

17th NATIONAL CONFERENCE ON BUILDING COMMISSIONING



EFFICIENCY • PERSISTENCE • PERFORMANCE

Programmatic Approaches To Infrastructure Development

Holly Townes, PE
Sr. Energy Management Engineer
Puget Sound Energy



PUGET SOUND ENERGY
The Energy To Do Great Things

AIA Quality Assurance



Learning Objectives

1. **Approaches to assuring continuing energy savings from commissioning**
2. **Utility program approaches to getting energy savings from commissioning**

Program Approaches for Energy Savings Performance

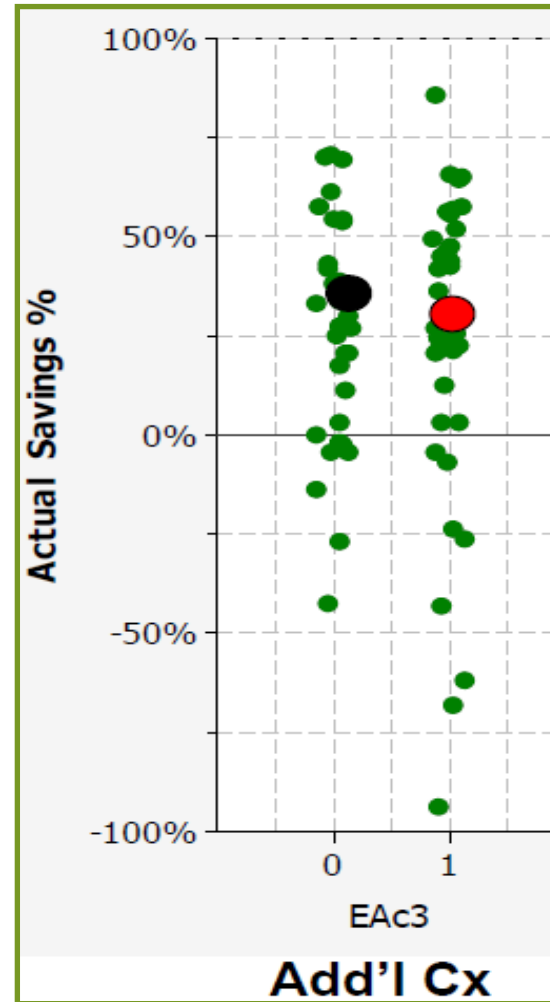
Overview

- New Building Commissioning
 - Present Dilemma
 - Approaches
- Existing Building Commissioning
 - Present Dilemma
 - Approaches
- Other Frontiers
- Common Keys to Assuring Savings

New Buildings Commissioning Dilemma

PROBLEM

Commissioned but
not operating
efficiently!



nbi Report for USGBC (3-4-09):

Energy Performance of LEED® for New Construction Buildings



New Buildings Commissioning Dilemma

Energy Efficiency Expectations / Value

- Design review
- Functioning per design
- Maintainability
- Operation staff training
- Fine tuning

California Commissioning Guide: New Buildings (2006, CACX)

“There are no other options to assure ...
efficient system...

Commissioning is the only answer.”

- *John Wimer*

Chief Operating Officer, National Center for Energy,
Management and Building Technologies

“Improves the building’s overall
performance by optimizing
energy-efficient design features”

New Buildings Commissioning Dilemma

Why not getting energy efficiency value?

- Design basis
- Main value to owner
- Emphasis of agents
- What owners are willing to pay for
- LEED Commissioning requirements



New Buildings CX: Program Approaches

What Needs Incentives?

