Data analytics driving energy efficiency through Monitoring Based Cx in the Real-World

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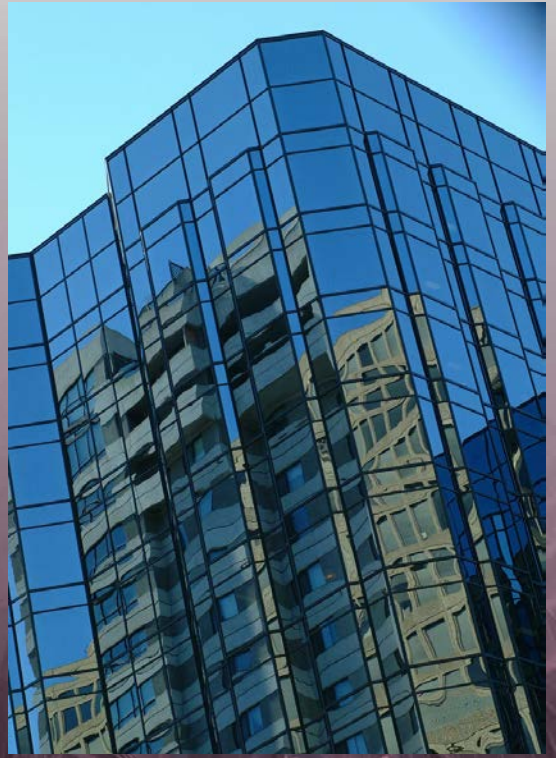
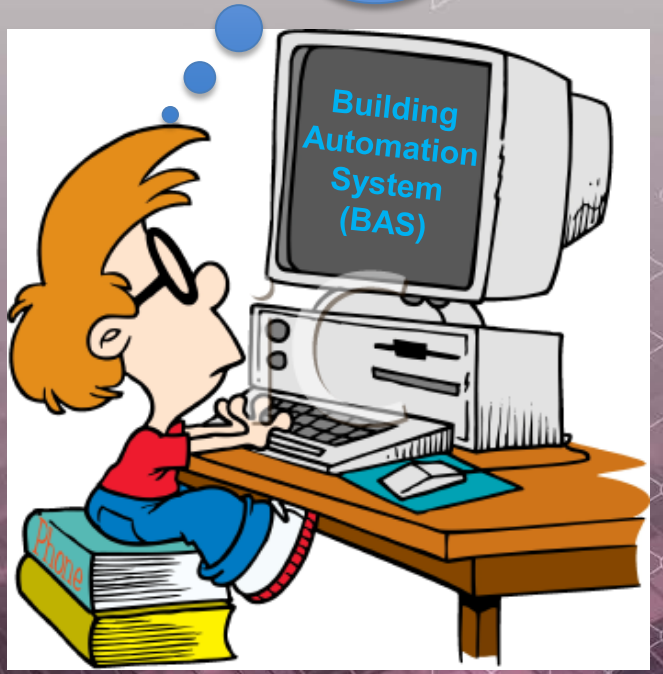
Grumman/Butkus Associates
Energy Efficiency Consultants and
Sustainable Design Engineers

