COMMITTEE OF THE WHOLE (PUBLIC) **06 March 2018**
Report No. 18-022

Multi-Year Energy Management Plan 2017-2020

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PURPOSE:

1. To provide an update on the multi-year energy management plan for 2017-2020.

CONTEXT:

2. One of the major findings of the Ministry of Education's operational review of the Facilities' department was that management should establish a multi-year energy management plan that incorporates measures to be implemented and the tools to monitor and manage the plan.

   The energy management plan is an annually updated three-year plan that outlines the main factors for both energy management and energy conservation for the District. The multi-year energy management plan for 2017-2020 (attached as Appendix A), complements the Facility Renewal Plan (FRP) and School Condition Improvements (SCI) projects by implementing energy conservation initiatives for the District's existing buildings that may otherwise not be included as renewal priorities. New buildings and additions are designed to incorporate energy efficiency and conservation measures, wherever possible.

KEY CONSIDERATIONS:

3. *The Green Energy Act of Ontario* and Ontario Regulation 397/11 require public sector organizations to produce an energy conservation and demand management (CDM) Plan. The OCDSB submitted a five-year CDM plan in 2014 to meet this legislative requirement. The CDM plan describes methodology, energy management initiatives and implementation costs that are consistent with the District's multi-year energy management plan for 2017-2020.

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RESOURCE IMPLICATIONS:

4. The current multi-year energy plan for 2017-2020 commits to invest in energy efficiency projects estimated at $5,577,000 over the next 3 years.

   The implementation cost is to be funded over the next 3 years (including the current year) at approximately $1.8 million per year with projects listed within Report 17-075, Facilities Renewal Plan and School Condition Improvement (FRP/SCI) Project Plan 2017-2018 and Report 18-007, FRP/SCI Project Plan Update, along with savings in the utilities budget. The benefits attributed to these expenditures realized a reduction in utilities costs in operating budgets.

   The calculated cost avoidance from energy saving initiatives in fiscal year 2017 is $1,736,633 and the cost avoidance since 2009 in utilities to date is $6,194,303. (See item 15 in Appendix A and Appendix B).

   Revenues generated from the solar Feed-in-Tariff (FIT) program from 2010 to 2017 total $1,567,837 and should continue at an annual rate of $362,000 through fiscal year 2019-2020 (see Appendix C).

   The government and utilities incentives received to date from energy saving initiatives totals $790,843 in revenue.

COMMUNICATION/CONSULTATION ISSUES:

5. Over the years, there has been a focus across the District and the province on energy management and energy conservation. The District has been involved with several agencies and organizations to develop long and short term plans to reduce energy consumption, reduce greenhouse gas emissions and develop best practices on conservation and waste reduction.

   The Facilities energy management group has been collaborating with the Environmental Education Steering Committee to ensure that energy and environmental aspects are incorporated in the curriculum.

   Facilities staff is well represented on the Ontario Association of School Board Officials' (OASBO) Operations, Maintenance and Construction (OMC) committees, OMC's Energy Conservation sub-committee and with the Ministry of Education.

   To meet the requirements of the *Green Energy Act* Part 1, on 1 July 2013, public reporting of the District's utility consumption data was completed; reported to the Ministry of Energy and posted on the District website. On 1 July 2014, the District updated the utility consumption data, as required by the Ministry of Energy and Climate Change and developed the five-year plan required for the Part 2 reporting. The report reflects investments, initiatives and the expected reductions in energy consumption. The annual utility data and multi-year plan is available to the public through the District website as required by the Ministry of Energy and Climate Change.

STRATEGIC LINKS:

6. Enhancing operational practices to effectively and responsibly manage human and financial resources in support of students, as well as smart energy use and sound environmental practices are activities that contribute to the District's goal of stewardship.

GUIDING QUESTIONS:

7. The following questions are provided to support the discussion of this item by the Committee:

    - Why is the multi-year energy plan important to environmental sustainability?
    - How does this plan help the District to achieve reductions in energy and greenhouse gas emissions?
    - How does the District foster environmental stewardship in students and staff?

Michael Carson Chief Financial Officer	Jennifer Adams Director of Education and Secretary of the Board

APPENDICES

Appendix A Multi-Year Energy Management Plan 2017-2020
Appendix B Cost Avoidance Report
Appendix C Fit and Micro Fit Solar Account Summary
Appendix D Energy Management Initiatives Plan

Appendix A to Report 18-022

Multi-Year Energy Management Plan 2017-2020

FACILITIES DEPARTMENT

Multi-Year Energy Management Plan

2017 -2020

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Introduction

1. The Ottawa Carleton District School Board's (OCDSB) strategic plan allows the development of Departmental work plans to support the five key priority areas of Well-being, Engagement, Equity, Learning and Stewardship. Part of the Facilities Department Work Plan is to develop an awareness of our energy usage and environmental issues and to develop strategies leading to the reduction of the OCDSB's energy consumption and Greenhouse Gas Emissions by:
    a Reduction or elimination of activities with negative environmental impacts
    b Recognition of positive measures provided by OCDSB staff and students
    c Development of short and long term strategies to improve OCDSB practices

Department Objective

2. The Facilities department is dedicated to providing leadership in the areas of energy management and conservation, waste management and environmental stewardship through its Energy Management and Conservation division (EMC).

3. In our daily activities we strive to promote energy management, environmental stewardship, sustainability principles and ecological literacy amongst all staff and students. We are committed to viewing all actions through an environmental lens and to heighten awareness about the impact of human actions on the environment by introducing and implementing innovative programs.

4. We work as a collaborative energy and environmental advisor to support other departments and individual schools throughout the District with informed practices and to safeguard and enhance the Board's physical plant and infrastructure.

5. EMC acts under the direction of the Supervisor of Maintenance and Energy Management. Our specific core functions include;
    a. Budgeting and tracking of utilities
    b. Gas and Electricity procurement
    c. Energy performance tracking & conservation targets
    d. Building Automation System (BAS) integration and scheduling
    e. Commissioning and re-commissioning
    f. Waste and recycling management
    g. Solar power generation
    h. Development and implementation of an energy management initiatives plan
    i. Energy incentives and rebates
    j. Support environmental stewardship through EcoSchools and in collaboration with Curriculum Services.
    k. Ensuring the Board's compliance with the Green Energy Act, OReg 397/11 and ORegs 102/103
    l. Sustainability Initiatives

Planning Process

6. Energy management and conservation planning process is a continuous evolving process, which will require a yearly cycle to ensure that the overall strategic goals for the District and departmental objectives are met. The figure below outlines the process.