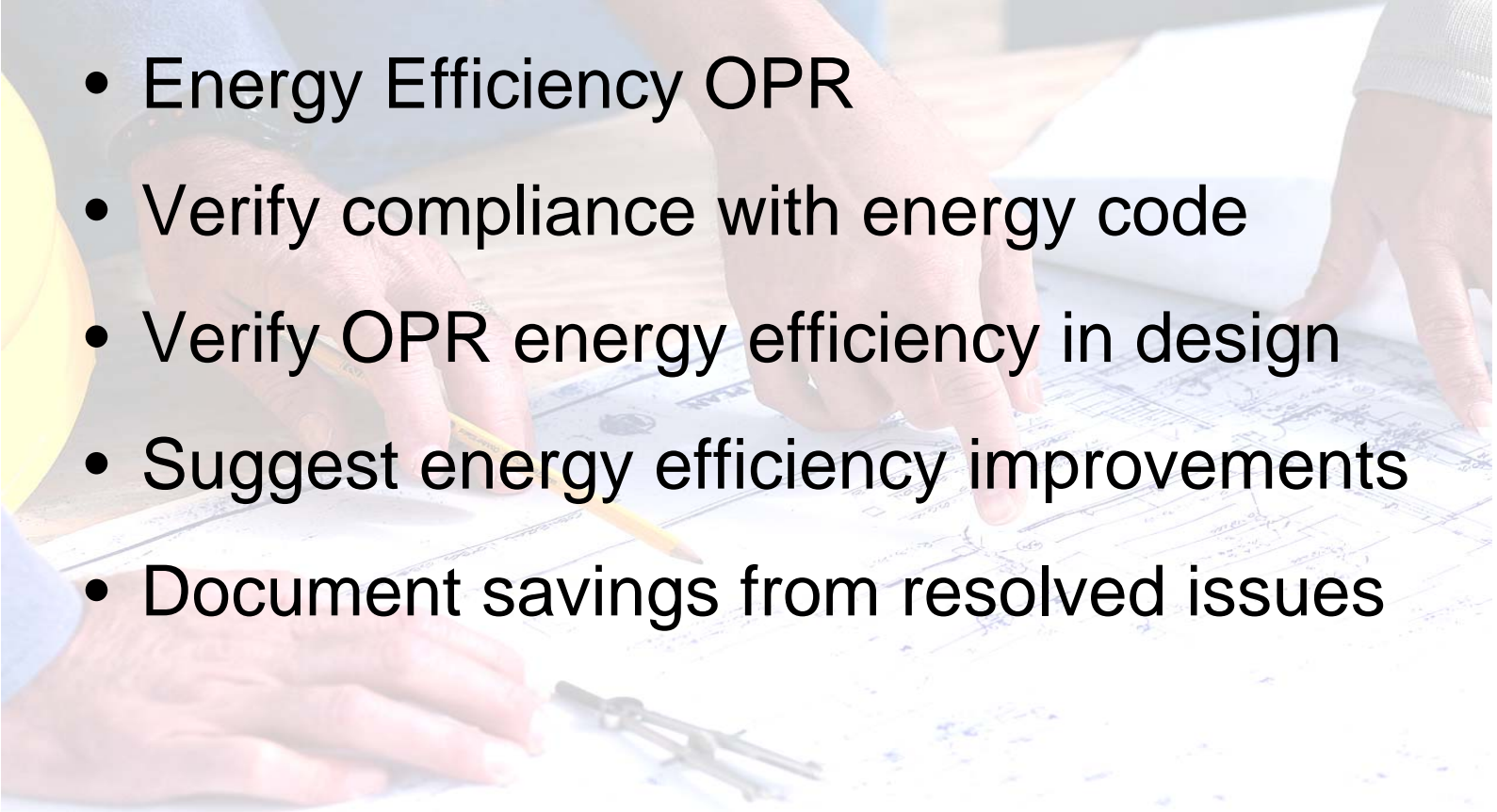
- Focus on energy efficiency
- Operator training
- Actual performance

