

City of Markham Case Study

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Municipal Corporate Energy Efficiency Case Study
March 29, 2017

Milliken Mills CC Profile

- **Year Built:** 1982
- **Type of Building:** Recreation
- **Total Area:** 103,438 sq ft
- **Main Features:**
 - Community hall, 4 meeting rooms, dance studio
 - 1 arena with pro-shop facility and skate rentals
 - 1 swimming pool, 1 small pool, whirlpool and sauna
 - 100kW FIT Solar Array
 - 18 Collector (80m²) Pool Solar Hot Water Heating

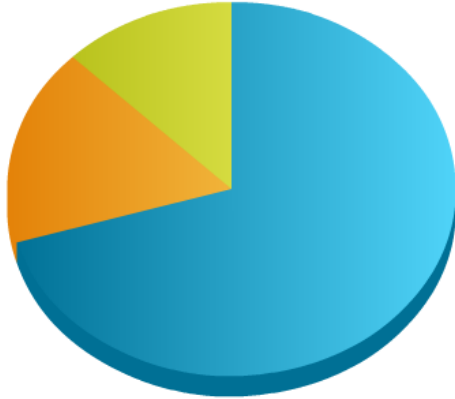




Milliken Mills CC Utility Graphs

Energy Cost Percentage

- Electric 70.3%
- Natural Gas 17.1%
- Water 12.5%



Daily Average Usage

Percentage Change from
**Previous Year To
Current Year**



4.5 %

Current Year:
Feb 2016 - Jan 2017
4,785.70 KWH

Previous Year:
Feb 2015 - Jan 2016
5,015.73 KWH

Daily Average Cost

Percentage Change from
**Previous Year To
Current Year**



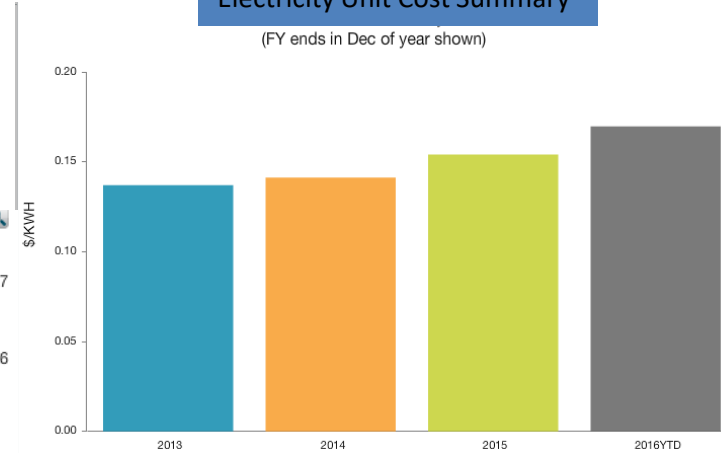
3.8 %

Current Year:
Feb 2016 - Jan 2017
\$816.52

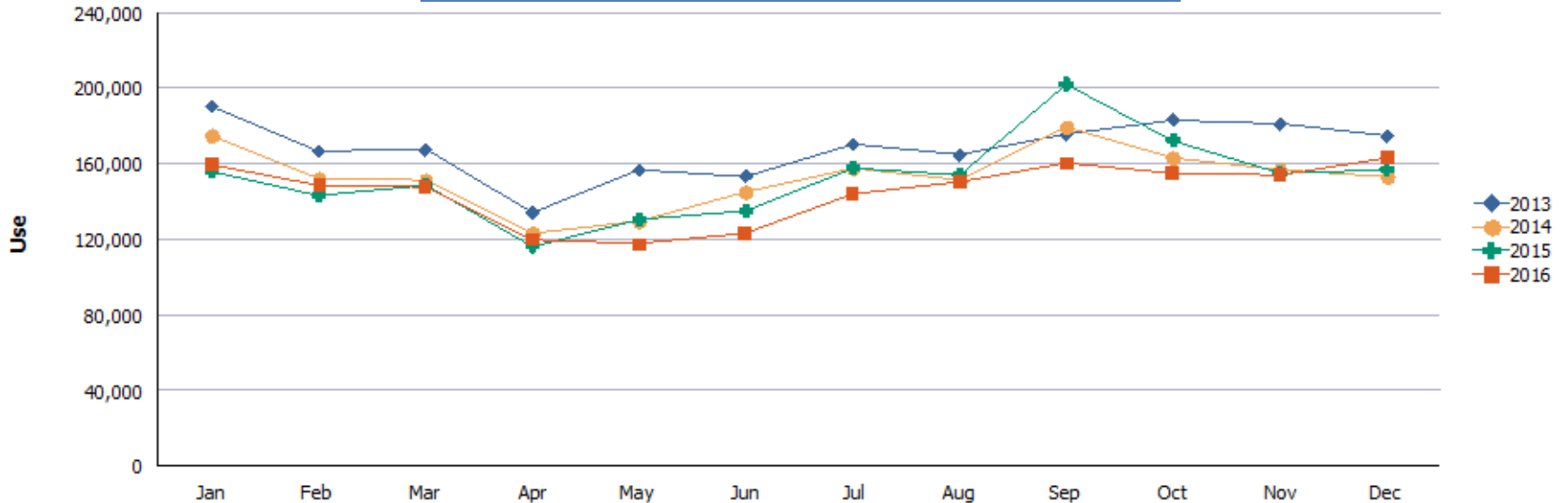
Previous Year:
Feb 2015 - Jan 2016
\$786.58