Budgeting and Tracking of Utilities

7. Details from all energy bills (electricity, natural gas, propane and water) from local distributing companies and suppliers are presently entered into the Utility Bill Consumption Software – EnergyCAP/RETScreen. The software is used to tabulate cost and monitor energy consumption. Prior to the formation of the EMC division and acquisition of this software, the process of verifying invoices was extremely time consuming and in some cases, need to be done on a sampling basis. Since the bill verification process started in 2010, EMC has been able to identify various billing errors and has been successful in recouping payments of approx. $410,000 for the Board. Billing errors are discovered during the verification process and follow up is done with the Utilities companies to ensure corrections are made on subsequent billings.

8. Forecasting of utilities costs for each facility are performed annually and submitted for budgeting purposes. Projected annual rate increases from the utilities companies are factored in when forecasting the next fiscal year's energy costs. Other factors that affect costs (usually a cost increase) but are not taken into account during budgeting because of their unpredictability include: heating/cooling degree days (a measure of the severity of outdoor temperatures throughout the year), increases in floor areas (new schools, additions and portables), increased hours of operation through community use of schools, and increased consumption due to construction activity. In addition, where older basic buildings have been eliminated, most new buildings, additions and retrofitted buildings are equipped with extensive mechanical systems and air conditioning which has a further negative effect on electricity usage.

9. Energy prices have fluctuated substantially in response to world and national events. For the FY 2017, the electricity unit cost is projected to increase by 8% and water is projected to increase by 6%. The natural gas unit cost is expected to remain stable or go down marginally due to changes in the District's gas procurement process and the introduction of shale gas.

Gas Procurement

10. The District was part of the Ottawa-Carleton Purchasing Group (OCEPG) until October 31, 2014. However, our commitment to purchase gas through the OCEPG continued until October 31, 2017. Since moving to the service offered by Catholic School Board Services Association (CSBSA) and now transferred to the Ontario Education Collaborative Marketplace (OECM), the District has been able to tailor its purchasing to maximize savings. While the gas pricing was very favorable, in the spring/summer 2017 the District was successful in locking in all of its current commodity volume from November 1, 2017 to August 31, 2020 at prices lower than we have not seen in decades. The commodity savings will more than offset the increase in delivery charges by Enbridge and will result in a gas budget cost reduction.

Electricity Procurement

11. The sum of the electricity pricing remains fairly stable. Whenever the cost of electricity is lower, global adjustment is increase and vice versa. This relatively stable rate includes an increase of approx. 5% per year. Offsetting reduction in the electricity budget can only be achieved through substantial conservation efforts and/or energy generation.

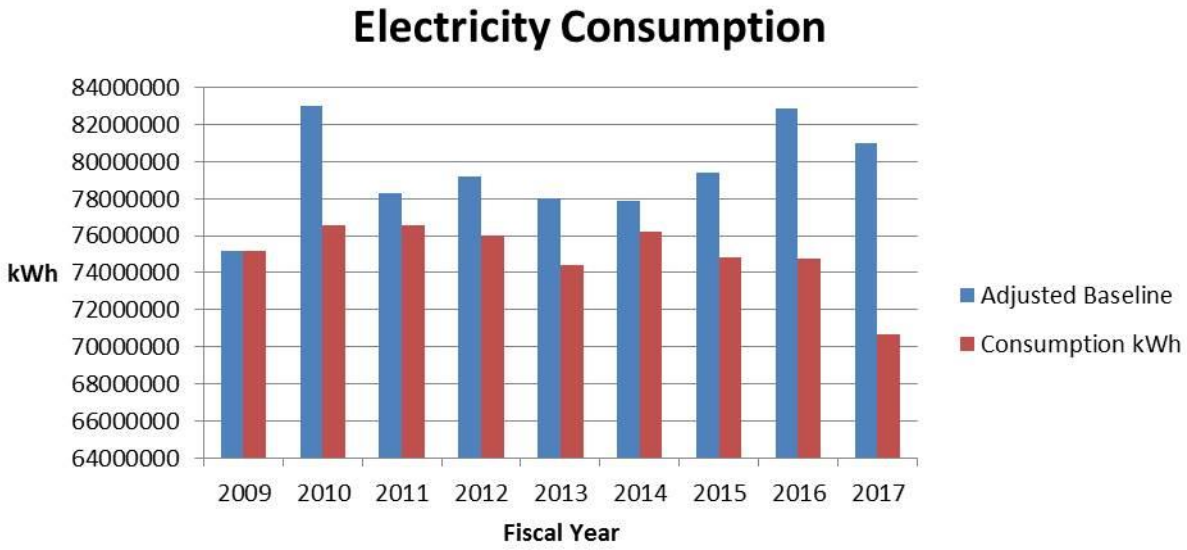
Energy Performance Tracking and Conservation Target

12. Energy cost and consumption data is currently being tracked in several ways, such as live monitoring through the building automation systems and via a database of on-site meter readings. As well, details from all energy bills (including electricity, natural gas, propane and water) from local distributing companies and suppliers are entered into the Utility Bill Consumption Software (EnergyCAP). The software allows us to audit and analyze the data, produce summary reports and 'benchmark' the individual facilities. Benchmarking is a tool used to evaluate a facilities performance and identify areas and facilities with the greatest opportunities for energy conservation and cost savings.

13. In addition, through the Energy Management and Conservation Initiative from the Ministry of Education (MOE), Aegent Energy Advisors, the consulting firm working on behalf of the MOE, populates gas and electricity data from all Ontario Local Distribution Companies (LDC) into a Utilities Consumption Database (UCD). All data is accessible through a central website (province wide) which the Ministry of Education is funding. This program is used to help generate the annual consumption reports mandated by the Green Energy Act. This legislation also requires each Board to submit a 5 year Conservation and Demand Management Plan. These reports are posted on our OCDSB website, as required by the legislation.

14. Energy Use Intensity (EUI) is an indication of overall energy efficiency. It is expressed as the energy consumption per area or equivalent kWh per square meter and takes into account both heating energy and electricity. When comparing FY 2017 to the previous year, we show a reduction in EUI of 9.9%, a clear indication of the positive impact of the energy saving initiatives. We continue to meet and exceed our annual reduction targets.

15. Through the ongoing energy performance tracking we are able to identify the benefit of work done since FY 2009 baseline year. From the consumption numbers we calculate a cost avoidance of $1,736,633 for FY 2017 year and a cumulative value of $6,194,303 since the baseline year (see Appendix B). The figure below shows the difference in annual electrical consumption versus the baseline year. The baseline year consumption is adjusted for the increase in facility total area and weather normalized to the comparison year. The adjusted baseline is the estimated consumption that would have been experienced by the District had no energy initiatives been implemented.