**BACK TO
THE ROOTS
OF CX**



New Buildings CX: Program Approaches

Incentives for Design Phase Elements

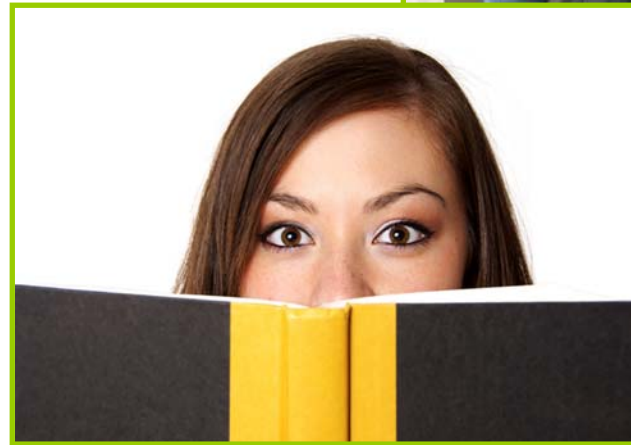
- 
- Energy Efficiency OPR
 - Verify compliance with energy code
 - Verify OPR energy efficiency in design
 - Suggest energy efficiency improvements
 - Document savings from resolved issues

New Building CX: Program Approaches

Incentives for Construction Phase Elements

Operator/Owner Training

- Training Verification
- Systems Manual



New Building CX: Program Approaches

Incentives for Post-Occupancy Phase Elements

Bonus for Actual Performance

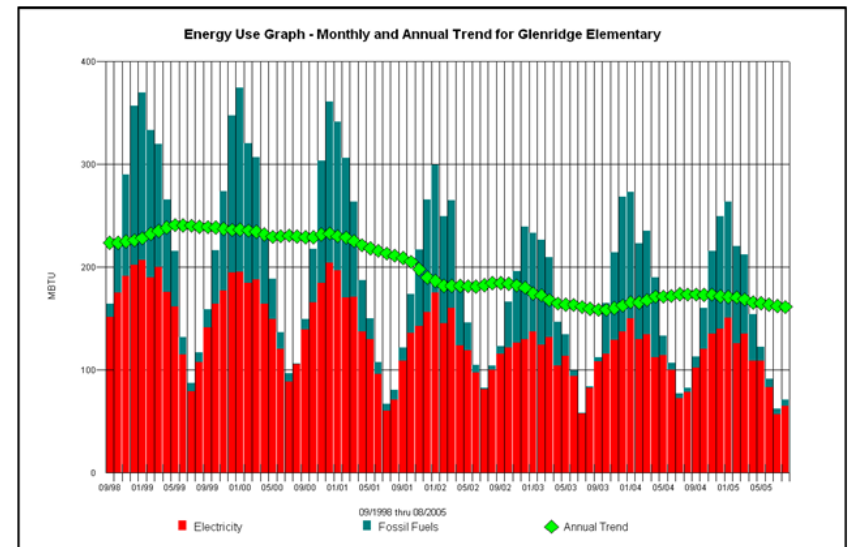
Based on:

- Optimization after full occupancy
- Tracking energy use
- Checks of energy elements

Operator/Owner Training

- Optimization
- Tracking energy use
- Checks for key efficiency elements

New Buildings Can Still Save Energy

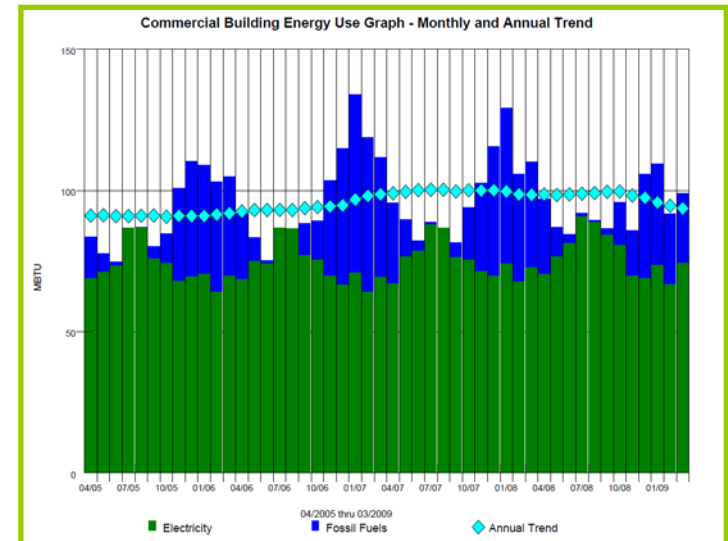


Existing Buildings Commissioning Dilemma

PROBLEM 1

Commissioned but
did not save energy!

