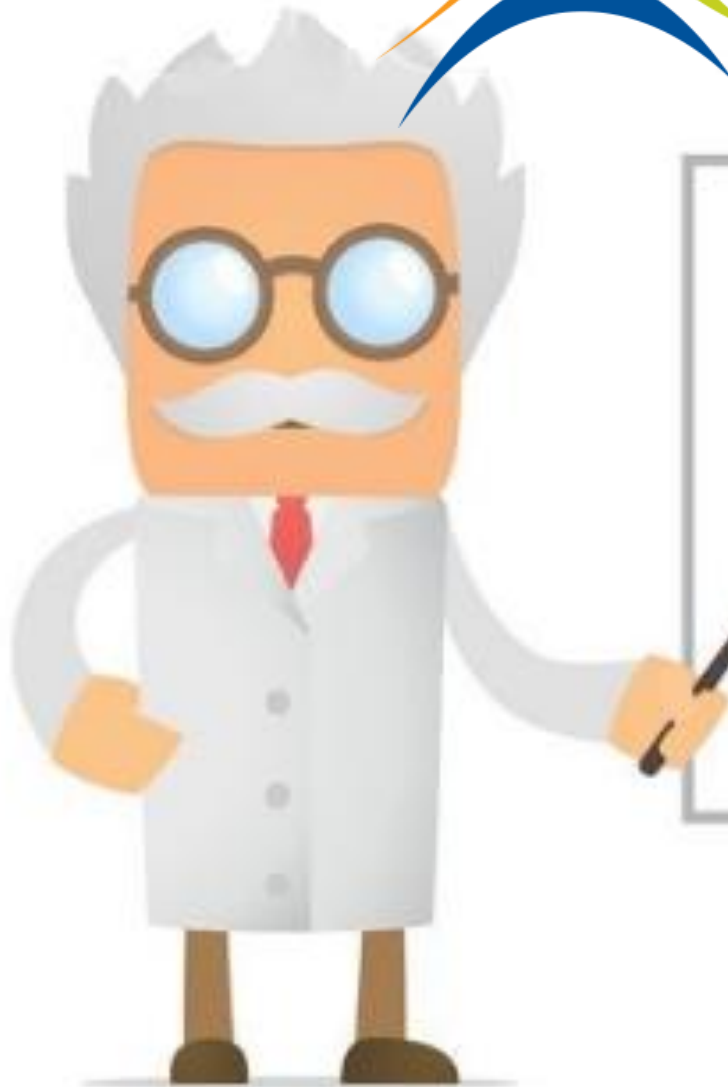




Oshawa[®]
Prepare To Be Amazed



**Lighting
Retrofits,
Energy
Workshops,
&
Conservation
Challenges**



INTRODUCING...



Hamid Syed, P.Eng, CEM, LEED GA
Facilities Energy Management
Coordinator for the City of Oshawa.

The City of Oshawa is the largest
municipality in the Regional
Municipality of Durham with a
population of approximately 157,000.

The City of Oshawa currently owns,
operates and/or leases approximately
100 facilities, including Recreational
Centres, Community Centres, Libraries,
Fire Halls, City Hall, Airport and Depots.



The Plan

1. Look at Technical measures
(Energy Retrofit Projects)
2. Behavioral measures
(Energy Workshops/Training)
3. Organizational measures
(Conservation Challenges/Staff Involvement)



