



Battelle

The Business of Innovation

Building Personality

Definitions (ours)

- HVAC Retro commissioning
- HVAC Re-tuning
- HVAC Re-commissioning
- HVAC Continuous Commissioning
- The above all relate to the process of setting up control systems to some known design configurations and the process of verifying set points and adding control algorithms
 - How do we know what these set points and configuration points are?
 - Engineering?
 - Building owner?
 - Tribal knowledge from service technicians?

Resent Results, Sam Nunn Atlanta Federal Center

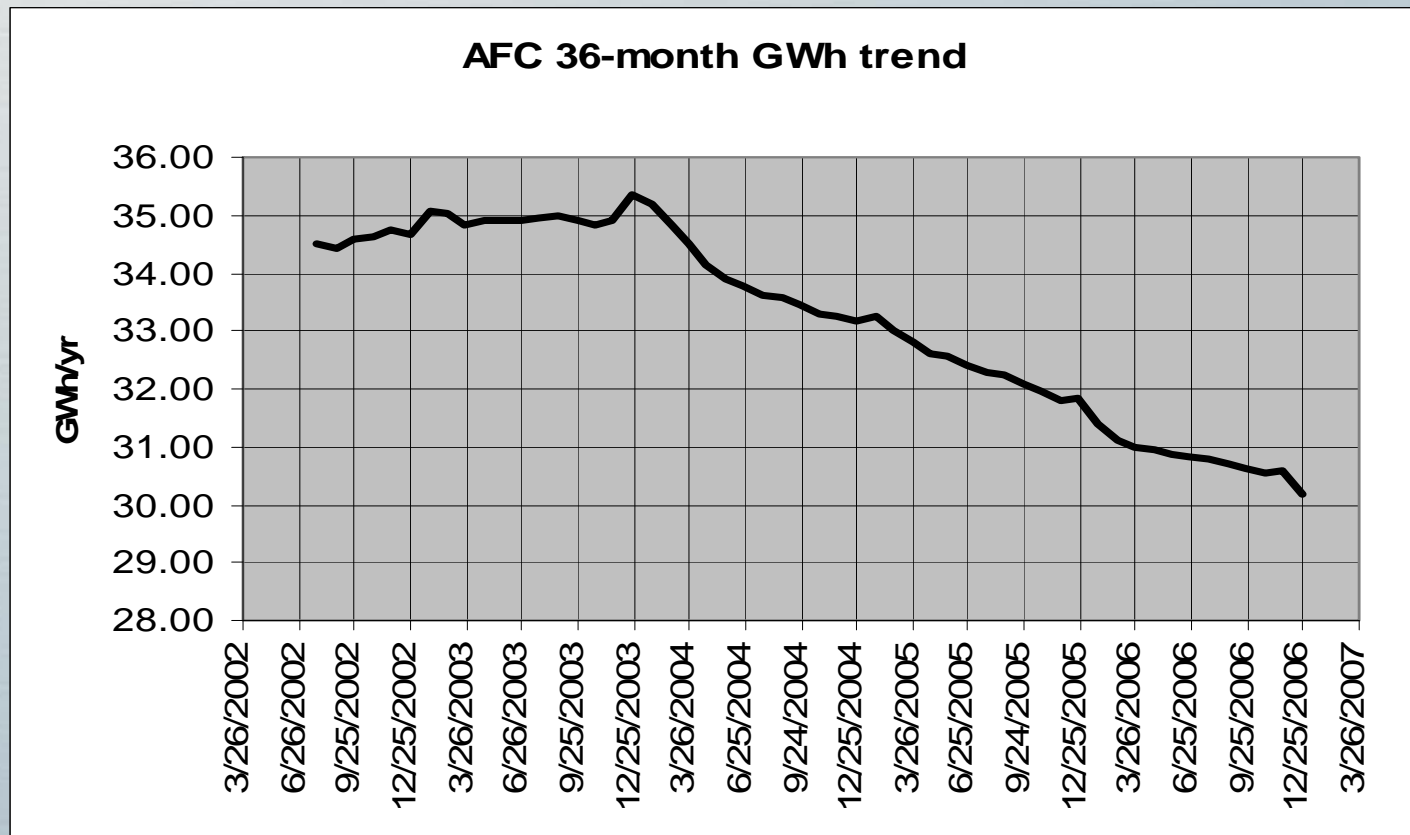
- 1.8 million square feet 2 city blocks high rise
- 10 MW feeder to the building
- All electric, perimeter box reheat
- 4 chillers, 3 1500-ton, 1 500-ton
- Variable chilled water flow
- Paired VAV air handler for each floor
- Mostly glass all sides
- True VAV facility
- ~ 100 air handlers total