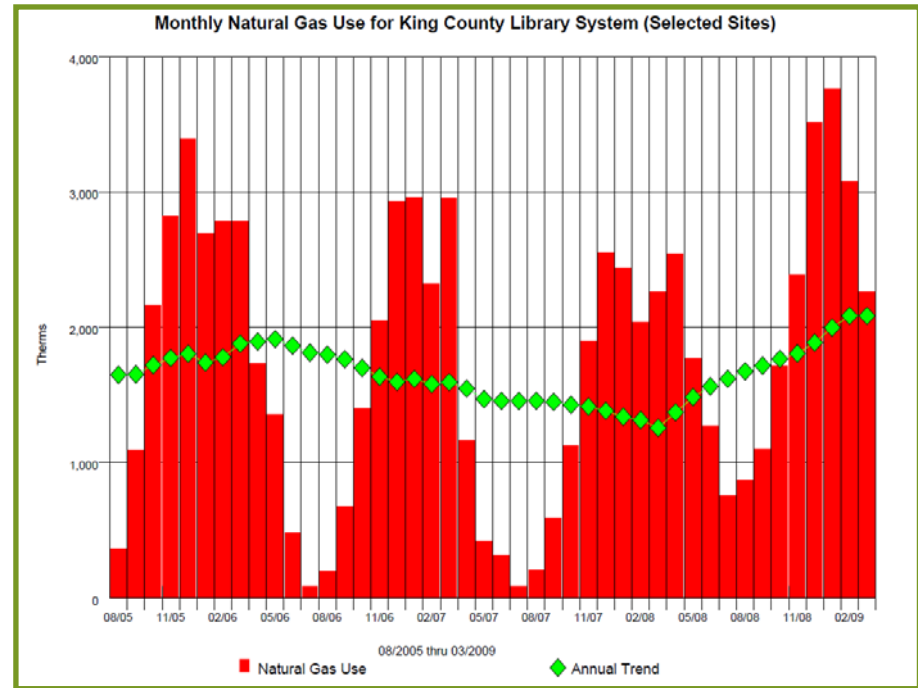
- ✓ Only investigation done
- ✓ No good improvements found
- ✓ No real savings



Existing Buildings Commissioning Dilemma

PROBLEM 2

Commissioned
but
savings did not last!