THE PLAN

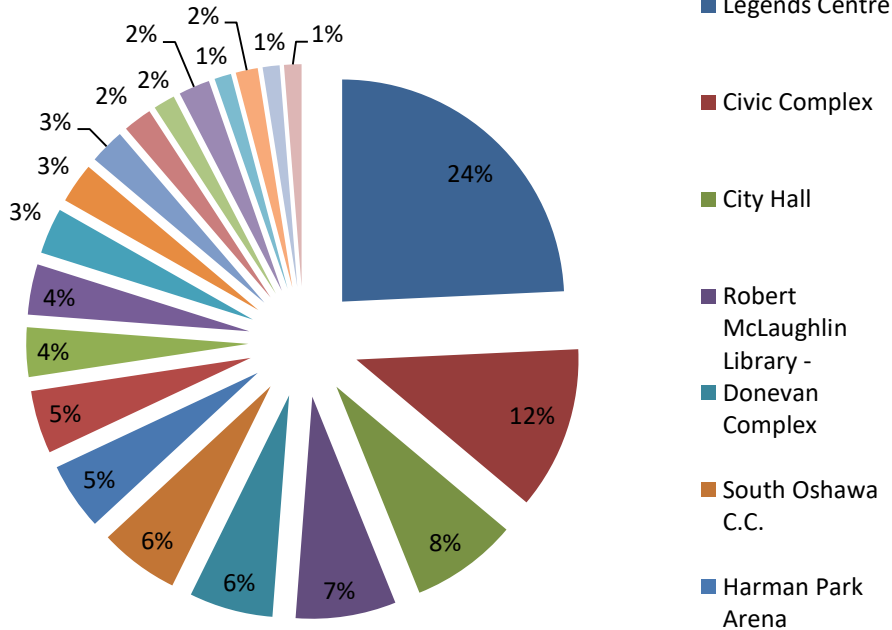


Building Details				2014 Electricity		2014 Natural Gas		Invoice Costs
	Operation Name	Operation Type	Total Floor Area (sq ft):	Quantity (kWh)	Invoice Cost	Quantity (m3)	Invoice Cost	Total Costs
1	Legends Centre	Community Centre	202,051	5,774,494	\$ 606,321.5	775,244	\$ 204,892.8	\$ 811,214.3
2	Civic Recreation Complex	Community Centre	86,004	2,824,409	\$ 296,562.0	352,330	\$ 86,230.2	\$ 382,792.2
3	City Hall	City Hall	128,105	1,852,508	\$ 194,512.5	187,160	\$ 39,303.6	\$ 233,816.1
4	Robert McLaughlin Library	Library	40,000	1,364,811	\$ 182,494.2	89,588	\$ 26,965.1	\$ 209,459.3
5	Donevan Recreation Complex (Pool & Arena)	Community Centre	45,361	1,119,669	\$ 152,363.4	143,420	\$ 36,269.1	\$ 188,632.5
6	South Oshawa Community Centre	Community Centre	128,000	1,145,732	\$ 145,076.4	188,661	\$ 39,618.6	\$ 184,695.0
7	Harman Park Arena	Community Centre	5,945	960,296	\$ 122,849.0	41,622	\$ 12,519.2	\$ 135,368.1
8	Parking Garage #3	Parking Garage	2,303	1,092,828	\$ 114,746.1		\$ -	\$ 114,746.1
9	Robert McLaughlin Gallery	Art Gallery	3,966	841,320	\$ 89,797.1	38,400	\$ 12,305.0	\$ 102,102.0
10	Airport Terminal Building	Airport	1,347	875,268	\$ 91,904.4	40,389	\$ 8,480.9	\$ 100,385.3
11	Parking Garage #1	Parking Garage	2,303	796,689	\$ 83,652.5	19,658	\$ 4,127.6	\$ 87,780.0
12	Parking Garage #2	Parking Garage	2,303	698,392	\$ 73,331.0		\$ -	\$ 73,331.0
13	Northview Community Centre	Community Centre	15,000	410,953	\$ 64,193.9	36,684	\$ 7,702.8	\$ 71,896.7
14	Childrens Arena	Indoor Rink	30,000	499,388	\$ 52,434.9	47,234	\$ 9,918.3	\$ 62,353.2
15	Consolidated Op Depot	Depot		541,004	\$ 56,805.0		\$ -	\$ 56,805.0
16	Animal Services/Parks HQ/Greenhouse	Animal Services	22,500	291,894	\$ 30,648.5	111,724	\$ 23,461.2	\$ 54,109.7
17	Oshawa Seniors Centre -	Seniors Centre	1,858	350,640	\$ 40,177.2	34,813	\$ 13,740.3	\$ 53,917.5
18	#5 Fire Hall	Fire Hall	17,890	292,766	\$ 30,739.8	55,064	\$ 11,562.6	\$ 42,302.4
19	#1 Fire Hall	Fire Hall	24,000	301,813	\$ 31,690.1	38,390	\$ 9,990.8	\$ 41,680.8
		TOTAL:		22,034,874	\$ 2,460,299.1	2,200,381	\$ 547,087.8	\$ 3,007,386.9