16. Besides the cost savings and greenhouse gas (GHG) reductions, there are many other benefits from our energy saving initiatives. These 'Non-Energy Benefits' are realized by the Board in many ways. Installing new Building Automation Systems saves on energy costs and also improves the indoor comfort for students. LED lighting retrofits greatly reduce the frequency of lamp changes required by the custodial staff. Upgrading heating and air conditioning systems to more energy efficient systems reduces the service time required by our maintenance staff and addresses a retrofit project at an earlier time than equipment failure. When selecting projects for implementation, the non-energy benefits are an important factor.

17. The success in achieving our targets can be largely attributed to the ongoing implementation of the Multi-Year Energy Plan, led by the EMC group in Facilities. Essential to the continued success of the program is buy-in from the various groups within Facilities, buy-in from the District's Senior Staff and buy-in from the staff and students at each school. Notwithstanding the ongoing implementation of energy conservation projects by Facilities, the success of this program is contingent on all building occupants following the District's best practices for energy conservation, such as:

- Lights are turned OFF when not required
- Computers and other electronic equipment are turned OFF when not in use and at the end of each day
- The networked photocopiers are used instead of individual printers
- Space around heating vents on walls, window sills and radiators are kept free of obstructions
- Personal appliances (heaters, refrigerators, air conditioners, fans, etc.) are not placed in classrooms
- Doors and windows to the outside of the building are not left open longer than necessary
- The school adheres to Board standard room temperature settings
- Building Systems equipment is checked regularly for proper operation. Any problems are reported promptly by using the Facilities work order system.

18. The province of Ontario has announced a target for reduction in greenhouse gas emissions by 80% from 1990 levels, by 2050. The OCDSB calculates emissions annually and this is reported on the Utilities Consumption Database submitted to the Ministry as part of our Green Energy Act reporting requirements. Like other school Districts, we had set a reduction target of 10% by the year 2023 or approx. 1% annually using a starting baseline year of 2013. This is reflected in our five-year Conservation and Demand Management Plan and is consistent with the target set by the City of Ottawa. Early success with our GHG reduction measures has enabled us to achieve a 5.5% reduction in GHG emissions over a three year period from 2013 to 2016.

    Based on our success we have further increased our 10 year (2023) GHG reduction target to 15% to help maintain our focus.

    As a leader in the community, and recognizing the national and provincial priority of GHG reduction initiatives, we continue to identify ways to significantly accelerate the existing 10 year target. Recognizing however, that this can only be achieved with increased funding from the province to assist with further building retrofits and ongoing maintenance.

Building Automation System (BAS) - Integration and Scheduling

19. Over the past six years EMC has integrated the various existing BAS's onto a common communication platform. In addition, new BAS's were installed where none existed. All facilities are now centrally controlled via a master BAS and communicating on a common software platform. Investment in the BAS will continue, to upgrade older components and ensure compatibility with current industry standards. Primary responsibility for managing the Board's BAS is assigned to the EMC group.

20. The building systems should always be operated in the most economical and efficient way possible and only for the amount of time required to provide the comfort conditions for a specific occupancy. Through continuous monitoring of all heating, ventilation and air conditioning equipment, lighting controls, scheduling of events and optimizing building setbacks, further efficiencies can be achieved. Operating schedules are closely monitored and coordinated with the school's classroom hours, Community Use of Schools, Extended Day Programs and Daycares. These programs have all contributed to an increase in operating hours of the building systems; however, schedules are being optimized wherever possible.

21. One function of the BAS is to maintain standardized temperature set points. The current standard in all schools (when fully occupied) is as follows: 21°C in winter in each designated school space with the exception of the gymnasium, which when used for Physical Education purposes will be set at 18 °C. The temperature setting for the summer, in schools where mechanical cooling is available, is 25 °C in all spaces during occupied periods. These set points are consistent with the industry standards and procedures being followed by other Districts in the province.

Commissioning and Re-Commissioning

22. Building Commissioning (new Construction) is defined as a systematic process of assuring, by verification and documentation that all building systems perform in accordance with the design intent and the owner's operational needs. During this process, testing and adjusting are performed to ensure systems are operating for optimal energy performance. Through verification of systems operation and coordination of OCDSB staff training, we are able to ensure a smooth transition and handover of the facility from the constructor to the OCDSB at project completion.

21. On new capital projects, EMC staff assist with the commissioning process and set out the criteria for the commissioning of HVAC equipment and systems. In doing so we are able to ensure quality of work and provide cost savings for the project.

22. Re-commissioning (existing Buildings) is a process that looks at how and why a building's systems are operated and maintained as they are, and then identifies ways to improve overall building performance. Since occupant comfort complaints and high energy use can often go hand-in-hand, re-commissioning can help to correct both. During the re-commissioning process a complete building inspection is performed including systems testing and monitoring. From that, a list of recommended improvement projects is produced. Implementation of these projects may occur during the current year or be planned for future years based on budget constraints.

23. Re-commissioning work is performed by the Commissioning Coordinator in EMC. Sites are evaluated based on current energy performance and occupant feedback in order to select the best candidates that will provide maximum benefit to the District.

Waste Management and Recycling

24. The budget for solid waste management and collection continues to be decreased. We have gone from $1,045,000 in FY 2010 to $680,000 for FY 2018. This decreasing trend is attributed to the implementation of the two stream recycling and composting (green bin) programs, improved participation in the recycling and green bin programs within schools and a more aggressive tracking & scheduling of pick-ups. This budget line includes the collection and disposal of solid waste from all District facilities, and the collection and recycling of mixed paper, cardboard and containers. Composting is currently being offered by the City of Ottawa under the 'Green Bins in Schools' program at no cost to the District. Through the sale of our recycled materials we were able to generate revenues for the District in the amount of $61,788 for FY2017 which was used to offset some of the waste collection costs.

25. Detailed information on waste, recycling, and composting is gathered for each facility and provided to the facility administrator to assist them in preparing their reports for compliance with the Ministry of the Environment O.Reg 102/94 Waste Audits and Waste Reduction Plans and 103/94 ICI Source Separation Programs. The chart below summarizes the District's waste collection by weight. The chart indicates that our diversion rate increased significantly last year compared with the previous year. Our total refuse generated was reduced. Despite a 1.59% increase in facility area, the total refuse generated decreased by 6.3%. Through ongoing promotion we hope to continue to reduce our total refuse generated and increase school participation in our recycling and composting programs.