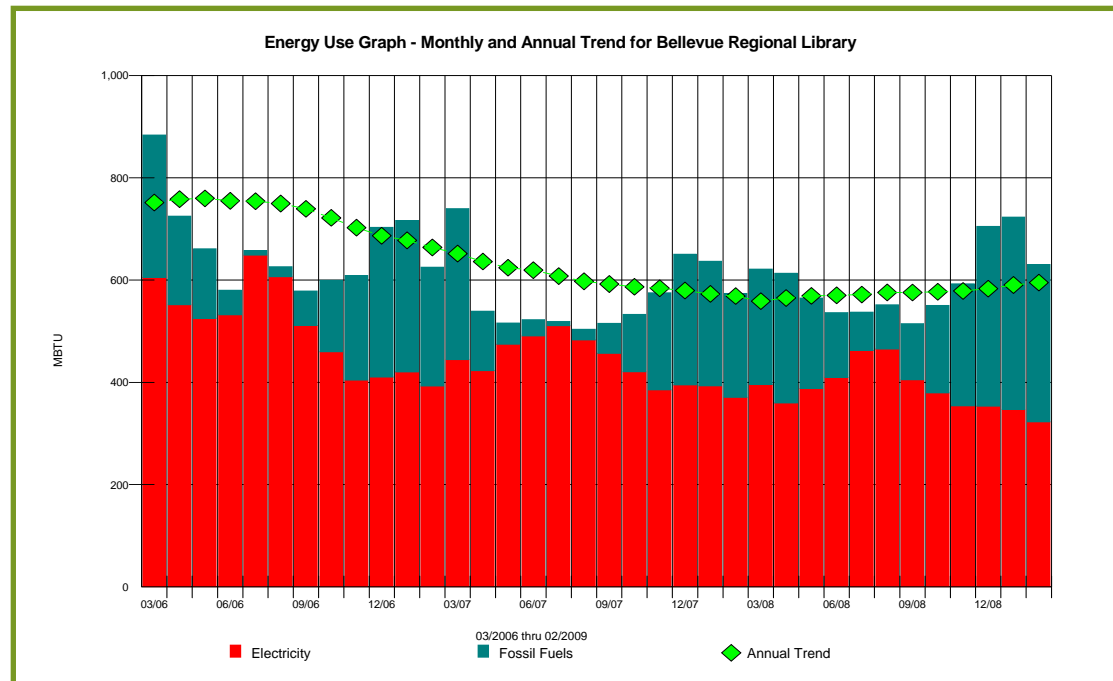


“Operational” changes
not
sequence or equipment changes

Existing Buildings Commissioning Potential

Energy Efficiency Value

- Energy Savings without capital improvements
- Improvements can be very cost-effective
- Operations has the biggest energy impact



Existing Buildings Commissioning Dilemma

Why not getting value?

- Not a lot of skilled providers yet
- Savings potential never there
- What owners are willing to pay for
- Operators change things
- No post CX tracking of performance



Existing Buildings CX: Program Approaches

Qualified Providers

- Initial list of pre-screened providers
- Offer guidance in process
- Build pool over time
- Offer training

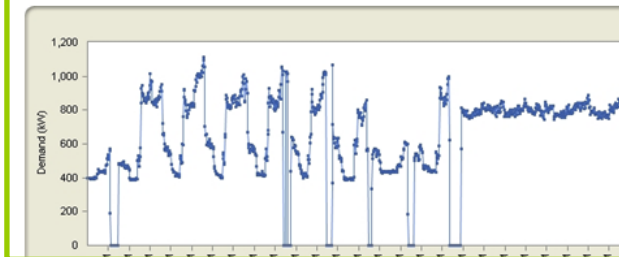


Existing Buildings CX: Program Approaches

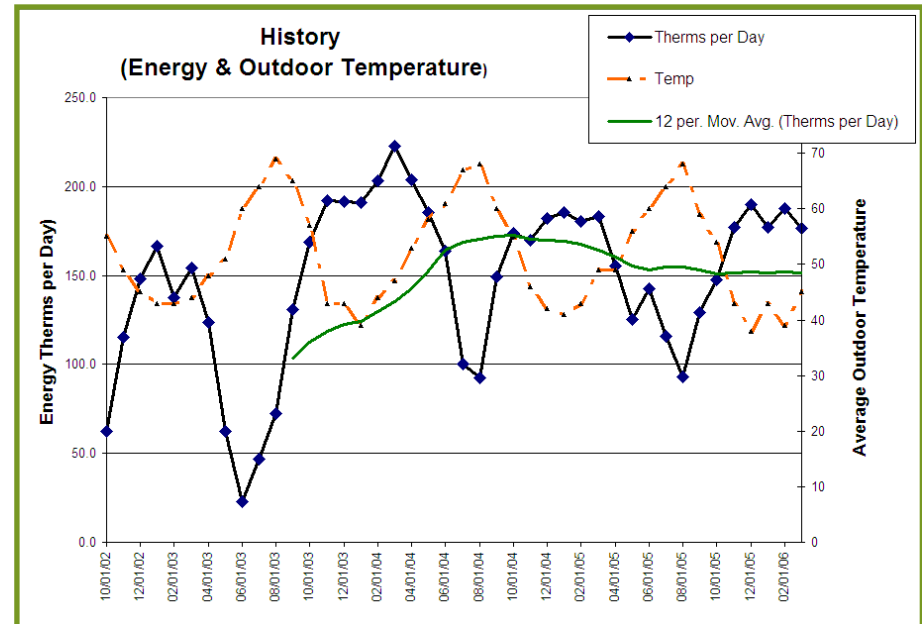
Pre-qualification of Building – good candidate?