iot emerge

Powered by Penton

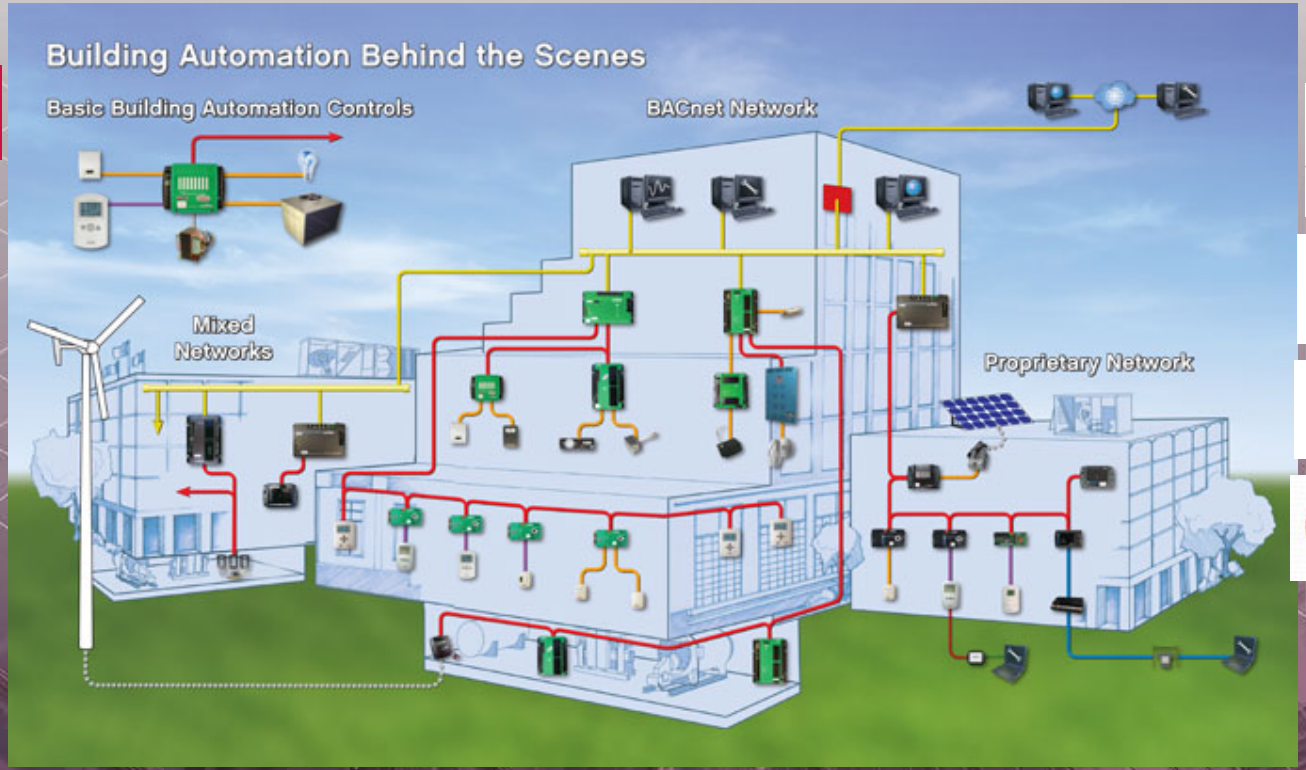
What runs a building?
What/Who makes a building run?





“Big Data” (Data Analytics)
Where does data come from?