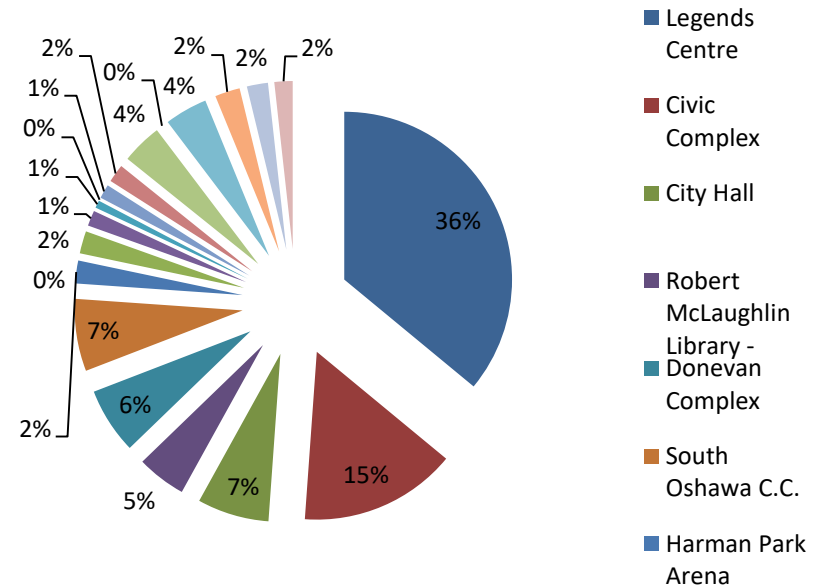


THE PLAN

2014 Electricity Costs



2014 Natural Gas Costs

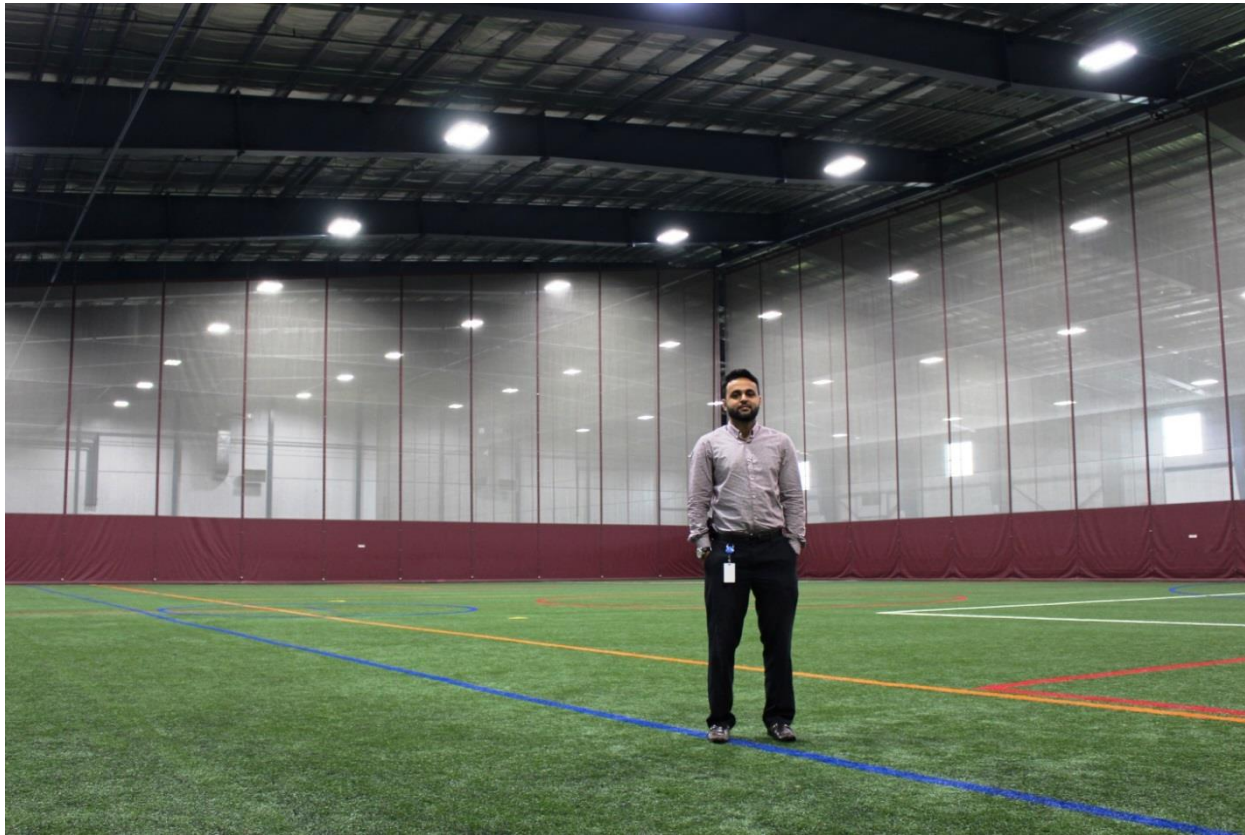


Our Goals

1. Reduce annual maintenance costs of approximately \$11,000/year.
2. **SAVE ENERGY!**
3. Eliminate the need for contractors to replace bulbs because of the high ceilings.
4. Increase the light levels from 25 ft. candles to 40 ft. candles!



THE FIELDHOUSE OUR RESULTS



Our Results

- Project began and was completed in June 2016.
- Project Cost: \$85,909
- Estimated Annual Energy Savings: \$25,098
- IESO Rebates: \$15,120
- Annual Maintenance Savings: \$11,000
- Simple Pay Back: 2 years

THE SWIMMING POOL OUR GOALS



Our Goals

1. Drastically increase Light Levels and provide uniform lighting.
2. Significantly reduced energy consumption!
3. Eliminate safety concerns and existing hazards for maintenance inspections.
4. Use LED lighting so that maintenance costs were dramatically reduced.

