC natural gas consumption from the Main Campus total once PG TEC consumption is reconciled with the construction contractor. Residence natural gas consumption per square metre is significantly lower than in other buildings as, unlike the other buildings, much of the Residence space heating is provided by electricity rather than natural gas. Nicholson Building natural gas performance was consistently worse than that of Main Campus and Brink. This is largely due to the fact that the building's natural gas heating systems (radiant gas heaters, two furnaces, and one make-up air unit) had no night setback capabilities. As discussed in the Approved Projects section, programmable thermostats for these systems were installed in late April 2011.

[2] Heating degree days (HDD) are a measure of how cold the weather is over a period of time. One HDD is assigned for every degree Celsius the average daily outdoor temperature is below the "balance point" (the temperature at which a building's heating system engages). For example, three HDDs would be assigned to a building with a balance point of 18 ºC on a day with an average outdoor temperature of 15 ºC.

TABLE 5: ELECTRICITY PERFORMANCE BY BUILDING

Utility Meter Location	Area (m2)	HDD			Electricity Performance (kWh/m2/HDD)			Change from FY2009	
		FY09 (Baseline)	FY10	FY11	FY09 (Baseline)	FY10	FY11	FY10	FY11
Main Campus (including Residence)	37,972	7,229	6753	7277	0.0215	0.0225	0.0198	4.5%	-8.1%
Nicholson Building	1,427	9,273	8796	9321	0.0137	0.0141	0.0130	3.1%	-4.5%
John A Brink Trades & Technology Centre	5,472	6,429	5962	6474	0.0157	0.0168	0.0142	6.6%	-9.4%
AGGREGATE*	**44,871**	**7,196**	**6,721**	**7,244**	**0.0206**	**0.0215**	**0.0189**	**4.7%**	**-8.2%**

HDD - heating degree days

* - aggregate values weighted to building area

n.a. - not applicable

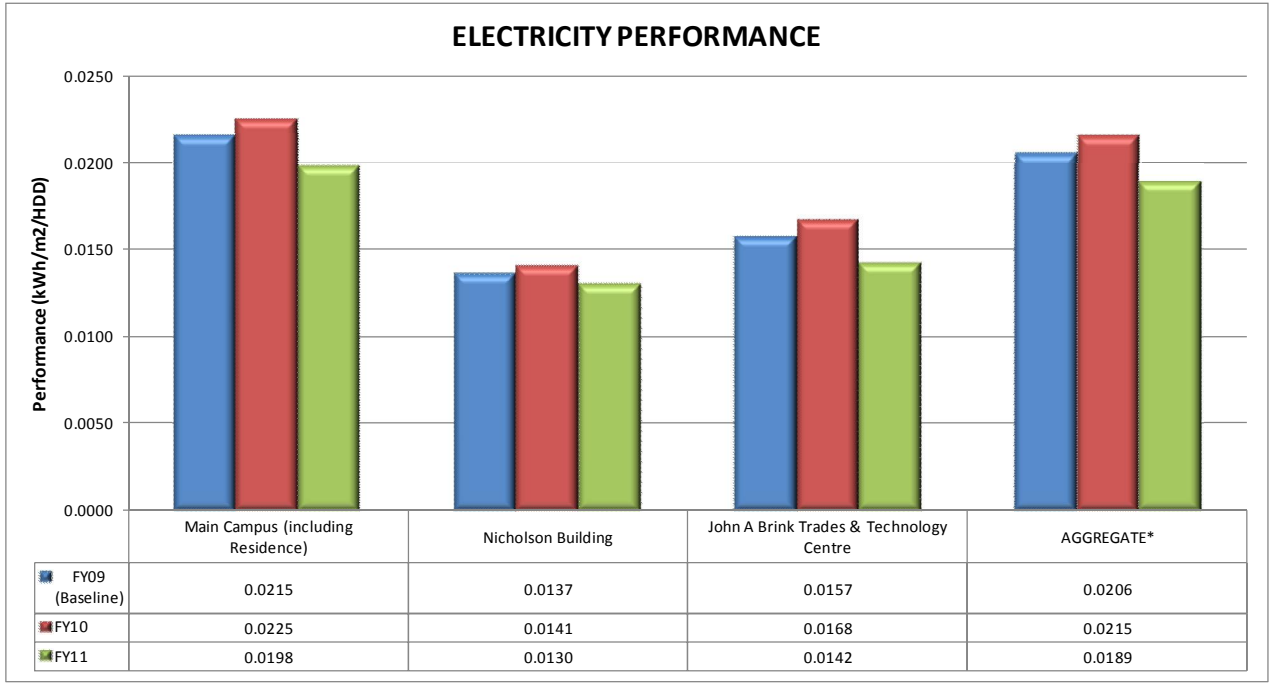


FIGURE 6: ELECTRICITY PERFORMANCE BY BUILDING

TABLE 6: NATURAL GAS PERFORMANCE BY BUILDING

Utility Meter Location	Area (m2)	HDD			Natural Gas Performance (ekWh/m2/HDD)			Change from FY2009	
		FY09 (Baseline)	FY10	FY11	FY09 (Baseline)	FY10	FY11	FY10	FY11
Main Campus (excluding Residence)	35,724	4,319	3916	4353	0.045	0.048	0.052	7.2%	15.9%
Residence	2,248	6,828	6355	6875	0.013	0.012	0.012	-3.6%	-9.0%
Nicholson Building	1,427	2,930	2566	2904	0.096	0.102	0.100	5.9%	3.7%
John A Brink Trades & Technology Centre	5,472	3,201	2839	3191	0.042	0.039	0.038	-7.6%	-8.5%
AGGREGATE*	**44,871**	**4,264**	**3,864**	**4,292**	**0.045**	**0.047**	**0.050**	**5.3%**	**11.9%**

HDD - heating degree days
* - aggregate values weighted to building area
n.a. - not applicable

