



# Retro Commissioning in Connecticut

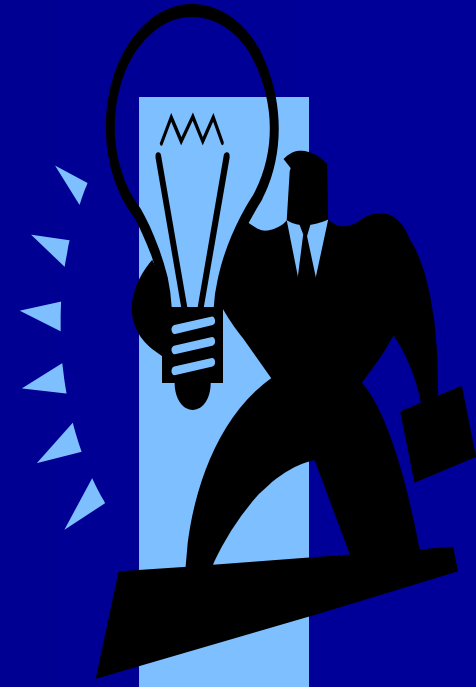
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## 16<sup>th</sup> National Conference on Building Commissioning

Newport Beach, California USA

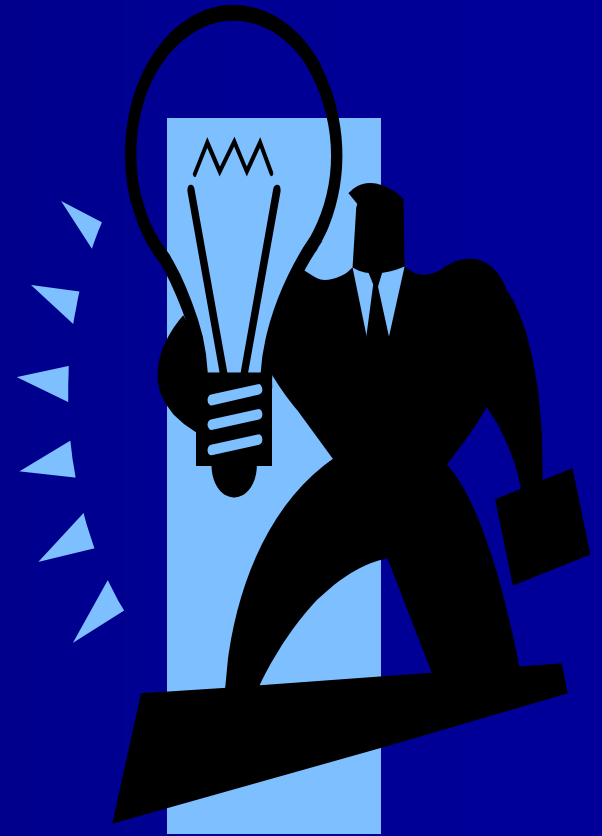
# ? What is Retro Commissioning (RCx)

- A Conservation & Load Management program designed for Connecticut Light & Power (CL&P) commercial and industrial customers who want to conduct an in-depth review of inefficiencies in their building's energy management system (BMS)
- The objective of the RCx program is to find low- or no-cost, low to no-capital energy-efficient measures that can be implemented effectively and quickly in a building or facility, primarily using the BMS.
- CT Eligibility guidelines require that buildings are pre-screened, over 100,000 square feet, be ENERGY STAR benchmarked and have a BMS with trending capability.



# History of RCx in Connecticut

- This program started as a pilot in late 2004 with 5 class A office buildings.
- A process & impact evaluation was undertaken & completed in Oct 2006.
- Due to mixed results the pilot was extended to an unlimited number of sites.

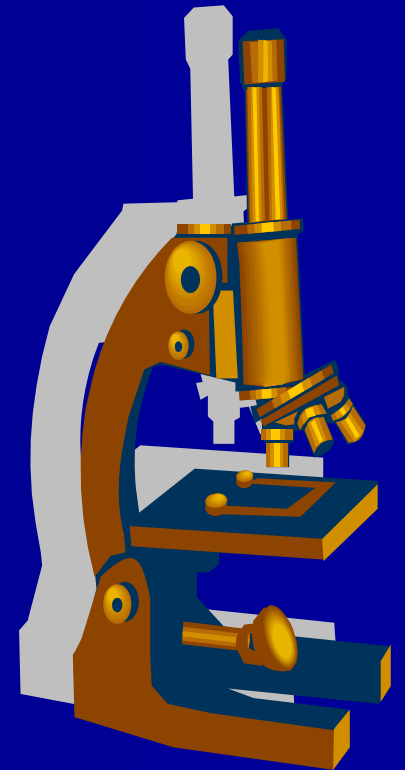


# RCx Pilot Process Lessons Learned

The evaluation identified

(2) two primary and  
(7) seven secondary program design  
improvement opportunities.

