FANSHAWE

Energy Conservation & Demand Management Plan

2014 - 2019

1001 Fanshawe College Blvd
London Ontario

www.fanshawec.ca

Contents

Plan Information

Green Energy Act Requirements

On January 1, 2012 Ontario Regulation 397/11 (Regulation) made under the Green Energy Act, 2009 came into effect to support public agencies in their energy conservation and greenhouse gas (GHG) emissions reduction efforts. This Regulation requires all public agencies to report on annual energy use and GHG emissions beginning in July of 2013, and requires development of five-year energy conservation and demand management (ECDM) plans (Plan) starting in July 2014. A guideline to aid public agencies in the development of their Plans was published in November 2013 by the Ontario Ministry of Energy. This Plan covers all College facilities, which support operations such as; administrative offices and related facilities, classrooms and related facilities, laboratories, student residences that have more than three storeys or a building area of more than 600 square metres, student recreational facilities and athletic facilities, and libraries.

The Plan is required to be published on or before July 1, 2014, with the Term being April 1, 2014 through March 31, 2019 (5 years). On or before July 1, 2019 (and every fifth anniversary thereafter) updates to this Plan must be published.

The measures identified in this Plan are estimated to be in place for a minimum of 10 years. The Plan Life Cycle is the 10 year period starting at commencement of the Term. Plan Life Cycle is used to calculate total energy avoidances and net investment value at the end of the 10 year period.

The Regulation requires the following elements to be included in the Plan:

1. information on the public agency's annual energy consumption [usage] during the last year for which complete information is available for a full year,
2. the public agency's goals and objectives for conserving and otherwise reducing energy consumption [usage] and managing its demand for energy,
3. the public agency's proposed measures under its energy conservation and demand management plan,
4. cost and saving estimates for its proposed measures,
5. a description of any renewable energy generation facility operated by the public agency and the amount of energy produced on an annual basis by the facility,
6. a description of,
    a. the ground source energy harnessed, if any, by ground source heat pump technology operated by the public agency,
    b. the solar energy harnessed, if any, by thermal air technology or thermal water technology operated by the public agency, and
    c. the proposed plan, if any, to operate heat pump technology, thermal air technology or thermal water technology in the future,
7. the estimated length of time the public agency's energy conservation and demand management measures will be in place, and
8. confirmation that the energy conservation and demand management plan has been approved by the public agency's senior management.

Time Period

Publication:	July 1st 2014
Term:	April 1 2014 – March 31, 2019 (5 years)
Plan Life Cycle:	April 1, 2014 – March 31, 2024 (10 years).
EMO Life Cycle:	Unless noted otherwise, EMOs identified in this Plan are anticipated to be in place for minimum of 10 years.

Development Team

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Approval:	Harry Bakker – Executive Director, Facilities Management and Community Safety

Plan Access

As required under the Regulation, the Plan is required to be publically available. This Plan can be accessed at the Colleges website www.fanshawec.ca under the document "Fanshawe College ECDM Plan 2014-2019".

Background Energy Information

Fanshawe College

The Fanshawe College of Applied Arts and Technology (College) operates out of 42 buildings, at 13 sites in the Counties of Middlesex, Oxford, Elgin and Norfolk, totaling over 2.3 million square feet of gross floor area. The London Campus (1001 Fanshawe College Blvd) accounts for approximately 75% of this total. Refer to Appendix-A for details.

Energy Information 2005 - 2012

Energy conservation has been a focus of Fanshawe College for some time. During the period of 2005-2012, the College's investment in energy conservation and demand management initiatives have resulted in approximately $3.9 million in energy cost avoidance, and reduction in GHG emissions by 5,500 tCO2e, which is equivalent to the amount approximately 1,000 cars or light trucks generate in one year. Energy Usage Intensity (EUI) during this timeframe was reduced by 32% and Energy Cost Intensity (ECI) by around 16%.

In 2005 the College consumed 53,599 equivalent MWh (eMWh) of energy. The total average area during that timeframe was approximately 1.7 million gross square feet (GSF) for an EUI of 0.030 eMWh/GSF.

The College is completing its second (annual) term of an agreement with London Hydro for the Ontario Power Authority's (OPA) Embedded Energy Managers (EEM) program. This program targets reduction in demand by 300 kW (0.3 MW) and usage by around 1,100 MWh[1]. The College is on track towards meeting these targets and approval of the College's application for a third term, which will commence July 1, 2014, has been recommended by the program's Technical Reviewer for approval by the OPA.

To further these energy conservation initiatives, the College has recently completed a comprehensive Energy Audit (EA-2013) of all College owned facilities (as of 2012) which assessed just over 2 million square feet, at 24 buildings located in London, St. Thomas, Simcoe and Woodstock. The results of this comprehensive energy audit have formed the basis and details of Energy Management Opportunities (EMOs) identified in this Energy Management Plan.

Energy Information 2013

In 2013 the College consumed 50,087 eMWh of energy (28,540 MWh electricity and 21,547 eMWh in natural gas) accounting for GHG equivalent of 6,219 tCO2e. The College's total average building area that year was 2.2 million GSF for an EUI of 0.023 eMWh/GSF. During this timeframe the College offset roughly 76 eMWh by way of renewable energy generation.

1 Calculated as peak reduction target (0.3MW) x facilities load factor (0.422) x 8,760 hours/year.

This included 19 MWh (electrical avoidance) in Solar Photo Voltaic (PV) at the St. Thomas/Elgin Campus, and 57 eMWh (natural gas avoidance) in Solar Hot Water (HW) at "Z" Building in London, accounting for approximately 12 tCO2e in GHG emissions avoided annually. Refer to Appendix-B & Appendix-C for details.

Total energy costs in 2013 were $4.2 million, comprised of $3.75 million and $445,000 in electrical and natural gas respectively. Cost per unit, for the College, during this timeframe averaged $131/MWh electrical and $0.21/m3 for natural gas.

Energy Baseline

The energy analysis provided in the EA-2013, along with the College's utilities database derived from utilities bills for 2013 have been used to determine the Baseline year's energy usage. This Baseline will be used for comparing reporting period data to verify EMO performance. The Baseline is calculated using regression analysis of overall EUI compared to heating and cooling degree days and then extrapolated to a normalized set of variables (GSF, HDD, and CDD). This normalized predicted Baseline represents the energy usage during normal operating conditions. These variables (GSF, HDD, and CDD) will be updated to match the target reporting period in order to verify performance and to calculate avoidances in the target period. Table 1 provides details for the years 2010 through to 2013, as well as the Baseline year.

Table 1: Energy & GHG Baseline[2]

	2011	2012	2013	Baseline (2013 Normalized)
Total Area GSF	2,155,592	2,155,592	2,221,085	2,350,083
Electrical Consumption (MWh)	29,352	28,488	28,540	28,957
Electrical EUI (MWh/GSF)	0.0136	0.0132	0.0128	0.0123
CDD	973	1,071	568	869
Electrical Peak (kW)	6,500	6,500	6,270	6,270
Natural Gas Consumption (M3)	1,853,565	1,686,189	2,081,727	2,275,591
Natural Gas Energy (eMWh)	19,185	17,452	21,546	23,553
Natural Gas EUI (eMWh/GSF)	0.0089	0.0081	0.0097	0.0100
HDD	3,190	2,750	3,480	3,174
Total Energy Consumption	48,521	45,941	50,087	52,509
GHG (tCO2e)	5,853	5,467	6,219	6,619
Total EUI (eMWh/GSF)	0.0225	0.0213	0.0226	0.0223

2 Normalized to anticipated reporting period variables (HDD & CDD values projected as average of prior 5 years & projected GSF).