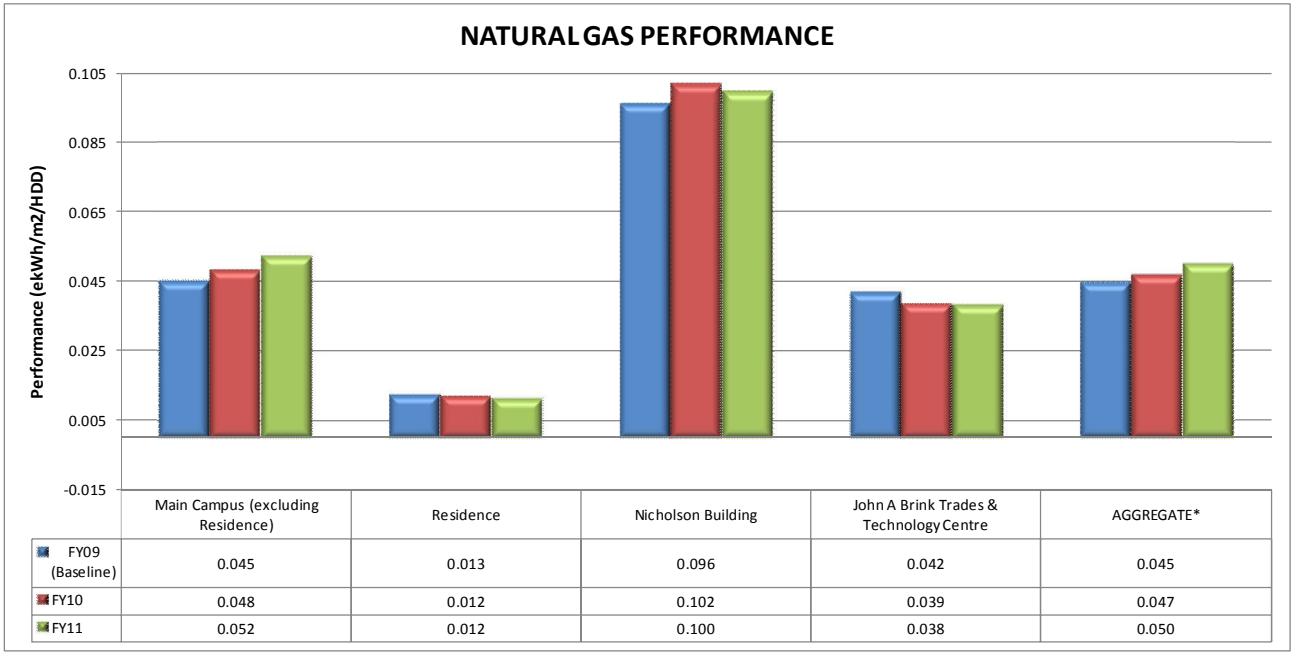


FIGURE 7: NATURAL GAS PERFORMANCE BY BUILDING

2.3 Aggregate Prince George Campus Target Attainment

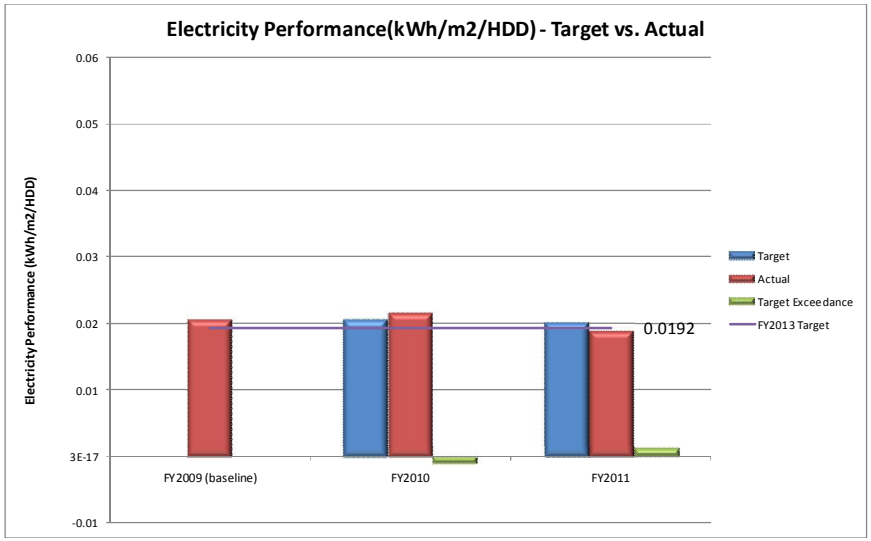
Energy reduction targets set in CNC's January 2010 SEMP are translated in this SEMP to BEPI (ekWh/m2/HDD) performance-based targets. The 2010 SEMP set energy reduction targets based on implementing over a period of three fiscal years (FY2011 through FY2013) all potential energy efficiency projects identified in a detailed energy audit that was completed in 2008. Once all projects are complete, annual electricity consumption is expected to decrease by approximately 351,000 kWh and annual natural gas consumption is expected to decrease by approximately 2,000 GJ. In 2009 a feasibility study was completed for upgrading the existing Main Campus chiller and boiler plants. The study estimated that annual energy savings would be 85,200 kWh and 7,600 GJ for the chiller and boiler plants, respectively. Combining estimates from the 2008 energy audit and the 2009 feasibility study, annual energy savings once all projects are complete (FY2013) are expected to be 436,200 kW in electricity and 9,600 GJ in natural gas. These savings will result in a total improvement in area- and weather-normalized energy performance – annual energy consumption per square metre per heating degree day – of 6.6% in electricity and 31.8% by the end of the three year period. This SEMP spreads these savings equally over the FY2011 through FY2013 three-year period (2.2% improvement each year in electricity performance and 10.6% improvement each year for natural gas, both as compared to FY2009 performance).

Table 7 and Figure 8 summarize electricity and natural gas target tracking since the CNC Energy Management Program began in FY2010. FY2009 data is provided in the Figure as the baseline performance against which the targets have been set. No reduction targets were set for the first year of the Program (FY2010), during which time electricity performance deteriorated 4.7% and natural gas performance deteriorated by 5.3%. Several projects and initiatives targeting electricity efficiency were implemented in FY2011. These activities – detailed in Section 3, FY2011 Activity Summary – resulted in an 8.2% improvement in electricity performance as compared to FY2009, exceeding the FY2011 target by 6.0% and the FY2013 target by 1.7%. FY2011 natural gas performance deteriorated by 11.9% as compared to FY2009 and fell short of the FY2011 target natural gas performance by 22.7%. This is largely due to natural gas consumed through PG TEC construction. To more accurately assess Main Campus FY2011 natural gas performance, PG TEC construction natural gas consumption will be removed from Main Campus consumption once PG TEC consumption has been reconciled with the construction contractor.