- Primary learning lessons involved:
  - the management of protocol cycles, and
  - the role of the scoping step.



# Lessons learned Cont.

- Other secondary learning lessons were:
  - The pilot's pairing of building owners with Commissioning Providers (CxP's),
  - The need to include indirect cost of the building owner's staff involvement as part of the incentive value was asked for,
  - Challenges of working with third party controls contractors,
  - Operational limitations of some outside providers,

# Lessons learned Cont.

- additional secondary learning lessons were:
  - RCx projects for some high-end buildings equate to energy savings with unperceived changes in tenant comfort,
  - Modifying the format of the Master List of finding into a more user friendly tool, and the
  - Desire by participants to capture natural gas savings and obtain incentive.

# RCx Pilot Impact evaluation

2004 Total Annual Electric  
Consumption

All Participants 83,368,000 kWh

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2004 Total Annual Electric Cost

All Participants \$6,669,440  
@ \$.08/kWh

Approx. \$.13/kWh currently for  
this rate customer



# RCx Pilot Impact evaluation

- Verified kWh Savings  
4,426,453 kWh or  
approx. 4.7% of the 3  
implemented Pilot  
Participant's kWh  
consumption
- Estimated Pilot Project  
Peak demand Savings  
of 696 kW



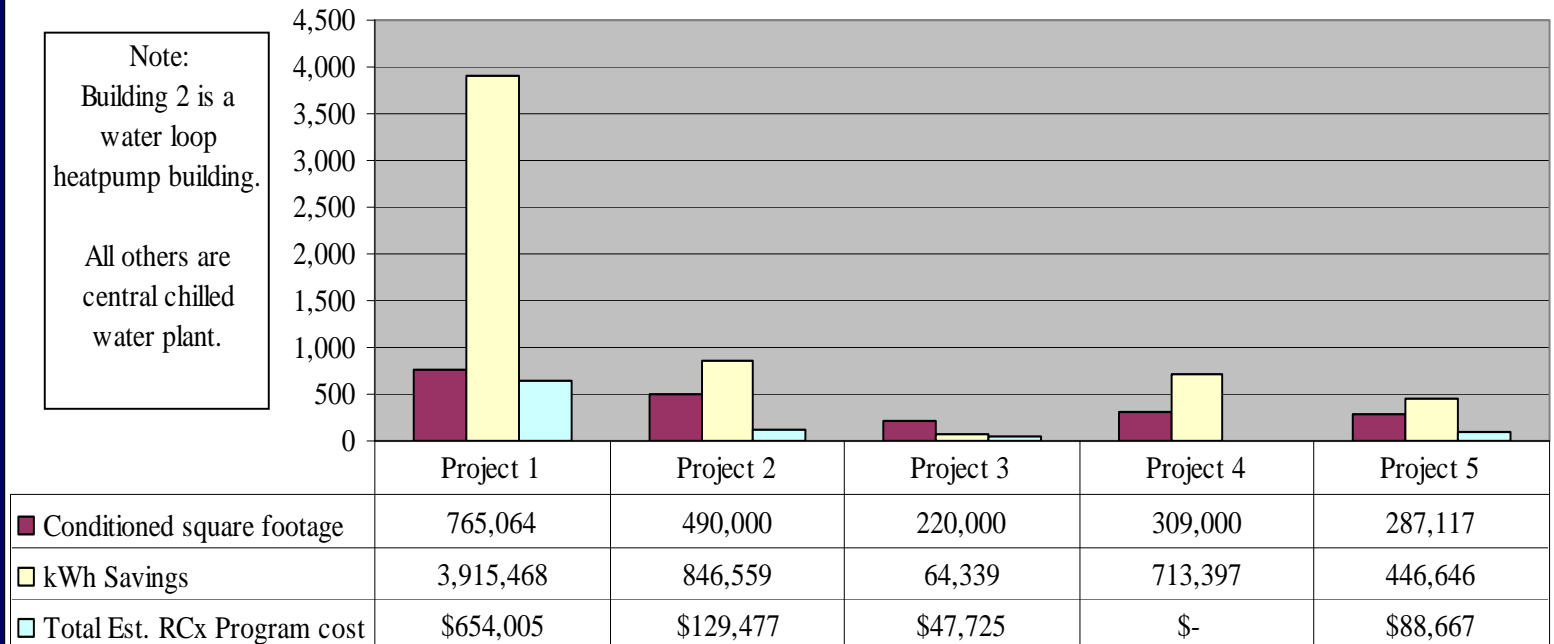
# RCx Pilot Results

Pilot Project		see Note		see Note		
Class "A" Commercial	Project 1	Project 2	Project 3	Project 4	Project 5	Totals
Conditioned square footage	765,064	490,000	220,000	309,000	287,117	2,071,181
kWh usage in 2004	45,576,291	11,600,000	4,790,880	10,911,600	10,490,000	83,368,771
kWh usage per square foot in 2004	59.57	23.67	21.78	35.31	36.54	40
kWh Savings	3,915,468	846,559	64,339	713,397	446,646	5,986,409
% Savings	8.6%	7.3%	1.34%	6.5%	4.3%	5.6%
Est. 2007 Dollars Saved (\$0.13)	\$ 509,011	\$ 110,053	\$ 8,364	\$ 92,742	\$ 58,064	\$ 778,233