ComEd



AUTOMATEDLOGIC

ALERTON

Johnson Controls

Schneider Electric

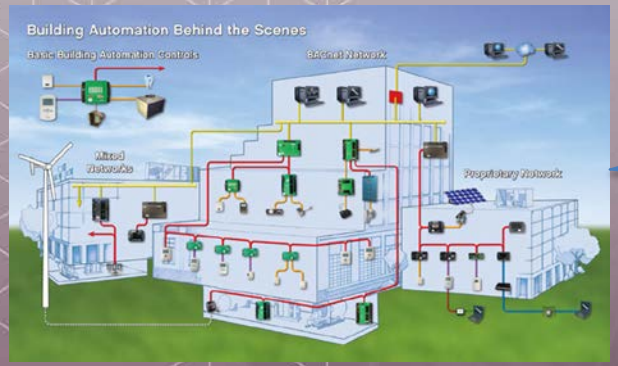
SIEMENS

TRANE

iot emerge

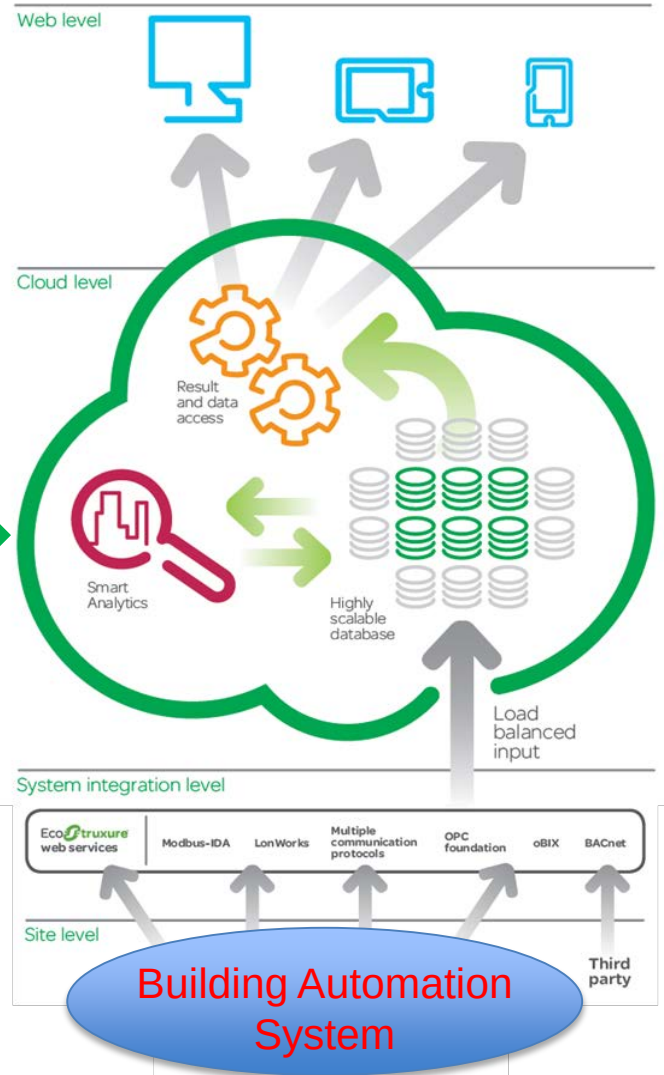
Powered by Penton

“Big Data” (Data Analytics) Where does it go?



Typical analytics

- Simultaneous heating and cooling
- Economizer
- Scheduling Verification
- Resets
  - Pump DP Pressure
  - Static Pressure
  - Discharge Temperature
  - HW System Temperature
  - CHW System Temperature



