The Case for:
Building Retro (& Re) Commissioning
Learning Objectives

What is it?

Why do it?

How to do it?

Probable Results..........................
What is: Commissioning / Retro and Re-Commissioning?

Building Commissioning is a quality control process that ensures that a new building will operate the way the owner intended.

Retro-Cx is the documented process of commissioning an existing building.

Re-Cx is the process of commissioning a building which has previously been commissioned.
What is: Commissioning / Retro and Re-Commissioning?

Investment opportunity

Payback Widget

Energy Project
What is: Commissioning / Retro and Re-Commissioning?

Goals

Obtain and verify energy savings
Identify improvement to operations
Recommend future capital projects
Re/Retro-Commissioning
Why do it?:

- Energy and Cost Savings
- Improved Comfort and Productivity
- Better IAQ
- Better Trained Staff
- Increase Equipment and System Life
Re/Retro-Commissioning

Why do it?:

- Low Cost
- Low Beta (Risk)
- High return on investment
- Single-most cost-effective way to save energy
- “Stealth” Strategy
Re/Retro-Commissioning

How To Do It

1. Identify a building

Expensive to operate
Older
DDC
Poor comfort conditions
Poor IAQ
High Maintenance
How To Do It

2. Get a Commissioning Agent

Consultant
Engineer
“Commissioning Agent”
Owner staff?
BMS Controls Vendor
How To Do It

3. Develop a Plan .............

Document current conditions
Current operations

Implement Findings
Verify Savings
How to Optimize Your Payback

Use in-house talent and knowledge

ReCx performed using experienced, knowledgeable, engaged building staff is most likely to produce long lasting results and provide the greatest payback.
Re/Retro-Commissioning

How to Optimize Your Payback Using in-house personnel

Gather building information
Assist in trending and testing
Building evaluations
Short term monitoring
Simple repairs
BMS manipulation

Test Protocol

Facility staff can reduce time spent on functional testing by assisting the commissioning team with tasks such as:
- Defining tests
- Preparing for tests
- Manipulating the systems to conduct tests
- Putting the systems back to normal following testing

A test protocol is a form that describes exactly how a test will be carried out. It includes:
- Purpose of the test
- Instructions for carrying out and documenting test
- Equipment required for test
- Acceptance criteria
- Precautions
- Prerequisites for testing
- Detailed procedural steps for testing
- Procedure for returning to normal
- Analysis required
- Required sign-offs
Re/Retro-Commissioning

How to Optimize Your Payback

Diagnostic Monitoring
BMS Trending / data loggers
Perform in all modes of operation and conditions
  temperatures
  flow rates
  pressures
Analysis and determine root cause
Re-baseline (Building Performance Capabilities)
Re/Retro-Commissioning

$$ What Does It Cost $$

[Graph showing commissioned cost vs. commissioned floor area for new construction and existing buildings.]
$$ What Will It Save $$

### Retrocommissioning Costs

<table>
<thead>
<tr>
<th>Description</th>
<th>Value or Ranges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total RCx Cost</td>
<td>$0.13 to $0.45/sqft</td>
</tr>
<tr>
<td>Provider Fee as % of Total RCx Cost</td>
<td>35 - 71%</td>
</tr>
<tr>
<td>Average RCx Cost Allocation</td>
<td></td>
</tr>
<tr>
<td>Planning and Investigation</td>
<td>69%</td>
</tr>
<tr>
<td>Implementation</td>
<td>27%</td>
</tr>
<tr>
<td>Verification, Tracking and Reporting</td>
<td>4%</td>
</tr>
<tr>
<td>Simple Payback Time</td>
<td>0.2 to 2.1 years</td>
</tr>
</tbody>
</table>
Re/Retro-Commissioning

$$ Keep Doing it $$

Diagram showing the process of New Building Commissioning and Existing Building Commissioning, with emphasis on periodic recommissioning with persistence strategies. Note: 3 to 5 years, depending on ongoing commissioning rigor and changes in building use.
Stuff We Find

- Schedule
- Alarm logs
- Overrides
- Sequence enhancements
  - Critical zone reset
  - Supply air reset
  - Single Zone VAV
- Calibrations
- Low Delta T
- Supply fan VFD at 0% but unit SP is 3.6”. VFD in Hand. Economizer disabled. No min OSA set point but OSA dampers at 25%.
Unit running at 100% at warmup SA temp only 63
Unit running in economizer mode with space temp 79
VAV box damper at 84% with 0 cfm
Space set point 69 space temp 61
AHU unable to reach SP set point
Unit not in graphics
Units not mapped properly in graphics
Poor central plant start/stop
No VAV box max or mins
Why Do Anything Else?

Q & A