Note: Projects 2 & 4 were investigated but **not** implemented

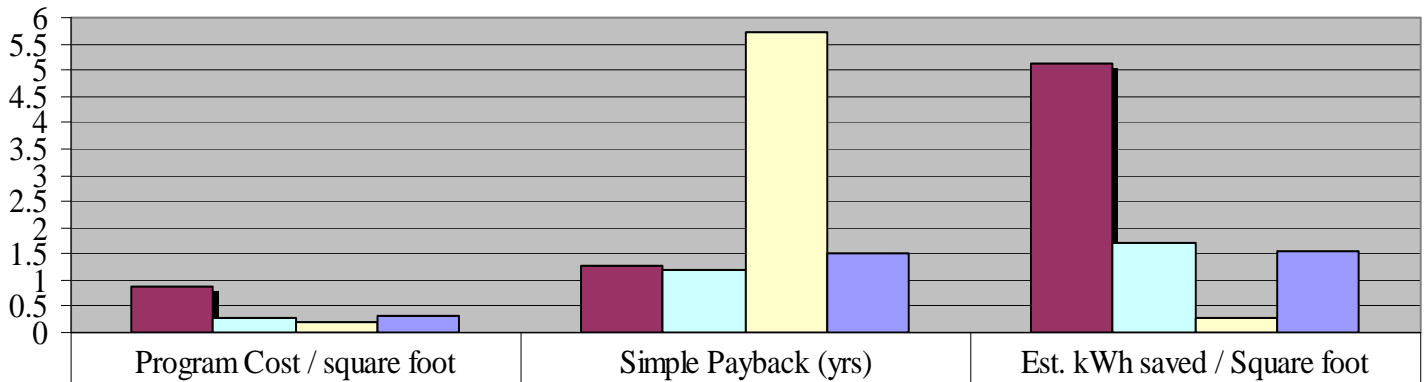
# RCx Pilot Results

Connecticut RCx Pilot - Fig. 1.1



# RCx Pilot Results

Connecticut RCx Pilot - Fig. 1.2

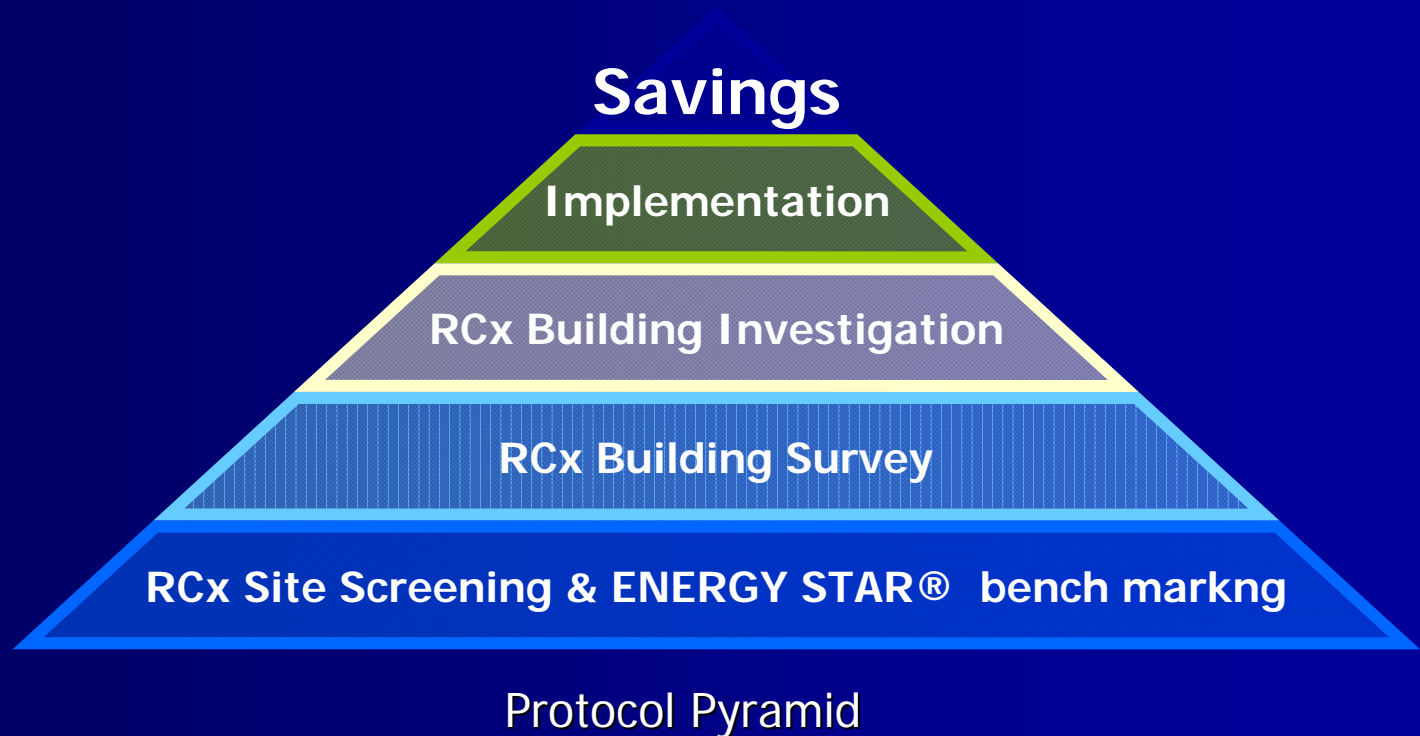


	Program Cost / square foot	Simple Payback (yrs)	Est. kWh saved / Square foot
Project 1	\$0.85	1.28	5.12
Project 2	\$0.26	1.18	1.73
Project 3	\$0.22	5.71	0.29
Project 5	\$0.31	1.53	1.56

