

Strategic Energy Management Plan 2013



THOMPSON RIVERS
UNIVERSITY



Prepared By James Gudjonson
September 2013

Senior Management Support:

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Section 1

Institution/Facility Profile



Section 1 - Institute Profile

Institute Name: Thompson Rivers University
Address: 900 McGill Road
Kamloops, British Columbia
V2C 5N3
Tel: (250) 828-5000
Fax: (250) 828-5086

1.1 Key Personnel

Key Executive:	<u>Matt Milovick</u>	Title:	<u>VP Administration & Finance</u>
Telephone	<u>250- 828-5011</u>	E-mail:	<u>mmilovick@tru.ca</u>
Key contact:	<u>James Gudjonson</u>	Title:	<u>Interim Director, Office of Environment & Sustainability</u>
Telephone:	<u>(250) 852-7253</u>	E-mail:	<u>jugudjonson@tru.ca</u>

1.2 Institute Survey

Date Institute Formed:	<u>1970</u>	Institute Fiscal Year Dates:	<u>April 1-March 31</u>
Total Area (m ²):	<u>92,173.19</u>	% Total Area heated:	<u>98%</u>
Number of Campuses:	<u>2</u>	Number of Buildings:	<u>30</u>
Name of Campuses	<u>Kamloops (29)</u>	Number of Buildings <10 years old:	<u>6</u>
(#of Buildings):	<u>Williams Lake (1)</u>	Number of Buildings 10-25 years old:	<u>7</u>
		Number of Buildings 25-40 years old:	<u>9</u>
		Number of Buildings over 40 years old:	<u>8</u>
Number of Employees:	<u>1725</u>	Number of Full Time Students:	<u>6,411</u>
Number of Students (on campus):	<u>13,170</u>	Number of Part Time Students:	<u>6,661</u>
		Full Time Equivalents (FTE):	<u></u>

Primary Facility Profile					
Building Code	Building Name	Year Built	Size (m ²)	Additions (size/year)	BEPI (KWhs/per sqf)
AE	Arts and Education	1991	5,661.62		14.52
AHT	Animal Health Technology	2002	1,180.66		12.51
CAC	Campus Activity Centre	1992	6,413.48	500/2012	21.27
CT	Clock Tower	1990	2,976.30		10
G	Gymnasium	1980	3,703.59		10.64
IB	International Building	2005	4,586.69		15.05
HOL	House of Learning	2011	6,552.7		14.28
LIB	Library	1975	3,350.64		8.75
OM	Old Main	1970	19,814.14	4500/2013	11.93
S	Science	1980	10,326.14		10.07
TT	Trades and Technology	1997	10,326.46		8.2
TOTAL AREA- average BEPI			79892.42	5000	AVG = 12.5

1.2.1 Facility Profile

Table 1. Summary of Primary Facilities

For campus map see appendix A, page 23



Secondary Facility Profile				
Building Code	Building Name	Year Built	Size (m ²)	BEPI
BCCOL	BC Centre for Online Learning	2007	4,334.81	28.83
CATC	Culinary Arts	1970	1,858.87	22.9
CS	Chemical Storage	1970	34.80	
DAY	Daycare	1993	441.90	
ED	Electrical Distribution Shed	1970	147.50	
FAA***	Faculty Annex A	1971	***571.33	
FB	Facilities Annex	1973	92.02	
FSS	Human Resources	1970	*543.56	
H01	House 1- Faculty Association	1945	128.90	
H02	House2- OMEGA Student Newspaper	1945	***138.60	
H04***	House4-	1945	134.20	
H05*	House 5- Aboriginal Cultural Centre	1945	138.50	
H06*	House 6- Research Centre	1945	161.00	
H07*	House 7- Research Centre	1945	175.50	
H08*	House 8- Radio Station	1945	130.80	
H09*	House 9- Foundation/ Alumni	1945	267.18	
H10*	House 10- Horticulture	1945	*346.39	
HS*	Horticulture	1985	*326.90	
MDC	Materials Distribution Centre	2006	1,689.94	10.09
TTO	Trades Storage (no heating)	1997	1,184.00	
WS	Weather Station	2005	144.00	
BEPI	Average- secondary buildings (EkWh/per sqf)		**40.23	
TOTAL AREA			11,348.16	

Table 2. Summary of Secondary Facilities

* Indicates meter has been recently installed or scheduled to be installed and BEPI will be established 2013 (meter data will be obtained through Pulse EMS system in summer 2013)

** Some buildings smaller than 1000 m² will not be sub-metered and will have an averaged BEPI

*** Buildings have been decommissioned

NOTE- BCCOL, CAC and CATC, the 3 buildings with the worst BEPI will be the focus of energy reduction projects for 2102-2013

Background Description

1.2.2 General

TRU has two main campuses. The primary campus is located at 900 McGill Road, Kamloops. The secondary campus is located at Western Avenue, Williams Lake. There are also several minor regional campuses at Clearwater, Barrier, Lillooet, and Ashcroft.

1.2.3 Facility Components

Lighting and Electrical Systems:

Interior lighting in the campus is primarily provided by fluorescent luminaries. Typically, buildings have utilized 34 W T12 lamps, which are now being replaced by 32 W T8 lamps. The T12 lamps are currently run by a mixture of standard efficiency and energy saving electromagnetic ballasts, and T8 lamps are run primarily by standard efficiency instant start electronic ballasts. The majority of interior lighting is manually turned on and off.

Fluorescent luminaries are complemented by incandescent and compact fluorescent lights. The Campus Activity Centre's lighting is also supplemented by neon tube lighting in the high ceiling atrium and for signage.

Exterior lighting is provided mainly by High Intensity Discharge (HID) lighting, primarily High Pressure Sodium. Exterior lighting is largely controlled by photocells, and operates an average of twelve hours per day throughout the year. HID's are also used in high ceiling areas such as the Library atrium, Trades building workshops and the Gymnasium, but these are mostly Metal Halide lamps.

Exit signs across campus are largely utilizing LED lamps, but a few use incandescent lamps, and must be replaced.

HVAC Systems:

Each building has an independent heating system that uses natural gas. Heating equipment varies in efficiency and age throughout the campus. Cooling is supplied by electric powered chillers and air conditioners (smaller buildings). A complete list of HVAC equipment is available in a central database.



1.2.4 Energy/Utility Supply

Utility	Vendor	Rate	In effect	Marginal Electricity (\$/kWh)	Marginal Demand (\$/kW)
Electricity	BC Hydro	1211	April 2010-2013	\$0.0426	\$8.66
Electricity	BC Hydro	1211	January 2011	Conservation Rate \$0.068	\$8.66

- Electricity for the institute is supplied through one account by BC Hydro at rate 1211. Table 3. Rates Used for Electricity Savings Estimates (Not Including HST)
- Natural gas is provided by Fortis BC also through one account at rate 5.