Electricity Unit Cost Summary

(FY ends in Dec of year shown)



Milliken Mills CC – Electricity Profile



Capital - Energy Efficient Lighting

- Arena (2013)
- Soccer Dome (2013)
- Exit Signs (2013)
- Pool (2014, 2015)
- Hallway (2015)
- Changerooms (2015)
- Meeting Halls (2015)

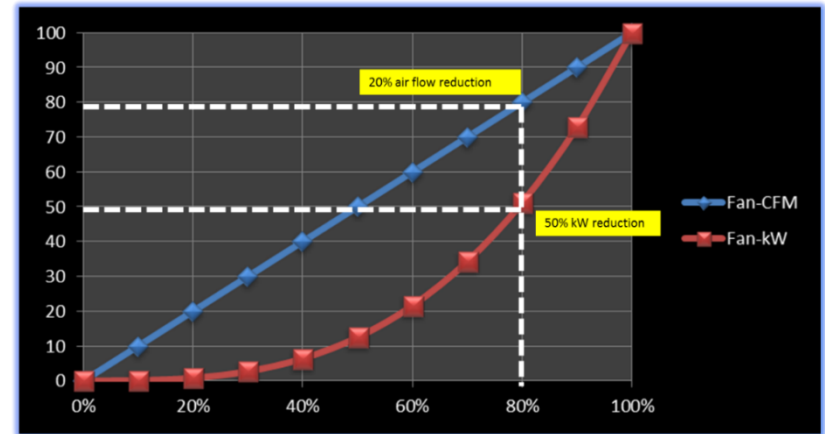


Capital - Energy Efficient HVAC

High Efficiency RTUs (2015)



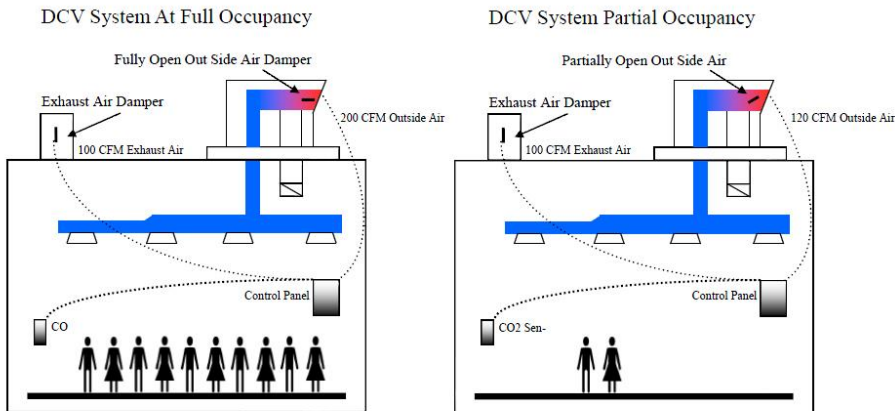
VFDs (2010, 2015)



CIMCO 6000E (2010)