	2015-2016		**2016-2017**	
	Weight (kg)	Diversion %	Weight (kg)	Diversion %
Refuse (landfill)	2,013,245		1,886,860	
Fibre Stream (black box)	436,648	16.6	469,440	18.1
Container Stream (blue box)	70,775	2.7	106,560	4.2
Composting (green bin)	109,072	4.2	126,000	4.9
Total	**2,629,740**	**23.5**	**2,588,860**	**27.2**

Solar Power Generation

26. The success that the District is having with Ontario Power Authority's (OPA) Feed In Tariff (FIT) program is a result of the early adoption back in 2009. The District currently owns and is receiving revenue on 13 MicroFIT systems having a capacity of 10 kW each. Revenue is also being received for the lease of roof space at 28 schools for FIT systems currently in operation, giving a total of 41 sites with solar generation.

27. The original solar revenue targets were set at $250,000 per year annually at the start of the Solar Photovoltaic program. The following table indicates last year's annual revenue and estimates for the next 3 years for systems currently in operation. (See Appendix C).

Year	Micro-FIT Revenues	FIT Revenues	Total FIT Revenues	Revenue Commitment	Amount above Commitment
2016-2017	$107,963	$249,984	$357,947	$250,000	$107,947
2017-2018	*$112,000*	*$250,000*	*$362,000*	*$250,000*	*$112,000*
2018-2019	*$112,000*	*$250,000*	*$362,000*	*$250,000*	*$112,000*
2019-2020	*$112,000*	*$250,000*	*$362,000*	*$250,000*	*$112,000*

2017-2020 Estimated values

28. With the expiration of the FIT program, net-metering solar power generation systems are a viable opportunity for new solar initiatives in the District. Net-metering systems provide the District the ability to consume the electricity generated on site. The electrical generation may offset as much as 50% of the annual electricity usage at a school, dependent on the installed system size and school's actual usage. The OCDSB has selected five sites for net-metering systems which are scheduled for completion in the spring of 2018. We will continue to add more net-metering systems in the upcoming years, as budgets permit.

Energy Incentives and Rebates

29. There have been many incentives offered by Federal, Provincial authorities and utility providers over the years. Facilities has been very successful in obtaining the incentives for new construction such as the Commercial Building Incentive Program (CBIP) and High Performance New Construction (HPNC) offered by Natural Resources Canada. Previously, the department did not have the resources to apply for the smaller incentive grants offered by other agencies until the formation of the EMC division. From its start in FY 2010 to the end of FY 2017 the EMC division has been successful in obtaining a total of $790,843 in incentives from Hydro Ottawa, Hydro One, and Enbridge Gas for efficiency upgrades.

Development and Implementation of an Energy Management Initiative Plan

30. In an effort to continue to improve our facilities energy performance year to year, we are constantly evaluating new technologies and engineering concepts to determine their suitability for use at our facilities. Many initiatives are proposed and the ones offering maximum benefit are selected and form the Energy Management Initiatives Plan. This plan is updated annually and is to coincide with the 5 year plan developed and posted on the District web site to satisfy the requirement of the Green Energy Act OReg 397/11. Five major initiatives for the current year are:

i) Building Automation System Integration and Upgrades

Facilities throughout the Board have been built with various levels of building automation systems and from various vendors. By integrating all systems onto a common platform, we are able to properly manage and operate the building systems from one central location. Investment in the BAS will continue, to upgrade older components and ensure compatibility with current industry standards. The Building Automation Systems allow us to operate HVAC and electrical systems for optimal performance and adjust operating schedules to match the user requirements.

ii) Lighting Retrofits

As technology improves, more energy efficient lighting systems are becoming available. We are taking advantage of this by retrofitting older systems with new high efficiency lighting such as LED fixtures. Automatic lighting control systems are being incorporated to turn off lights when not needed and reduce lighting levels when natural light (daylight harvesting) is available.

We will continue on the black-out of sites from last year's pilot program where all outside lights are to be turned on at 6:00 am until dawn, turned off during daylight hours, turned on at dusk and turned off automatically 15 minutes after the last custodian activates the security system upon leaving the premises.

iii) HVAC Controls Upgrades

In many cases HVAC equipment can be found to be in good working order, however the overall systems may not be operating efficiently due to the way they are being run. By upgrading to automated controls and utilizing technology such as variable frequency drives and heat recovery systems, we are able to maximize the systems efficiencies.

iv) Projects from Re-Commissioning

Re-commissioning, as previously described, can help to correct both occupant comfort complaints and building high energy use. Project lists produced by the re-commissioning process will vary from school to school but may include replacement of old inefficient equipment, upgrades to lighting and HVAC control systems, and modifications to the building's automated control systems.

v) Awareness / Occupant Behaviour

We will continue to increase awareness of energy usage at the school level through various methods, such as Live Monitor displays of energy usage at each school and direct feedback to the Chief Custodians.

Each facility is now equipped with an energy monitor displaying energy usage, energy saving tips and short video clips to promote energy conservation and environmental initiatives.

EMC has developed an electronic database to record data from the utility meters at each site. This enables EMC to provide direct feedback to the custodial staff on the energy usage at their facility.

EMC will continue to support schools involvement in the Ontario EcoSchools program, which in turn offers a variety of conservation activities.

Energy Management Initiatives Plan Implementation

31. The following table summarizes the costs to implement the current program for the next 3 years and coincides with the values identified in the Green Energy Act reporting.

Year	Budget
2017-2018	$1,809,000
2018-2019	$1,859,000
2019-2020	$1,909,000
Total	$5,577,000

Refer to Appendix D for a more detailed summary of the energy management initiatives plan which dates back to the baseline year of 2009-2010.

32. The Ontario Government has introduced a Cap & Trade program to help control carbon emissions in the province. The revenues generated from this program are intended to be used to fund initiatives that will reduce Greenhouse Gas (GHG) emissions. The Ministry of Education provided funding this year to School Districts to implement energy and GHG reduction initiatives (Greenhouse Gas Reduction Funding). If future funding is provided for the upcoming years, additional initiatives will be added to the implementation plan.

Support of Environmental Stewardship

33. The Ontario EcoSchools Program is an initiative that focuses on staff and students. It promotes energy conservation and waste minimization through occupant behaviour and is supported by staff from both leading and learning services. This program will be promoted through the Environmental Education Steering Committee. The implementation plan will be as follows:
    a. An Eco Team is created in each school following the Ontario EcoSchools “Six Pillar” program. The Eco Team may include teachers, principal or vice-principal, staff, students and the custodian. Ontario EcoSchools hosts one workshop in October every school year and the District hosts two workshops scheduled around the two main deadlines of the Ontario EcoSchools program to assist with certification completion.
    b. An energy Conservation and waste minimization initial eco review is conducted in each school before the end of January as per the Ontario EcoSchools certification guide. A follow up review is completed before the end of April to finalize applications.
    c. The EMC division makes energy consumption, waste and recycling information, live solar generation data, Ontario EcoSchools resources, and other environmental stewardship links available through the live monitor displays, networking, and the District’s internal Google system.