Sam Nunn Atlanta Federal Center

- Major changes to facility
 - Recommission unoccupied modes (Complaint was building would not recover. Proved it could recovery)
 - Recommission variable chilled water pumping and chillers.
 - 3 secondary chilled water pumps, down to 1 to 2
 - Chilled water reset. 42 to 48°F based on humidity and loads at coils
 - Was 2 large chillers at night, now 1 smaller chiller at night. Forced them to fix the smaller chiller
 - Currently 2, 250 sq ft server rooms drive chilled water set point!
 - Installed discharge air temperatures and pressure reset based on warmest interior & coolest exterior zones
 - Changed dead bands on interior and exterior to allow for floating of temperature

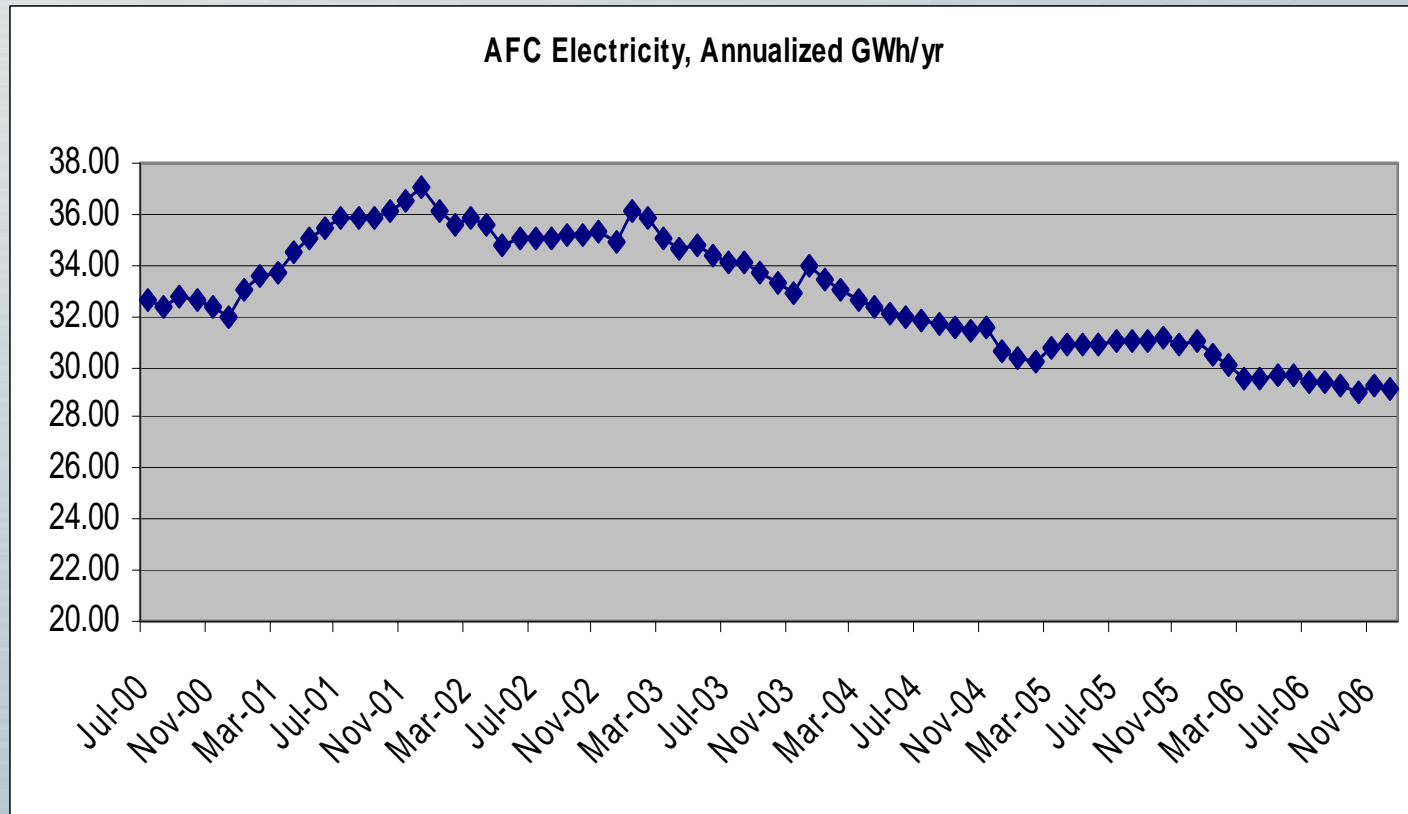
Can it work?

GSA Sam Nunn - Atlanta Federal Center



Can it work?

GSA Sam Nunn - Atlanta Federal Center



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- Major changes to facility
 - Received Energy Star rating
 - Energy down 15% to 20%
 - Peak down on shoulder months
 - **Tenant complaints down 35%**

Can it work?

