

Managing Energy Performance Beyond the Audit

Greater Toronto Apartment Association
Energy Efficiency Seminar
April 19, 2016

Eric Chisholm
416-644-1369
Eric.Chisholm@wspgroup.com

TWO FIRMS COMING TOGETHER



**PARSONS
BRINCKERHOFF**



PIVOTAL

Kazmar
KAZMAR ASSOCIATES LIMITED
STRUCTURAL ENGINEERS



STRUCTURAL + BUILDING SCIENCE +
SUSTAINABILITY + PROJECT MANAGEMENT



RYBKA



MECHANICAL + ELECTRICAL + STRUCTURAL +
SUSTAINABILITY + COMMISSIONING





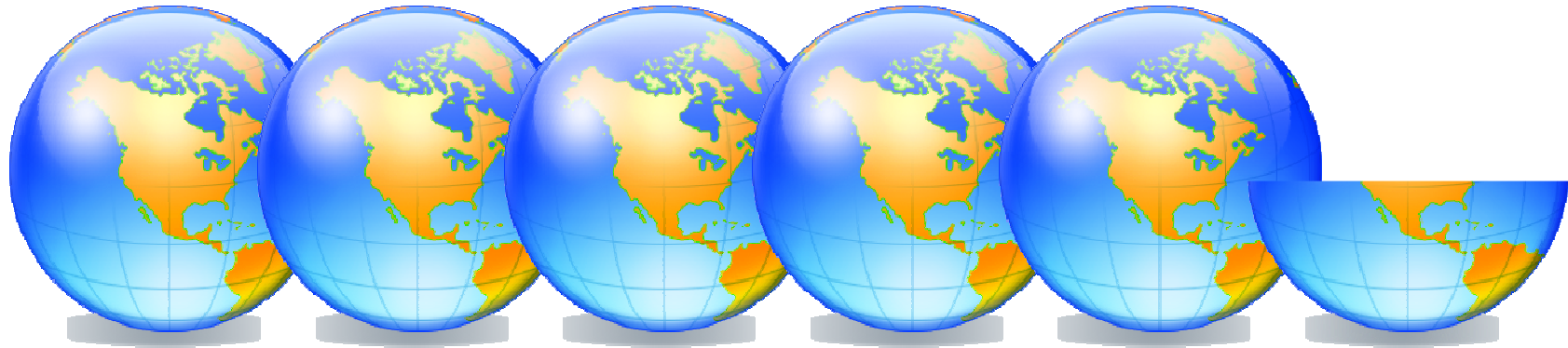
500+ Green Building Projects

70 Million+ Square feet of benchmarking, greening and retrofitting existing buildings