Energy Objectives and Targets

Vision, Mission, Values & Goals

In May of 2013 the College's Board of Governors approved a new strategic framework including updated Vision, Mission and Values for the College. This Plan aligns with the new strategic framework and provides a means towards achievement, specifically with respect to involving our communities, utilizing resources wisely and fostering a high-performing and sustainable college.

Vision	**Unlocking Potential**
Mission	**Provide pathways to success, an exceptional learning experience, and a global outlook to meet student and employer needs**
Values	**Focus on students, involve our communities, utilize resources wisely, embrace change, engage each other**
Strategic Goals	**Grow enrolment by 15% over 5 years, ensure that all students are provided the opportunity to access flexible learning options, provide the premier learning, student life and career preparation experience, foster a high-performing and sustainable college**

Energy Targets

This Plan outlines an annual implementation of EMOs, consisting of capital initiatives, retro-commissioning and Energy Management Information System (EMIS) implementation over the Term of the Plan, commencing in 2014 with the target year being 2019 for verification of performance. These EMOs are projected to reduce overall electrical and natural gas usage by 11% and 9% respectively over the Baseline (2013 normalized). Table 2 provides a summary of the energy management targets of this Plan. Table

Table 2: Conservation & Demand Targets Summary[3]

	2013	Baseline (2013 Normalized)	Target (2019)	Reduction (Baseline – Target)	Percent Reduction
Total Area GSF	2,210,085	2,350,083	2,350,083	0	0%
Electrical Consumption (MWh)	28,540	28,957	25,844	3,113	11%
Electrical EUI (MWh/GSF)	0.0129	0.0123	0.0110	0.0013	11%
CDD	568	869	869	0	0%
Electrical Peak (kW)	6,270	6,270	5,811	459	7%
Natural Gas Consumption (M3)	2,081,727	2,275,591	2,062,621	212,969	9%
Natural Gas Energy (eMWh)	21,546	23,553	21,348	2,204	9%
Natural Gas EUI (eMWh/GSF)	0.0097	0.0100	0.0091	0.0009	9%
HDD	3,480	3,174	3,174	0	0%
Total Energy Consumption	50,087	52,509	47,192	5,317	10%
GHG (tCO2e)	6,219	6,619	5,967	652	10%
Total EUI (eMWh/GSF)	0.0227	0.0223	0.0201	0.0023	10%

3 Given the College's ongoing fiscal pressures it may not be possible for the level of investment to be sustained. Consequently this plan will need to be adjusted annually to reflect the level of achievement relative to funding availability. Ongoing funding advocacy will be needed.

Plan of Action

Current Initiatives (2014)

The EMOs that either have been completed or are in the planning or implementation stage for completion in 2014, are anticipated to reduce peak electrical demand by 457 kW and reduce annual electrical and natural gas usage by 2,515 MWh & 43,000 m3 respectively. These EMOs represent approximately $1.7 million in capital expenditures, and are anticipated to reduce energy costs by $348,000 annually (present value). This equates to a simple payback of approximately four years when including incentives received. Current initiatives include:

- Building Envelope Upgrades;
- Heating, Ventilation and Air Conditioning (HVAC) upgrades;
- Lighting Upgrades;
- New Building and Major Renovation;
- Process Equipment; and
- EMIS Implementation

Table 3: Current Initiatives (2014)

EMO Category	Capital Expenditure	Cost Avoidance / Year	Annual Elec Avoidance (MWh) / Year	Elec Peak Avoidance (kW)	Natural Gas Avoidance (M3) / Year	Total Energy Avoidance (eMWh) / Year	GHG Avoidance (tCO2e) / Year
.01 EMO Capital Expenditure	$1,402,168	$305,272	2,261	387	43,008	2,706	262
.03 EMO EMIS	$14,500	$24,550	192	61	0	192	15
.04 EMO Energy Audit	$270,253	$0	0	0	0	0	0
.05 EMO Employee Awareness & Outreach	$9,200	$17,676	140	37	0	140	11
Grand Total	**$1,696,121**	**$347,498**	**2,593**	**484**	**43,008**	**3,038**	**289**

Plan Initiatives (2015 – 2019)

In order to meet the targets noted above this Plan outlines six main EMO categories where energy conservation can be achieved, monitored, verified, updated, promoted, and improved.

1. Capital Projects
2. Retro-commissioning (RCx)

3. Energy Management Information System (EMIS)
4. Energy Auditing
5. College Community Awareness and Training
6. Energy Team

The College has approved funding for the first year (2015) of the Plan. Of the six EMO categories noted above, the first year of the Plan includes Capital Projects, RCx, EMIS, College Awareness & Training, as well as formation of the Energy Team. These EMOs are anticipated to provide for electrical peak reduction of 329 kW and annual electrical and natural gas usage avoidances of 1,497 MWh & 125,642 m3 respectively. This represents an annual GHG avoidance of 357 tCO2e. With a cost of $900,000, and including potential incentives of $240,000, these initiatives provide a three year simple payback. Table 4 provides details regarding initiatives which have approved funding for 2015.

Table 4: Year 1 Initiatives (2015)

EMO Category	Capital Expenditure	Cost Avoidance / Year	Annual Elec Avoidance (MWh) / Year	Elec Peak Avoidance (kW)	Natural Gas Avoidance (M3) / Year	Total Energy Avoidance (eMWh) / Year	GHG Avoidance (tCO2e) / Year
.01 EMO Capital Expenditure	$374,048	$81,140	519	92	70,627	1,250	175
.02 EMO Retro-Commisioning	$220,500	$78,533	594	29	24,616	848	94
.03 EMO EMIS	$294,000	$52,742	358	113	28,500	653	83
.05 EMO Employee Awareness & Outreach	$10,500	$3,686	26	6	1,900	45	6
Grand Total	**$899,048**	**$216,100**	**1,497**	**239**	**125,642**	**2,798**	**357**

The EMOs included for the remaining years of this Plan (2016-2019) are anticipated to provide an additional annual electrical and natural gas usage avoidance of 1,616 MWh and 87,327 m3 respectively, representing an annual GHG avoidance of 294 tCO2e. The total expenditure for these EMOs will be $1.6 million[4] and, when including potential incentives, will result in a simple payback of less than 6.5 years. Table 5 provides details regarding initiatives for years 2 through 5.

4 Given the College's ongoing fiscal pressures it may not be possible for the level of investment to be sustained. Consequently this plan will need to be adjusted annually to reflect the level of achievement relative to funding availability. Ongoing funding advocacy will be needed.