BAS Improvements & CO2 DCV (2015, 2016)



Enbridge Run it Right (2016)



Support Every Step of the Way

Register

- Contact your Enbridge ESC to see if you are Eligible
- Register for the **Run it Right** Program

Complete

Investigate

- Free Building Investigation by our Investigation Agents
- Receive an Investigation Report including:
 - Energy consumption analysis & load profile
 - List of operational opportunities & recommendations

Complete

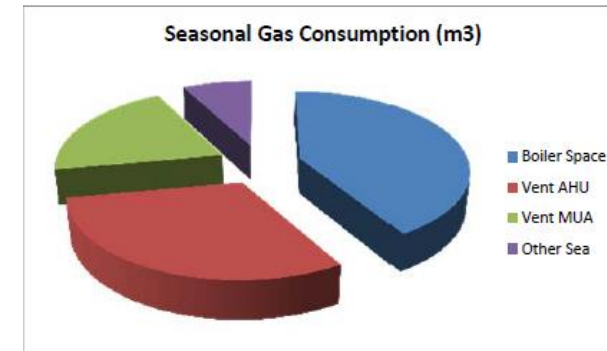
Implement

- Implementation incentive between \$2,500 - \$10,000 depending on building consumption and complexity
- Receive a customizable checklist and calculation tool to select measures with your Service Provider/Contractor
- Investigation agent can review your report to go into more detail of the recommended measures

Complete. Submitted post project data for \$3,500 rebate

Monitor

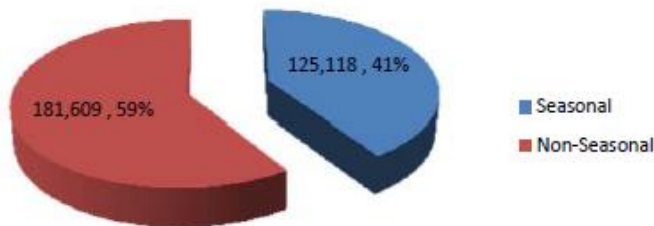
- Free access to the Enbridge's third party EMIS for the 12 month monitoring term
- Training and Support



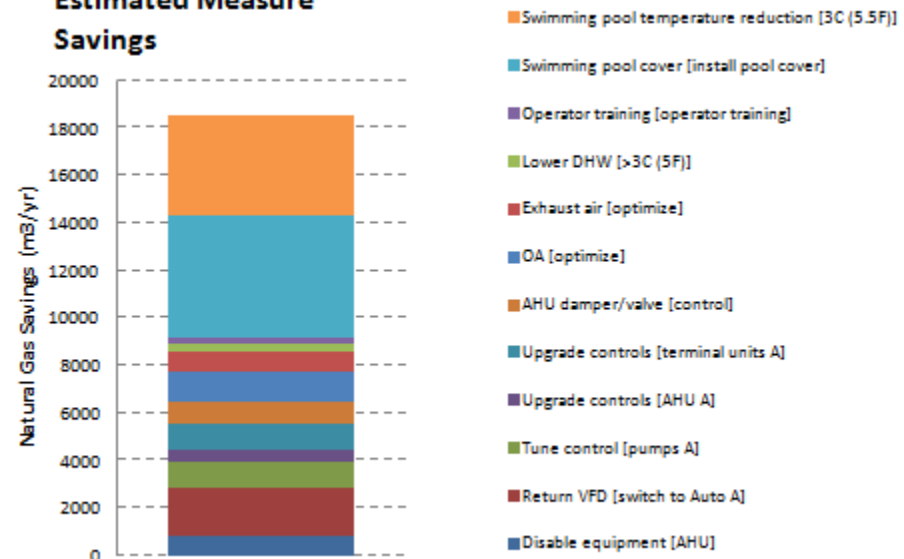
Operational Building Tune Up

Enhanced Operations & Maintenance

Baseline Natural Gas Consumption (m3)