34. In order to support the Ontario EcoSchools program, several teaching workshops have been developed through a collaborative effort with Curriculum Services under the guidance of the Environmental Education Steering Committee. Although energy conservation is achieved, the main goal of the program is to promote conservation and create habits which students, teachers and staff can bring home and implement in their daily lives, creating a broader impact to community sustainability.

Sustainability Initiatives

The entire Facilities department is committed to sustainable initiatives across the Operations, Maintenance, Design & Construction, and Energy Management and Conservation divisions. The following is a brief overview of the areas that support the District's goals.

The benefits of all energy savings strategies help to reduce the District's carbon footprint and greenhouse gas emissions.

Waste & Recycling
Through ongoing promotion from Facilities and increased efforts by the schools in the recycling and composting programs, our diversion rates have increased and the overall refuse being generated has been reduced.

Green Clean
The District continues in its efforts to use green cleaning products so as to minimize the adverse effect cleaning products can have on the environment. Permissible products are "EcoLogo", "Green Seal", or "Environmental Choice Program".

Trees
We continue our struggle to overcome the devastation caused by the Emerald Ash Borer infestation. In the last year four years we have had to cut down over 1000 dead trees. We have inoculated approximately 400 Ash trees to keep them healthy. The District has planted 349 new trees of various species at 49 different sites. Another 300 new trees have been planted through donations and programs from The City of Ottawa.

In addition we have started an 'Adopt-a-Tree / Create-a-Forest' program. Seedlings are provided to the schools who care for the seedlings until they are of size suitable for planting. They are then planted at a location at the MacSkimming Outdoor Education Center. Last year 300 seedlings were delivered to the schools which resulted in 167 trees being planted at MacSkimming.

Fleet Vehicles
Efficiency improvements within the fleet started with the replacement of 20 leased compact cars with Hybrid subcompact cars cutting the fuel consumption in half. The process of right-sizing of vehicles for the individual trades is now ongoing. Instead of simply replacing large old vans with identical newer ones, large old vans are being replaced with more efficient mid-size work vehicles. Considerations are being made on the use of electric vehicles in the future.

Electric Vehicles (EV) Charging Stations
With the introduction and public acceptance of Electric Vehicles, Facilities is rolling out some trials on EV Charging stations at the Facilities Stittsville Depot and 133 Greenbank. Costs associated with the installation of the charging equipment are being funded through GHG funding and other incentives. Future sites will be considered as trials are completed.

Water Bottles
In support of the environmental initiative to reduce the amount of single use water bottles consumed within our schools, water bottle filling stations were installed throughout the District in 2011. To date an equivalent of over 5 million 16 oz. water bottles have been filled using the water bottle filling stations.

Carbon 613
Carbon 613 is a made-in-Ottawa target-based sustainability program where member organizations are plugged in to a local network, supported in setting a green gas reduction target, and celebrated for progress made towards environmental results. As a key member of Carbon 613, the District will be revered as an environmental leader in the Capital Region.

Energy Evolution
The District is working in collaboration with The City of Ottawa and other major stakeholders on the development and implementation of the Energy Evolution initiative to reduce city-wide greenhouse gas emissions.

New Construction
New buildings and additions continue to be designed and constructed to LEED-like standards. The District receives energy efficiency rebates through programs like the High Performance New Construction (HPNC) incentives for investments into upgraded building components. A continued focus on improving new building construction designs to set targets towards a net-zero energy performance.

Lighting Upgrade
Lighting on the exterior of buildings is being systematically changed to LED to improve the efficiency and take advantage of the extended lifespan. LED lighting is also being introduced inside buildings along with occupancy sensors and daylight harvesting, where feasible, during renovations and new construction.

Green Energy
The District owns green energy installations at several locations. One type of installation is a solar hot water heating system which is installed at a high school. There are 13 small (10 kW) solar photovoltaic (PV) MicroFIT arrays on the roof of 13 individual schools.

The District also has larger solar PV systems under a lease agreement at 28 schools through the FIT program. These arrays generate 50 to 250KW depending on the size of the installation.

As part of a new initiative this year, five (5) sites will have net-metering solar power generation systems installed by spring of 2018. Further installations are being planned as future funding becomes available.

Environmental Stewardship Program

As part of the environmental stewardship program, many schools were actively participating in EcoSchools program last year with 53 schools achieving certification. We will continue to promote participation in the EcoSchools program with the expectation that more schools will come on board next year.

COST AVOIDANCE REPORT

		2008/09 - Baseline Year			2009/10					
Utility		**Utilities**	**Cost**	**Unit Cost**	**Utilities**	**Cost**	**Unit Cost**	**% Change from 08/09**	**Adjusted Baseline**	**Cost Avoidance**
Electricity Use	kWh	75,197,802	$ 7,849,320	0.1044	76,027,648	$ 8,922,443	0.1174	12.43	83,005,869	**$ 819,243.15**
Demand	KW	237,294	-	-	241,712	-	-			
Natural Gas	m^3	12,102,251	$ 5,201,648	0.4298	10,978,394	$ 3,781,608	0.3445	-19.86	10,672,732	**$ (103,500.56)**
Water	m^3	410443	$ 1,048,525	2.5546	405796	$ 1,092,992	2.6935	5.43		
Propane	Lit.	36,174	$ 21,589	0.597	51,194	$ 32,035	0.626	4.85		
Oil	Lit.	19,180	$ 18,181	0.948	23,285	$ 17,741	0.762	-19.62		
Total	ekWh	**202,976,311**	**$ 14,139,263**		**192,133,911**	**$ 13,846,819**				**$ 715,742.59**
Area	m^2	995,167			1,017,549			2.25		
Portables		288			306			6.25		
Net Area	m^2	1,015,615			1,039,275			2.33		
Heat Degree Days	^oC	4530			3904			-13.82		
Cool Degree Days	^oC	212			317			49.53		
Energy Intensity	$ekWh/m^2$	**202.44**	**$ 14.05**		**187.26**	**$ 13.42**		-7.50		
Cost per ekWh			**0.0697**			**0.0721**				