# Pilot Recommendations Implemented

- Modification of scoping step
  - An application to enter the program design.
  - Helps the customer understand the program through the answering of questions and providing documentation.
  - Customer is given list of Pre Qualified RCx Commissioning Providers (CxP) to call, interview and make selection.

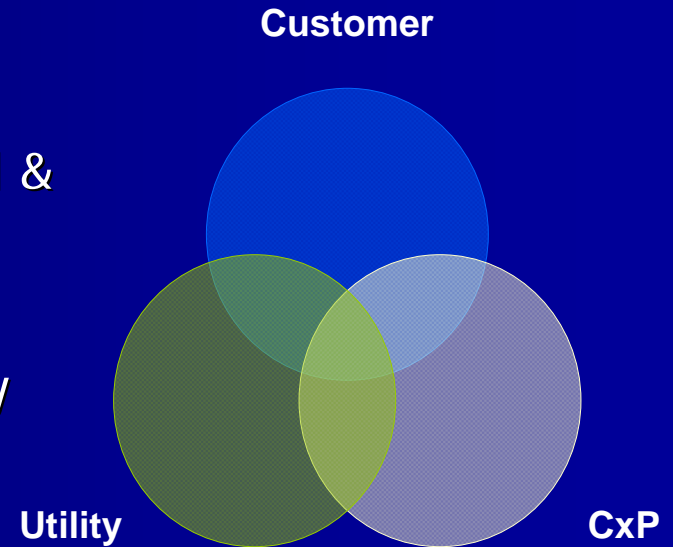
# Pilot Recommendations Implemented



# Pilot Recommendations Implemented

Cont.