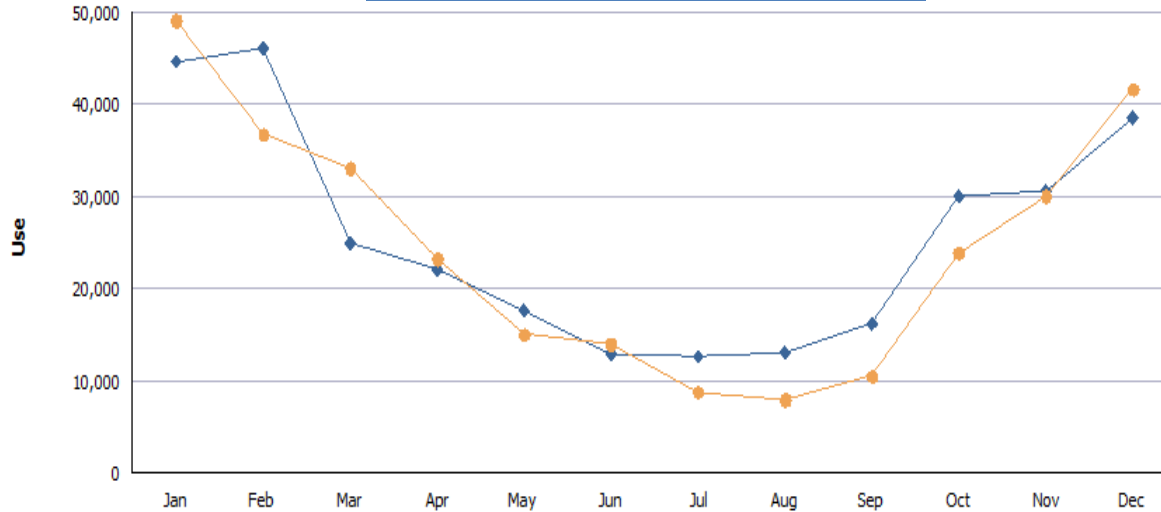


Estimated Measure Savings



Liquid Pool Gel Cover Pilot (June 2016)

Milliken Mills CC – Gas Profile



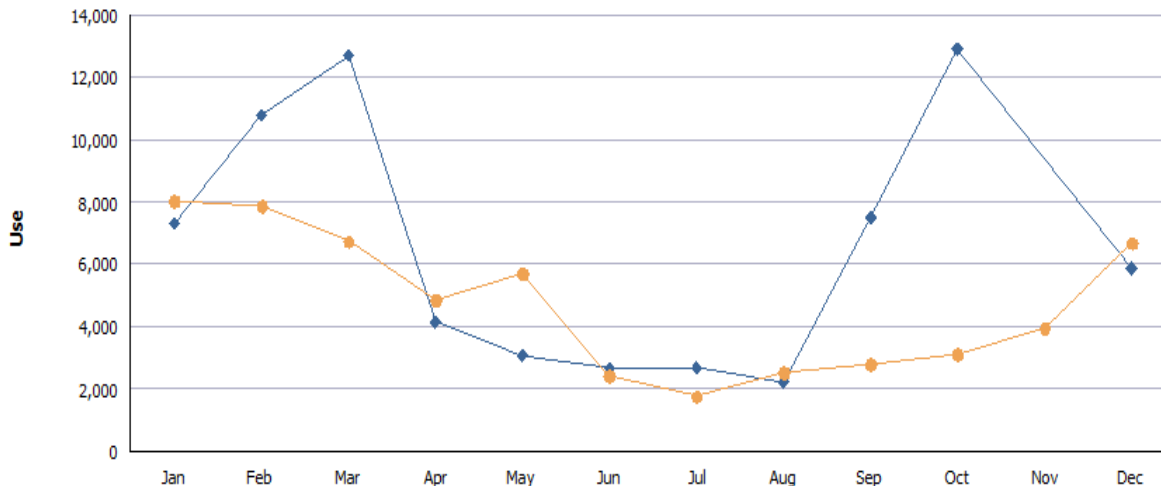
Milliken Mills CC: All Year, Indoor
Savings = 15,000 m³/yr (\$4,000/yr)
Cost = \$3,960/yr

◆ 2015
● 2016



heatsavr™
The green swimming pool saver™

Rouge River CC – Gas Profile



Rouge River CC : June – Sept, Outdoor
Savings = 3,500m³/yr (\$910/yr)
Cost = \$660/yr