TABLE 7: AGGREGATE PRINCE GEORGE CAMPUS ELECTRICITY AND NATURAL GAS TARGET TRACKING

Fiscal Year	Electricity Performance					Natural Gas Performance				
	Target Improvement*	Target Performance (kWh/m2/HDD)	Actual Performance (kWh/m2/HDD)	Actual Improvement	Target Exceedance	Target Improvement*	Target Performance (ekWh/m2/HDD)	Actual Performance (ekWh/m2/HDD)	Actual Improvement	Target Exceedance
FY2010	0.0%	0.0206	0.0215	-4.7%	-4.7%	0.0%	0.0447	0.0471	-5.3%	-5.3%
FY2011	2.2%	0.0201	0.0189	8.2%	6.0%	10.7%	0.0399	0.0501	-11.9%	-22.7%
FY2012	4.4%	0.0197	--	--	--	21.4%	0.0352	--	--	--
FY2013	6.6%	0.0192	--	--	--	32.2%	0.0304	--	--	--

* - targets set based on FY2009 performance



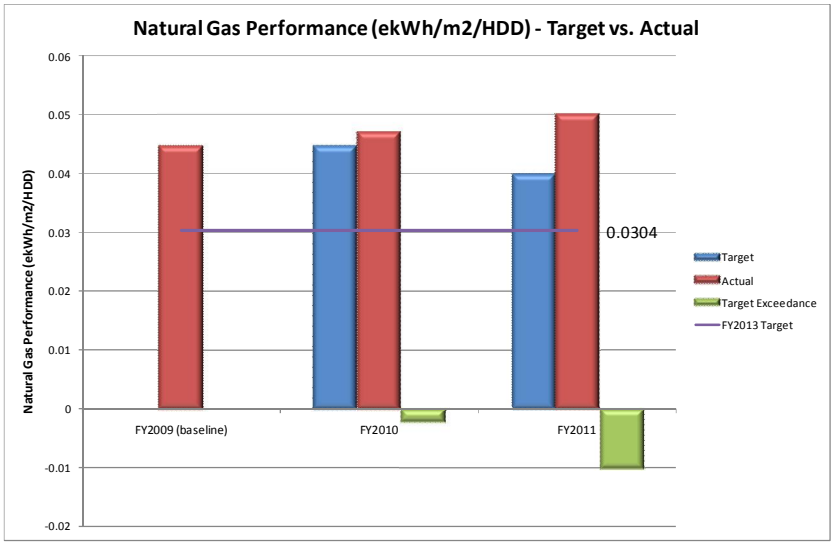


FIGURE 8: AGGREGATE PRINCE GEORGE CAMPUS ELECTRICITY AND NATURAL GAS TARGET TRACKING

3. FY2011 ACTIVITY SUMMARY

CNC took great strides in FY2011 toward engraining an energy conservation culture in its operations, policies, and procedures. This section summarizes capital- and non-capital projects and initiatives that were undertaken in FY2011. In most cases, work will continue to move these activities to completion in FY2012 and beyond.

3.1 Capital Projects and Initiatives

CNC's Information Technology department completed two projects in FY2011 that will incur ongoing electricity savings: 54 servers were virtualized with expected savings of 90,000 kWh/year ($6,000/year) and 60 Power Save software licenses were installed with expected savings of 10,000 kWh/year ($700/year).

The cafeteria servery was renovated during the summer of 2010. The renovation included an energy-efficient lighting retrofit and an Energy Star dishwasher upgrade.

Late in December 2010, a lighting retrofit project was initiated to replace inefficient T12 fluorescent lighting in 20 classrooms with occupancy-controlled, energy-efficient, T8 fluorescent lighting. The retrofit was completed in early April 2011 and is expected to save over 92,000 kWh/year ($6,150/year) in consumption and up to 330 kW/year ($2,650/year) in demand. Valued at approximately $46,000, the project is co-funded by CNC, BC Hydro, and Natural Resources Canada.

In January 2011, CNC received 100% provincial government funding approval for a solar water heating system that will be installed on the Student Residence. The system will supplement the Residence's domestic hot water system and is expected to displace 134 GJ/year natural gas ($1,600 including avoided carbon emissions offset payments). The system will demonstrate CNC's leadership in supporting clean, renewable energy sources and will provide Trades Program educational opportunities. The system will be operational by the end of August 2011.

In February 2011 the roof-top unit (RTU) that delivers space heating and space cooling to the classrooms in the Nicholson Building failed. A high-efficiency unit was installed in March 2011. The new RTU is expected to improve seasonal cooling efficiency by approximately 40% over the 12-year old failed unit and by approximately 24% over a standard efficiency unit. Also, in late April 2011 CNC installed programmable thermostats on all existing building space heating equipment (radiant gas heaters, two furnaces, and one make-up air unit). This is expected to significantly improve this building's natural gas consumption performance.

CNC's Main Campus library is lit with more than 400, 2-lamp T8 fluorescent fixtures. Ballasts in these fixtures are not well-suited to the application and as a result, lamps have prematurely failed since the system was installed. Suitable replacement ballasts have been identified and CNC will conduct a pilot test to evaluate light output using these ballasts with 28W long life and 28W extra-long life lamps. If the test is successful, CNC will begin replacing the existing ballasts with the new ballasts and the lower wattage lamps as lamps currently in place fail. Once completely retrofit, the new system is expected to

save almost 47,000 kWh/year in consumption ($3,100 /year) and up to 9.3 kW in demand ($900/year). The longer-life lamps will also result in significant labour savings associated with lamp replacement.