- Scoping Phase modified to a Survey
  - Survey agreement requires identification of customers RCx lead & is free to customer.
  - No Scoping Fee paid to CxP
  - Shorter estimated onsite and survey report generation required
  - Survey's purpose is to generate investigation proposal
  - Customer selects CxP



# Pilot Recommendations Implemented Cont.

- Investigation Agreement
  - Firmer schedule w/noted completion dates,
  - Monthly meetings to follow & keep progress on track,
  - \$5,000.00 Capital expense allowance per measure, otherwise measure moves to more appropriate program and considered a Capital improvement,
  - All customers 50% buy in for RCx investigation. No fee for Federal, State, Municipal or Town facilities if they meet RCx screening requirements.

# Who's interested & why

- Cities & Towns
  - Budget constraints and the rapid rise in Electrical generation rates.
  - Value, no capital investment
- Universities
  - Mandate from CT Governor to lower energy use
  - No Capital investment
- Large multi building property owners
  - Value, Fits continuous improvement objectives

# RCx Projects in Process

Retro commissioning Pilot extension Program plan - as of March 2008																							
Pilot RCx Program	TASK					Agreement				Deliverable/Result	Agreement	TASK	TASK	Deliverable/Result	Agreement	TASK	TASK						
Customer (#) = number of buildings	CT RCx invite to customer Information document completed and presented	ENERGYSTAR Benchmark completed	DDC Trending capabilities confirmed	NU site review conducted	CxP Selected	Survey agreement Signed	Bill Release from Customer	Confidentiality Agreement	Billing history customer	BUILDING Survey	Survey Report (30 days)	Survey Report Meeting	RCx Investigation Agreement	25% Customer payment received	Repair of O&M Deficiencies	RCx INVESTIGATION w/monthly meetings	Implementation Plan meeting	Approve Implementation plan	Utility LOA	IMPLEMENTATION with monthly meetings	Final Inspection of Measures	Incentive Payment	
High School #1 (1)																							
State College-Phase1 (3)																					LOA signed		
Office Complex, Norwalk (6)																					LOA signed by Customer		
Large Hospital (1)																					LOA signed by Customer		
City Elementary School #1																					Draft in REVIEW		
City Elementary School #2																					Working on draft		
City Elementary School #3																					Working on draft		
City Elementary School #4																					Calculations in review		
State College-Phase2 (1)																					Monthly meetings underway		
State University (1)																					Signed by Customer - Pending NU signature		
State University (1)																					Signed by Customer - Pending NU signature		
State Univ.-Phase3 (4)																							
City Magnet School																					Survey agreement returned signed		
Central State College (5+)																							
Large pharmaceutical #1																					Sent to be signed 3/10/08		
Western State College (2)																							
Town Elementary School #1																					Sent to be signed 3/10/08		
Town High School#2																					Sent to be signed 3/10/09		
Town High School #3																							
Town Elementary School #2																							
Town Elementary School #3																							
Large Office Bldg																					Sent		
Town High School #3																					Pending start later this year		
Town Middle School																					Need to send Survey agreement		
Town High School#4																					Information document pending		
Large pharmaceutical #2																					CxP selection underway		
Town Hall																					Information document pending - sent December 2007		
Small Commercial office bld																					Information document pending - sent January 2008		
Small pharmaceutical #1																					Looking to begin process in 2008		

# Is RCx working?

- RCx is not a typical utility demand side management program offering.
- Takes more time to implement.
- Complicated to the outside observer.
- The interaction with & time spent with CxP educates customers on the operations side.
- Benefits the environment by using in-place capital to generate the savings.

# What are the barriers ?

- Is faster smarter?  
Tortoise or the hare.....Expected savings
- Is simpler better?  
Prescriptive or custom, Quality Standards
- Technical talent?  
Can the building controls industry handle  
all the RCx work?

# RCx Lite Proposed pilot

- Draft Design for Lite pilot
  - Projects focus on less investigation for quicker results on “Standard measures”
  - More standard/prescriptive measures developed though measures implemented in “Full” RCx projects.
  - Customer could move to Full RCx after RCx Lite for more custom attention.

# Next steps

- Continue to sign up customers
- Develop RCx Lite pilot program and present with state wide RCx program later in 2009, after results from Full RCx are in.

Questions ?

Comments ?



# Thank you for your time

## CT RCx Program

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