Table 5: Initiatives (2016 - 2019)

EMO Category	Capital Expenditure	Cost Avoidance / Year	Annual Elec Avoidance (MWh) / Year	Elec Peak Avoidance (kW)	Natural Gas Avoidance (M3) / Year	Total Energy Avoidance (eMWh) / Year	GHG Avoidance (tCO2e) / Year
.01 EMO Capital Expenditure	$1,019,842	$174,595	1,229	154	70,359	1,957	231
.02 EMO Retro-Commisioning	$122,220	$38,037	283	14	9,368	380	40
.03 EMO EMIS	$105,000	$0	0	0	0	0	0
.04 EMO Energy Audit	$315,000	$0	0	0	0	0	0
.05 EMO Employee Awareness & Outreach	$42,210	$15,514	104	23	7,600	183	23
Grand Total	**$1,604,272**	**$228,870**	**1,616**	**220**	**87,327**	**2,520**	**294**

Capital Projects:

Capital Projects are EMOs which include lighting, electrical, mechanical, HVAC, and building envelope upgrades as well as major renovations and new construction. This Plan identifies Capital Projects which when fully implemented are expected to provide annual electrical and natural gas usage avoidances of 1,748 MWh, and 140,986 m3 respectively, as well as reduce electrical peak demand by 287 kW. Refer to Table 6 for details. Capital Projects planned for implementation in the first year include:

- Building Envelope Upgrades (new roofing, and cladding, weather-stripping of doors and windows)
- HVAC Upgrades (motors, variable frequency drives, building automation controls, etc.)
- Lighting Upgrades
- Mechanical Upgrades (controls, and hydronic equipment such as boilers and pumps)
- Process Equipment

Table 6: Capital Projects

Year / EMO Package Details	Capital Expenditure	Cost Avoidance / Year	Annual Elec Avoidance (MWh) / Year	Elec Peak Avoidance (kW)	Natural Gas Avoidance (M3) / Year	Total Energy Avoidance (eMWh) / Year	GHG Avoidance (tCO2e) / Year
EMO ELEC	$1,065	$524	4	0	0	4	0
EMO HVAC	$789,709	$159,465	1,108	205	72,051	1,854	225
EMO Lighting	$17,362	$3,882	31	4	0	31	2
EMO Mechanical	$218,835	$28,834	211	20	8,559	300	33

Year / EMO Package Details	Capital Expenditure	Cost Avoidance / Year	Annual Elec Avoidance (MWh) / Year	Elec Peak Avoidance (kW)	Natural Gas Avoidance (M3) / Year	Total Energy Avoidance (eMWh) / Year	GHG Avoidance (tCO2e) / Year
General Contractor (Multi-trades)	$282,430	$33,631	244	0	11,949	368	42
Process Equipment	$3,728	$1,377	11	0	0	11	1
Renewable Energy	$51,870	$7,693	6	1	31,639	333	60
EMO Building Envelope	$28,892	$20,329	133	16	16,788	307	42
Grand Total	**$1,393,890**	**$255,735**	**1,748**	**246**	**140,986**	**3,207**	**406**

Retro-Commissioning (RCx):

Retro-Commissioning (RCx) of existing buildings involves a process of optimizing a building's operations and maintenance. The goal of RCx is to return the building to either its original designed purpose or to an improved energy efficient state. RCx may result in Capital Projects being identified, but the main purpose is the optimization of the facility. EA-2013 noted that typically RCx provides energy savings in the range of 8% to 30%. For the purposes of this Plan a conservative energy savings of 8% is assumed. This Plan anticipates that RCx of select facilities will provide annual electrical and natural gas usage avoidances of 876 MWh and 33,984 m3 respectively, as well as reduce electrical peak demand by 42 kW.

Energy Management Information System (EMIS):

The implementation of the Energy Management Information System (EMIS) will play an integral role in verifying and tracking the performance of the other initiatives implemented as well as identify in real time unexpected energy waste. This system will provide the necessary information and analysis required to monitor energy usage in real time so that action can be taken in a timely manner, ensuring system efficiency is maintained. By identifying wasted energy or inefficiencies immediately, rather than at receipt of the next energy bill or yearly analysis, it is anticipated that electrical and natural gas energy usage avoidance of 1.5% will be realized annually. This Plan anticipates that the EMIS will provide annual electrical and natural gas usage avoidances of 358 MWh and 28,500 m3 respectively, as well as reduce electrical peak demand by 113 kW.

Energy Auditing:

As EMOs are implemented over the course of this Plan, and new technology becomes available, it will become necessary for the energy audit to be updated. This Plan proposes that an updated Energy Audit take place in the fourth year of the Plan. This will provide external, third party verification of energy usages and costs as well as identify additional EMOs for inclusion in the next iteration of the Plan.

College Community Awareness & Training:

In partnership with the Sustainability Committee, employee incentive and reward programs will be developed to bring about an awareness of energy usage and foster a culture inclined towards reducing waste and becoming more efficient. It is anticipated that energy awareness, training and College community involvement, will result in energy avoidances. As these initiatives are difficult to quantify, it is estimated that a conservative reduction of ½ % will be realized annually. This Plan estimates that providing College Community Awareness & Training will result in annual electrical and natural gas usage avoidances of 130 MWh and 9,500 m3 respectively, as well as reduce electrical peak demand by 29 kW.

Energy Team:

During the first year of the Plan an Energy Team will be formed consisting of key energy champions. This team will meet on a tri-annual basis to review progress of the Plan's implementation, identify additional measures, oversee the implementation of the College Community Awareness and Training programs as well as provide recommendations for additional content and improvements.

EMO Details:

Refer to Appendix-D for details regarding EMOs identified in this Plan.

Implementation Budget & Plan Life Cycle Analysis

In order to meet the targets as presented in this Plan investment will be required on an annual basis to support expenditures including costs for implementation of Capital Projects, RCx, the EMIS, initiatives under the Energy Team including College Community Awareness and Training programs, and updating the Energy Audit. Total capital funding of $2.5 million will be required over the Term of the Plan, and when potential incentives and cumulated cost avoidances are included, it is anticipated that the maximum "out of pocket" expense will be approximately $900,000.

The College has allocated resources of Year 1 of the Plan ($900,000); however, given the College's ongoing fiscal pressures it may not be possible for that level of investment to be sustained. Consequently this plan will need to be adjusted annually to reflect the level of achievement relative to funding availability. Ongoing funding advocacy will be needed.

These EMOs will result in a net investment value of $1.6 million ($617,000 Net Present Value) at the end of the Plan Life Cycle, assuming that incentive programs are continued past 2015. The cost avoidances resulting from these measures will provide an overall simple payback in under 5 years (5.5 years without incentives past 2015).

Refer to Table 7a, 7b and Figure 1 below for details.