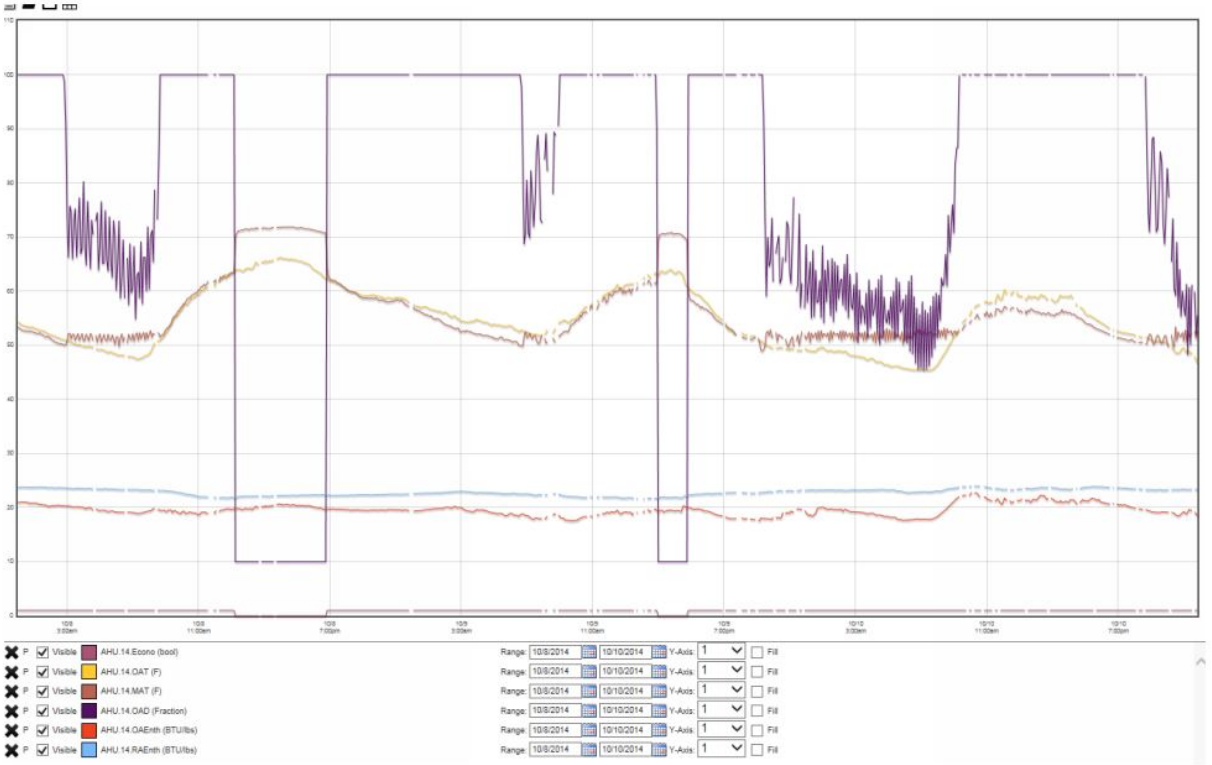
Data Analytics meets the Real World

Data Analytics meets the Real World

- Ability to easily sift through mountains of data!
- Ability to compare and contrast data against one another.
- Machine vs. Man

Insert applicable supporting graphs

The following graph illustrates the economizer operation for AHU 14, this is typical for all AHUs. On 10/8/2014 the outdoor air temperature climbed to 64F so economizer was disabled. At this time the outdoor air enthalpy was only 19.8 btu/lb compared to 22 btu/lb for the return air. By switching out of economizer the cooling load was increased. This is also illustrated by the increase in the mixed air temperature. When the unit was in economizer the MAT equalled the OAT. After economizer was disabled the MAT jumped up to 72F.



Real World – Results and Savings

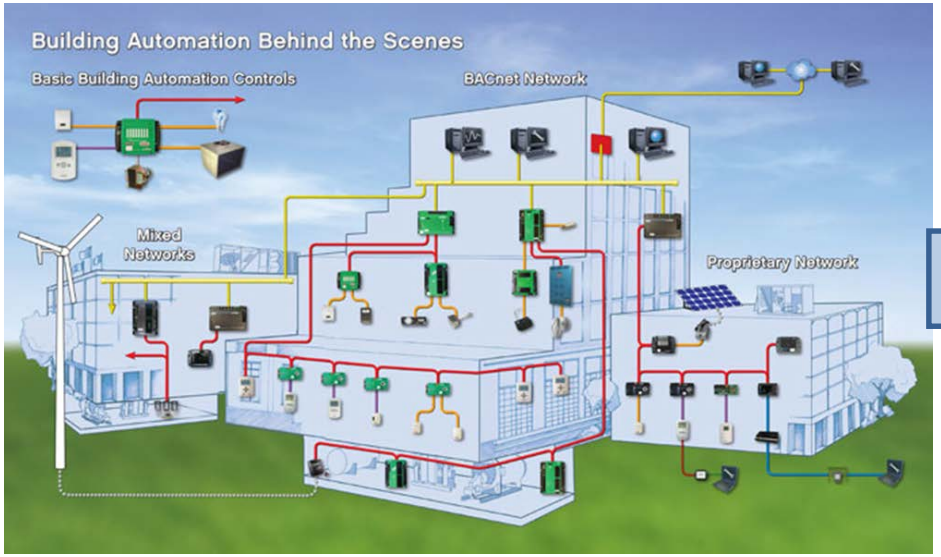
- iot – data analytics – FINDS the simple broken items
- iot – data analytics – ENABLES – a person to efficiently review and EVALUATE mountains of data that was never before possible
- ≈ 50% of saving straight from analytics*
- ≈ 50% of savings from human evaluation of data and implementation of improved building operations*