		2010/11					
Utility		**Utilities**	**Cost**	**Unit Cost**	**% Change from 08/09**	**Adjusted Baseline**	**Cost Avoidance**
Electricity Use	kWh	76,539,468	$ 9,593,327	0.1253	20.08	78,261,171	**$ 215,729.37**
Demand	KW	238,553	-	-			
Natural Gas	m^3	12,168,846	$ 4,728,587	0.3886	-9.59	11,978,540	**$ (73,952.91)**
Water	m^3	442833	$ 1,276,605	2.8828	12.85		
Propane	Lit.	55,229	$ 42,084	0.762	27.68		
Oil	Lit.	18,092	$ 18,608	1.029	8.50		
Total	ekWh	**205,142,162**	**$ 15,659,211**				**$ 141,776.46**
Area	m^2	1,022,685			2.77		
Portables		309			7.29		
Net Area	m^2	1,044,624			2.86		
Heat Degree Days	^oC	4363			-3.69		
Cool Degree Days	^oC	327			54.25		
Energy Intensity	$ekWh/m^2$	**199.02**	**$ 15.11**		-1.69		
Cost per ekWh			**0.0763**				

		2011/12					
Utility		**Utilities**	**Cost**	**Unit Cost**	**% Change from 08/09**	**Adjusted Baseline**	**Cost Avoidance**
Electricity Use	kWh	76,006,139	$ 9,940,147	0.1308	25.29	79,180,981	**$ 520,999.80**
Demand	KW	236,602	-	-			
Natural Gas	m^3	10,312,780	$ 4,507,338	0.4371	1.69	10,430,534	**$ 51,470.14**
Water	m^3	477957	$ 1,431,183	2.9944	17.21		
Propane	Lit.	32,181	$ 30,660	0.953	59.64		
Oil	Lit.	20,822	$ 22,313	1.072	13.05		
Total	ekWh	**184,948,701**	**$ 15,931,641**				**$ 572,469.94**
Area	m^2	1,027,298			3.23		
Portables		335			16.32		
Net Area	m^2	1,051,083			3.49		
Heat Degree Days	^oC	3777			-16.62		
Cool Degree Days	^oC	348			64.15		
Energy Intensity	$ekWh/m^2$	**178.36**	**$ 15.29**		-11.90		
Cost per ekWh			**0.0861**				

		2012/13					
Utility		**Utilities**	**Cost**	**Unit Cost**	**% Change from 08/09**	**Adjusted Baseline**	**Cost Avoidance**
Electricity Use	kWh	74,383,052	$ 10,141,851	0.1363	31.03	77,986,310	**$ 380,073.61**
Demand	KW	230,669	-	-			
Natural Gas	m^3	11,818,510	$ 4,026,852	0.3407	-26.15	11,788,015	**$ (10,389.65)**
Water	m^3	468728	$ 1,492,489	3.1841	24.64		
Propane	Lit.	75,206	$ 42,892	0.570	-4.74		
Oil	Lit.	0	$ -				
Total	ekWh	**199,247,751**	**$ 15,704,084**				**$ 369,683.96**
Area	m^2	1,024,186			2.92		
Portables		340			18.06		
Net Area	m^2	1,048,326			3.22		
Heat Degree Days	^oC	4287			-5.67		
Cool Degree Days	^oC	258			21.70		
Energy Intensity	$ekWh/m^2$	**192.87**	**$ 15.11**		-4.73		
Cost per ekWh			**0.0788**				

		2013/14					
Utility		**Utilities**	**Cost**	**Unit Cost**	**% Change from 08/09**	**Adjusted Baseline**	**Cost Avoidance**
Electricity Use	kWh	76,208,083	$ 11,165,916	0.1465	40.33	77,878,704	**$ 365,406.94**
Demand	KW	237,792	-	-			
Natural Gas	m^3	13,105,232	$ 5,612,268	0.4282	-0.37	13,085,722	**$ (8,354.18)**
Water	m^3	469,725	$ 1,607,233	3.4216	33.94		
Propane	Lit.	79,346	$ 74,364	0.937	56.95		
Oil	Lit.						
Total	ekWh	**214,638,480**	**$ 18,459,781**				**$ 357,052.76**
Area	m^2	1,025,911			2.89		
Portables		354			22.92		
Net Area	m^2	1,051,045			3.49		
Heat Degree Days	^oC	4733			4.48		
Cool Degree Days	^oC	219			3.30		
Energy Intensity	$ekWh/m^2$	**207.44**	**$ 17.73**		2.47		
Cost per ekWh			**0.0860**				

		2014/15					
Utility		**Utilities**	**Cost**	**Unit Cost**	**% Change from 08/09**	**Adjusted Baseline**	**Cost Avoidance**
Electricity Use	kWh	74,851,280	$ 12,136,662	0.1621	55.27	79,395,103	**$ 733,293.80**
Demand	KW		-	-			
Natural Gas	m^3	13,057,867	$ 4,541,080	0.3478	-19.10	13,367,902	**$ 108,276.31**
Water	m^3	480,703	$ 1,756,573	3.6542	43.04		
Propane	Lit.	68,298	$ 47,806	0.700	17.25		
Oil	Lit.	0	$ -				
Total	ekWh	**212,704,956**	**$ 18,482,121**				**$ 841,570.11**
Area	m^2	1,036,060			4.10		
Portables		376			30.55		
Net Area	m^2	1,062,756			4.64		
Heat Degree Days	^oC	4782			5.56		
Cool Degree Days	^oC	244			15.10		
Energy Intensity	$ekWh/m^2$	**201.70**	**$ 17.54**		2.47		
Cost per ekWh			**0.0869**				

		2015/16					
Utility		**Utilities**	**Cost**	**Unit Cost**	**% Change from 08/09**	**Adjusted Baseline**	**Cost Avoidance**
Electricity Use	kWh	74,772,791	$ 13,420,868	0.1795	71.90	82,879,293	**$ 1,455,965.00**
Demand	KW		-	-			
Natural Gas	m^3	11,529,407	$ 3,411,766	0.2959	-31.20	11,539,631	**$ 2,810.00**
Water	m^3	507,142	$ 1,953,966	3.853	50.80		
Propane	Lit.	50,305	$ 29,522	0.587	-1.70		
Oil	Lit.	Nil	$ -				
Total	ekWh	**196,419,318**	**$ 18,816,122**		**30.71**		**$ 1,458,775.00**
Area	m^2	1,044,019			4.70		
Portables		370			28.50		
Net Area	m^2	1,070,289			5.20		
Heat Degree Days	^oC	4059			-10.40		
Cool Degree Days	^oC	362			72.20		
Energy Intensity	$ekWh/m^2$	**183.52**	**$ 17.58**		-9.20		
Cost per ekWh			**0.0958**				