Table 7a: Annual Implementation Budget[5]

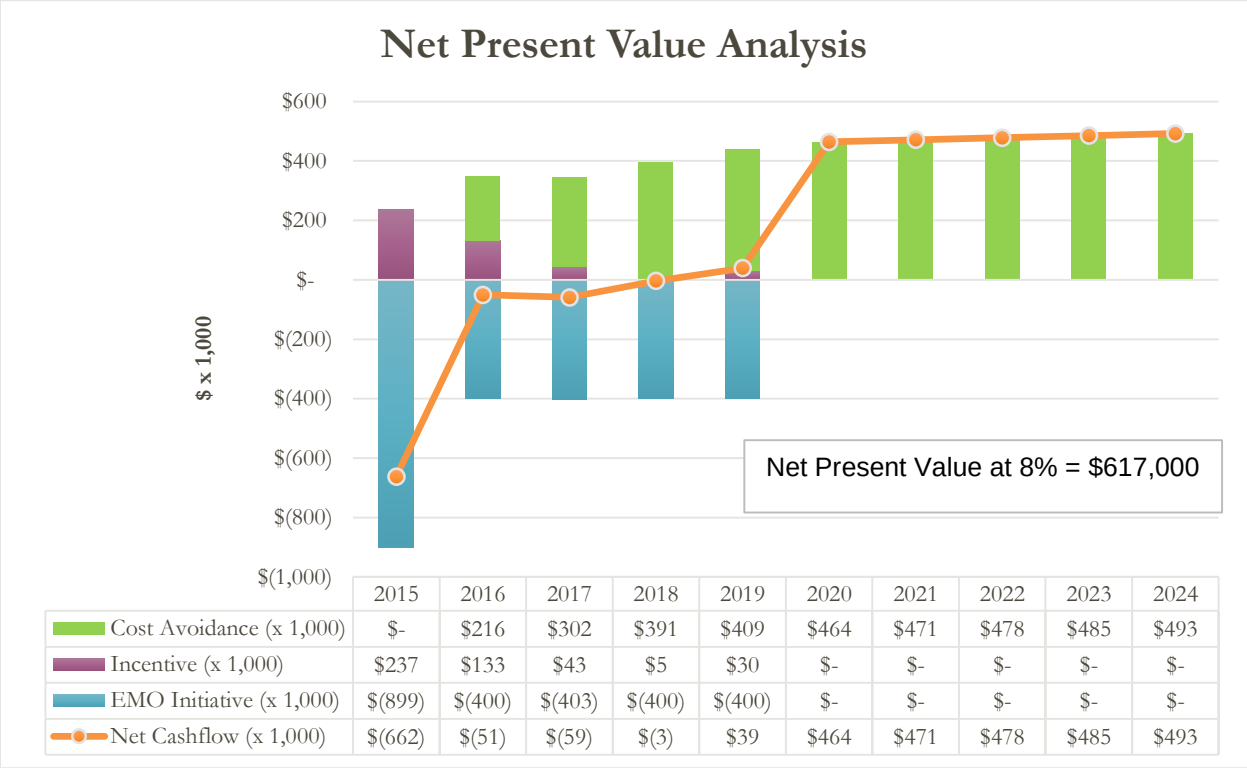
	Year 1 (2015)	Year 2 (2016)	Year 3 (2017)	Year 4 (2018)	Year 5 (2019)	Total
Capital Projects	$374,048	$363,530	$244,376	$48,365	$363,570	$1,393,890
Retro-Commissioning	$220,500	-	$122,220	-	-	$342,720
EMIS Implementation	$294,000	$26,250	$26,250	$26,250	$26,250	$399,000
Energy Audit Update	-	-	-	$315,000	-	$315,000
College Community Awareness and Training	$10,500	$10,500	$10,500	$10,710	$10,500	$52,710
Total Expenditure (Budget Required)	**$899,048**	**$400,280**	**$403,346**	**$400,325**	**$400,320**	**$2,503,320**
Potential Incentive	$237,010	$133,462	$42,533	$5,430	$30,363	$448,797
Total Cost to College (Expenditure less Incentive)	$662,038	$266,818	$360,813	$394,896	$369,958	$2,054,523
Cost Avoidance / Year	$216,100	$82,535	$85,276	$12,026	$49,033	$444,970
Simple Payback Period (Years)	3.1	3.2	4.2	32.8	7.5	4.6

5 The increased length of time for payback in year 4 is due to the completion of the Energy Audit, which does not contribute to cost avoidance.

Table 7b: Annual Energy and GHG Avoidance

	Year 1 (2015)	Year 2 (2016)	Year 3 (2017)	Year 4 (2018)	Year 5 (2019)	Total
Electrical Avoidance (MWh) / Year	1,497	582	615	74	345	**3,113**
Electrical Peak Avoidance (KW)	239	93	83	14	30	**459**
Natural Gas Avoidance (M3) / Year	125,642	36,818	26,105	9,382	15,021	**212,969**
Total Energy Avoidance (eMWh) / Year	1,300	381	270	97	155	**2,204**
Total GHG Avoidance (TCO2e) / Year	357	116	99	24	56	**652**

Figure 1: Financial Analysis with Full Incentives[6]



	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Cost Avoidance (x 1,000)	$-	$216	$302	$391	$409	$464	$471	$478	$485	$493
Incentive (x 1,000)	$237	$133	$43	$5	$30	$-	$-	$-	$-	$-
EMO Initiative (x 1,000)	$(899)	$(400)	$(403)	$(400)	$(400)	$-	$-	$-	$-	$-
Net Cashflow (x 1,000)	$(662)	$(51)	$(59)	$(3)	$39	$464	$471	$478	$485	$493

6 This plan assumes that electrical cost will increase at a rate of 4.65% annually. This represents an increase of 1.65% over the assumed general inflation rate of 3%, for projected increase in electrical budget requirement of $3.6 million over 10 years ($900,000 over 5 years).

Keys to Success & Verification

This Plan is a living document and requires periodic updates and review of the EMOs implemented, in order to verify performance. Each individual element and phase of the Plan requires targets for implementation, as well as a method for verifying level of performance in meeting specific target.

Verification of funding availability[7] will be reviewed on an annual basis to confirm the adequacy in meeting the expenditures required. Shortfalls (if any) will be documented and mitigation strategies developed to minimize the impact on targets.

Each phase of this Plan plays an integral role in its success. By assigning individual(s) responsibility and pre-determining timelines and milestones for completion, this Plan can be effectively implemented within the annually-approved funding envelop, so that the desired results are achieved. Refer to Appendix-F for further details.

7 From operations budget and incentives

Conclusion

This Plan targets annual reduction in electrical and natural gas by 3,113 MWh (11%) and 212,696 m3 (9%) respectively when compared to the Baseline year (2013 normalized). These energy usage avoidances will result in 652 tonnes of CO2e (10%) being diverted from the environment per year, which is equivalent to removing 124 cars or light trucks from use annually. The cumulated amount of GHG diverted from the environment over the Term of the Plan would be 2,100 tCO2e, which is the amount 397 vehicles produce in one year.

To meet these targets, EMOs such as Capital Projects, Retro-Commissioning, EMIS, update of the Energy Audit (Year 4) and Employee Awareness Programs will be implemented. These EMOs require funding of $2.5 million over the Term of the Plan. Over the 10 year Plan Life Cycle, these investments are projected to result in total normalized energy cost avoidances of approximately $3.6 million and an overall net investment value of $1.6 million ($617,000 Net Present Value) assuming incentive programs are renewed past 2015. This represents an overall simple payback of just under 5 years (under 5.5 years without incentives past 2015).

As the nature of the Plan relies on energy cost avoidance to validate payback on investment, and for ongoing investment, the Plan includes implementation of the EMIS to ensure that targets are being met.

This Plan fulfills the College's regulatory requirements under the Green Energy Act, provides a roadmap for stabilizing and reducing overall operational costs as energy prices increase, provides a self-sustaining long term energy conservation strategy, and promotes a high-performing and sustainable college.