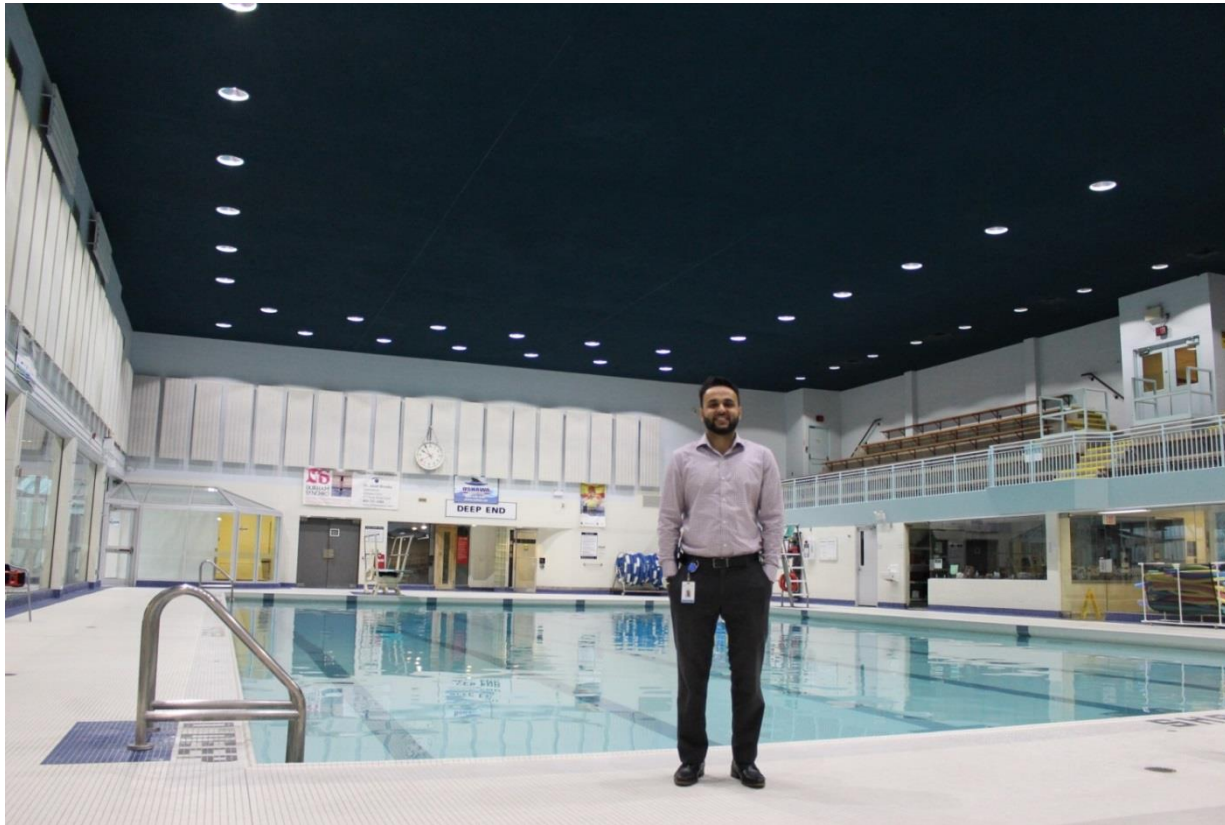
The Plan



1. Redesign to the original lighting layout to provide uniformity and better light levels
2. Redesign the fixture itself and find appropriate LED fixture to match fixture.
3. Re-wire the fixtures with plug in fixtures for easy and safe maintenance.
4. Base Case: 8 (1000W) metal halides to retrofit case: 42



THE SWIMMING POOL OUR RESULTS



Our Results

- Project Started & Completed: August 2016
- Project Cost: \$45,000
- Estimated Annual Energy Savings: \$6,000
- Rebates: \$2,000
- Annual Maintenance Savings: \$1,000
- Simple Pay Back: 6 years



AEROBICS ROOM

OUR RESULTS



Our Results

- Project Completed: September 2016
- Project Cost: \$7,838
- Estimated Annual Energy Savings: \$1,200
- Rebates: \$1,120
- Simple Pay Back: 4 years





Our Results

- Project Started & Completed: October 2016
- Project Cost: \$10,786
- Estimated Annual Energy Savings: \$4,875
- Rebates: \$2,680
- Annual Maintenance Savings: \$350
- Simple Pay Back: 1.5 years



Northview Community Centre Hallway LED Lighting and Controls



OUR RESULTS

Our Results

- Project Started & Completed: Dec 2016
- Project Cost: \$20,000
- Estimated Annual Energy Savings: \$4,875
- Annual Maintenance Savings: \$350
- Simple Pay Back: 2.5 years



OUR RESULTS



So far, we have experienced **Dramatic Costs Savings** on our utility bills.

- Best part, we have received **GREAT FEEDBACK** from both the staff and the public using the recreational centers.
 - Feedback emails to the Mayor
 - Positive comments to Recreational staff from users of the facility
 - Thank you emails from Facility supervisors and facility operators



ENERGY MANAGEMENT WORKSHOP



Customized Energy Workshop

- Workshop was geared towards Building Automation System and mostly geared to our recreational facilities
- Facilitated by Stephen Dixon & Garth White
- We had 2 sessions with 20 of City of Oshawa staff members with our primary focus on our building operators and supervisors

A dark grey rectangular slide with the Oshawa logo in the top right corner. The main title "Managing Energy with Building Automation" is in large, bold, yellow font. Below it, in white font, is "A Workshop for City of Oshawa Building Operations". A small orange horizontal line is above the text "Stephen Dixon & Garth White" and "November 7th, 2016". The ENBRIDGE logo is in the bottom right corner.