		2016/17					
Utility		**Utilities**	**Cost**	**Unit Cost**	**% Change from 08/09**	**Adjusted Baseline**	**Cost Avoidance**
Electricity Use	kWh	70,692,516	$ 11,724,481	0.1659	58.90	81,020,067	**$ 1,713,340.00**
Demand	KW	-	-	-			
Natural Gas	m^3	11,907,811	$ 3,399,884	0.2855	-33.60	11,989,397	**$ 23,293.00**
Water	m^3	518,919	$ 2,098,739	4.044	58.30		
Propane	Lit.	206,965	$ 164,556	0.795	33.20		
Oil	Lit.		$ -				
Total	ekWh	**196,319,922**	**$ 17,387,660**				**$ 1,736,633.00**
Area	m^2	1,062,322					
Portables		352					
Net Area	m^2	1,087,314					
Heat Degree Days	^oC	4190					
Cool Degree Days	^oC	191					
Energy Intensity	$ekWh/m^2$	**180.55**	**$ 15.99**				
Cost per ekWh			**0.0886**				

Cumulative Cost Avoidance 2009/10 to 2016/17		
Electricity		**$ 6,204,049.00**
Natural Gas		**$ (9,746.00)**
Total		**$ 6,194,303.00**

Notes:

1. For the Cost Avoidance calculation, the Baseline values have been adjusted for known factors such as Utility rate increases, weather and facilities area changes Other unknown factors that increase the annual energy consumption include: increases to hours of operation (Community Use of Schools, Extended Day Program and Childcare), increased consumption due to construction activity and the addition of air conditioning into existing facilities. These factors have not been quantified and are not factored into the Cost Avoidance calculation.

Fit and Micro Fit Solar Accounts Summary

Appendix C

FIT PROGRAM										
Summary	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	Total
School	Revenue	Revenue	Revenue	Revenue	Revenue	Revenue	Revenue	Revenue (Est)	Revenue (Est)	Revenue
A. Lorne Cassidy ES	$ -	$ -	$ -	$ 2,812.90	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 50,812.90
AY Jackson SS	$ -	$ -	$ -	$ -	$ 10,761.29	$ 14,400.00	$ 14,400.00	$ 14,400.00	$ 14,400.00	$ 68,361.29
Adrienne Clarkson ES	$ -	$ -	$ 2,714.29	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 31,514.29
Arch Street PS	$ -	$ -	$ -	$ -	$ 2,734.19	$ 6,240.00	$ 6,240.00	$ 6,240.00	$ 6,240.00	$ 27,694.19
Bells Corners PS	$ -	$ -	$ -	$ 4,387.10	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 28,387.10
Blossom Park PS	$ -	$ -	$ -	$ -	$ 2,528.57	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 21,728.57
Bridlewood Com. ES	$ -	$ -	$ -	$ -	$ 9,703.23	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 48,103.23
Cairine Wilson SS	$ -	$ -	$ -	$ 10,477.41	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 58,477.41
Carleton Heights PS	$ -	$ -	$ -	$ 3,013.33	$ 3,700.59	$ 3,744.00	$ 3,744.00	$ 3,744.00	$ 3,744.00	$ 21,689.92
Castlefrank ES	$ -	$ -	$ -	$ 1,946.67	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 49,946.67
Cedarview MS	$ -	$ -	$ -	$ 8,933.33	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 56,933.33
Churchill Alternative	$ -	$ -	$ 1,419.35	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 30,219.35
Convent Glen ES	$ -	$ -	$ 840.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 29,640.00
Fallingbrook ES	$ -	$ -	$ -	$ -	$ 15,406.45	$ 14,400.00	$ 14,400.00	$ 14,400.00	$ 14,400.00	$ 73,006.45
Grant Alternative	$ -	$ -	$ -	$ -	$ 2,485.71	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 21,685.71
John McCrae SS	$ -	$ -	$ 4,400.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 62,000.00
Maple Ridge ES	$ -	$ -	$ 3,226.66	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 60,826.66
Mary Honeywell ES	$ -	$ -	$ 6,000.00	$ 14,400.00	$ 14,400.00	$ 14,400.00	$ 14,400.00	$ 14,400.00	$ 14,400.00	$ 92,400.00
Merivale HS	$ -	$ -	$ 1,706.67	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 59,306.67
Orleans Wood ES	$ -	$ -	$ -	$ 2,477.41	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 50,477.41
Robert Bateman PS	$ -	$ -	$ -	$ -	$ 3,640.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 22,840.00
Roberta Bondar PS	$ -	$ -	$ -	$ -	$ 10,103.22	$ 14,400.00	$ 14,400.00	$ 14,400.00	$ 14,400.00	$ 67,703.22
Sawmill Creek ES	$ -	$ -	$ -	$ 10,012.90	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 58,012.90
South Carleton HS	$ -	$ -	$ -	$ -	$ 18,000.00	$ 24,000.00	$ 24,000.00	$ 24,000.00	$ 24,000.00	$ 114,000.00
Stephen Leacock PS	$ -	$ -	$ -	$ 946.67	$ 6,400.00	$ 3,200.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 24,946.67
Terry Fox ES	$ -	$ -	$ -	$ 8,025.81	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 56,025.81
Vincent Massey PS	$ -	$ -	$ -	$ -	$ 8,103.23	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 9,600.00	$ 46,503.23
Viscount Alexander PS	$ -	$ -	$ -	$ -	$ 2,485.71	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 4,800.00	$ 21,685.71
Total	-	-	$ 20,306.97	$110,633.53	$225,652.19	$ 248,384.00	$ 249,984.00	$ 249,984.00	$ 249,984.00	$1,354,928.69