In September 2011, CNC will begin offering a Medical Radiography (Med Rad) program. Two existing rooms (3-221 and 3-224) in 200 Block are currently being renovated for this purpose. Recognizing that X-ray equipment associated with the program will increase Main Campus electricity consumption and demand, CNC required during the service procurement process that energy efficiency be built into the design for Med Rad mechanical and lighting systems. An energy-efficient roof-top unit will be installed with variable speed controls and an air-side economizer that will allow the system to operate in free cooling mode[3]. Design simulations show that equipping the unit with an economizer will mean that it will operate in free cooling mode to deliver the vast majority of space cooling demand; mechanical cooling will be required for only a very small percentage of the time. Inefficient T12 fluorescent lighting in the area will be upgraded to occupancy-controlled, dimmable, energy-efficient, T8 fluorescents. Annual lighting savings for this retrofit are estimated at approximately $350 in consumption (5,300 kWh/year) and up to $180 in demand (1.8 kW).

3.2 Non-Capital Projects and Initiatives - Operations

From May until August 2010, the Main Campus gymnasium was closed for use: the air handling unit was shut down, lighting turned off, and the hot water boiler temporarily taken out of service. This initiative saved an estimated 78,000 kWh ($3,100) over the four-month period and is expected to be repeated to some degree in FY2012.

Most of the common areas on the Prince George Main Campus are lit by manually-controlled, inefficient T12 fluorescent lighting. This common area lighting burned virtually 24 hours per day, 365 days per year until late June 2010 at which time a daily manual common area lighting shut-down procedure was put in place. Since that time, Security staff manually turns off switchable common area lighting in areas with good daylighting during the day and in all switchable common areas each evening as activity in the building wanes (usually between 9:00 PM and 10:00PM on weekdays; earlier on weekends). This ongoing initiative is expected to save approximately 84,000 kWh/year ($5,600/year[4]).

During July and August 2010, access was restricted to computer labs and classrooms that were not scheduled for Intersession classes. Lights and electronic equipment was turned off, thermostat settings were increased (to avoid unnecessary cooling), blinds were drawn (to minimize solar gain), and doors were locked. This initiative saved an estimated 35,400 kWh ($1,400) over the two-month period and is expected to be repeated in FY2012.

BC Hydro's Continuous Optimization program is aimed at ensuring that buildings that are currently operating efficiently continue to do so over time. Through the program, BC Hydro funds a Service Provider to identify efficiency improvement opportunities in the building and an Enterprise Energy Management (EEM) software service, which will analyze real-time building energy consumption data and immediately alert the building operator of anomalous consumption.

[3] When outside air temperatures are sufficiently cool and dry, outside air can be used to cool an indoor space rather than relying on energy-intensive mechanical systems to deliver this cooling.
[4] Using new BC Hydro Large General Service Part 2 rate of $0.0668/kWh

In September 2010, the Brink Building was accepted into BC Hydro's Continuous Optimization program. Enersolv Design + Build Ltd. (Vancouver) began its work as Service Provider in December 2010 and conducted a site visit in January 2011. In May 2011, Enersolv's Master List of Findings was submitted to and approved by BC Hydro. In executing the BC Hydro Continuous Optimization Agreement, CNC has committed to implementing energy efficiency upgrades as identified by Enersolv and with a bundled simple payback of less than two years up to a total value of $15,000.

CNC selected Pulse Energy Inc. (Vancouver) as EEM software provider. BC Hydro and Fortis BC revenue meters have been upgraded to pulse output meters. CNC expects that they will have internet connections installed at the two meters in July 2011 to allow Pulse to begin energy consumption baseline monitoring. During the several-month baseline monitoring period, the Pulse system will collect electricity, natural gas, and weather data to develop a predictive model for Brink Building energy consumption. Pulse will build alarms into the model that will alert the CNC building operator when out of tolerance energy consumption conditions arise. These real-time alerts will allow the operator to investigate and correct the causes of conditions that might otherwise have gone unnoticed until utility bills were received and analyzed, or have gone unnoticed altogether. BC Hydro covers the EEM software licensing fees for five years.

The Student Residence began a "cold water only" laundry initiative in late November 2010 by disconnecting hot water lines serving the four Residence washing machines. Information regarding warm and hot water laundry usage prior to the launch was not available, so natural gas savings estimates have not been completed. Natural gas savings will be estimated from weather- and occupancy-normalized changes in total natural gas consumption for the Residence.

The 100 horsepower make-up air unit in the 800 Block Welding Shop consumes large volumes of natural gas to heat the air it supplies to the shop. In December 2010, members of the Energy Executive met with campus operations and welding faculty to discuss options for reducing natural gas consumption in the area. As a result of these discussions, alterations were made to the make-up air unit controls to allow operation at lower temperatures and faculty agreed to be more vigilant about keeping shop bay doors closed during the winter months. Main Campus natural gas usage is being tracked to estimate the savings realized through this initiative.

Energy consumed by air handling unit (AHU) fans can be significantly reduced by cleaning AHU heating and cooling coils to allow air to pass through them with less resistance to flow. Nalco Canada (Richmond, BC) provides a proprietary coil cleaning service under a BC Hydro-funded program. Nalco visited CNC in Mach 2011 to collect data to estimated energy savings that could be expected through cleaning CNC's AHU coils. In June 2011 Nalco submitted a CNC coil cleaning proposal to BC Hydro that was used to estimate the BC Hydro funding incentive for completing the work. BC Hydro accepted the proposal in July 2011 and committed 51% of the $13,750 project costs. The project is expected to save 62,000 kWh/year (approximately $4,100) and yields a 1.6 year simple payback. CNC is currently considering the project for implementation.

CNC has submitted applications for the Main Campus and Brink building to participate in Fortis BC's building audit initiative designed to identify natural gas savings opportunities. The audits have been completed and CNC currently awaits the reports.

3.3 Non-Capital Projects and Initiatives – Policies & Procedures

CNC recognizes that aligning policies and procedures with energy management objectives is integral in ensuring that an energy conservation culture becomes engrained within College practices. To move toward this goal, CNC undertook several initiatives in FY2011 as described below.

Goods and services purchased today can impact CNC's energy consumption long into the future. With this understanding, CNC began reviewing and amending as necessary current procurement policies and procedures. This included developing RFP language to ensure that long-term energy consumption was considered in the designs of Med Rad and classroom lighting retrofit projects. This work will continue to evolve in FY2012 and will include formalizing already existing practices of purchasing energy efficient equipment (e.g. Energy Star purchasing policy).