Appendix-A: Facility Information

Table A-1: Facility Info[8]

Campus/Facility Name	Address	Area (GSF)	Owned / Leased	Associated Activity Code
DELHI CRC	Delhi - 253 James St., Unit 3	1,101	Leased	1
"Y" Building	London - 1000 Air Ontario Drive	81,400	Owned	1, 2 & 3
“A” Building	London - 1001 Fanshawe College Blvd	120,912	Owned	1, 2, 3 & 6
“B” Building	London - 1001 Fanshawe College Blvd	199,385	Owned	1, 2, 3 & 6
“C” Building	London - 1001 Fanshawe College Blvd	72,902	Owned	1, 2, & 3
“D” Building	London - 1001 Fanshawe College Blvd	239,302	Owned	1, 2, 3 & 6
“E” Building	London - 1001 Fanshawe College Blvd	49,457	Owned	1, 2, 3 & 6
“F” Building	London - 1001 Fanshawe College Blvd	86,466	Owned	1, 2, 3 & 6
“G” Building	London - 1001 Fanshawe College Blvd	30,821	Owned	1, 2, 3 & 6
“H” Building	London - 1001 Fanshawe College Blvd	77,138	Owned	1, 2 & 3
“J” Building	London - 1001 Fanshawe College Blvd	98,443	Owned	1, 2, 3, 5, & 6
“K” Building	London - 1001 Fanshawe College Blvd	13,370	Owned	1, 2, & 3
“L” Building	London - 1001 Fanshawe College Blvd	40,893	Owned	1, 2, 3 & 6
“M” Building	London - 1001 Fanshawe College Blvd	91,505	Owned	1, 2, 3 & 6
“N” Building	London - 1001 Fanshawe College Blvd	4,025	Owned	1, 2, & 3
“R1” Residence	London - 1001 Fanshawe College Blvd	150,018	Owned	1, 2 & 4
“R2” Residence	London - 1001 Fanshawe College Blvd	142,164	Owned	1 & 4
“R3” Residence	London - 1001 Fanshawe College Blvd	154,886	Owned	4
“SC” Building	London - 1001 Fanshawe College Blvd	50,717	Owned	1 & 2
“SUB” Building	London - 1001 Fanshawe College Blvd	24,792	Owned	1 & 2
“T” Building	London - 1001 Fanshawe College Blvd	111,669	Owned	1, 2, 3 & 6
"LD-A" Building	London - 137 Dundas Street	58,598	Owned	1, 2, 3 & 6
LSD-NELSON PLAZA	London - 155 Clark Rd	2,535	Leased	1 & 2
"Z" Building	London – 1764 Oxford Street E	149,866	Owned	1, 2, 3 & 6
2 Cuddy Facility	London – 2 Cuddy Court	45,456	Owned	2
CITI Plaza	London - 355 Wellington Rd (Units 113, 114, & part 110, 112)	16,557	Leased	2
“R4” (12 Buildings)	London – 900 Fanshawe College Blvd	134,625	Owned	4
JNA Campus Simcoe	Simcoe – 634 Ireland Road	31,774	Owned	1, 2, 3 & 6
St. Thomas Elgin Campus	St. Thomas – 120 Bill Martyn Parkway	45,132	Owned	1, 2, 3 & 6
Cuddy Farm	Strathroy - 28443 Centre Rd. RR5	6,501	Owned	3
Oxford County Campus	Woodstock – 369 Finkle Street	17,674	Owned	1, 2, 3 & 6
Total	**42**	**2,350,083**		

8 Current as of commencement of Plan Term (April 1, 2014)

Table A-2: Activity Code

Activity Code	Description
1	Administrative offices and related facilities
2	Classrooms and related facilities
3	Laboratories
4	Student residences that have more than three storeys or a building area of more than 600 square metres
5	Student recreational facilities and athletic facilities
6	Libraries
7	Parking garages (not applicable)

Appendix-B: Energy Usage

Table B-1: 2012 Usage Data

Building	Electrical Usage (MWh)	Natural Gas Usage (eMWh)	Total Energy (eMWh)	Natural Gas Usage (M3)	Total GHG (tCO2e)
Cuddy Farm	49	48	97	4,609	13
ELGN-STT	753	991	1,744	95,759	253
LC-A	2,031	902	2,933	87,133	360
LC-B	2,092	1,280	3,372	123,684	435
LC-C	499	275	774	26,592	98
LC-D	4,138	3,989	8,127	385,416	1,126
LC-E	928	0	928	0	89
LC-F	1,507	454	1,961	43,860	228
LC-G	518	41	559	3,926	57
LC-H	1,376	326	1,703	31,533	192
LC-J	1,352	540	1,892	52,199	229
LC-K	177	111	288	10,751	37
LC-L	508	0	508	0	49
LC-M	1,782	447	2,229	43,215	253
LC-N	168	272	440	26,244	66
LC-R1	1,193	967	2,160	93,471	291
LC-R2	1,230	758	1,988	73,281	257
LC-R3	1,329	957	2,287	92,472	303
LC-R4	594	526	1,120	50,823	153
LC-SC	813	278	1,091	26,893	129
LC-Signage	10	0	10	0	1
LC-SUB	558	507	1,066	49,029	146
LC-T	1,685	712	2,396	68,760	292
LC-Z (1764)	1,678	1,449	3,127	140,001	426
LD-A (137 Dundas)	124	740	864	71,523	147
LSD-CITI PLAZA	221	0	221	0	21
LSD-NELSON PLAZA	64	43	107	4,185	14
MDLSX-CUDCRT	364	406	770	39,228	109
NORF-Delhi, 253 James	2	2	4	228	1
NORF-Delhi, 254 James	0	2	2	228	0
NORF-Delhi, 255 James	6	5	12	518	2
NORF-JNA	429	269	698	25,981	90
OXF-WOOD	310	152	461	14,648	57
Total	**28,488**	**17,452**	**45,941**	**1,686,189**	**5,924**

Table B-2: 2013 Usage Data

Building	Electrical Usage (MWh)	Natural Gas Usage (eMWh)	Total Energy (eMWh)	Natural Gas Usage (M3)	Total GHG (tCO2e)
Cuddy Farm	47	76	124	7,382	19
ELGN-STT	654	845	1,499	81,634	217
LC-A	1,981	1,004	2,985	96,982	374
LC-B	1,996	1,511	3,507	145,995	468
LC-C	617	236	853	22,799	102
LC-D	4,036	5,278	9,313	509,912	1,352
LC-E	905	0	905	0	87
LC-F	1,469	569	2,038	54,966	245
LC-G	592	80	672	7,730	71
LC-H	1,373	409	1,782	39,519	207
LC-J	1,393	613	2,006	59,230	246
LC-K	176	159	335	15,375	46
LC-L	496	0	496	0	48
LC-M	1,756	618	2,373	59,661	281
LC-N	166	375	541	36,232	84
LC-R1	1,238	1,042	2,280	100,687	309
LC-R2	1,282	1,088	2,370	105,163	322
LC-R3	1,375	1,212	2,586	117,068	353
LC-R4	562	1,312	1,874	126,764	294
LC-SC	838	316	1,153	30,515	138
LC-Signage	10	0	10	0	1
LC-SUB	545	674	1,218	65,111	175
LC-T	1,607	838	2,445	80,969	307
LC-Y	179	0	179	0	17
LC-Z (1764)	1,665	1,715	3,380	165,707	473
LD-A (137 Dundas)	223	746	969	72,101	158
LSD-CITI PLAZA	221	0	221	0	21
LSD-NELSON PLAZA	42	28	71	2,739	9
MDLSX-CUDCRT	314	284	599	27,477	82
NORF-Delhi, 255 James	3	11	14	1,081	2
NORF-JNA	458	299	757	28,886	99
OXF-WOOD	324	207	531	20,042	69
Total	**28,540**	**21,546**	**50,087**	**2,081,727**	**6,677**

Appendix-C: Renewable Energy Generation

Existing Renewable Energy

The College has several generators of renewable energy in the form of solar electrical and thermal heating (water). Table 24a shows details regarding the existing current renewable energy generation at the College.