30 Million+ Square feet of new building development

30 Community Energy Plans and Sustainability Frameworks and/or Municipal Green Building Standards

ONE PLANET VS. 5 ½



CAUSES OF DESIGN FOLLOW UP

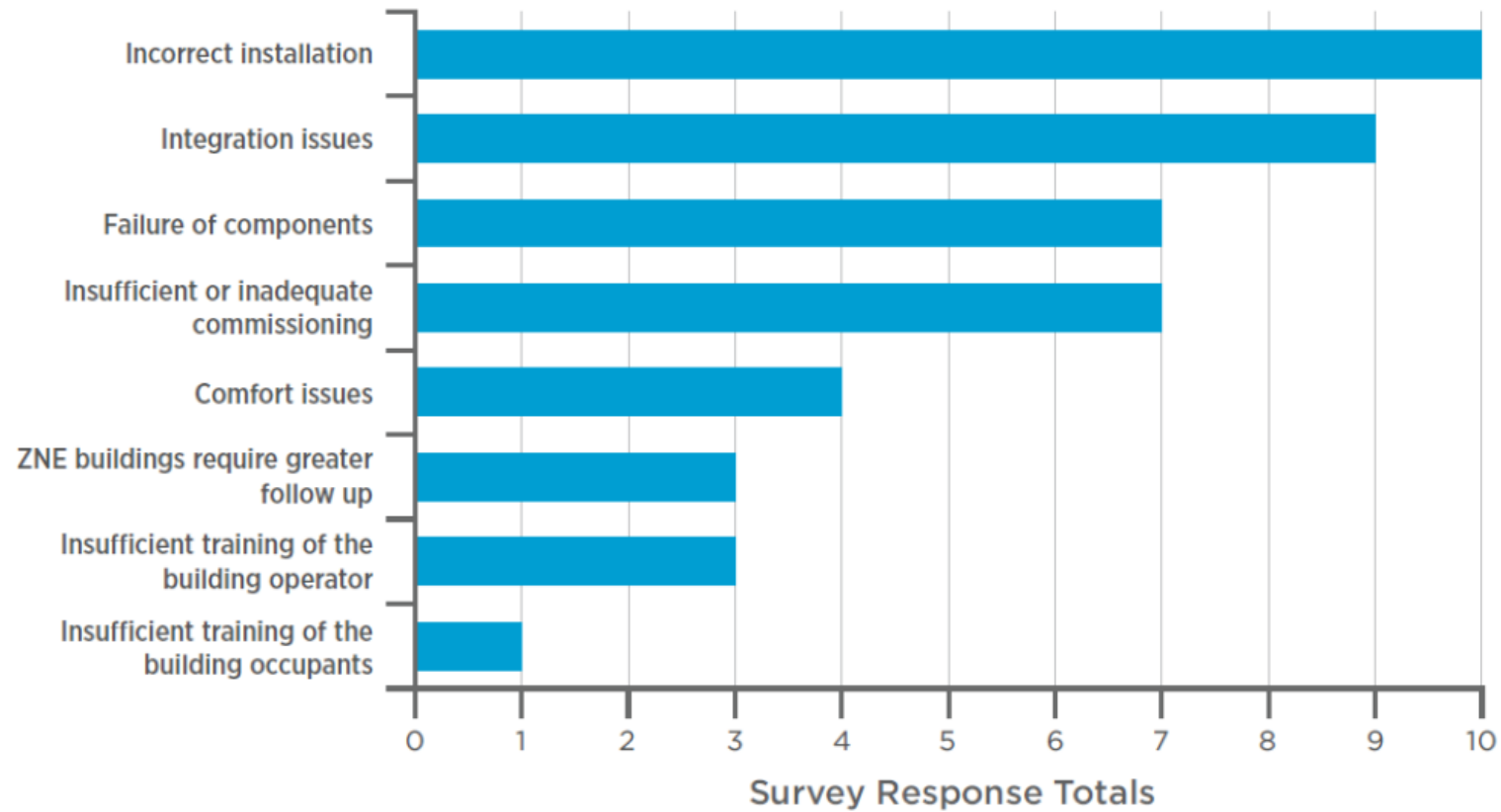
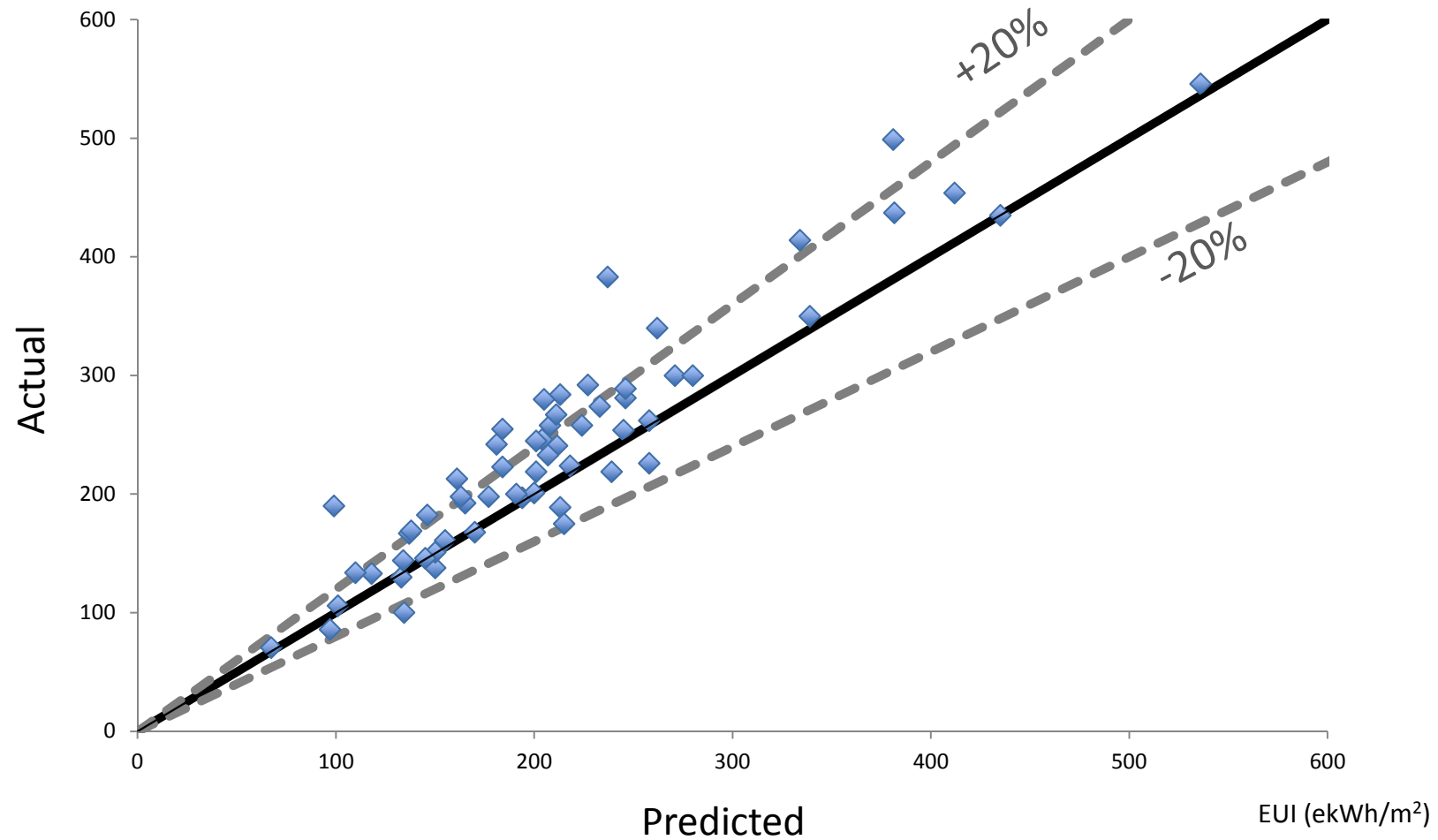