In FY2011, work was initiated with the Human Resources department to identify jobs within the College with strong links to energy consumption. In FY2012, work with Human Resources will continue to include energy conservation language and expectations in the job descriptions and performance evaluation criteria for these positions. As an example, consider CNC's Power Plant Supervisor who is responsible for Power Plant and building systems operation. Arguably, this is the role that is most closely linked to energy consumption within the organization. In early May 2011 the position was vacated. CNC's Energy Manager worked closely with staff to ensure that energy conservation played a significant role in the job description for the Power Plant Supervisor's replacement.

CNC has a comprehensive preventative maintenance program in place. Work began in FY2011 and will continue in FY2012 to compare existing program details to industry best practices to ensure each major type of energy consuming equipment is maintained at peak energy efficiency.

3.4 Non-Capital Projects and Initiatives – Communications & Reporting

Communicating Energy Management Program targets, objectives, and achievements to all levels of the organization is important to raise energy conservation awareness and gain buy-in from all stakeholders. In FY2011 formal communication was generally limited to the Energy Executive in Quarterly BC Hydro Presentations. Presentations on a more *ad hoc* basis were also given to Regional Managers and Prince George Operations staff. With CNC's recent commitment to allocate funding toward energy efficiency projects, new energy efficiency projects will kick off early in FY2012. This will provide an opportunity to more formally roll out the Energy Management Program to all stakeholders: faculty, staff, the student body, and the community. This will involve completing communications and reporting work that began in FY2011 including developing an Energy Management page on CNC's website, scheduling quarterly Operations meetings and semi-annual Regional Management presentations. A list of stakeholders is provided as Appendix A.

CNC recognizes that engaging the student body is very important in developing an energy conservation / sustainability culture on campus. Attempts to form a CNC Green Team both in 2009 and 2010 were challenging. A Green Team comprising predominantly students but also faculty and staff was formed in FY2011 with the mandate of raising awareness around environmental issues such as energy conservation, recycling, and long-term sustainability. CNC will endeavour to reassemble the Green Team when classes resume in September 2011.

3.5 Energy, Cost, and Carbon Emissions Tracking

Table 8 provides a summary of projects and initiatives that have been completed since the Energy Management Program began in December 2008. Estimated accrued energy consumption savings, avoided carbon emissions, and avoided costs are also provided.

From FY2010 to FY2011 estimated consumption savings have increased by 280%, avoided costs have increased by 400%, and avoided greenhouse gas (GHG) emissions have increased by 139%. Aligning CNC's HVAC system operation schedules to the College's holiday schedule has realized the highest accrued savings at approximately $8,570 as of the end FY2011. In total, the Energy Management Program avoided approximately $27,900 in energy and carbon emissions offset payments and 52.2 tonnes of carbon dioxide equivalent emissions.

TABLE 8: ESTIMATED ENERGY MANAGEMENT PROGRAM ENERGY SAVINGS, GHG EMISSIONS REDUCTIONS, AND AVOIDED COSTS (ACCRUED)

Project Name+	Estimated Annual Energy Savings		Start Date	Estimated Accrued Energy Savings (ekWh)			Estimated Avoided Consumption Cost ($)			Estimated Avoided GHG Emissions (T CO2e +)			Estimated Avoided Carbon Offset Cost ($)			Total Avoided Cost ($)		
	Electricity (kWh)	Natural Gas (GJ)		FY10	FY11	TOTAL	FY10	FY11	TOTAL	FY10	FY11	TOTAL	FY10	FY11	TOTAL	FY10	FY11	TOTAL
5.3.6 - Holiday Scheduling	24,519	332	Dec-09	58,371	116,741	175,112	$ 2,351	$ 5,786	$ 8,137	8.62	17.24	25.86	$ -	$ 431	$ 431	$ 2,351	$ 6,217	$ 8,568
5.3.8 - Align Operating Hours of AHU-720	20593	115	01-Nov-09	29,187	52,537	81,725	$ 1,305	$ 2,701	$ 4,006	3.49	6.29	9.78	$ 52	$ 157	$ 210	$ 1,357	$ 2,858	$ 4,216
Server Virtualisation	90,000		Mar-10	750	63,750	64,500	$ 45	$ 3,673	$ 3,718	0.02	1.66	1.68	$ 0	$ 41	$ 42	$ 45	$ 3,714	$ 3,760
Daily Manual Common Area Lighting Shutdown	84000	-	Jun-10	-	63,000	63,000	$ -	$ 3,630	$ 3,630	0.00	1.64	1.64	$ -	$ 41	$ 41	$ -	$ 3,671	$ 3,671
5.3.1 - Brink Classroom 1031 RT	0	76	03-Sep-09	16,420	21,111	37,531	$ 578	$ 1,001	$ 1,579	2.96	3.80	6.76	$ 32	$ 95	$ 127	$ 609	$ 1,096	$ 1,705
5.4.9 - Gym Lighting Upgrade	22,850	-	01-Feb-10	3,808	22,850	26,658	$ 227	$ 1,317	$ 1,543	0.10	0.59	0.69	$ 2	$ 15	$ 17	$ 229	$ 1,331	$ 1,560
Summer Gym Closure	26,000	-	May-10	-	26,000	26,000	$ -	$ 1,498	$ 1,498	0.00	0.68	0.68	$ -	$ 17	$ 17	$ -	$ 1,515	$ 1,515
5.3.2 - Full Recirculation in Unoccupied Cold Weather	0	66	Jun-10	-	18,333	18,333	$ -	$ 869	$ 869	0.00	3.30	3.30	$ -	$ 83	$ 83	$ -	$ 952	$ 952
Computer Lab Access Restrictions	35,400	-	01-Jun-10	-	17,700	17,700	$ -	$ 1,020	$ 1,020	0.00	0.46	0.46	$ -	$ 12	$ 12	$ -	$ 1,031	$ 1,031
Power Saver Software	10,000	-	Apr-10	-	10,000	10,000	$ -	$ 576	$ 576	0.00	0.26	0.26	$ -	$ 7	$ 7	$ -	$ 583	$ 583
5.3.11 - Insulate Domestic HW Piping	-	17	Jan-10	1,181	4,722	5,903	$ 42	$ 224	$ 265	0.21	0.85	1.06	$ 5	$ 21	$ 27	$ 47	$ 245	$ 292
			TOTAL	109,717	416,745	526,462	$ 4,547	$ 22,294	$ 26,841	15.40	36.76	52.16	$ 92	$ 919	$ 1,011	$ 4,639	$ 23,213	$ 27,852