Utility	Source	Rate	In effect	(\$/GJ)
Natural Gas	Fortis BC	5	July 1, 2012	\$7.50
Carbon Tax	BC Government	na	2010-2012 average	\$1.50
Carbon Offset	BC Government	na	January 2011	\$1.25
Total				\$10.25

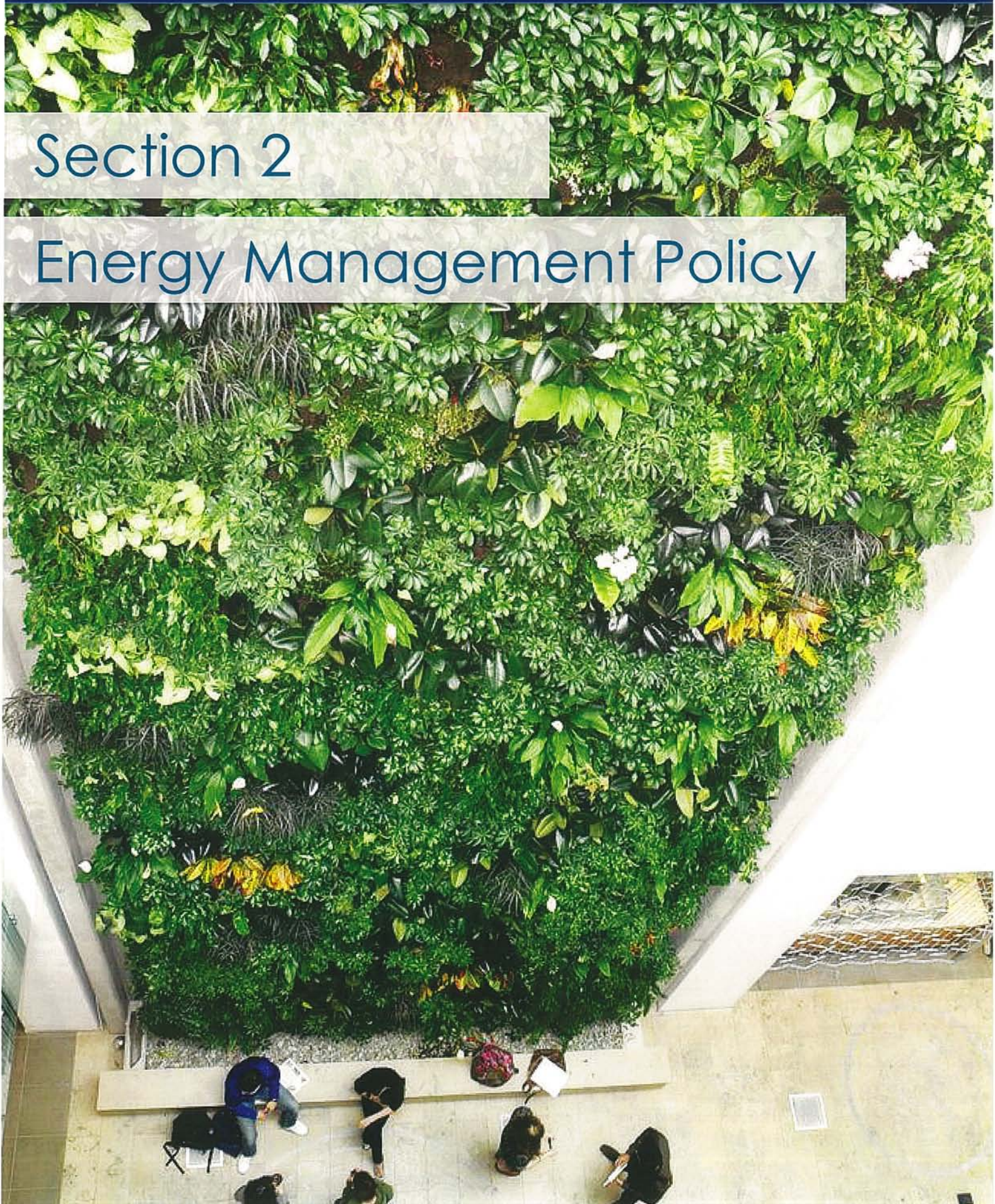
Table 4. Rates used for Gas Savings Estimates (Not Including HST)

1.2.5 Energy Metrics/Key Performance indicators

- A Building Energy Performance Index (BEPI) has been established for all buildings > than 1000 m² - Several buildings smaller than 1000 m² are scheduled to have meters installed and a BEPI by February 2013. Pulse software will allow for BEPI reports for 22 buildings (to be done monthly).
- An averaged BEPI has also been established for all (occupied) buildings on campus. The averaged BEPI will allow TRU to compare with other institutions (see figure 5, p.16). In addition the averaged BEPI will also factor in expansion and new buildings. New buildings will also be sub-metered to allow for comparison between buildings on campus
- A Student Energy Metric (SEM) has also been established. This metric allows for comparing energy usage relative to student hours during summer, fall and winter semesters. This is important information for institution planners as well as providing a metric that resonates with administration staff, for example; students during the summer months use 6 times the electrical energy (and cost) per hour compared with students in the fall due to less students + cooling loads occupying same space.

Section 2

Energy Management Policy



Section 2: Energy Management Policy

2.1 Commitment by Institute

One of Thompson Rivers University's seven founding principles is to be the University of Choice for Environmental Sustainability. According to TRU's Strategic Plan, TRU is committed to:

- Develop and expand programming and associated research activities in the areas of environmentally sustainable technologies, policy development, and environmentally and socially responsible economic development.
- Develop policies and best practices that support environmental stewardship and sustainability in the university's operations.
- Foster environmental literacy amongst students, staff, faculty and alumni, and cooperate with other community partners to increase environmental awareness.
- Encourage the development of partnerships with public and private sector organizations in support of environmental stewardship and sustainability.

In April of 2010 the president of TRU signed the Talloires Declaration¹ (TD), which has been signed by over 350 university presidents and chancellors in over 40 countries. Originally composed in 1990 at an international conference in Talloires, France, this is the first official statement made by university administrators of a commitment to environmental sustainability in higher education. The Talloires Declaration is a ten-point action plan for incorporating sustainability and environmental literacy in teaching, research, operations and outreach at colleges and universities.

¹ http://www.ulsf.org/programs_talloires.html

For TRU's sustainability policy see appendix B, page 24



2.2 Energy Management Objectives

TRU's commitment to effective energy management is guided by the following objectives:

- To reduce energy usage, greenhouse gas emissions and operating costs through a comprehensive energy management program.
- To reduce energy usage, greenhouse gas emissions and operating costs by implementing and improving upon:
 1. Sound operating and maintenance practices
 2. Institution wide "green" purchasing policies
 3. Incorporating energy efficiency into all new building designs
 4. Utilizing an effective monitoring and tracking system
- To reduce energy usage, greenhouse gas emissions and operating costs by implementing an effective behavioral change program.