- Off site – initial pre-screen by utility
- On site – by CX Agent, at no cost to owner
- Energy Screening Tools
 - Interval Demand Data
 - Bills & spreadsheet graphs
 - Utility Manager Software
 - EUI tables

Night Setback Control Malfunction



Interval Demand Data



Billing Data Spreadsheets

Existing Buildings CX: Program Approaches

Clear Requirements for Owner Participation

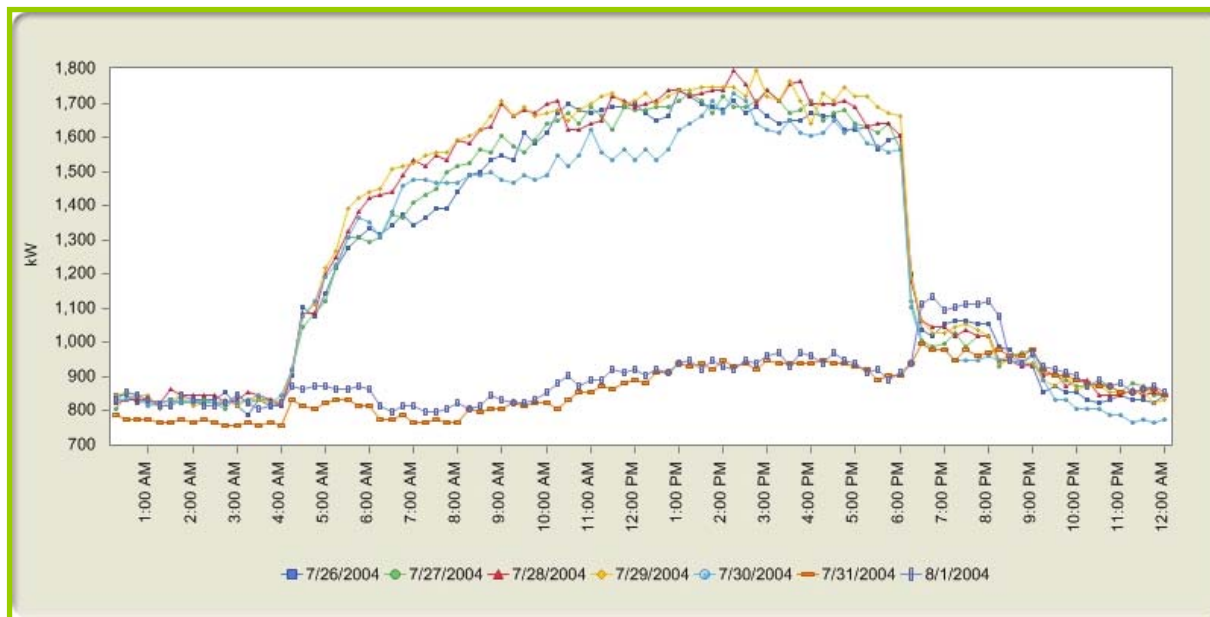
- Implementation of improvements – \$ & time
- O&M staff participation – time & training