+ - numeric section references to 2008 Detailed Energy Audit sections provided where applicable

+ - T CO2e - tonnes carbon dioxide equivalent as per Emissions Factors for Use in Reporting Public Sector Greenhouse Gas Emissions, Version 2.0, 15 September 2009

4. FY2012 STRATEGIC ENERGY MANAGEMENT STRATEGY

In addition to completing the projects currently underway as just discussed, CNC's FY2012 Energy Management Strategy will focus on six areas:

- Energy efficiency projects
- Capital projects with energy efficiency opportunities
- Major Capital Projects
- Non-capital initiatives
- Program expansion to regional campuses
- Revolving fund

Foreseeable opportunities and strategies for each of these areas are discussed below.

4.1 Energy Efficiency Projects

In November 2008, a Detailed Energy Audit Report was completed by Prism Engineering. The energy audit highlighted energy conservation opportunities in CNC-owned buildings: Main Campus (including, to some extent the Student Residence) and the Brink Building. The Nicholson Building was not included in the energy audit. Several of the energy efficiency opportunities that Prism recommended have already been implemented (see Table 8). Those that have not yet been implemented and are still valid (800 Block recommendations are no longer considered valid as this building will be demolished in 2011) have been prioritized according to their estimated net present value (NPV) as summarized in Table 9.

TABLE 9: PRIORITIZED FY2012 ENERGY EFFICIENCY PROJECTS

Report Section Reference*	Project Name	Project Life (yr)	2011 Capital Cost ($)	Estimated Funding+ ($)	Annual Savings ($)	NPV ($)	IRR (%)	Return on Investment Annual (%)	Return on Investment Project (%)	Simple Payback++ (yr)
5.2.1	Non-Classroom T12 Opportunities	15	$ 290,191	$ 110,726	$ 21,307	$180,124	16.6%	7.3%	10%	8.4
5.4.2	Change VIV to VSD	20	$ 131,929	$ 53,412	$ 10,278	$147,111	19.9%	7.8%	56%	7.6
5.3.7	Reduce Ventilation for Cafeteria and Kitchen	20	$ 61,771	$ 11,344	$ 6,112	$64,296	16.5%	9.9%	98%	8.3
5.3.9	Zone isolation for block 700 first floor***	20	$ 9,802	$ 739	$ 1,337	$14,373	18.9%	13.6%	173%	6.8
5.2.1	Remaining T12 Classrooms	15	$ 82,884	$ 18,747	$ 3,608	($3,253)	5.3%	4.4%	-35%	17.8
5.3.10	Demand Control Ventilation in Gymnasium***	20	$ 10,454	$ -	$ 344	($4,597)	0.5%	3.3%	-34%	30.3
5.4.1	Standby Mode for Brink RTUs***	20	$ 15,013	$ 817	$ 512	($4,706)	2.1%	3.4%	-32%	27.7
5.4.5	Theater isolation***	20	$ 20,705	$ 2,006	$ 709	($4,735)	3.1%	3.4%	-32%	26.4
	BUNDLE SUMMARY		**$622,749**	**$197,791**	**$44,208**	**$388,613**				**9.6**

Notes:

* - Detailed Energy Audit Report Update, November 2008, Prism Engineering Ltd.

** - reported capital cost inflated to 2011 at 5% per annum

*** - costs per Johnson Controls RFQ # 10-016, 20 October, 2010

+ - funding has not been confirmed/secured

++ - after incentives

( ) - negative value

CNC has allocated $300,000 of the FY2012 Annual Capital Allowance (ACA) to undertake energy efficiency projects this fiscal year. Due to the 2012 phase-out of T12 lamps, the majority of this budget will go toward lighting upgrades. Through an RFP process, CNC will engage a consultant with experience in post-secondary/institutional energy efficient lighting design. CNC will work with that consultant to develop a campus lighting strategy and design to best utilize the allocated budget. The strategy will be aimed at improving lighting efficiency and controls across the Main Campus and is expected to be completed in phases beyond FY2012. The plan will also address T12 lighting in Regional Campuses.

In addition to projects identified in Table 9, CNC will priorities key buildings/departments for electricity and natural gas sub-metering. This initiative is discussed in more detail in Section 4.4.

4.2 Capital Projects with Energy Efficiency Opportunities

CNC maintains a prioritized list of capital projects that guides ACA spending. Many of these projects have links to CNC's energy consumption. Table 10 provides a summary of such projects that have been identified to date.

TABLE 10: ACA CAPITAL PROJECTS WITH ENERGY EFFICIENCY OPPORTUNITIES

	Project Description	Campus	Priority*		Project Description	Campus	Priority*
1	IT upgrades (thin client, printer consolidation)	All	H	17	Replace 15 mini fridges	PG Residence	H
2	Replace heating elements & resurface loading dock ramp	PG	H	18	Replace eight microwaves	PG Residence	H
3	Replace front entrance doors	PG	H	19	LD Campus roof replacement	Lakes	H
4	100 Block mechanical upgrades	PG	H	20	Parking lot lighting replacement	Lakes, PG	H
5	Power Plant upgrade	PG	H	21	HVAC upgrades	Most	H
6	Synchronized clock system	PG	H	22	Quesnel Phase 2	Quesnel	H
7	Classroom renovation	PG	H	23	Roofing replacement	All	M
8	Parking lot 'C' expansion	PG	H	24	Miscellaneous renovations	All	M
9	Replace one of two furnaces	PG Residence	H	25	Master site development plan	PG	M
10	Replace one of four domestic hot water tanks	PG Residence	H	26	Front entrance expansion	PG	M
11	Install new window coverings in lounge	PG Residence	H	27	Washroom upgrades	PG	M/H
12	Install new window coverings in rooms	PG Residence	H	28	Fort St. James renovation	FSJ	M
13	Replace five windows	PG Residence	H	29	Exterior envelope replacement	Nech	M
14	Replace five doors	PG Residence	H	30	HR renovation	PG	L
15	Reshingle roof - assess insulation	PG Residence	H	31	Boardroom renovation	PG	L
16	Install low-flow showerheads	PG Residence	H	32	Dental office space expansion	PG	L

Notes:
* - H: high; M: medium; L:low

CNC will ensure that long-term energy consumption is considered as each of these ACA-funded projects proceeds.