2.3 Energy Management Targets/Budget (2012-2015)

The first year of energy management objectives included a Detailed Energy Audit (DEA) of the primary buildings on campus, and a preliminary energy audit of the secondary buildings. The results of the DEA indicated TRU's commitment to a 10 % reduction target in electrical and gas consumption was a realistic target for 2010-2011. The energy conservation project was completed in July of 2011 and the initial M&V reports indicate an 11-12% reduction was achieved.

The TRU energy reduction target for the period 2012-2016 is to achieve is an addition ~14% for a total reduction of 25% below baseline from 2010-2016.

Targets

Year	Reduction	Projects
2012-2013	6.6 % = 1 GWh	See table 4.1.2
2014	3.6% = .55 GWh	See table 4.1.3
2015	4% = .6 GWh	See table 4.1.3
2012-2015 (total)	14.2%	See tables 4.1.2- 4.1.3

Budgets

Department	Dates	Budget
Environment & Sustainability- Energy projects	2012	\$170,000 (projects completed)
Environment & Sustainability – Operating	2103	\$300,000
Environment & Sustainability – Energy Projects	2013	\$200,000 (not including VDI transfer project)
Environment & Sustainability – Energy Projects	*2014 (yearly base- energy revolving fund)	\$200,000
Facilities	2013	5.1 million
Maintenance	2013	2.4 million

*Revolving fund established in 2012 from savings generated after original retro-fit project, fund will top out at \$200,000K

2.4.1 Key Personnel

Planning Team		
Name	Title	Roles/Responsibility
Matt Milovick	VP Finance/Administration	Executive sponsor
James Gudjonson	Director (interim) Office of Environment & Sustainability	Energy Champion, Energy Manager
Les Tabata	Director, Facilities	Organization of in house staff and resources
Lincoln Chua	Manager, Facilities	Organization of electrical, HVAC technicians
Natalie Yao	Energy Specialist	Implement energy projects
Environment Advisory Committee	Energy Sub-committee- Revolving Fund	Review and evaluate energy projects funded through revolving fund

Table 5.a. Planning Team Description

2.4.2 External/Internal Stakeholders

Name	Title/Organization	Roles/Responsibility
Students	Student Environmental Advisory Group	Promote ongoing sustainability awareness campaign
Faculty/staff	Environmental Advisory Committee	Draft/present sustainability policy to board of governors
City/greater community	City of Kamloops	Work together towards energy reductions (district energy talks, waste heat recovery, transportation issues for students/staff)
BC Hydro Power Smart staff	BC Hydro	Provide support/resources to help TRU reduce energy
Climate Action Secretariat	BC Government	Draft policies, provide support to public sector to promote reduction in GHG emissions

Table 5. b. Stakeholders Description

Section 3

Energy Use and Costs

- 
- A vertical directory sign in a modern building lobby. The sign is white with black text and arrows pointing upwards. The background shows a blurred person walking through the lobby, which has a high ceiling and modern lighting.
- ↑ Washrooms
 - ↑ Elevators
 - ↑ Receiving
 - ↑ Security
 - ↑ South Lobby
 - ↑ Irving K. Barber BC Centre
 - ↑ First Nations Offices

Section 3- Energy Use and Costs

3.1 Energy Consumption

Table 6a. Comparison of Annual Energy Use with and without Energy Management Program (EKWh)