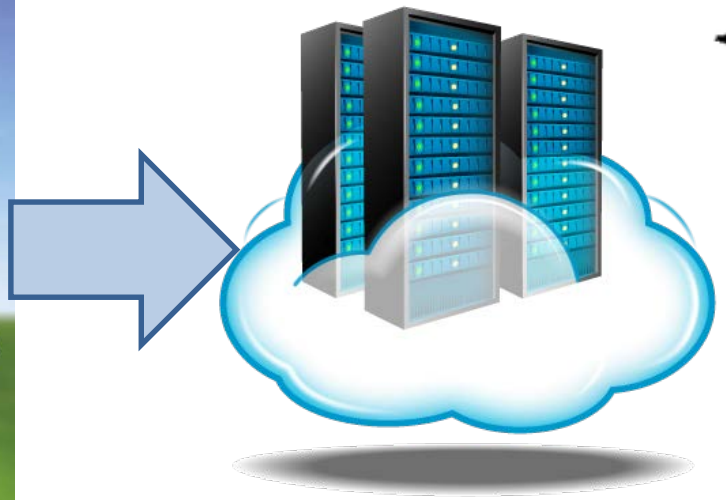
(* Example from completed projects, results will vary project to project)

How do you actually get Savings?

- ACTION !!
  - corrective repairs (Fix the broken stuff)
  - Schedule, turning things off or setback
  - Optimized and improved sequence of operations
- What does this mean?
  - Change Management
  - Training

What is the Process?





Get data out of the building to the “cloud”

What is the Process?

Diagnostics

The Diagnostics module provides a prioritized, searchable list of identified faults and energy saving opportunities across your portfolio.

Search Criteria

View By
- (•) Building
- ( ) Equipment Class
- ( ) Equipment
- ( ) Analysis

*Select Building: Elmhurst Memorial Hospi

Display Interval
- ( ) Half Day
- ( ) Daily
- ( ) Weekly
- (•) Monthly

Date Range
*Start Date: 1/1/2016
*End Date: 5/31/2016

Top Priorities
Top: All

Text Filter
Notes Summary:
Tracking Code:

Generate Data

Crunch "analyze" the data

Download Current Diagnostics Page
Download Full Diagnostics Results

7136 data records found for 1/1/2016 to 5/31/2016 in monthly intervals.

Building	Equipment	Analysis	Start Date	Notes Summary	Tasks	Cost	E	C	M	Actions
Elmhurst Memorial Hospital	AHU.10 (Air Handler)	AHU Coils	1/1/2016	Simultaneous heating and cooling. Return RH higher than setpoint. Leaking heating valve. Leaking cooling valve.	0	$4,144	10	10	6	▼
Elmhurst Memorial Hospital	AHU.10 (Air Handler)	AHU Coils	2/1/2016	Simultaneous heating and cooling. Return RH higher than setpoint. Leaking heating valve. Leaking cooling valve.	0	$3,562	10	10	6	▼
Elmhurst Memorial Hospital	AHU.10 (Air Handler)	AHU Fan	1/1/2016	Supply and return fan speed constant.	0	$2,437	10	0	4	▼
Elmhurst Memorial Hospital	AHU.07 (Air Handler)	AHU Fan	5/1/2016	Supp press						
Elmhurst Memorial Hospital	AHU.07 (Air Handler)	AHU Fan	3/1/2016	Supply and return fan speed constant. Supply static pressure smaller than setpoint. Fan status data mismatch.	0	$2,390	10	0	6	▼
Elmhurst Memorial Hospital	AHU.07 (Air Handler)	AHU Fan	1/1/2016	Supply and return fan speed constant. Supply static pressure smaller than setpoint. Fan status data mismatch.	0	$2,383	10	0	6	▼

