

Saving Energy with a Building Automation System

**The Goal: Increase Comfort
While Reducing Energy Usage**

Gregory J. Kurpiel

**Johnson Controls
National Manager, Performance Assurance
281-419-3521**

First Things First

Building Automation System can be one of the largest Energy ABUSER in a Facility!

Why

- **Causing simultaneous Heating & Cooling.**
- **Operating the HVAC System with incorrect Setpoint.**
- **Operating the HVAC when not needed.**
- **Operating the wrong HVAC equipment at the wrong time.**
- **Setting new monthly Peak Demand.**
- **The list goes on & on!**

First Things First

- **Do you know if the BAS is working correctly?**
- **In most cases the answer is NO!**
- **What to do about this problem?**

Whole Building Retro Commissioning

or

Real-Time Commissioning

of the
HVAC / Control Systems

Whole Building Retro Commissioning

- Studies have shown savings from 7% to 29% **BUT**,
- We have seen savings Deteriorate over time after Retro Commissioning has been completed.
- What to do about this problem?

Real-Time

Commissioning & Optimization

- **Employs technology to analyze and interpret data from controlled devices.**
- **Identify retrofit activities to save energy.**
- **Optimization will increase comfort & reduce energy.**

Real-Time

Commissioning & Optimization

- **Real-Time Commissioning – a LEED requirement.**
- **Reduces energy & labor by identifying when a system is not working correctly.**
- **Reduces labor by going from a Preventive to a Conditional Based Maintenance Approach.**

Real-Time

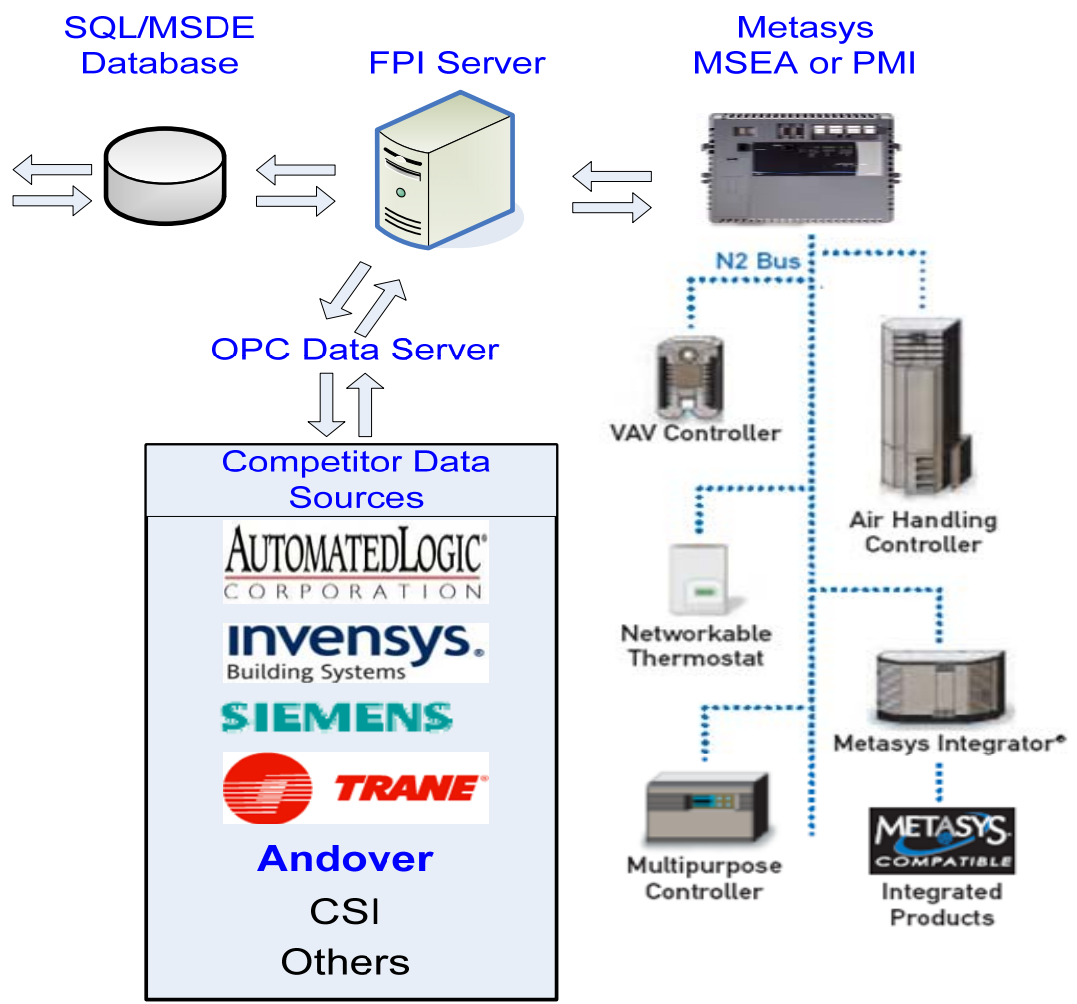
Commissioning & Optimization

- **Real-Time Commissioning should have a ROI within 1 or 2 years.**
- **Real -Time Optimization should have a ROI within 1 year.**