◆ 2015
● 2016

Energy Awareness/Operational Improvements

- Corporate Energy Team (2014)
- CEMP (2014)
- Battle of the Buildings (2015-2017)
- EMIS (2015, on-going)
- eLearning (2015)
- BAS Training (2015)
- **Training!!**
- **Celebrating success!**

Help Reduce Energy in our Swimming Pool

What the City is doing:

- Reducing ventilation overnight when pool is not in use
- Keeping pool air temperatures at 24°C to 30°C
- Keeping air temperature 2°C warmer than pool temperature to reduce heat loss and evaporation
- Ensuring heaters are off when not in use
- Turning off lights when not in use and when sunlight is available for daylighting
- Using energy efficient lighting
- Scheduling equipment according to occupancy
- Keeping equipment and fixtures clean and well maintained
- Using high efficiency boilers
- Using solar collectors to heat pool water
- Sealing leaks in building envelope to keep heat in pool area

What you can do:

- Keep all facility doors closed to help maintain temperature settings
- Take short showers with soap before and after swimming
- Make sure all taps are off when not in use
- Report energy waste, including leaking taps or showers
- Turn off the lights when not needed
- Save phantom power by unplugging devices when not in use

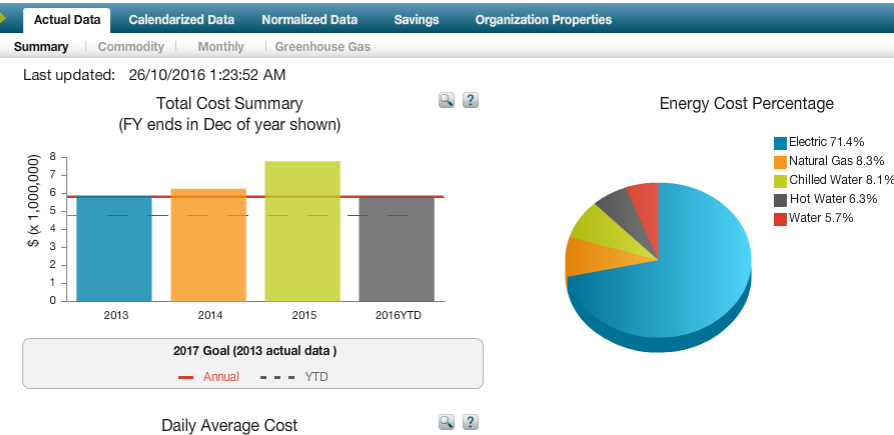
Visit markham.ca/sustainability to see which facilities are in the lead and to learn more.

Make your own commitments and become an energy champion at home!
Do you have an energy tip? Email us at sustainability@markham.ca



Buildings & Meters

- Home Dashboard
- Buildings & Meters
- Groups & Benchmarking
- Customers & Chargebacks
- Accounts
- Vendors & Rates
- Bill Processing
- Reports
- Administration



2017 Projects – BAS and RTU Upgrade

Phase I (Jan-May):

- BAS Analysis, Energy Audit, Investigation for Improvements, and Design Docs/Bid Package
- BSA \$5k Incentive for study

Building Systems Audit	
Building Size	Incentive
Any	50% of costs of an audit up to \$5,000

Phase II (June – Dec):

- RFT for full BAS Replacement
- High Efficiency ACS-1 RTU

Milliken Mills CC Preliminary List of ECM for Consideration - BAS Upgrade Project		
BAS Upgrade	Existing Condition	Remarks/Recommendations
BAS Replacement	Existing BAS System has very limited capability in monitoring and controlling the entire facility.	Replace with new system with a capability to tie in to all HVAC equipment (Open Protocol). Design and sequence of operation will be based on current and existing equipment.
Unit Heaters/Cabinet Heaters Optimization	No control valves and no connection to the BAS. Some Unit heaters are operating all the time.	Provide 2-way control valve to modulate the flow (0%-100%) and add to BAS point to enable and disable based on the space temperature set point.
ACS-1 Library Unit replacement	A plan is in place replace the Library Unit with a DX Cooling and Natural Gas Burner Heating Roof Top Unit.	The unit can be replaced by a more efficient VRV System. Providing cooling and heating at the same time using only refrigerant eliminating the natural gas fuel. Heating backup during extreme weather temperature will be the existing perimeter heating system.