4.3 Major Capital Projects

CNC often undertakes Major Capital Projects that are not funded through the ACA. Examples of these projects that are currently underway include construction of Price George and Quesnel Technical Education Centres (TEC) and Med Rad. In May 2011, CNC applied to the Provincial Government for $1.2 million funding to upgrade the Prince George Power Plant and peripheral HVAC systems/controls. This project represents the largest energy conservation opportunity for the College and will be integral in meeting the FY2013 natural gas reduction targets. If the project proceeds, CNC will ensure that energy efficiency forms the cornerstone for all related system designs.

4.4 Non-Capital Initiatives

All non-capital initiatives – operations, policies & procedures, communications & reporting – discussed in section FY2011 Activity Summary that began in FY2011 but were not completed, will continue into FY2012. Additionally, the following scope of work has been developed that will address the five Critical

Areas identified in CNC's Energy Management Assessment Final Report & Action Plan (December 2010) Plans for each Critical Area (CA) are provided here. Quoted references are taken from the EMA report.

CA1: Policy

"Update conservation goals in energy policy to accurately reflect available funding and resources. Establish regular reviews of performance against energy policy goals."

Once ACA funding has been announced and budgets have been set, energy efficiency and other capital projects will be selected for completion in FY2012. At that time, CNC will:

- Adjust FY2012 energy reduction targets presented in the Draft FY2012 Strategic Energy Management Plan (SEMP);
- Finalize the FY2012 SEMP (this version);
- Draft package to be used by CNC Communications Department to launch Energy Management Program to the organization;
- Develop and implement a formal, stakeholder-specific reporting structure for the Prince George Campus that will track performance against targets; and
- Investigate additional Key Performance Indicators such as classroom hours and incorporate into reporting structure as required.

CA2: Targets / Reporting

"Continue participation in BC Hydro Continuous Optimization Program as initial approach to increasing interval energy metering capabilities. Set energy intensity parameters and consumption reduction targets for all key departments that cascade up to the overall annual reduction target. Proactively deliver regular energy intensity reports to department personnel for use in examining variances from established targets."

In September 2010, the Brink Building was accepted into BC Hydro's Continuous Optimization Program. This project will continue for several years. In order to set department-specific targets and monitor performance toward meeting those targets, identification and sub-metering of those departments will be required. To meet CA2 recommendations, CNC will:

- Continue to participate in BC Hydro's Continuous Optimization Program for the Brink Building;
- Identify and priorities buildings/departments for sub-metering and define which will be sub-metered in FY2012;
- Execute the FY2012 sub-metering plan including integration with the Brink Energy Management Information System where possible; and
- As areas are sub-metered, begin to establish processes and procedures for building/department baselining, target-setting, monitoring, response, reporting, and communications.

CA3: Plans / Actions

"Develop energy conservation plans that correlate potential savings from both capital projects and organizational/behavioural initiatives to the established consumption reduction targets, commensurate with available funding levels."

As discussed in C1 Policy, this version finalizes the FY2012 SEMP thus setting FY2012 energy efficiency budget and identifying lighting as the major project for completion in FY2012. In FY2012 Quarter 4, CNC will deliver a Draft FY2013 SEMP.

Several initiatives began in 2010 aimed at aligning CNC business practices with energy management objectives. During 2011, CNC will continue to develop these initiatives which include:

- Working with the Purchasing Department to amend the existing Purchasing Policy to include guidelines for purchasing energy consuming equipment and services (e.g. Energy Star™ purchasing policy, guidelines for purchasing equipment for which Energy Star™ options do not exist);
- Working with the Purchasing Department and project teams to ensure that language is included in purchase documentation (RFPs, RFQs, tenders, service contracts, etc.) that requires life cycle energy consumption to be considered in evaluating equipment specifications and project designs;
- Working with the Human Resources department to include energy conservation language and expectations in the job descriptions and performance evaluation criteria for jobs within the College with strong links to energy consumption; and
- Working with the Facilities Department review and provide recommendations where applicable to amend the existing preventative maintenance program to ensure that each major type of energy consuming equipment is maintained at peak energy efficiency in accordance with industry best practices.

CA4: Teams / Committees

"Establish departmental energy coordinators and leverage "green teams" to improve broader participation in the energy conservation program. Create check-lists to be used for conducting walkabouts to identify energy-saving opportunities or ensure compliance with established procedures."

The CNC Energy Manager is responsible for identification and implementation of individual technical "projects" and coordination of the overall Energy Management Program. Successfully fulfilling these responsibilities will require the active participation of CNC personnel and senior management support. Senior management will need to clearly communicate that each department will need to be involved in meeting the established targets with regards to behavioural and operational issues and charged with taking the necessary corrective actions on a day-to-day basis to ensure that the prescribed expectations are met. Identifying and working with departmental coordinators will be critical to developing, communicating, and achieving departmental targets. To meet CA4 requirements, CNC will:

- Work with the Communications Department and Executive to reinforce the role of the Energy Manager;
- As part of the sub-metering plan (CA2 Targets / Reporting), identify coordinators in each department/area with strong energy links;
- Work with these coordinators and other CNC staff to begin to set department-specific targets, communicate performance, and lead energy conservation initiatives in their respective departments;
- Work with CNC Communications Department to communicate departmental coordinators' participation in the program to the rest of the organization; and
- Provide support to the CNC Green Team upon request.

CA5: Employee Awareness / Training

"Ensure more effective communication of the energy policy to the broader organizational stakeholders and utilize available energy usage data in a meaningful format to raise employee energy awareness in general."

CNC established its Energy Policy in December 2009. During FY2012 CNC will develop and implement a Communications Plan that will disseminate the Energy Policy and ongoing energy performance tracking to all stakeholder groups. The preliminary framework presented below will serve as a starting point for developing the Communications Plan.