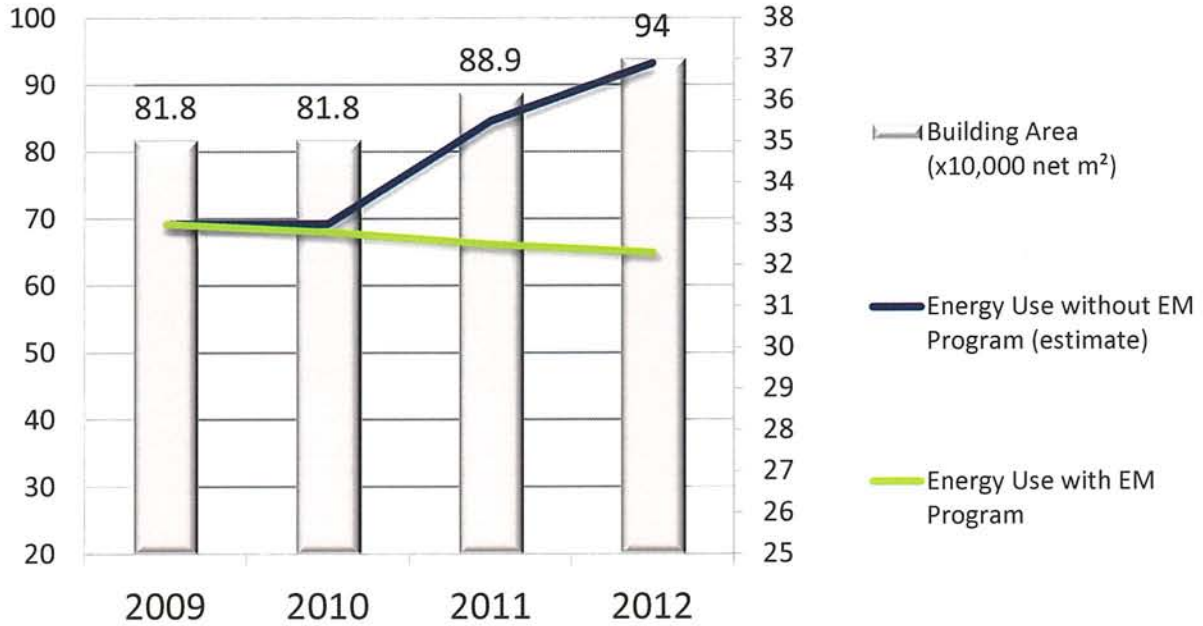


Table 6b. Moving Forward – Projected savings/Impacts of 25% Reduction Target

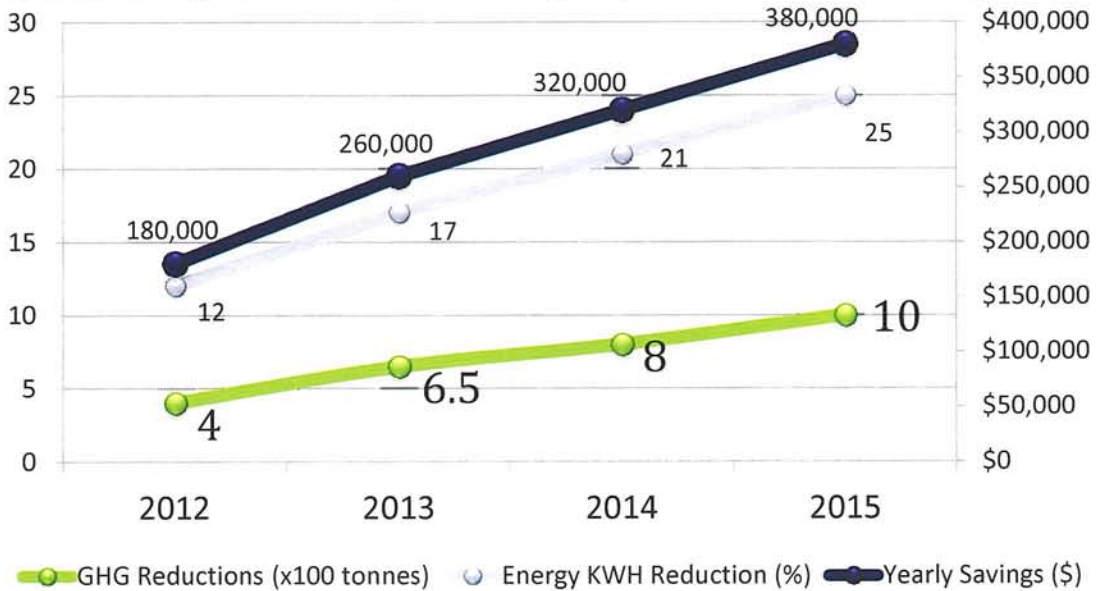


Table 6c. Building Energy Performance Index (BEPI) (2013-2015 Projected)