Image courtesy of New Buildings Institute

OPTIMISM, REALISM



IT'S COMPLICATED

- Solar roofs
- Rainwater
- Condensing boilers
- Smart thermostats
- Geothermal loop
- Envelope failures
- Large portfolios



ONE BUTTON



AFTER THE AUDIT

LIFE GOES ON

Four truths of achieving ongoing energy savings:

- 'Why' matters
- Real people run buildings
- I usually take the easy way
- No feedback is a problem



PROGRAM MANAGEMENT

- Vision, leadership, targets
- One program: Cost? Carbon? Energy? Water?
- Focus on results
- Manage risk, cost, deadlines

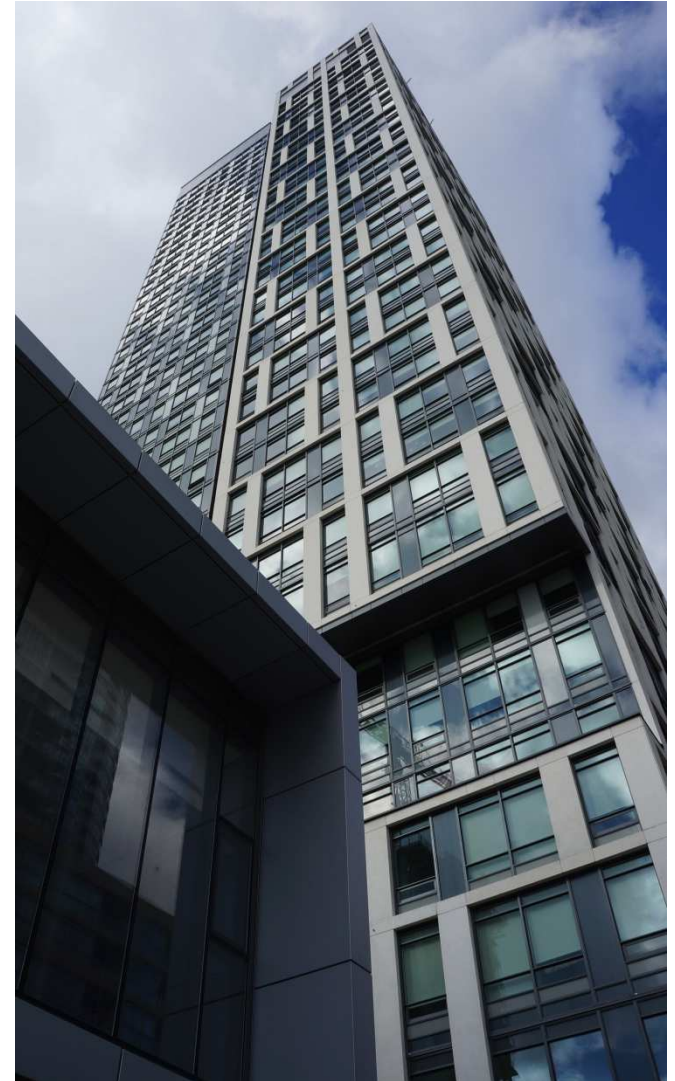


DISCOVER OPPORTUNITY, PLAN FOR PERSISTENCE

Potential Energy Conservation Measure	Potential Energy Savings (ekWh/yr)	Prelim. Opinion of Cost	Simple Payback (years)	Potential Emissions Reduction (eCO ₂ t/yr)	Persistence Strategy
Add Ground/Concourse Low-Temp Hot Water Heater VSD Observation: Constant-speed secondary pumps circulate low-temp hot water to ground floor fan coil units. Pumps are activated by operator control on the BAS. Proposed Solution: Consider adding a VSD to control pumps, this could be controlled based on space temperature sensor(s) placed in critical areas.	230,000 (\$23,500)	\$14,000	<1 yr	50 t/yr	Document sequence in building Operating Plan. Yearly review of sequence vs plan. Periodic operator training.
Restore Chilled Water Pump Automation Observation: Chilled water circulation pumps (lead/standby) are each on a VSD with the lead running at 100%. Proposed Solution: Suggest that operators return automatic control to the VSD to maintain the chilled water pressure set-point. If required, install a differential pressure sensor.	10,000 (\$1100)	Low/no cost	<1 yr	2.0 t/yr	BAS manual-control log Quarterly review
Add Feedback Control for Parking Glycol Heating Observation: Building operators indicate the parking heating circulation pumps are oversized, and a VFD with a fixed speed setting is used to improve performance. Boiler water is supplied to maintain glycol supply temperature. None of these systems are controlled using feedback from space temperature setpoints. Proposed Solution: Install space temperature sensors. Program the glycol pumps VFD based on a space temperature set-point. Program the boiler water mixing valve based on a space temperature set-point.	145,000 (\$15,000)	Low/no cost	<1 yr	32 t/yr	Document sequence in building Operating Plan. Yearly review of sequence vs plan. Periodic operator training.
Add Setback to High-Temp Hot Water Heating System Observation: There is currently no day/night temperature setback on the boiler loop. Proposed Solution: Program a day/night temperature setback on the boiler loop. This will reduce return water temp which increases efficiency of the condensing boiler. The building heating load is also reduced.	60,000 (\$2,300)	Low/no cost	<1 yr	11 t/yr	Document setpoints in building Operating Plan. Quarterly review of setpoints vs plan.