JC Facility Performance Indexing Overview Data Flow



FPI Standardized Reporting



Commissioning & Optimization HVAC Tuning

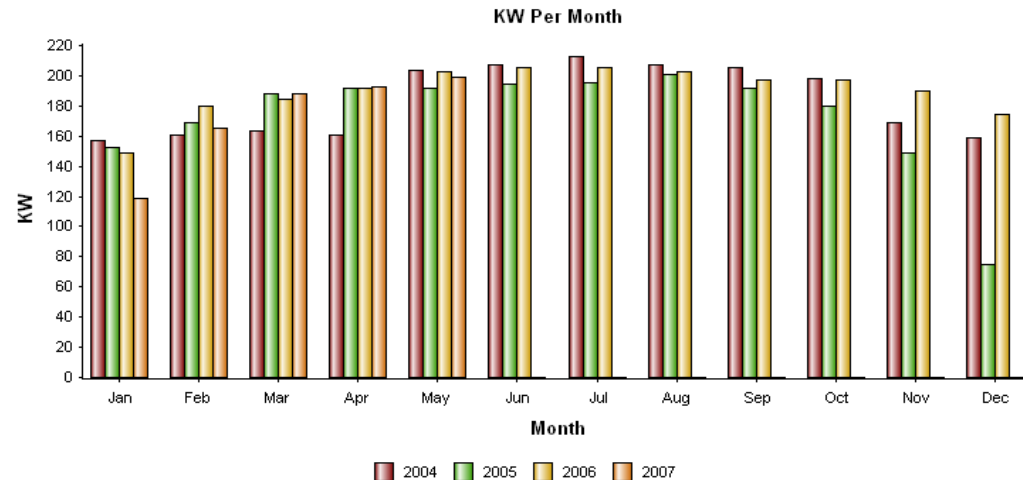
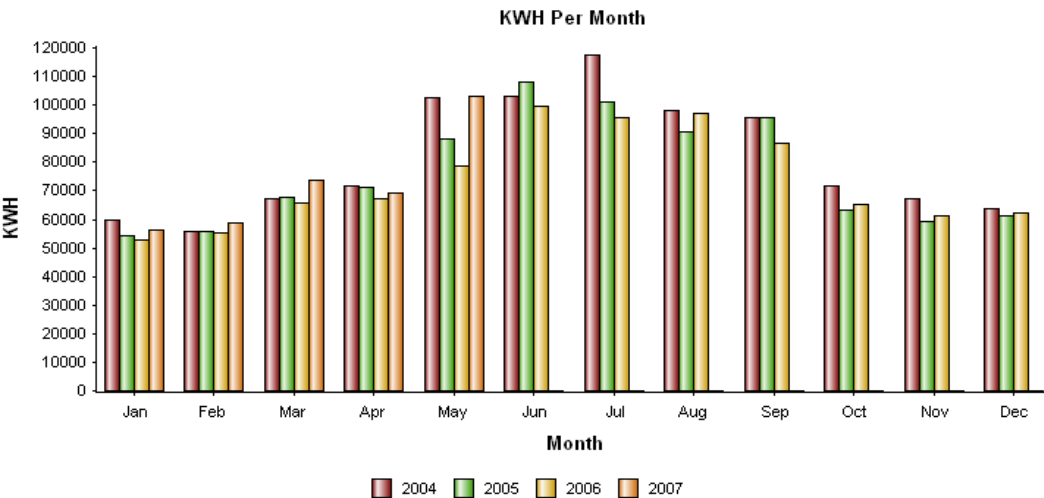
A Three Step Approach

Commissioning & Optimization HVAC Tuning

A Three Step Approach.

Step 1

- Analyze the facility energy usage for the last 12 months or more & Benchmark the facility.



Commissioning & Optimization HVAC Tuning

A Three Step Approach.

Step 2

- From the information gathered in Step 1 is the facility operating correctly?**
 - If using too much energy, the building is Energy Sick**
 - If using too little energy, the building could have poor Indoor Air Quality – IAQ Sick.**
 - Using the correct amount of energy is the GOAL for a Healthy Energy Efficient Facility!**

Commissioning & Optimization HVAC Tuning

A Three Step Approach.

Step 3

– Once we understand how the building is using energy the following actions should take place:

- Fix Mechanical Problem (e.g. water balance, inlet dampers, VFDs, ...)**
- Program the BAS with Energy Management Strategies.**

Commissioning & Optimization HVAC Tuning

Case Studies & ROI

- **Hospital 253K Sq.Ft.**
 - Replaced one Control.
 - Reprogrammed the BAS.

 - Cost \$30K
 - Savings per year \$62K
 - ROI – About 6 months

Commissioning & Optimization HVAC Tuning

Case Studies & ROI

- **New Building (Federal Court House)**
 - Installed JCFPI System.
 - Revealed inadequacies of Standard Commissioning process.
 - Found problem with calibration of Steam Utility Meter.
 - Programmed changes & repairs were verified by JCFPI.

 - Cost \$275K
 - Unknown but the Steam Utility Meter was 400% off.
 - ROI – Unknown

Commissioning & Optimization HVAC Tuning

Case Studies & ROI

- **New Building (City Office Building (300K Sq.Ft.))**
 - Installed JCFPI System.
 - Reveled incorrect Chiller Water Flows.
 - Found HVAC Sizing problems
 - Programmed changes were verified.

 - Cost \$75+/-K
 - Savings per year \$25+/-K
 - ROI – About 36 months

Commissioning & Optimization HVAC Tuning

Case Studies & ROI

- **Hospital 205K Sq.Ft.**
 - Upgraded some Controls.
 - Rebalanced the Secondary Chilled Water Loop
 - Reprogrammed the BAS.
 - Cost \$50K+/-
 - Savings per year \$107K
 - ROI – About 6 months

BAS

Is the Heart of a Facility

Use It & Take Care Of It

&

It Will Take Care Of You

Neglect It & It Will Cost You

BAS

Is the Heart of a Facility

QUESTIONS