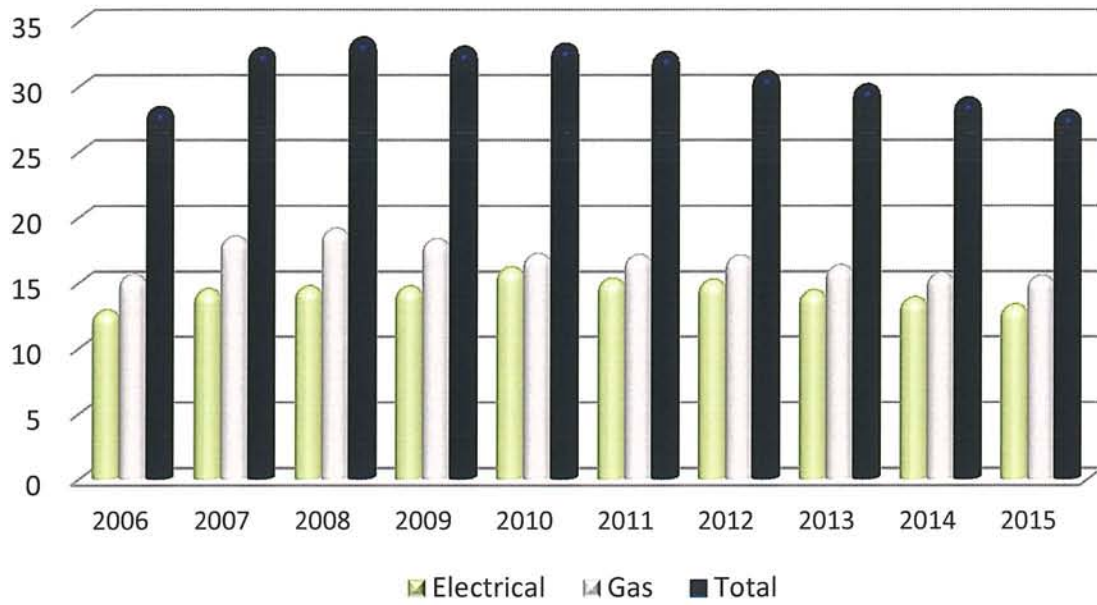


Figure 1. Breakdown of Institute Energy Use

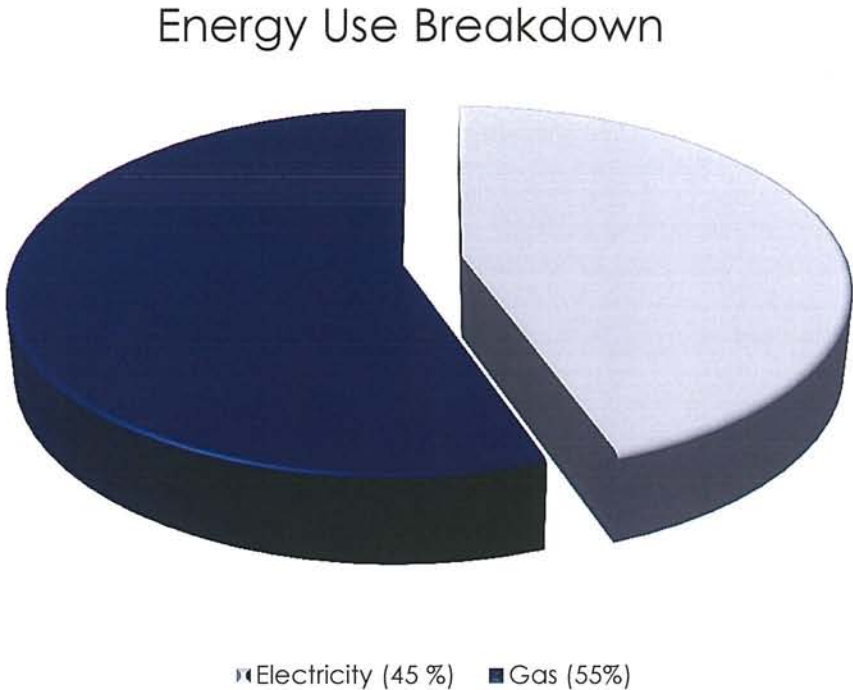


Figure 2. Breakdown of Institute Energy Use Costs

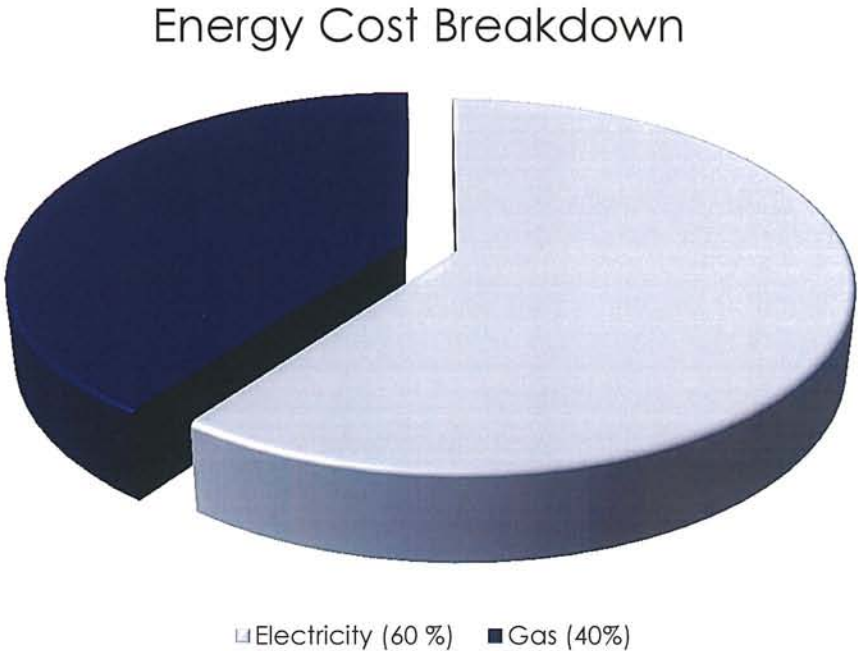
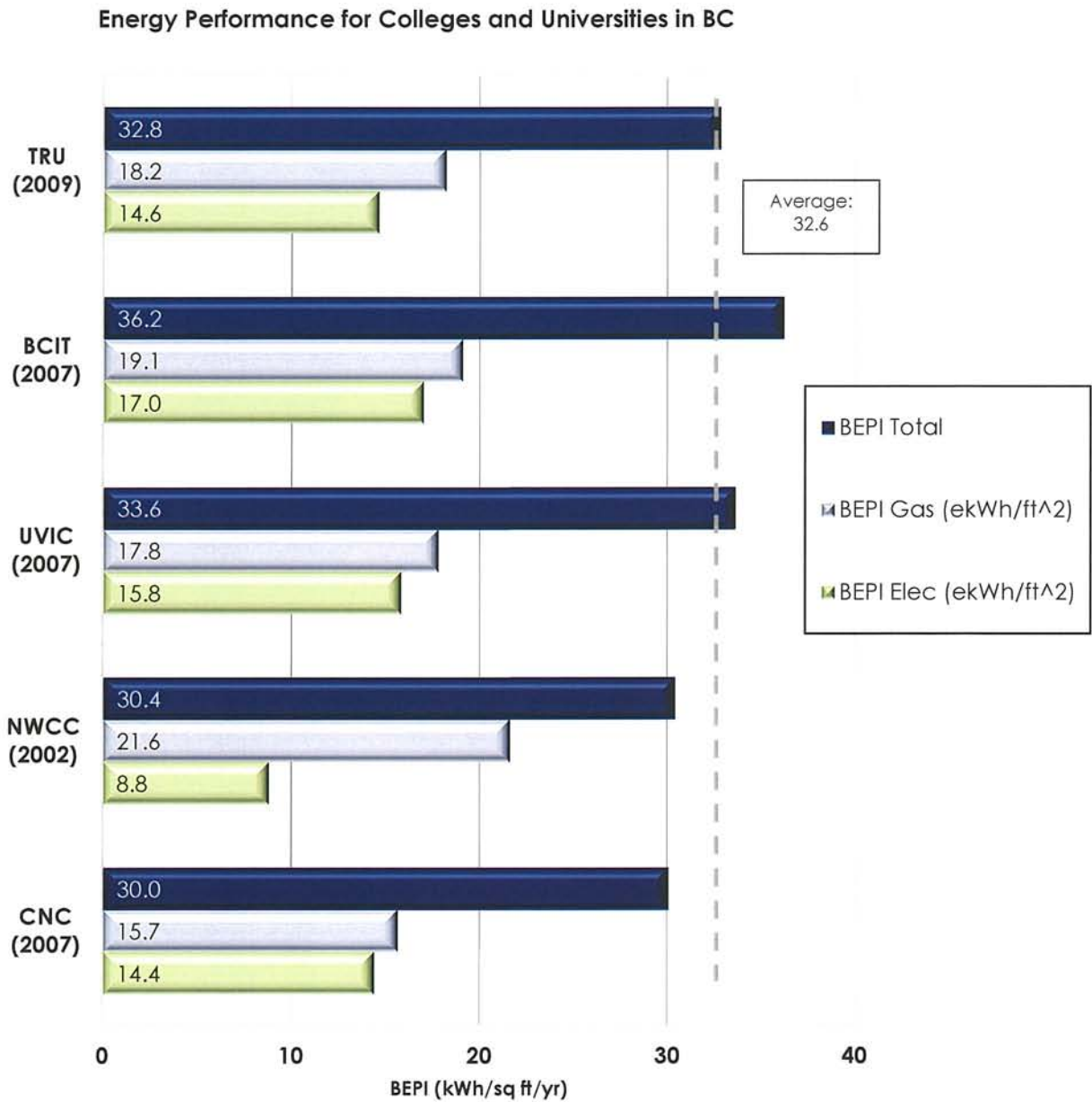


Figure 3. Energy Performance Comparisons for Five Colleges/ Universities in BC



3.2 Greenhouse Gas Information

Table 7. Summary of Annual Greenhouse Gas Emissions

Annual Greenhouse Gas Emissions								
Year	Electrical			Fuel			Total	
	kWh	e kWh	GHG (tonnes)	GJ	e kWh	GHG (tonnes)	e kWh	GHG (Tonnes)
2007	15,104,403	15,104,403	347.4	69,384	19,273,195	3,459.8	34,377,598	3,807.2
2008	15,283,229	15,283,229	427.9	71,706	19,918,306	3,575.6	35,201,535	4,003.5
2009	15,367,200	15,367,200	430.3	68,832	19,120,111	3,432.3	34,487,312	3,862.6
2010	16,058,604	16,058,604	400.43	67,140	18,650,108	3377.17	34,708,712	3,777.6
2011	15,026,400	15,026,400	370.17	66,497	18,471,388	3,335.49	33,497,788	3,706
2012	15,254,565	15,254,565	378.93	61,028	16,952,222	3,061.16	32,206,787	3,440