Existing Buildings CX: Program Approaches

Incentives for Owner Training

- O&M staff
- Tracking energy use & improvements
- Systems Manual



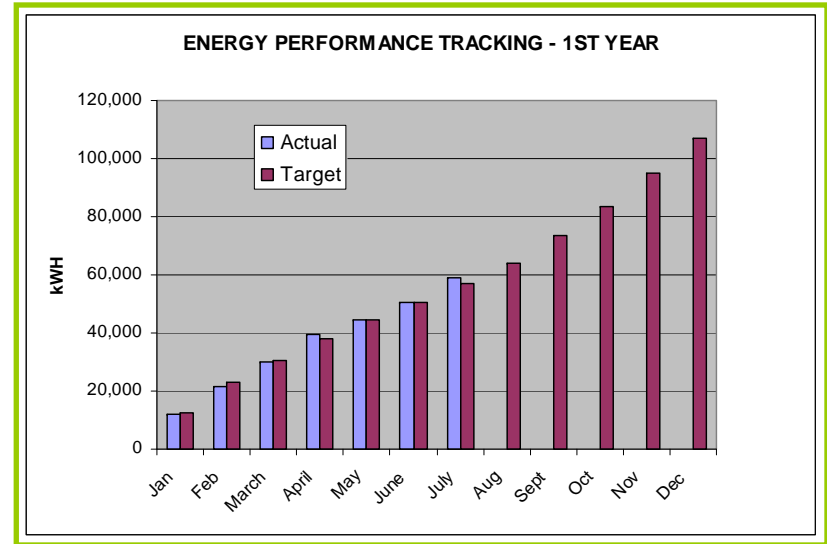
TOOL:
15 minute
demand
profile

Existing Buildings CX: Program Approaches

Bonus Incentives for Actual Performance

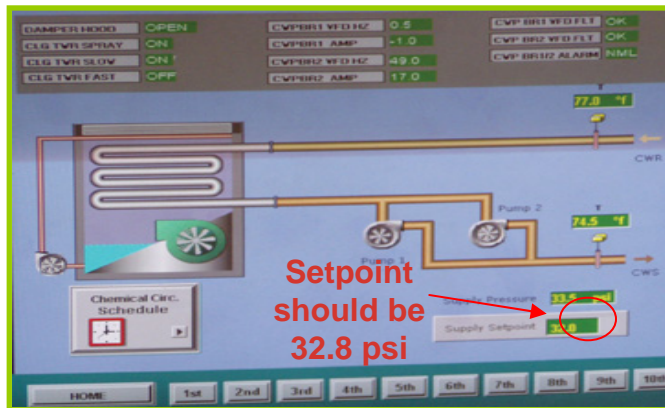
Based on:

- Owner tracking energy use
- Post – CX actual savings
- Owner checks for persistence



TOOL: Simple Energy Tracker

**TOOL:
Systems
Manual**



ADJUSTED SAVINGS (Predicted + User Adj - Current)	
Electricity kWh	Natural Gas Therms
37,766	876
15,038	922
12,051	480
40,496	2
36,335	-14
31,426	289
42,142	989
42,282	992
38,098	1,050
38,582	1,326
33,713	698
52,986	834
420,916	8,446
21.0%	35.9%

**TOOL:
Utility
Manager**

Allows
weather &
other
adjustments



Other Frontiers

Building Energy Disclosure/Benchmarking

- Energy Star ratings
- Energy report card now in laws
- ASHRAE Energy labeling

Monitoring

- MBCx or On-going commissioning
- Local business offerings

Common Keys to Assuring Savings

All Buildings

- Incentive for actual performance
- Support for training

Existing Buildings only

- Extensive pre-qualification
- Requiring implementation



AIA Quality Assurance



Portland Energy Conservation, Inc is a registered provider with The American Institute of Architects Continuing Education Systems. Credit earned on completion of this program will be reported to CES Records for AIA members. Certificates of Completion for non-AIA members are available on request.

This program is registered with the AIA/CES for continuing professional education. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the AIA of any material of construction or any method or manner of handling, using, distributing, or dealing in any material or product. Questions related to specific materials, methods, and services will be addressed at the conclusion of this presentation.



Thank you!

QUESTIONS?

Contact: Holly.Townes@pse.com

425-462-3652