MICRO FIT PROGRAM										
Summary	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	Total
School	Revenue	Revenue	Revenue	Revenue	Revenue	Revenue	Revenue	Revenue (Est)	Revenue (Est)	Revenue
D.Roy Kennedy PS	$ 6,215.15	$ 7,358.90	$ 9,376.11	$ 8,869.53	$ 6,885.27	$ 8,802.21	$ 8,867.23	$ 8,867.23	$ 8,867.23	$ 74,108.86
Earl of March SS	$ 1,355.39	$ 11,109.79	$ 8,936.11	$ 9,274.53	$ 8,792.38	$ 9,587.77	$ 8,141.79	$ 8,141.79	$ 8,141.79	$ 73,481.34
LDH SS	$ 5,947.27	$ 7,238.95	$ 7,228.33	$ 10,125.85	$ 8,724.74	$ 9,163.82	$ 8,841.68	$ 8,841.68	$ 8,841.68	$ 74,954.00
Mutchmor PS	$ 5,610.42	$ 6,311.88	$ 8,029.26	$ 4,136.55	$ -	$ 5,864.60	$ 7,926.90	$ 7,926.90	$ 7,926.90	$ 53,733.41
Nepean HS	$ 5,975.31	$ 5,940.44	$ 7,913.60	$ 8,289.92	$ 7,936.84	$ 8,723.79	$ 7,801.73	$ 7,801.73	$ 7,801.73	$ 68,185.09
Osgoode Township HS	$ 5,453.60	$ 7,298.20	$ 8,501.20	$ 6,255.60	$ 6,095.20	$ 9,944.80	$ 4,892.20	$ 9,000.00	$ 9,000.00	$ 66,440.80
Queen Elizabeth PS	$ 6,586.12	$ 7,266.75	$ 8,145.94	$ 6,998.49	$ 6,758.59	$ 7,540.98	$ 8,558.73	$ 8,558.73	$ 8,558.73	$ 68,973.06
Sir Guy Carleton SS	$ 6,178.89	$ 6,686.38	$ 8,523.61	$ 9,010.81	$ 8,532.47	$ 9,348.03	$ 8,344.70	$ 8,344.70	$ 8,344.70	$ 73,314.29
Sir Wilfred Laurier HS	$ 6,255.60	$ 8,661.60	$ 9,223.00	$ 6,768.88	$ 7,177.90	$ 8,268.62	$ 10,038.76	$ 10,038.76	$ 10,038.76	$ 76,471.88
South March PS	$ 5,985.39	$ 6,716.13	$ 8,858.45	$ 9,528.38	$ 9,069.44	$ 9,808.77	$ 8,622.53	$ 8,622.53	$ 8,622.53	$ 75,834.15
Stittsville PS	$ 6,796.11	$ 7,709.62	$ 9,884.61	$ 10,836.87	$ 9,756.73	$ 10,689.77	$ 8,107.56	$ 8,107.56	$ 8,107.56	$ 79,996.39
West Carleton SS	$ 6,231.47	$ 9,924.08	$ 9,035.20	$ 7,458.60	$ 8,028.02	$ 9,856.58	$ 9,070.62	$ 9,070.62	$ 9,070.62	$ 77,745.81
York Street PS	$ 3,323.85	$ 7,033.80	$ 8,883.86	$ 10,153.29	$ 8,680.63	$ 9,457.12	$ 8,749.55	$ 8,749.55	$ 8,749.55	$ 73,781.20
Total	$71,914.57	$ 99,256.52	$112,539.28	$107,707.30	$ 96,438.21	$ 117,056.86	$ 107,963.98	$ 112,071.78	$ 112,071.78	$ 937,020.28

Yearly Grand Total	$71,914.57	$ 99,256.52	$132,846.25	$218,340.83	$322,090.40	$ 365,440.86	$ 357,947.98	$ 362,055.78	$ 362,055.78	$ 2,291,948.97

Cumulative Grand Total	$71,914.57	$171,171.09	$304,017.34	$522,358.17	$844,448.57	$ 1,209,889.43	$ 1,567,837.41	$ 1,929,893.19	$ 2,291,948.97	$ 2,291,948.97

Energy Management Initiatives Plan

Initiative	2009-2010	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015
Building Automation Systems - Integration & live monitoring		$ 633,928	$ 250,952	$ 355,931	$ 445,657	$ 339,307
Building Automation Systems - New Installations and System Upgrades	$ 20,000	$ 185,000	$ 275,000	$ 220,000		$ 100,000
Building Automation Systems - Pneumatic System Conversions	$ 18,000		$ 100,000	$ 100,000	$ 200,000	$ 100,000
Lighting - Re-Lamping Phase I-IV	$ 369,863					
Lighting - Replace Exit Signs	$ 29,799					
Lighting - Interior Black-Out		$ 20,000	$ 30,000	$ 30,000	$ 30,000	$ 30,000
Lighting - Exterior Light Upgrade			$ 50,000	$ 100,000	$ 100,000	$ 150,000
Lighting Retrofits - Gyms, Libraries and LED Retrofits	$ 67,100	$ 50,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000
Lighting - Small Projects	$ 83,195	$ 83,966	$ 100,000	$ 100,000	$ 100,000	$ 150,000
Lighting Controls - Occupancy Sensors and Automatic Controls		$ 66,116	$ 300,000	$ 300,000	$ 300,000	$ 210,000
Energy Champion Program		$ 10,000	$ 190,000	$ 105,000	$ 60,000	$ 65,000
HVAC Controls - Small Projects including VFD Upgrades	$ 91,518	$ 35,000	$ 225,000	$ 175,000	$ 175,000	$ 75,000
Retro Commissioning (ReCx) Projects - TBD after Systems Evaluation			$ 84,114	$ 84,746	$ 100,000	$ 300,000
Annual Budget	$ 679,475	$ 1,084,011	$ 1,705,066	$ 1,670,423	$ 1,609,306	$ 1,619,307
Cumulative Investment	$ 679,475	$ 1,763,485	$ 3,468,551	$ 5,138,974	$ 6,748,280	$ 8,367,587

Initiative	2015-2016	2016-2017	2017-2018	2018-2019	2019-2020
Building Automation Systems - Integration & live monitoring	$ 450,000	$ 50,000	$ 50,000	$ 50,000	$ 50,000
Building Automation Systems - New Installations and System Upgrades	$ 149,000	$ 330,000	$ 350,000	$ 450,000	$ 450,000
Building Automation Systems - Pneumatic System Conversions	$ 150,000	$ 150,000	$ 75,000	$ 100,000	$ 100,000
Lighting - Re-Lamping Phase I-IV					
Lighting - Replace Exit Signs					
Lighting - Interior Black-Out	$ 90,000	$ 100,000	$ 50,000	$ 50,000	$ 50,000
Lighting - Exterior Light Upgrade	$ 110,000	$ 20,000	$ 20,000	$ -	$ -
Lighting Retrofits - Gyms, Libraries and LED Retrofits	$ 100,000	$ 150,000	$ 400,000	$ 400,000	$ 500,000
Lighting - Small Projects	$ 100,000	$ 100,000	$ 100,000	$ 100,000	$ 100,000
Lighting Controls - Occupancy Sensors and Automatic Controls	$ 200,000	$ 200,000	$ 250,000	$ 150,000	$ 150,000
Energy Champion Program	$ 10,000	$ 75,000	$ 75,000	$ -	$ -
HVAC Controls - Small Projects including VFD Upgrades	$ 100,000	$ 125,000	$ 200,000	$ 175,000	$ 125,000
Retro Commissioning (ReCx) Projects - TBD after Systems Evaluation	$ 250,000	$ 459,000	$ 239,000	$ 384,000	$ 384,000
Annual Budget	$ 1,709,000	$ 1,759,000	$ 1,809,000	$ 1,859,000	$ 1,909,000
Cumulative Investment	$ 10,076,587	$ 11,835,587	$ 13,644,587	$ 15,503,587	$ 17,412,587