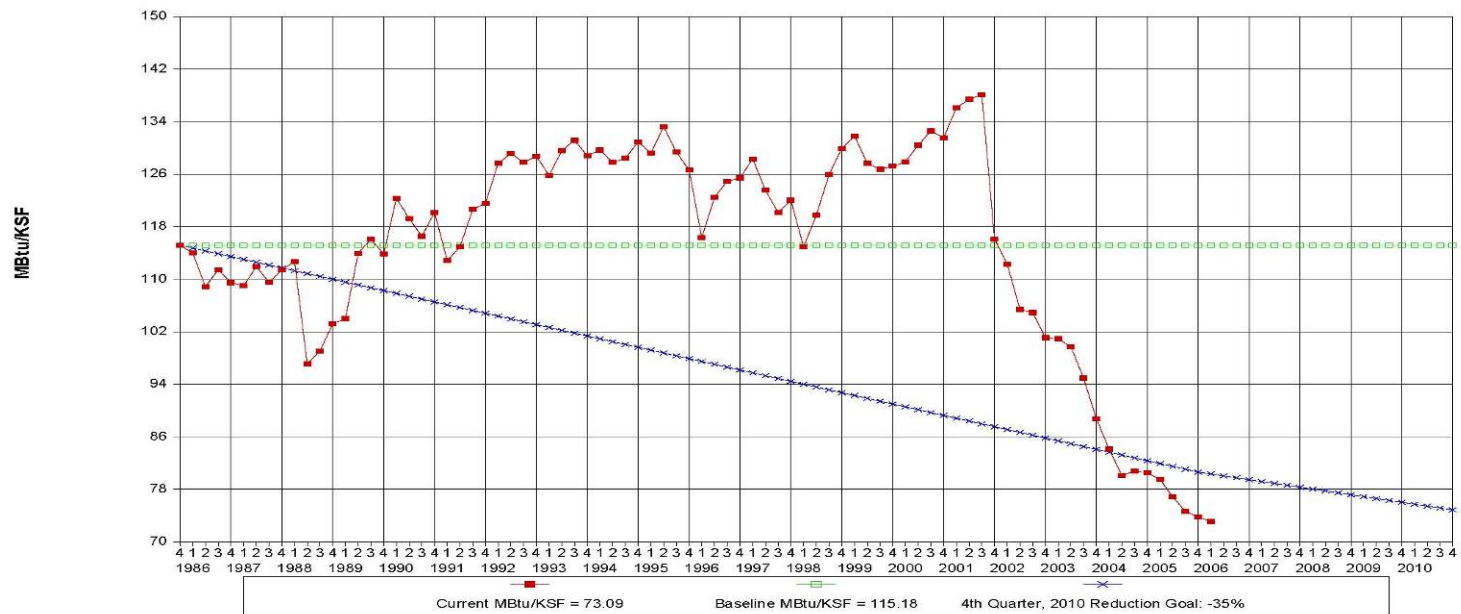
Marine Corp Air Station, Beaufort SC

NFESC Graph: EAR16

M60169 MCAS BEAUFORT SC
1st Quarter FY 2006: January 2005 through December 2005

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Energy Reduction Progress



Energy Reduction Progress Graph: EAR16

Report Created: 15-Mar-2006 09:05:37

Building Personality (cont.)

- Buildings start as children
 - Designed (parents)
 - By engineers with best guess information
 - For some weather conditions
 - Inside load conditions
 - For a specific number of occupants
 - For a specific solar gain and orientation
 - Built with (childhood years)
 - Low bid
 - Tight schedules
 - Limited inspections
 - Poor commissioning

Building Personality (cont.)

- Buildings grow to be teenagers
 - Usage, constant change (teenage years)
 - Weather impacts
 - Staff loading changes
 - Electrical computer loading changes
 - Equipment malfunctions that are not repaired
 - Design flaws that are not repaired
 - Cubical and wall reconfigurations without moving diffusers
 - Poor maintenance
 - Dampers
 - Controls
 - Valving
 - Air and water balance

Building Personality (cont.)

- Buildings grow to be adults
 - Current conditions (adulthood)
 - High energy cost
 - High complaints
 - Small zones driving large systems
 - Poor operations based on complaint response instead of the bigger picture
 - Still poor maintenance

Building Personality (cont.)

- Like children, you need to get to know your building
- What is its personality
 - How does it act or respond to changing internal conditions?
 - How does it responded to weather changes?
 - What is its balance point? No heat and no cooling required
- It takes time and history to actually learn a facility.
 - Need for operational history data
 - Need for complaint history

Building Personality (cont.)

- A psychologist will analyze a patient to learn a personality and then suggest changes in behavior or environment to help change that personality for a more acceptable response to their environment (happier person)
- Personality tuning is the process of learning a facility and then gently modifying its control parameters and sequence of operations to achieve more desirable results (happier building with less energy usage and lower customer complaints)