MARKHAM STOUFFVILLE HOSPITAL

Performance Improvement
The Target, Story So Far and Future Planning
Greening Health Care – May 31, 2018
Markham Stouffville Hospital

- Acute care site
- 710,000 ft², 309 beds
- Cooling, hot water, steam, electricity (Building B) supplied by Markham District Energy plant
- 385,000 ft² LEED Silver expansion (Building B) completed in 2013
- Cumulative savings of $485,000 since 2015
  - 2016 – 2.3% total energy; $130,000
  - 2017 – 7.0% total energy; $306,000
  - 2018 YTD – 3.2% total energy; $49,000
2016-18 Progress - Electricity

Building A
(Service Building)

2017 Savings: 15.6%; 1,263,165 kWh

- Original hospital, now service building, not all areas are occupied 24/7
- Aug/Sept 2016 scheduling of fans using VAV boxes and VFDs
- Photo sensors to control lighting
- Upgraded lighting control system linking controls between both buildings
2016-18 Progress - Electricity

Building B (Main Hospital)

2017 Savings: 5.3%; 506,843 kWh

- AHUs for non-critical areas also being scheduled
- Lower speed motors on heat wheels, repaired bypasses
- Converted lighting to LED and fixed ¾ closed blinds and photo sensors that weren’t working
2016-18 Progress – Chilled Water

Both buildings

2017 Savings: 12.2%; 459,825 kWh

- AHU scheduling
- Reduced reheat by increasing SAT set points
- Aug/Sept 2016 scheduling of fans using VAV boxes and VFDs
- Reduced use of 100% outside air by activating recirculation
2016-18 Progress – Hot Water

2017 Savings: 4.1%; 98,056 m³

- Increased operator involvement through Plant Services Committee
- Aug/Sept 2016 scheduling of fans using VAV boxes and VFDs
- Lower speed motors on heat wheels, repaired bypasses
- Reduced reheat by increasing SAT set points
- Reduced use of 100% outside air by activating recirculation
2016-18 Progress – Steam

Both buildings

2017 Savings: 6.9%, 116,860 m³

- Reduced use of 100% outside air by activating recirculation
- Corrected overheating plenums when fans shut down
- Shut down steam lines in summer
- Replaced steam traps
2016-17 Progress – Water

Both buildings

2017 Savings: 3.8%, 5,536 m³
Our Team
Building Automation System Monitoring
Cooling Equipment on City Water

Elevator Room

Kitchen compressors

Refrigerator
2017 Energy Targets

Savings Potential Summary

<table>
<thead>
<tr>
<th></th>
<th>2017</th>
<th>Target</th>
<th>Savings Potential</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>%</td>
<td>kWh</td>
<td>Cost</td>
</tr>
<tr>
<td><strong>Electricity (kWh/ft²)</strong></td>
<td></td>
<td></td>
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<tr>
<td>Base</td>
<td>23.9</td>
<td>19.4</td>
<td>19%</td>
<td>3,165,264</td>
<td>$474,790</td>
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<tr>
<td>Chilled Water</td>
<td>3.4</td>
<td>2.1</td>
<td>37%</td>
<td>902,061</td>
<td>$135,309</td>
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<table>
<thead>
<tr>
<th><strong>Thermal (Gas + Steam) (ekWh/ft²)</strong></th>
<th>2017</th>
<th>Target</th>
<th>Savings Potential</th>
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</thead>
<tbody>
<tr>
<td>Base</td>
<td>29.4</td>
<td>19.0</td>
<td>35%</td>
<td>714,346</td>
<td>$214,304</td>
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<tr>
<td>Heating</td>
<td>26.1</td>
<td>12.6</td>
<td>52%</td>
<td>926,253</td>
<td>$277,876</td>
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<thead>
<tr>
<th><strong>Water (liters/ft²)</strong></th>
<th>2017</th>
<th>Target</th>
<th>Savings Potential</th>
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<tbody>
<tr>
<td>Total</td>
<td>201.0</td>
<td>161.7</td>
<td>20%</td>
<td>27,906,642</td>
<td>$101,301</td>
</tr>
</tbody>
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**Total Savings Potential:** 82.7 53.1 36% $1,203,580

- Further upgrades to BAS
- Rebalancing Building B AHUs (oversupply)
- Reset CAV boxes
- After-hours scheduling of 100% Outside Air OR systems
- Removing silencers from ducts, check for air leaks
- Low pressure loss filters
- Demand-controlled ventilation for kitchen (no longer in full operation)
- Right-sizing glycol pumps
- Systematic checking of heating and cooling valves
- Heat recovery from condensate
- Replace city water cooling in elevator rooms
- Heat Wheel Bypass Dampers
- Low Pressure Drop Filters
- Recommissioning the Lighting Computer
- Operational Efficiencies by Building Staff
Utility Company Incentives and Support
Any Questions?

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