Table C-1: Renewable Energy (Existing)

EMO Package Details	Capital Expenditure	Cost Avoidance / Year	Annual Elec Avoidance (MWh) / Year	Elec Peak Avoidance (kW)	Natural Gas Avoidance (M3) / Year	GHG Avoidance (tCO2e) / Year	Completion Date
"B" Building Solar Research	$50,000	$99	2	1	0	0.1	2010
"Z" Building Solar Hot Water	$30,000	$1,210	0	0	5,500	10.4	2011
St. Thomas Solar PV (10kW Dual Arrays)	$6,500	$1,096	19	10	0	1.5	2013
Total	**$86,500**	**$2,405**	**20.36**	**10.8**	**5,500**	**12.0**	

St. Thomas Campus Solar Arrays:

This project included the installation of a dual tracking 10kW solar PV Array system at the St. Thomas Elgin Campus. This system was installed in 2013 and generates approximately 17MWh of electricity to offset the usage at this campus.

"Z" Building Solar Hot Water:

In 2011 "Z" Building was expanded and renovated to house the College's Centre for Applied Transportation Technology (CATT), and was equipped with a solar domestic hot water system. This system is estimated to offset the equivalent of 5,500 m3 of natural gas per year (72 MMBtu/year).

"B" Building Solar PV Research:

In 2010 the College's Applied Research department, in cooperation with Campus Planning & Capital Development, installed two dual axis tracking Solar PV Arrays. This system is connected to "B" Building electrical grid, to supplement usage, and is equipped with a battery bank; however, the primary purpose for the system is for research. Both of the arrays contain 2 x 200w solar panels each and is complete with a 10kW inverter, located in B1030. It is estimated that the maximum electrical generation per year is around 1.68 MWh.

Renewable Energy Capital Projects:

Several EMOs where identified for candidates for renewable energy implementation. These included Solar Hot Water heating at the St. Thomas Elgin Campus, and Solar Pre-Heating of make-up air for 2 make-up air units in “G” Building. Table 24b shows details regarding these initiatives.

Table C-2: Renewable Energy (Future)

EMO Package Details	Capital Expenditure	Cost Avoidance / Year	Annual Elec Avoidance (MWh) / Year	Elec Peak Avoidance (kW)	Natural Gas Avoidance (M3) / Year	GHG Avoidance (tCO2e) / Year	Anticipated Completion Date
Solar Water Heating for DHW and System Reheat	$36,750	$6,670	0	0	30,489	58	2015
Install Solar Pre-Heating Duct System on the Roof for the Two (2) MUA "G" Building	$15,120	$1,028	6	1	1,150	3	2018
Total	**$50,682**	**$8,300**	**6**	**1**	**33,304**	**61**	

Appendix-D: EMO Details

Table D-1: In-Progress (2014) Details

EMO Category / Building	Capital Expenditure	Cost Avoidance / Year	Annual Elec Avoidance (MWh) / Year	Elec Peak Avoidance (kW)	Natural Gas Avoidance (M3) / Year	Total Energy Avoidance (eMWh) / Year	GHG Avoidance (tCO2e) / Year
.01 EMO Capital Expenditure	**$1,402,168**	**$305,272**	**2,261**	**387**	**43,008**	**2,706**	**262**
ELGN-STT	$20,750	$15,073	123	14	-270	120	9
LC-A	$56,000	$8,771	51	9	10,882	164	25
LC-All	$4,000	$58,299	477	43	0	477	38
LC-B	$217,815	$28,003	218	76	0	218	17
LC-G	$1,250	$4,628	38	4	79	38	3
LC-J	$394,850	$58,106	454	113	4,272	498	44
LC-M	$6,802	$7,234	28	0	17,854	212	36
LC-Res	$38,722	$10,930	90	3	0	90	7
LC-SC	$56,657	$19,623	160	19	97	161	13
LC-SUB	$31,750	$1,709	7	2	3,632	45	7
LC-Z (1764)	$10,901	$8,465	67	16	0	67	5
LD-A (137 Dundas)	$250,220	$37,941	228	25	0	228	18
MDLSX-CUDCRT	$37,500	$7,744	46	13	-1,345	32	1
NORF-JNA	$204,351	$26,272	186	27	8,979	279	32
OXF-WOOD	$70,600	$12,474	87	22	-1,172	75	5
.03 EMO EMIS	**$14,500**	**$24,550**	**192**	**61**	**0**	**192**	**15**
ALL	$14,500	$24,550	192	61	0	192	15
.04 EMO Energy Audit	**$270,253**	**$0**	**0**	**0**	**0**	**0**	**0**
ALL	$270,253	$0	0	0	0	0	0
.05 EMO Employee Awareness & Outreach	**$9,200**	**$17,676**	**140**	**37**	**0**	**140**	**11**
ALL	$9,200	$17,676	140	37	0	140	11
Grand Total	**$1,696,121**	**$347,498**	**2,593**	**484**	**43,008**	**3,038**	**289**