Greenhouse Gas Generation Breakdown

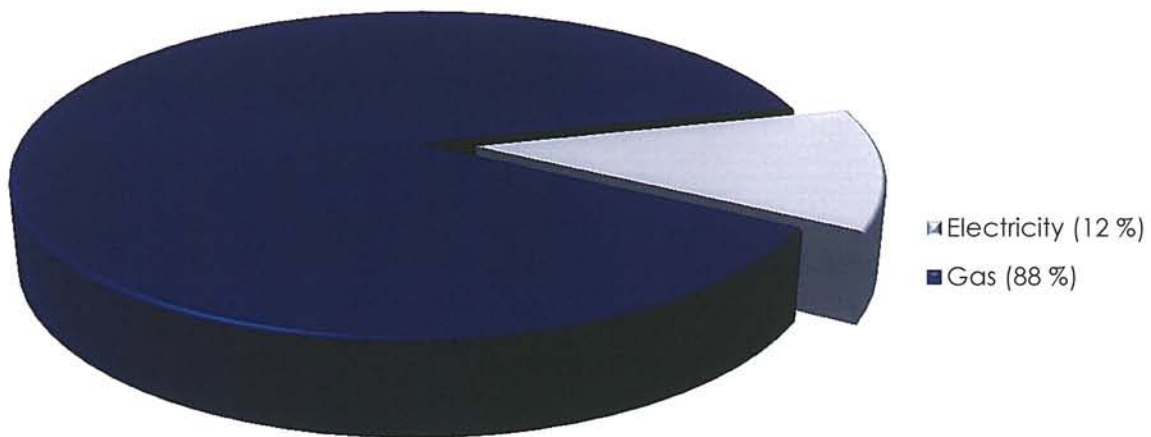


Figure 4. Breakdown of the Institute’s Greenhouse Gas Generation

Section 4

Energy Management Projects & Actions



Section 4- Energy Management Projects and Actions

Past and Currently Undergoing Projects and Actions

4.1.1 Completed Energy Conservation Projects (2010-2011)

2010 Projects									
Measure	Demand Savings (kW)	Electrical Savings (kWh)	Electrical Savings (\$)	Fuel Savings (GJ)	Fuel Savings (\$)	Total Cost Savings (\$)	Incentive Savings (\$)	Budget Retrofit Costs	Simple Payback (yrs)
A/E T12 Replacement		3660	2400			\$2,400			8
Replace power bars with smart bars		140,000	6300			\$6,300	\$7,000	\$13,000	2
TOTAL 2010	-	143,360	\$8,700	-	-	\$8,700	-	-	-
2011 Projects									
Measure	Demand Savings (kW)	Electrical Savings (kWh)	Electrical Savings (\$)	Fuel Savings (GJ)	Fuel Savings (\$)	Total Cost Savings (\$)	Incentive Savings (\$)	Budget Retrofit Costs	Simple Payback (yrs)
ECM 1: Lighting Base Retrofit	189.9	678,802	\$46,656	-	-	\$45,628		\$657,550	14.2
ECM 1: Lighting Screw-in CF Retrofit	4.5	14,762		-	-	\$1,028		\$3,450	
ECM 2: Lighting Controls	-	122,292	\$4,941	-	-	\$4,941		\$65,500	13.3
ECM 3: Vending Machine Usage Control	-	45,033	\$1,819	-	-	\$1,819		\$10,000	5.5
ECM 4: Appliance Timers for Corridor Televisions	-	10,530	\$425	-	-	\$425		\$650	1.5
ECM 5: Power Factor Correction	-	0	\$8,191	-	-	\$8,191		\$36,800	4.5
ECM 6: Holiday Scheduling	-	198,380	\$8,015	768	\$6,960	\$14,975		\$31,000	2.1
ECM 7: Optimum Start Morning Warm-up and Cool down for Ventilation Systems	-	216,990	\$8,765	839	\$7,600	\$16,365		\$44,900	2.7
ECM 8: Summer Scheduling	-	67,345	\$2,720	0	\$0	\$2,720		\$6,500	2.4
ECM 9: VAV Zone Isolation	-	116,330	\$4,700	203	\$1,845	\$6,545		\$50,000	7.6
ECM 10: DCV for Classrooms and Offices Served by WS Heat Pumps	-	21,755	\$880	1,227	\$11,125	\$12,005		\$102,500	8.5

ECM 11: Demand Controlled Ventilation for Clock Tower Theatre	-	3,800	\$155	23	\$210	\$365		\$3,900	10.7
ECM 12: Align Clock Tower DDC Weekly Schedules with Typical Occupancy	-	3,295	\$135	140	\$1,265	\$1,400		\$8,700	6.2
ECM 13: Trades Welding Booth Fan Operation	-	36,120	\$1,460	851	\$7,710	\$9,170		\$40,200	4.4
ECM 14: Wood Shop Dust Collector Occupancy Controlled Shutdown	-	9,885	\$400	14	\$130	\$530		\$5,200	9.8
ECM 15: Standby Mode and DCV for Gym Ventilation Systems	-	30,050	\$1,215	330	\$2,985	\$4,200		\$12,900	3.1
ECM 16: Heat Pump Loop Pump Shutdown	-	33,815	\$1,365	0	\$0	\$1,365		\$8,300	6.1
ECM 17: Old Main Unoccupied Exhaust Fan Shutdown	-	7,910	\$320	365	\$3,300	\$3,620		\$27,100	7.5
ECM 18: Install Flue Dampers on CAC Heating Plant	-	0	\$0	1,377	\$12,480	\$12,480		\$8,000	0.6
TOTAL 2011	194.4	1,617,095	\$92,160	*6,135	\$55,613	\$147,775		\$1,123,150	7.6
2012 Projects									
COP (BCCOL)		110,000	\$8800	600	\$4150	\$12950	n/a	\$16,000	1.5
Demand Ventilation Controls CATC		50,000	\$4250	650	\$3925	\$8175	\$5000	\$18,680	2.5
Demand Ventilation Controls CAC		50,000	\$4250	500	\$3250	\$7500	\$5000	\$16,000	2.5
WEMS (CATC)		100,00	\$8500	n/a	\$	\$8500	\$80,000	\$97,000	< 2
WEMS (Library)		30,000	\$2550	n/a		\$2250	*(above)	*(above)	*(above)
TOTAL 2012		340,000	\$28,050	1,750	\$11,325	\$39,375	\$100,000	\$145,680	1.3
2009 Data for Entire Campus	-	15,367,200	\$852,349	68,832	\$559,001	\$1,411,350		-	-
% Savings	-	12.7%	14%	11%	10%	10%		-	-
TOTAL To-Date		1,957,095	\$120,210.00	*7885	*\$66,938	\$187,148.00			

*Final fuel savings to be modified

* WEMS project costs and savings includes CATC and Library buildings

4.1.2 Completed Renewable Energy Projects

Table 8. Summary of Measures for New Building Additions

Section	Measure	Electrical Savings (kWh)	Electrical Savings (\$)	Fuel Savings (GJ)	Fuel Savings (\$)	Total Cost Savings (\$)	Incentive Savings (\$)	Budget Retrofit Costs (\$)	Simple Payback
	**Solar DHW- OM			800				72,000	0
	**Solar DHW- CAC			600				108,000	0
	**Solar DHW- CATC			465				82,000	0