MAKE THE CHANGE (RETROFITS)

- Design
- Install
- Commission, verify



TRAIN & MAINTAIN

Staff

- General (CIET BOC)
- Building-specific
- Construction check-ins
- Policies, procedures, documents

Occupants

- Awareness
- Advocacy
- Action



FEEDBACK

DISCOVER OPPORTUNITIES, ADDRESS ISSUES

Group	Rules	Targets	Timelines
Petersburg 41 sparks	AHU Fan Failure	Carytown RTU-1	
	Lights On and Unoccupied	Carytown Main Lights Status	
	Temp Sensor Failure	(3)	
Richmond 38 sparks	AHU On and Fan Off	Short Pump RTU-1	
	KW Exceeds Target	Short Pump ElecMeter-Main	
	Lights On and Unoccupied	Short Pump Main Lights Status	
Washington DC 163 sparks	AHU Cool Failure	Gaithersburg RTU-1	
	AHU Cool and Heat	Gaithersburg RTU-1	
	AHU Cool-Heat Mode Cyding	Gaithersburg RTU-1	

MONITOR PERSISTENCE, MANAGE BILLS, RESOLVE ERRORS, MEET REGULATIONS

Energy Rates on the Rise

2014 utility rates are on the rise across Toronto and much of Ontario, outpacing inflation three to one or more:

- Enbridge's natural gas rates rose by 40% on April 1
- Electricity rates will rise 11% in 2014 and 18% by 2015 (Ontario Power Authority forecast)
- Toronto water rates will also continue to increase - by 9% in 2014 and by 2017


For building owners and managers, this means higher utility bills for tenants, higher year-end adjustments; and for condominium owners, increased condo fees.

What can you do to combat rising energy costs?

- Given the above utility cost increases, review any energy performance reports previously prepared for your property and reconsider recommendations.
- Engage with your Operations Team, ensure they know about rate hikes, and explore conservation options that they identify.
- Engage with tenants to explore options; most importantly, make sure system operating schedules match actual tenant occupancy.
- If you identify and implement tactics for improving performance, weekly energy reporting to track performance compared to targets provides feedback that motivates your team to make the changes necessary to achieve lasting results.
- To add a new perspective and additional experience to your team, consider enlisting external expertise in retro-commissioning and energy analysis.

For support in controlling energy costs at your building, call the Energy Services Team. Our knowledge is your competitive edge.

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 **ENERGY STAR® Statement of Energy Performance**

86
ENERGY STAR® Score¹

Test Building
Primary Property Type: Office
Gross Floor Area (ft²): 231,000
Built: 1960
For Year Ending: December 31, 2007
Date Generated: April 15, 2016

1. The ENERGY STAR score is a 1-100 assessment of a building's energy efficiency as compared with similar buildings nationwide, adjusting for climate and business activity.

Property & Contact Information			
Property Address		Property Owner	Primary Contact
Test Building 2300 Yonge St. Toronto, Ontario M1K 3M6			
Property ID: 1552367			
Energy Consumption and Energy Use Intensity (EUI)			
Site EUI	Annual Energy by Fuel		National Median Comparison
76.8 kBtu/ft²	Natural Gas (kBtu)	3,405,738 (19%)	National Median Site EUI (kBtu/ft²)
	Electric - Grid (kBtu)	14,330,400 (81%)	National Median Source EUI (kBtu/ft²)
			% Diff from National Median Source EUI
Source EUI	Annual Emissions		
142.2 kBtu/ft²	Greenhouse Gas Emissions (Metric Tons CO2e/year)		681

Signature & Stamp of Verifying Professional

I, _____ (Name) verify that the above information is true and correct to the best of my knowledge.

Signature: _____ Date: _____

Licensed Professional

Professional Engineer Stamp
(if applicable)



Managing Energy Performance Beyond the Audit

- ✓ Program Management
- ✓ Compliance
- ✓ Opportunity Discovery (Audits)
- ✓ Incentive Application
- ✓ Opportunity Implementation (Retrofits)
- ✓ Train, Maintain
- ✓ Monitor Persistence (Manage Bills)





Thank You

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