Building	Equipment	Analysis	Start Date	Notes Summary	Tasks	Cost	E	C	M	Actions
Elmhurst Memorial Hospital	AHU.10 (Air Handler)	AHU Coils	1/1/2016	Simultaneous heating and cooling. Return RH higher than setpoint. Leaking heating valve. Leaking cooling valve.	0	$4,144	10	10	6	▼

What is the Process?

WHO is this cast of characters?

- **Human review and development of actionable items**
- Facilities Operations Staff
- Engineering
- Service (controls) contractors

SAME cast of characters?

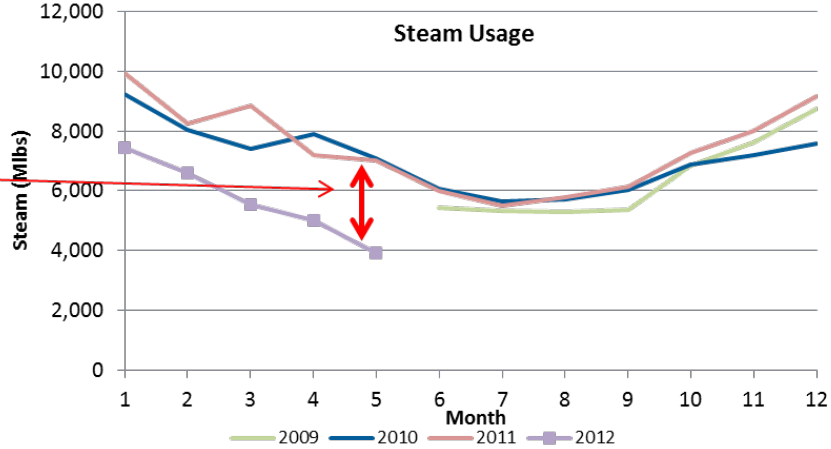
What is the Process?

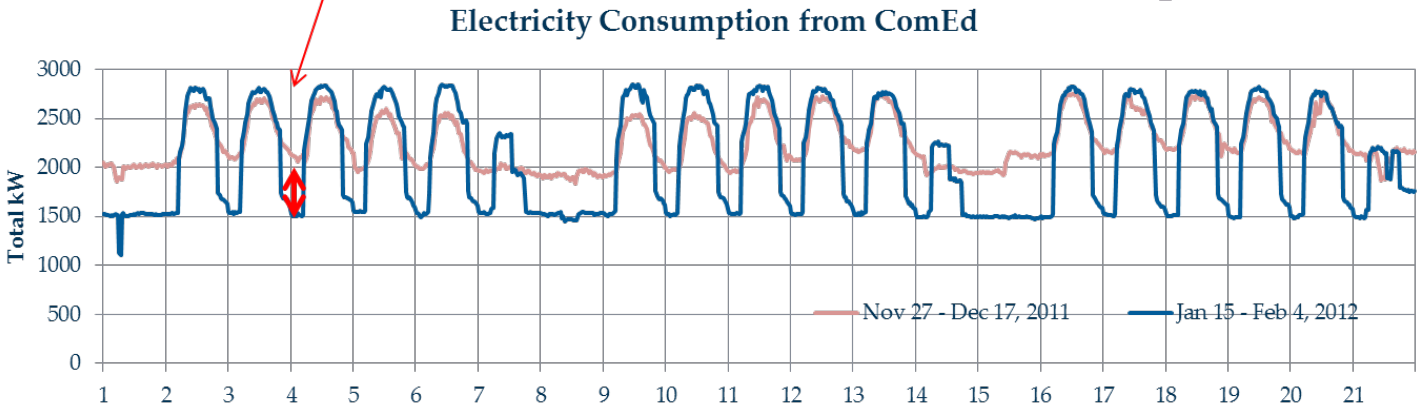
- **Make actual repairs**
- Facilities Operations Staff
- Engineering
- Service (controls) contractors

What is the Process?