4.2 Proposed Projects 2013-2018

Table 9. Summary of Projects 2012-2015

2013 Projects								
Measure	Electrical Savings (kWh)	Electrical Savings (\$)	Fuel Savings (GJ)	Fuel Savings (\$)	Total Cost Savings (\$)	Incentive Savings (\$)	Budget Retrofit Costs (\$)	Simple Payback
Residence Sensors	200,000							
IT- Change to VDI	250,000							
COP (A&E)	82,490	7,235	211	1,795	9,030	TBD	22,100	2.6
COP (IB)	76,997	6,753	23	193	6,946	TBD	19,400	3.1
COP (CAC)	28,902	2,535	1,016	8,634	11,169	TBD	21,200	1.9
COP (S)	40,848	3,583	254	2,161	5,744	TBD	26,400	5.5
COP (T&T)	25,157	2,206	183	1,555	3,762	TBD	18,000	5.7
2014 Projects								
Measure	Electrical Savings (kWh)	Electrical Savings (\$)	Fuel Savings (GJ)	Fuel Savings (\$)	Total Cost Savings (\$)	Incentive Savings (\$)	Budget Retrofit Costs (\$)	Simple Payback
COP (HOL)-2014	TBD	TBD	TBD	TBD	TBD	TBD	TBD	2
COP (OM)-2015	TBD	TBD	TBD	TBD	TBD	TBD	TBD	2
IT-Change to VDI	250,000	\$59,5000				\$59,500	TBD	TBD
Behaviour Change	100,000							
Residence sensors	100,000	\$8500		27,153	32,153.79	TBD	93,112.39	3
2015 Projects								
Measure	Electrical Savings (kWh)	Electrical Savings (\$)	Fuel Savings (GJ)	Fuel Savings (\$)	Total Cost Savings (\$)	Incentive Savings (\$)	Budget Retrofit Costs (\$)	Simple Payback
Behaviour Change	100,000	TBD	TBD	TBD	TBD	TBD	TBD	0
Total (estimated)	1.6 GWh	85,000	5000	50000	135,000	TBD	220,000	2 years

* The electrical savings and incentive savings are only based on replacing 4' T12 lamps with T8 lamps and electronic ballasts

** This is a combination of the electrical savings (\$4014) and maintenance savings (\$1297) calculated by the BC Hydro Calculator

4.2.3 Summary of energy/cost savings and cost avoidance

Table 10. Summary of Planned Measures for Secondary Projects

Year	KWhs saved	Fuel Savings (GJ)	Cost Savings (\$)	Avoided cost	Total Dollars saved
2010	143,660		\$8700	\$1356	\$10,056
2011	1,665,095	6000	\$203,690.20	\$24022	\$236412.2
2012	300,000	1000	\$34,000	\$1200	\$35200
To Date	2,108,755	7000	\$2246390.20	\$26,578	\$272968.20

4.3 Training, Communication and Awareness Programs

Program	Anticipated Savings (KWH)	Target Audience	Estimated Reach (# people)	Start/End Date
Home/Work Challenge	TBD	Staff and Faculty	>100	Fall 2011- ongoing
BuiltSpace	TBD	Staff and Faculty	500	2012- ongoing
Media Campaign	TBD	Staff, Faculty, Students	15,000	2103-2104
Yearly Initiatives				
	Anticipated Savings (KWH)	Target Audience	Estimated Reach (# people)	Start/End Date
Earth Hour		Staff, Faculty, Students	15,000	Annual
Sweater Day		Staff, Faculty, Students	15,000	Annual

A successful training, communication and awareness program is an integral part of TRU's energy management plan. The following is a description of ongoing and future strategies:

Training

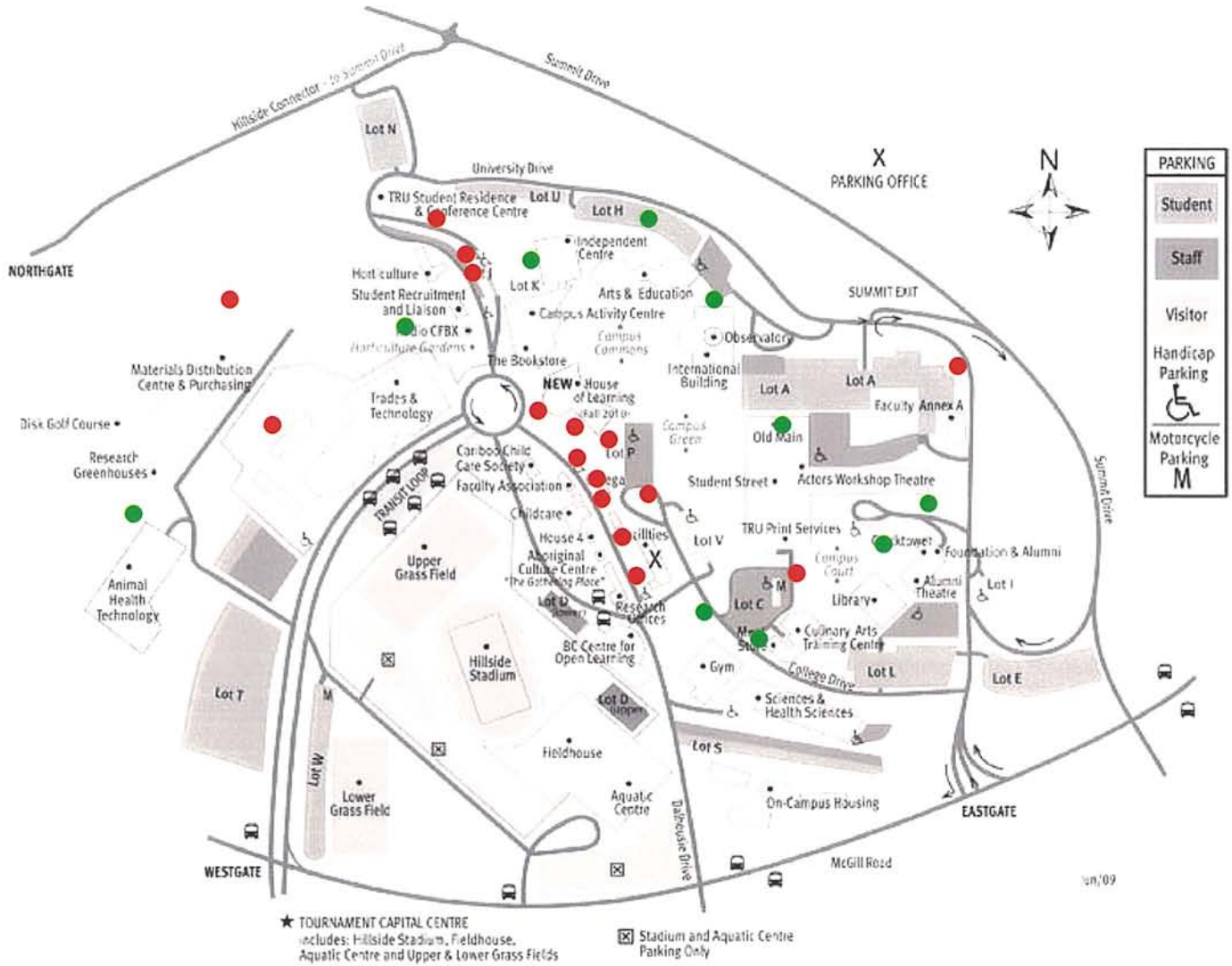
- Staff training for all new energy related equipment (smart bars, multi-function copiers etc.)
- Technical staff engagement and training for all retrofit and new building projects involving new equipment and controls
- Staff training for new scheduling and zone isolation energy conservation measures scheduled for winter 2010-2011(knowing where override buttons are etc.)
- Utilize Trade & Technologies Department faculty and Trades students to help with retrofit project, and turn campus into 'living lab'

Communication and awareness

- Maintain and update existing website to inform and engage entire TRU community in energy, sustainability and environmental related projects and initiatives. Comprehensive media campaign this fall to inform building occupants regarding energy efficiency upgrades in buildings and launch 25% reduction target media campaign. Utilize traditional and social media to increase social media profile
- Continue to engage in campus activities to inform students and staff of ongoing green projects and initiatives (kiosks, handouts, posters etc.)

