Tools of the Trade

National Conference on Building Commissioning

Frank Mayfield
M2M Systems Integrators
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m2m Productivity Promise

- Makes opaque control systems transparent
- Eliminates hours of interrogating systems
- Substitutes for comprehensive BAS knowledge

*m2m can improve the productivity of your people by enabling them to use the control system for a commissioning tool*
Critical Factors

- People
- Technology
- Skills
- Processes
- Outcomes
People

Building Commissioning:

A Golden Opportunity for Reducing Energy Costs and
Greenhouse Gas Emissions

Evan Mills, Ph.D
Lawrence Berkeley National Laboratory
Berkeley, CA 94720 USA

Report Prepared for:
California Energy Commission
Public Interest Energy Research (PIER)

July 21, 2009
Every Building Every 10 years

- In 2005 1,100 FTE commissioned 1% of the building stock
- 11,000 required for every building, every decade
- Is that often enough?
Technology

Race Against The Machine

Erik Brynjolfsson
Andrew McAfee

How the Digital Revolution is Accelerating Innovation, Driving Productivity, and Irreversibly Transforming Employment and the Economy
The story of Chess
Moore’s Law

- IT Begins
- Apollo
- Deep Blue
- 2006
- 32\textsuperscript{nd} sq
36th Square

- Watson wins Jeopardy
- Google app drives car 4,000 miles
- Encyclopedia Britannica stops printing
- MIT on line
- IPv6
- Web enabled garage door openers
- Wi-Fi thermostats
- HVAC analytics!
It’s Not a New Concept
Skills

• Understanding of complex HVAC systems
• Knowledge of sophisticated equipment
• Network expertise
• Protocol prowess
• Controls Cunning
Processes

- Pattern recognition
- Regression analysis
- Energy metrics
- Rule based fault detection
Outcomes

Building HVAC equipment routinely fails to satisfy performance expectations envisioned at design. Such failures often go unnoticed for extended periods of time. Additionally, higher expectations are being placed on a combination of different and often conflicting performance measures, such as energy efficiency, indoor air quality, comfort, reliability, limiting peak demand on utilities, etc. To meet these expectations, the processes, systems, and equipment used in both commercial and residential buildings are becoming increasingly sophisticated. This development both necessitates the use of automated diagnostics to ensure fault-free operation and enables diagnostic capabilities for the various building systems by providing a distributed platform that is powerful and flexible enough to perform fault detection and diagnostics (FDD).

Steven Bushby, NIST
Future Factors

- Networks: cheap, fast, ubiquitous
- Protocol adoption & conformance
- Rationalize snowflakes
- Good tools are crucial to good outcomes
- Outcomes determine availability of capital for efficiency improvements
Ongoing $C_x$ circa 1960
Info Needle from Data Haystack

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Go Forth and Conquer

• Understand the protocols
  – BACnet
  – Lon
  – Modbus

• Embrace the applications

• Hold controls sub accountable

• Utilize networks to deliver good outcomes

• Maintain to Sustain
Thank You

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