TABLE 11: PRELIMINARY COMMUNICATIONS FRAMEWORK

STAKEHOLDER GROUP	CONTENT	METHOD	FREQUENCY
Upper Management	Detailed by Campus and meter	Presentation	Quarterly
	Detailed by Campus and meter	SEMP	Annual
	Detailed by Campus and meter	EA web Portal	Continuous
Regional Management	Detailed by meter	Presentation	Semi-annual
	Detailed by Campus and meter	SEMP	Annual
	Detailed by Campus and meter	EA web Portal	Continuous
Operations	Detailed by meter	CUSUM report	Monthly
	Detailed by meter	SEMP excerpt	Annual
	Detailed by meter	Presentation	Quarterly
	Detailed by meter	EA web Portal	Continuous
Faculty - General	General update	Presentation	Semi-annual
	General update	CNC Sustainability / Energy Management web page	Quarterly
Staff - General	General update	CNC Sustainability / Energy Management web page	Quarterly
	Behavioural	Awareness campaign	Annual
Student Body - General	General update	CNC Sustainability / Energy Management web page	Quarterly
Faculty - Targeted (high energy)	Detailed by sub-meter	CUSUM report	Monthly
	Detailed by sub-meter	Presentation	Semi-annual
Staff - Targeted (champions)	Detailed by meter	CUSUM report	Quarterly
Student Body - Targeted (high ene	Detailed by sub-meter	Bulletin board posting	Monthly
	Detailed by sub-meter	Presentation	Semi-annual
Community	Detailed	Media release	Project- / Inititiative-specific

CNC will also identify current contractors/vendors that provide energy intensive services and ensure that these contractors/vendors understand CNC's energy policy and CNC's expectations for conforming to it.

4.5 Program Expansion to Regional Campuses

As shown in Figure 9 Prince George Campus accounts for approximately 80% of CNC's total energy consumption and has therefore been the focus of CNC's energy management strategy thus far. In FY2012, the program will be extended to the regional campuses and will include:

- Conducting walkthrough energy audits of all metered regional facilities to identify energy conservation opportunities;
- Benchmarking energy consumption in all metered regional facilities for comparison to Prince George Campus; and
- Developing regular reporting to regional campuses including training regional campus management to access the Energy Advantage Web Portal.

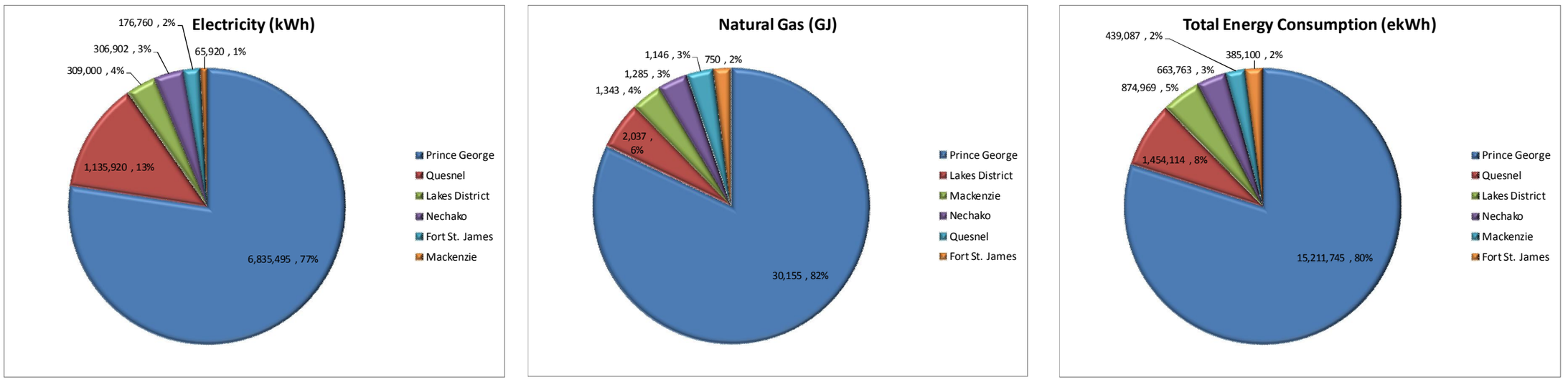


FIGURE 9: ENERGY CONSUMPTION PERCENTAGE BREAKDOWN BY CAMPUS – CALENDAR 2010

4.6 Revolving Fund

CNC anticipates that ACA budgets will continue to be modest for the foreseeable future. Recognizing that this could limit the ability of the College to implement non-essential energy conservation projects, in FY2012 CNC will investigate the feasibility of establishing an energy conservation project revolving fund. In principle, the fund would establish a process whereby full or partial verifiable savings from energy projects would be banked to fund – either fully or partially – future energy conservation projects.

APPENDIX A – LIST OF STAKEHOLDERS

STAKEHOLDER GROUP	MEMBERS / CONTACTS		
Institutional Board	Ray Gerow	Peggy Botrakoff	Keith Playfair
	Robert Murray	Jessica Cave	Martin Pudlas
	Linda Smerychynski	Jack Page	Melinda Worfolk
	Claudia Blair	Stacy Dingman	Jim Hoyer
	David Rourke	Beverley Haluschak	John Bowman
Energy Executive	John Bowman	Penny Fahlman	Jim Hoyer
	Burke Gulbranson	Randall Heidt	George Friedrich
Energy Committee (Operations)	Jim Hoyer	Jeff Shaw	Larry Kabatoff
	Burke Gulbranson	Dennis McFadyen	Cliff Flavel
	George Friedrich	Cody Elliott	
Facilities Project Staff	Jim Hoyer	Burke Gulbranson	Theo Mushumanski
	Randy Chencharik		
Regional Management	Ann McCormick (Fort St. James)	Doug Larsen (Quesnel)	Trish Davidson (Mackenzie)
	Joan Ragsdale (Lakes District)	Maureen Mallais (Nechako)	Sandra Craig (Valemount)
Faculty - General	Contact(s) to be designated		
Faculty - Targeted (high energy)	Contact(s) to be designated		
Student Body - General (high energy)	Contact(s) to be designated		
Student Body - Targeted (high energy)	Contact(s) to be designated		
Communications	Randall Heidt		
Purchasing	Trish Bichon	Helene Rohn	
Human Resources	Michelle Woolf		
Community	television	radio	newspaper