Table D-2: Year 1 (2015) Details

EMO Category / Building	Capital Expenditure	Cost Avoidance / Year	Annual Elec Avoidance (MWh) / Year	Elec Peak Avoidance (kW)	Natural Gas Avoidance (M3) / Year	Total Energy Avoidance (eMWh) / Year	GHG Avoidance (tCO2e) / Year
.01 EMO Capital Expenditure	**$374,048**	**$81,140**	**519**	**92**	**70,627**	**1,250**	**175**
ELGN-STT	$88,830	$18,358	58	7	50,276	579	100
LC-A	$683	$232	2	0	0	2	0
LC-B	$46,270	$13,146	108	0	0	108	9
LC-G	$2,205	$2,707	21	3	168	23	2
LC-J	$22,365	$13,162	104	12	794	112	10
LC-M	$43,933	$6,464	52	0	412	57	5
LC-SUB	$1,131	$221	0	0	1,003	10	2
LC-Z (1764)	$1,785	$714	5	0	361	9	1
OXF-WOOD	$8,085	$2,655	21	2	86	22	2
LC-D	$123,166	$10,825	76	56	874	85	8
LC-E	$683	$250	2	0	0	2	0
LC-F	$6,930	$1,360	11	0	0	11	1
LC-H	$788	$274	2	0	0	2	0
LC-K	$2,035	$418	3	1	90	4	0
LC-L	$263	$91	1	0	0	1	0
LC-N	$3,507	$1,313	10	5	62	10	1
LC-T	$3,150	$2,246	5	0	7,261	80	14
LC-C	$9,870	$1,977	16	0	0	16	1
LC-R2	$4,171	$2,555	11	7	4,514	58	9
LC-R3	$4,200	$2,170	9	0	4,725	58	10
.02 EMO Retro-Commisioning	**$220,500**	**$78,533**	**594**	**29**	**24,616**	**848**	**94**
LC-M	$52,500	$15,045	117	6	2,868	147	15
LC-Z (1764)	$62,580	$19,248	140	7	9,234	235	29
LC-D	$105,420	$44,240	337	16	12,514	466	51
.03 EMO EMIS	**$294,000**	**$52,742**	**358**	**113**	**28,500**	**653**	**83**
ALL	$294,000	$52,742	358	113	28,500	653	83
.05 EMO Employee Awareness & Outreach	**$10,500**	**$3,686**	**26**	**6**	**1,900**	**45**	**6**
ALL	$10,500	$3,686	26	6	1,900	45	6
.06 EMO Incentive Program	**$0**	**$0**	**0**	**0**	**0**	**0**	**0**
ALL	$0	$0	0	0	0	0	0
Grand Total	**$899,048**	**$216,100**	**1,497**	**239**	**125,642**	**2,798**	**357**

Table D-3: Year 2 (2016) Details

EMO Category / Building	Capital Expenditure	Cost Avoidance / Year	Annual Elec Avoidance (MWh) / Year	Elec Peak Avoidance (kW)	Natural Gas Avoidance (M3) / Year	Total Energy Avoidance (eMWh) / Year	GHG Avoidance (tCO2e) / Year
.01 EMO Capital Expenditure	**$363,530**	**$78,072**	**556**	**58**	**34,918**	**918**	**111**
ELGN-STT	$6,300	$521	3	0	784	11	2
LC-A	$3,360	$353	0	0	1,603	17	3
LC-B	$7,140	$931	8	0	0	8	1
LC-G	$16,595	$3,761	30	4	0	30	2
MDLSX-CUDCRT	$1,838	$206	0	0	936	10	2
OXF-WOOD	$3,465	$373	3	0	0	3	0
LC-E	$103,005	$15,409	124	0	0	124	10
LC-H	$20,213	$4,524	36	0	0	36	3
LC-L	$65,625	$10,115	74	0	4,289	118	14
LC-T	$2,100	$287	1	0	544	7	1
LC-C	$29,925	$5,689	43	14	0	43	3
LC-R1	$56,280	$20,341	136	32	12,074	261	34
LC-R2	$27,300	$8,522	55	3	7,344	131	18
LC-R3	$20,385	$7,040	43	4	7,344	119	17
.03 EMO EMIS	**$26,250**	**$0**	**0**	**0**	**0**	**0**	**0**
ALL	$26,250	$0	0	0	0	0	0
.05 EMO Employee Awareness & Outreach	**$10,500**	**$3,740**	**26**	**6**	**1,900**	**45**	**6**
ALL	$10,500	$3,740	26	6	1,900	45	6
Grand Total	**$400,280**	**$81,811**	**582**	**64**	**36,818**	**963**	**116**

Table D-4: Year 3 (2017) Details

EMO Category / Building	Capital Expenditure	Cost Avoidance / Year	Annual Elec Avoidance (MWh) / Year	Elec Peak Avoidance (kW)	Natural Gas Avoidance (M3) / Year	Total Energy Avoidance (eMWh) / Year	GHG Avoidance (tCO2e) / Year
.01 EMO Capital Expenditure	**$244,376**	**$43,445**	**306**	**63**	**14,837**	**460**	**53**
LC-G	$47,534	$6,204	46	21	-558	40	3
LC-SC	$14,175	$4,899	38	4	0	38	3
LC-Z (1764)	$10,500	$2,099	17	0	0	17	1
LC-D	$2,457	$676	5	1	0	5	0
LC-E	$25,687	$2,789	8	0	8,017	91	16
LC-H	$60,900	$7,951	63	0	0	63	5
LC-N	$1,523	$612	0	0	2,784	29	5
LC-C	$31,868	$3,874	23	0	4,594	70	11
LC-R1	$13,193	$2,925	23	0	0	23	2
LC-R2	$26,040	$8,741	68	6	0	68	5
LC-R3	$10,500	$2,674	15	31	0	15	1
.02 EMO Retro-Commisioning	**$122,220**	**$38,037**	**283**	**14**	**9,368**	**380**	**40**
LC-B	$85,260	$27,506	205	10	6,286	270	28
LC-H	$36,960	$10,531	77	4	3,082	109	12
.03 EMO EMIS	**$26,250**	**$0**	**0**	**0**	**0**	**0**	**0**
ALL	$26,250	$0	0	0	0	0	0
.05 EMO Employee Awareness & Outreach	**$10,500**	**$3,795**	**26**	**6**	**1,900**	**45**	**6**
ALL	$10,500	$3,795	26	6	1,900	45	6
Grand Total	**$403,346**	**$85,276**	**615**	**83**	**26,105**	**885**	**99**

Table D-5: Year 4 (2018) Details

EMO Category / Building	Capital Expenditure	Cost Avoidance / Year	Annual Elec Avoidance (MWh) / Year	Elec Peak Avoidance (kW)	Natural Gas Avoidance (M3) / Year	Total Energy Avoidance (eMWh) / Year	GHG Avoidance (tCO2e) / Year
.01 EMO Capital Expenditure	**$48,365**	**$7,953**	**47**	**9**	**7,482**	**125**	**18**
LC-G	$15,120	$1,024	6	1	1,150	18	3
LC-SUB	$12,449	$2,401	11	0	4,729	60	10
LC-C	$5,460	$1,051	6	0	986	16	2
LC-R1	$1,833	$773	6	0	0	6	0
LC-R3	$13,503	$2,704	18	8	618	25	3
.03 EMO EMIS	**$26,250**	**$0**	**0**	**0**	**0**	**0**	**0**
ALL	$26,250	$0	0	0	0	0	0
.04 EMO Energy Audit	**$315,000**	**$0**	**0**	**0**	**0**	**0**	**0**
ALL	$315,000	$0	0	0	0	0	0
.05 EMO Employee Awareness & Outreach	**$10,710**	**$4,072**	**27**	**6**	**1,900**	**47**	**6**
ALL	$10,500	$3,850	26	6	1,900	45	6
LC-M	$210	$222	2	0	0	2	0
Grand Total	**$400,325**	**$12,026**	**74**	**14**	**9,382**	**172**	**24**