 Oshawa®
Prepare To Be Amazed

Managing Energy with Building Automation

A Workshop for City of Oshawa Building Operations

—

Stephen Dixon & Garth White
November 7th, 2016



ENERGY MANAGEMENT WORKSHOP



Customized Energy Workshop

- A key focus of the workshop was on the development of an understanding of “how energy behaves and is used in your facility”.
- This understanding is fundamental to being able to identify and act upon savings opportunities.
- The workshop experience was designed to provide many perspectives on saving energy dollars, whether operational, technological or a combination of both.



Key Things thought in Workshop

- Key Role of facility operators in Reducing Energy Consumption and Costs
- Low Cost / No Cost Ways to Avoid Costs
- Methodology for Prioritizing Your Actions
- At a high level, how to calculate energy use for equipment
- HVAC Checklist to identify and mark opportunities for savings

HVAC CHECKLIST

System Controls:

- ☐ Heating and cooling systems are properly sequenced to prevent cycling.
- ☐ Reset controls are used appropriately.
- ☐ Outdoor air economizers are used.
- ☐ Supply/mixed air set points are appropriate.
- ☐ Humidity set points are appropriate
- ☐ Dehumidification sequences are used appropriately.
- ☐ Dampers are sequenced properly during the morning warm-up cycle.
- ☐ The hot and cold deck temperature set points are appropriate.

Space Temperature Controls:

- ☐ The night/weekend setback control zones are properly sized
- ☐ Temperature control zones are properly sized and divided.
- ☐ Thermostats are calibrated with the appropriate deadbands to prevent cycling of heating and cooling equipment.

AIR HANDLING SYSTEMS CHECKLIST

- ☐ Localized air-conditioning equipment is used in areas of varying or low occupancy load.
- ☐ Schedules are used for supply air temperature setpoint.
- ☐ A regular operation and maintenance schedule is established.

2016-2017 WINTER CONSERVATION CHALLENGE



Using tools from the Managing Energy with Building Automation Workshop, help the City of Oshawa reduce electricity and natural gas consumption at your facility this winter!

See Hamid Syed for more information.
(2560) hsyed@oshawa.ca

Building on the Managing Energy with Building Automation workshop, held on November 7th, 2016, the City of Oshawa conducted a Winter Community Centre Conservation Challenge.

Included Recreation and Culture Services (RCS) staff at six City facilities.

The challenge was to reduce electricity and natural gas consumption over the 2016-2017 winter period through behavioural habits.



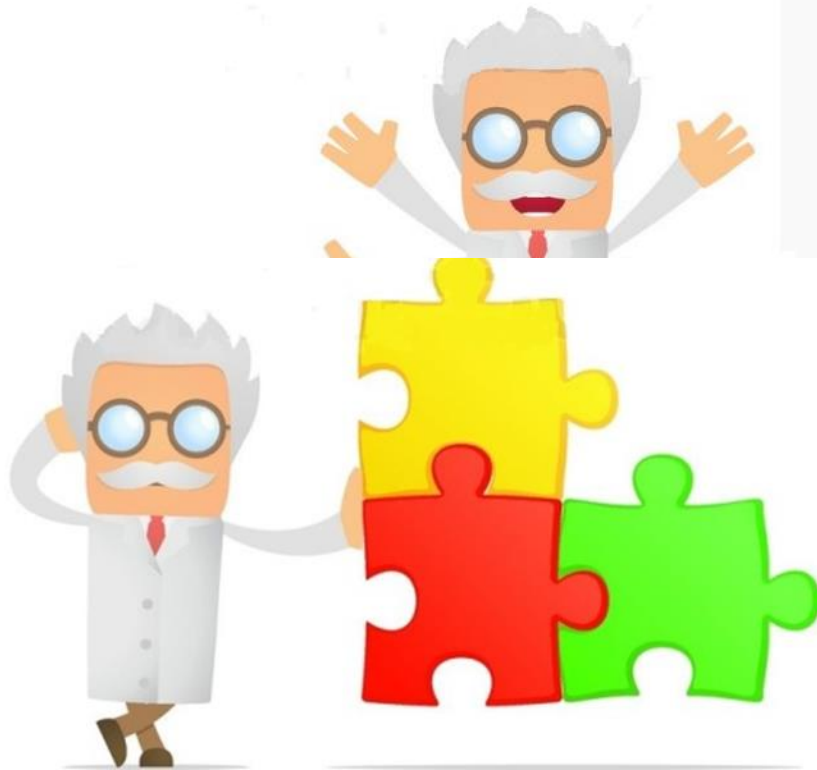
2016-2017 WINTER CONSERVATION CHALLENGE



The 2016-2017 Winter Conservation Challenge aimed to shed lighting costs, on the importance of behavioural measures, to conserve energy at six of the City's Community Centres.