- **VERIFICATION!!**

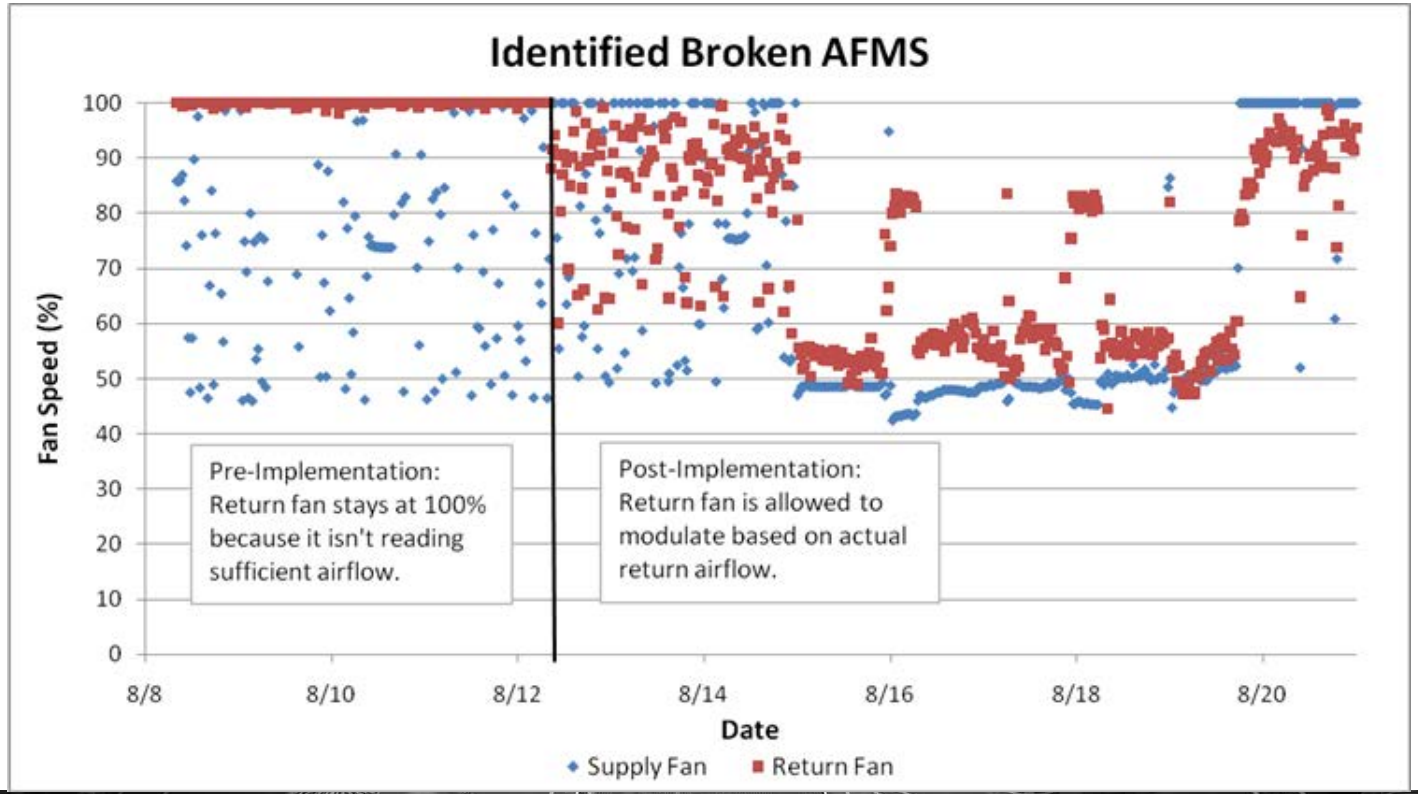
Verified energy savings.