Table D-6: Year 5 (2019) Details

EMO Category / Building	Capital Expenditure	Cost Avoidance / Year	Annual Elec Avoidance (MWh) / Year	Elec Peak Avoidance (kW)	Natural Gas Avoidance (M3) / Year	Total Energy Avoidance (eMWh) / Year	GHG Avoidance (tCO2e) / Year
.01 EMO Capital Expenditure	**$363,570**	**$45,126**	**320**	**24**	**13,121**	**455**	**50**
LC-F	$186,165	$19,104	131	0	9,190	226	28
LC-N	$4,971	$811	0	0	3,646	38	7
LC-R1	$765	$463	1	8	285	4	1
LC-R2	$92,920	$14,469	109	8	0	109	9
LC-R3	$78,750	$10,278	77	8	0	77	6
.03 EMO EMIS	**$26,250**	**$0**	**0**	**0**	**0**	**0**	**0**
ALL	$26,250	$0	0	0	0	0	0
.05 EMO Employee Awareness & Outreach	**$10,500**	**$3,907**	**26**	**6**	**1,900**	**45**	**6**
ALL	$10,500	$3,907	26	6	1,900	45	6
Grand Total	**$400,320**	**$49,033**	**345**	**30**	**15,021**	**501**	**56**

Appendix-E: Glossary of Terms & Conversions

ASHRAE	American Society of Heating, Refrigeration, and Air Conditioning Engineers
British Thermal Units (BTU):	The unit of heat in the imperial system can be defined in two ways: The amount of heat required to raise the temperature of one pound of water through 1oF (58.5oF - 59.5oF) at sea level (30 inches of mercury). 1 BTU = 1055.06 J = 107.6 kpm = 2.931 10-4 kWh = 0.252
Cost/Energy Saving:	The cost/energy savings as result of implementation of EMOs imply cost avoidance
Cooling Degree Day (CDD)	Degree days are calculated by the average temperature above or below the base temperature (exterior temperature where heating or cooling is not required depending on desired interior temperature) times the number of days. For example assuming base temperature of 72dF and average exterior temperature of 52df for 5 days, the HDD = (72-52) x 5 = 100 HDD for that period (F days/year).
EMO	Energy Management Opportunity
Gigajoule (GJ)	The unit of heat in the SI-system the Joule is: The mechanical energy which must be expended to raise the temperature of a unit weight (2 kg) of water from 0oC to 1oC, or from 32oF to 33oF. 1 J (Joule) = 0.1020 kpm = 2.778 10-7 kWh = 2.389 10-4 kcal = 0.7376 ft.lbf = 1 kg.m2/s2 = 1 watt second = 1 Nm = 1 ft.lb = 9.478 10-4 Btu
GHG Emission Factors	GHG Emission Conversion Factors: 1890.63 gCO2/m3 of NG and 80 gCO2/kWh.
Heating Degree Day (HDD)	See note for Cooling Degree Day
HVAC	Heating Ventilation and Air-conditioning
Kilowatt Hour (kWh)	Is the amount of power consumed/generated over a period of one hour
Megawatt hour (MWh)	1 MWh = 1,000 kWh
LED	Light Emitting Diode
Simple Payback	Simple Payback is calculated by total expenditure / annual cost savings. Simple payback doesn't take into consideration increase in energy costs over the years or inflation.

Appendix-F: Action Items

Table F-1: Action Items

Item Description	Key Milestone Description	Target Date	Action By:	Description of Target for Verification	Method for Verification of Performance	Verified by:	Results & Next Steps:
EMO Projects for 2014	Projects Completed and in service by Dec. 31, 2014	31-Dec-14	Energy Coordinator	Energy Management as noted in Plan.	Individual Project M&V. Baseline to be adjusted for individual buildings to suite target period (tbd following completion). Follow IMVP protocol where possible.		
Budget for Year 1 (EMO Initiatives 2015)	Approval by July 1, 2014	1-Jul-14	College SLC	Confirm Budget Approval	Written confirmation of amount approved.		
Energy Team	Determine Team and commence Meetings	1-Sep-14	Energy Coordinator	Team has been determined and schedule for Tri-annual (once per semester meetings) have been setup.	Team approval minutes of meetings.		
EMIS Phase 2	System infrastructure installed and software commissioned	31-Mar-15	Energy Coordinator	System is in operation and provide data, notifications, and reports.	Baseline to be adjusted in individual buildings to suite target period (tbd following completion). Follow IMVP protocol where possible. Reports are delivered.		
EMO Projects for 2015 Implemented	Projects Completed and in service by March 31, 2015	31-Mar-15	Energy Coordinator	Energy Management as noted in Plan.	Individual Project M&V. Baseline to be adjusted in individual buildings to suite target period (tbd following completion). Follow IMVP		

Item Description	Key Milestone Description	Target Date	Action By:	Description of Target for Verification	Method for Verification of Performance	Verified by:	Results & Next Steps:
					protocol where possible.		
Budget for Year 2 (EMO Initiatives 2016)	Approval by March 31, 2015	31-Mar-15	College SLC	Confirm Budget Approval	Written confirmation of amount approved.		
EMO Projects for 2016 Implemented	Projects Completed and in service by March 31, 2016	31-Mar-16	Energy Coordinator	Energy Management as noted in Plan.	Individual Project M&V. Baseline to be adjusted in individual buildings to suite target period (tbd following completion). Follow IMVP protocol where possible.		
Budget for Year 3 (EMO Initiatives 2017)	Approval by March 31, 2016	31-Mar-16	College SLC	Confirm Budget Approval	Written confirmation of amount approved.		
EMO Projects for 2017 Implemented	Projects Completed and in service by March 31, 2017	31-Mar-17	Energy Coordinator	Energy Management as noted in Plan.	Individual Project M&V. Baseline to be adjusted in individual buildings to suite target period (tbd following completion). Follow IMVP protocol where possible.		
Budget for Year 4 (EMO Initiatives 2018)	Approval by March 31, 2017	31-Mar-17	College SLC	Confirm Budget Approval	Written confirmation of amount approved.		
EMO Projects for 2018 Implemented	Projects Completed and in service by March 31, 2018	31-Mar-18	Energy Coordinator	Energy Management as noted in Plan.	Individual Project M&V. Baseline to be adjusted in individual buildings to suite target period (tbd following completion). Follow IMVP protocol where possible.		

Item Description	Key Milestone Description	Target Date	Action By:	Description of Target for Verification	Method for Verification of Performance	Verified by:	Results & Next Steps:
Energy Audit	Incentives Confirmed and Audit Commenced	31-Mar-18	Energy Coordinator	Energy Audit Complete	Review of Report and Incentives Obtained.		
Budget for Year 5 (EMO Initiatives 2019)	Approval by March 31, 2018	31-Mar-18	College SLC	Confirm Budget Approval	Written confirmation of amount approved.		
EMO Projects for 2019 Implemented	Projects Completed and in service by March 31, 2019	31-Mar-19	Energy Coordinator	Energy Management as noted in Plan.	Individual Project M&V. Baseline to be adjusted in individual buildings to suite target period (tbd following completion). Follow IMVP protocol where possible.		
Update of Plan v2.0 (2019-2023)– Draft	Updated plan required by O.Reg 397/11 following 5 years. Complete draft for review September 2018.	Complete Draft by Sept 2018	Energy Coordinator	Draft Plan v2.0 Completed	Draft reviewed by Energy Team, and presented for review by Senior Management		
Update of Plan v2.0 (2019-2023) – final	Plan Approved and Published	30-Jun-19	Energy Coordinator	Final Plan v2.0 Completed	Plan Completed and Approvals received by Senior Management. Plan posted on College website as required by Regulation.		