Facilities Management Services (FMS) worked alongside facility staff to provide information on ways to increase and improve energy savings and optimize the use of facilities through workshops and an employee engagement program.

2016-2017 WINTER CONSERVATION CHALLENGE



Previous 2009 - 2010 Community Centre Conservation Challenge included staff at eight of the City's recreational facilities.

Staff challenged to reduce electricity for a period of 90 days.

RESULTS:

- Reduction of 597,896 kilowatt hours of electricity.
- Reduction of 19% in energy savings (electrical and gas), which translated into savings of approximately \$34,000.



2016-2017 WINTER CONSERVATION CHALLENGE



OUR RESULTS

Energy Consumption Profile



2016-2017 WINTER CONSERVATION CHALLENGE



OUR RESULTS

Month of December				Percentage
Hydro Peak Demand	Dec-15	294.00	kW	-12.93%
	Dec-16	256.00	kW	
	Difference	38.00	kW	
Hydro Energy Consumption	Dec-15	166,108.00	kWh	-14.08%
	Dec-16	142,724.00	kWh	
	Difference	23,384.00	kWh	
Month of January				
Peak Demand	Jan-16	294.00	kW	-13.27%
	Jan-17	255.00	kW	
	Difference	39.00	kW	
Energy Consumption	Jan-16	167,430.00	kWh	-12.82%
	Jan-17	145,960.00	kWh	
	Difference	21,470.00	kWh	
Month of February				
Peak Demand	Feb-16	303.00	kW	-12.87%
	Feb-17	264.00	kW	
	Difference	39.00	kW	
Energy Consumption	Feb-16	160,239.00	kWh	-18.83%
	Feb-17	130,067.00	kWh	
	Difference	30,172.00	kWh	



2016-2017 WINTER CONSERVATION CHALLENGE



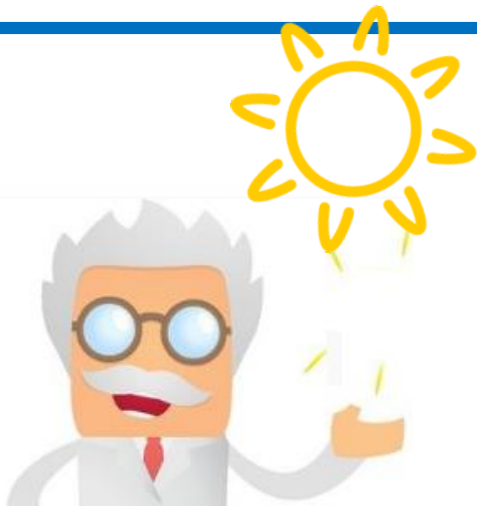
OUR RESULTS

3 Month Summary Chart:

Facility	Total Demand Savings (kW)	Avg Percentage	Total Energy Savings (kWh)	Avg Percentage	Total Cost Avoidance
Legends Centre	59.00	-2.55%	95,944.00	-8.19%	\$ 14,391.60
Civic Complex	116.00	-13.02%	75,026.00	-15.24%	\$ 11,253.90
Donevan C.C.	18.00	-2.20%	20,338.00	-5.67%	\$ 3,050.70
Harman Park	23.00	-2.40%	8,308.00	-6.35%	\$ 3,587.85
Northview C.C.	8.50	-2.72%	12,232.00	-8.39%	\$ 1,834.80
South Oshawa C.C.	11.00	-2.39%	8,308.00	-4.52%	\$ 1,246.20
TOTAL	235.50	-4.21%	220,156.00	-8.06%	\$ 35,365.05



2017 ENERGY PROJECTS



Questions?