Appendix A

TRU Campus Map



Appendix B

TRU Sustainability Policy

POLICY

Thompson Rivers University recognizes that it has a significant role to play in education, research, policy development and information exchange related to the health of the local and global environments in which we live and work. TRU seeks to be the University of Choice for students concerned about environmental sustainability and to be recognized for its leadership and stewardship in responding to environmental challenges.

This policy should guide other operational policies and procedures that may be developed to demonstrate responsibility and due diligence on the part of the University and to educate and assist members of the University community to understand and fulfill their environmental and sustainable responsibilities

The University is committed to being the 'University of Choice for Environment and Sustainability' as set out in the Strategic Plan 2007-2012.

The University is a signatory to the Taillores Declaration and the University and College Presidents' Climate Statement of Action for Canada.

This policy applies to all campuses and all activities of the University

REGULATIONS

Purpose

- a. To facilitate and support the University's mission with respect to Environment and Sustainability as set out in the Strategic Plan.
- b. To establish appropriate standards for managing sustainability initiatives at the University
- c. To establish the process and responsibilities for standards measures and monitoring related managing sustainability initiatives at the University
- d. To outline the principles through which the environmental and sustainability objectives can be achieved.
- e. To outline the roles and responsibilities for implementing Sustainability Action Plans

Definitions**Sustainability**

Meeting the needs of the current situation which does not compromise the needs of future generations through a decision making process which integrates ecological, economic and human factors.

Environment

Surrounding conditions, forces or influences which influence the natural, built, or human systems.

University Community

The University community includes the physical setting in which any University programme is delivered in Canada and internationally. It also includes all individuals which design, deliver, participate in and support the programmes which TRU delivers.

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Principles

1. Leadership in Sustainable Operations

1.1 TRU will maximise energy efficiency, use of renewable resources and use best available carbon reduction technology.

1.2 TRU will minimize water consumption, waste generation and the use of toxic substances in all campus operations. Where substitution, reuse or recycling cannot be implemented, best practices will be used in the disposal of the remaining waste

1.3 TRU's procurement policy will integrate evaluation of social, ethical and economic factors in the purchasing process though the use of such tools as life cycle costing or similar analysis.

1.4 TRU will consider biodiversity in decision making regarding the use and development of campus lands

2. Leadership in Evaluating Success

2.1 TRU will continually measure and monitor the impacts of its activities against the principles of sustainability, setting objectives and targets and measuring results in the form of a Campus Sustainability Action Plan which will be updated every three years with the first update to occur in parallel to the Strategic Plan 2007-1012 update.

3. Leadership in Community Sustainability

3.1 TRU will foster and encourage the development of sustainable practices and activities among all faculty, staff, student and administrators of the institutions both on campus and in the broader community.

3.2 TRU will work cooperatively and provide support to sustainable programs and actions in the broader community both for its alumni and other organizations and individuals.

3.3 TRU will work with other universities, government departments and organizations to further the objectives of sustainability in society generally

4. Leadership in managing Environmental Risks

- a. The University, through the Office of Environmental Sustainability, will establish and manage an environmental management plan which sets targets, indicators and measures environmental performance and reports progress
- b. The University commits to a process of continual environmental improvement and best practices

5. Responsibilities for implementation

- a. The Vice Presidents are responsible for reviewing the Environmental and Sustainability Action Plans for their portfolios, and for approving actions, schedules and funding to implement. Information from the Plans will be compiled and published in an Annual Environmental Sustainability Report
- b. The Director of Environmental and Sustainability is responsible for coordination, advocacy and communication of the sustainability principles, objectives targets and activities on campus. The Director will also support TRU's sustainability actions within the broader community, government departments and organizations and other universities.
- c. The Director of Environment and Sustainability is responsible for regulatory reporting

APPENDIX C (BEPI)

BEPI - Elec AHT	A&E	BCCOL	CAC	CT	CATC	GYM	HOL	INT	LIB	MDC	OM	SC	T&T	
Date	Electrical Energy - Ar	Electrical	Electrical	Electrical	Electrical	Electrical	Electrical	Electrical	Electrical	Electrical	Electrical	Electrical	Electrical	
May-11	No Data	71227	110980	105419	No Data	30113	36347	No Data	55440.83	23718	9497	210406	88330	78451
Jun-11	No Data	71503	111158	105133	No Data	29711	37442	No Data	63478.21	24918	10617	224361	78195	73735
Jul-11	6297	58593	117007	103805	4417	25520	30618	No Data	65038.37	22271	11002	235096	74749	77617
Aug-11	11237	69667	117282	140549	21989	34651	36059	No Data	75705.36	31326	13512	210087	83636	84142
Sep-11	12731	61932	112791	126817	23567	43834	33127	No Data	78697.44	29947	11210	236205	94803	75825
Oct-11	13192	66476	112683	116748	23318	45404	32127	No Data	63283.59	24803	14207	213088	105620	69197
Nov-11	13735	80802	112983	132956	25575	45672	35701	No Data	60337.8	26415	18891	216678	110920	74877
Dec-11	11536	84151	110870	109347	27237	34827	32848	12656.28	51268.09	30218	20119	181560	101204	67471
Jan-12	13653	93066	115664	121831	30548	39731	39224	75951.24	59859.32	31813	24348	210682	112942	80650
Feb-12	13563	80570	105121	137680	26490	40202	35236	72546.56	56512.61	29350	20248	200018	105835	76556
Mar-12	15888	79994	111672	143683	25437	47261	37656	78551.37	58425.49	30557	16957	216049	116267	82089
Apr-12	14304	67367	107129	124788	21633	41348	37673	73240.47	55204.44	29303	13007	197026	102371	70742
Average	13315.44	73779	112111.7	122396.3	25088.22	38189.5	35338.17	75072.41	61937.63	27886.58	15828.91	212604.7	97906	75946
Total	126136	885348	1345340	1468756	230211	458274	424058	312945.9	743251.6	334639	183615	2551256	1174872	911352
square feet	12709	60941	46660	69034	32037	20009	39865	63000	49371	38219	18190	213800	116590	111150
BEPI - Elec	12.57	14.52	28.83	21.27	10	22.9	10.64	14.28	15.05	8.75	10.09	11.93	10.07	8.2