



18th National Conference on Building Commissioning

A PECI EVENT

Results from the Field: An Analysis of Existing Building Commissioning Measures

Joan Effinger
Technical Manager
PECI



Outcomes

What are you going to learn today?

- Commissioning Providers
- Building Owners
- Utility Program Managers

Outline

- Approach
- Background
- Results
- Conclusions
- Future Recommendations

Approach

Two similar studies

- Mills, Evan. “*Building Commissioning: A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions*” 2009.
- PECCI. “*IEA Annex 47: Cost-Effective Commissioning for Existing and Low Energy Buildings*” 2009.

This Study

Goal: Cost benefit analysis of EBCx measures

Research Questions

- Most common measures?
- Simple payback?
- Highest savings?
- Older and smaller buildings?

Data

- Utility-incented programs
- 122 projects
- 950 measures
- Building characteristics
 - Type
 - Size
 - Age
 - ASHRAE climate zone

Results – Cost Effectiveness

Metric: simple payback

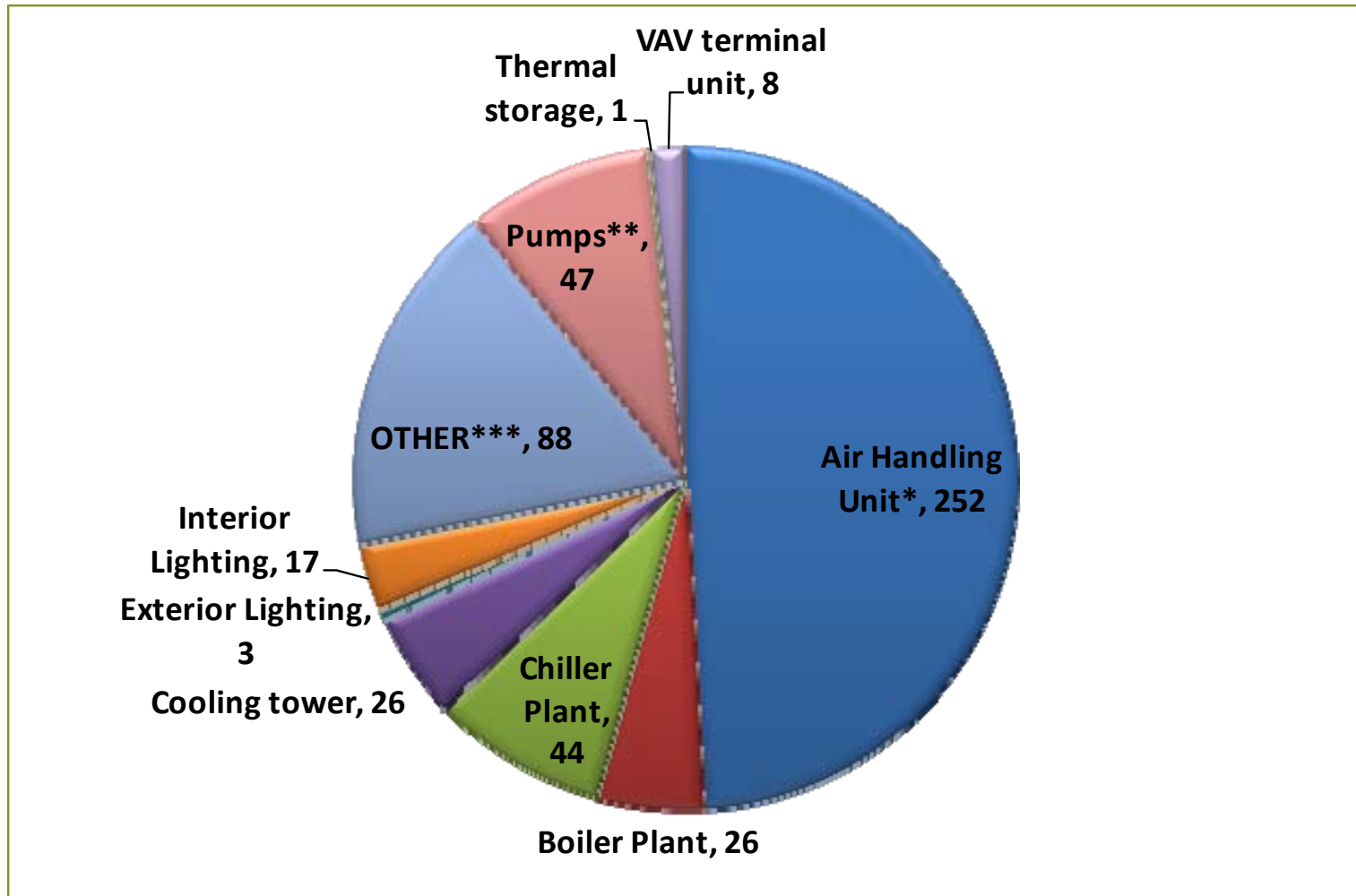
- Gas + electric savings
- Implementation cost

Implemented measures were cost effective

- Building characteristics

Results - Systems and Equipment

50% of implemented measures affected the air handling units



Question

What measures do you see in your programs?

Why do you see these measures?

Results – Savings/sf

8 measures have the highest savings/sf

- Example:



Source: <http://www.ctvweb.com/rkmills/images/boiler-logo-1.jpg>

But, low frequency!

Results - Frequency of Implementation

13 measures are implemented most frequently

- Example:



But, low savings!

Source: <http://natashawilson.files.wordpress.com/2009/02/cfl.jpg>

Frequency vs. Savings/sf

Most Frequently Implemented	Top Savings/sf
Optimize airside economizer	Tune / Upgrade Controls
Reduce equipment runtime	Add / Optimize HWST reset
Reduce / reset DSP setpoint	Relocate / shield temp sensor
Revise control sequence	Add /optimize boiler lockout
Add / optimize SAT reset	Add small A/C unit
Add VFD to pump	Add VFD to chiller
Other	Add / optimize chiller staging
Reduce lighting schedule	Lower / reset VAV box flow
Replace/repair/calibrate sensor	Optimize waterside economizer

Results – Cumulative Savings

Measure	% of Total Savings
Revise control sequence	21%
Reduce equipment runtime	15%
Optimize airside economizer	12%
Add / optimize SAT reset	8%
Add VFD to pump	6%
Reduce coil leakage	4%
Reduce / reset DSP setpoint	4%
Add / optimize optimum start/stop	3%
Add / optimize CWST reset	2%
Total	75%

Conclusions

- Customized approach
- Include top savings measures
- Applicable to all buildings

Future Recommendations

- Expand the data set
 - Standard data format
- Implemented vs. non-implemented measures
- Smaller and older buildings

Key Takeaways



Source:http://www.stmatthewssalfordpriors.org.uk/content/pages/uploaded_images/131.jpg

What interested you about this study?

How could you apply this?

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!

Joan Effinger

jeffinger@peci.org

(503) 575-4103