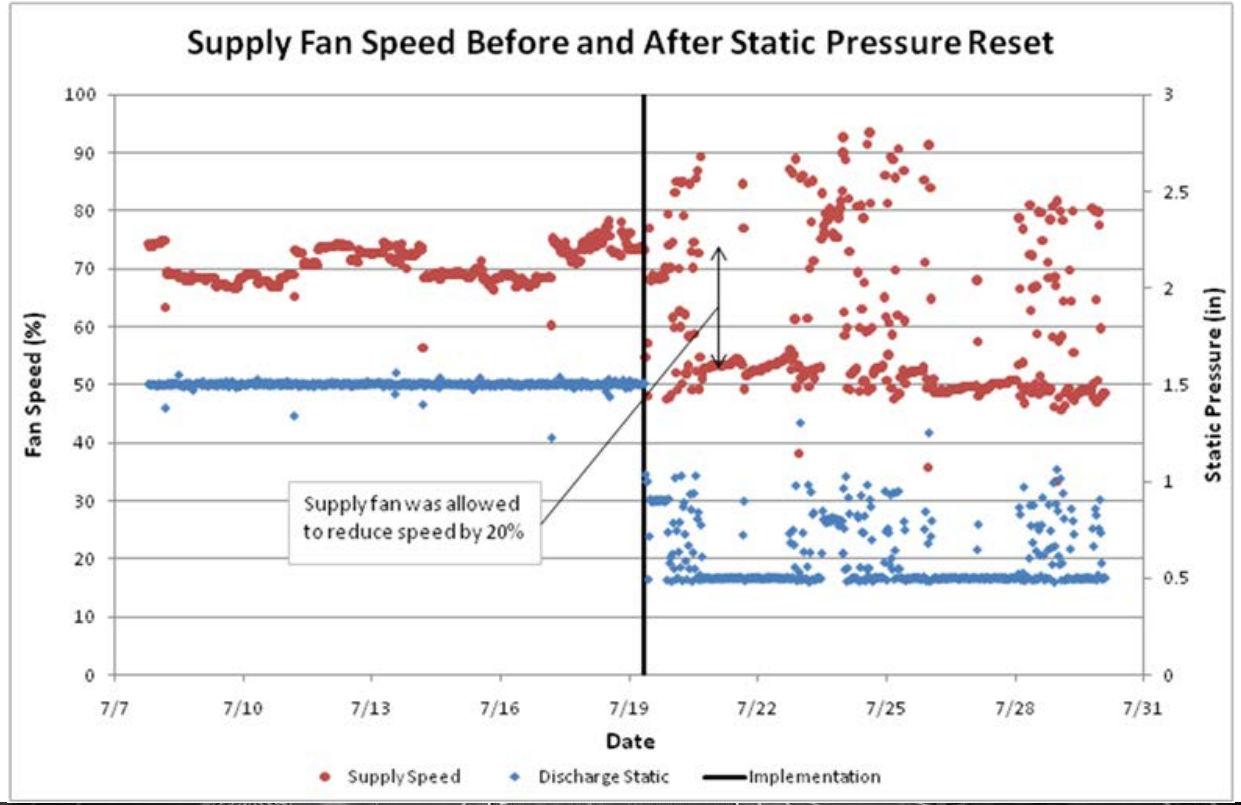
What is the Process?

- VERIFICATION!!



What is the Process?

- VERIFICATION!!



So what is MBCx?

MBCx is a **PROCESS** that optimizes the energy performance of your facility to improve your business's bottom line while ensuring a comfortable environment for building

Process includes:

- Data
- Analytics
- **People**

Thank You

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