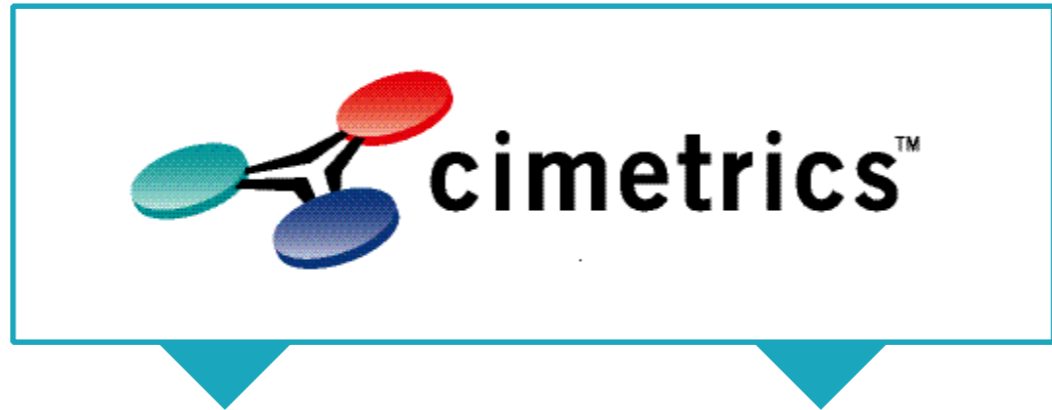




Jim Lee
Cimetrics Inc.
October 2017

Cimetrics is a 28 year old company, whose core competency is PHYSICAL WORLD ANALYTICS for THE INTERNET OF THINGS

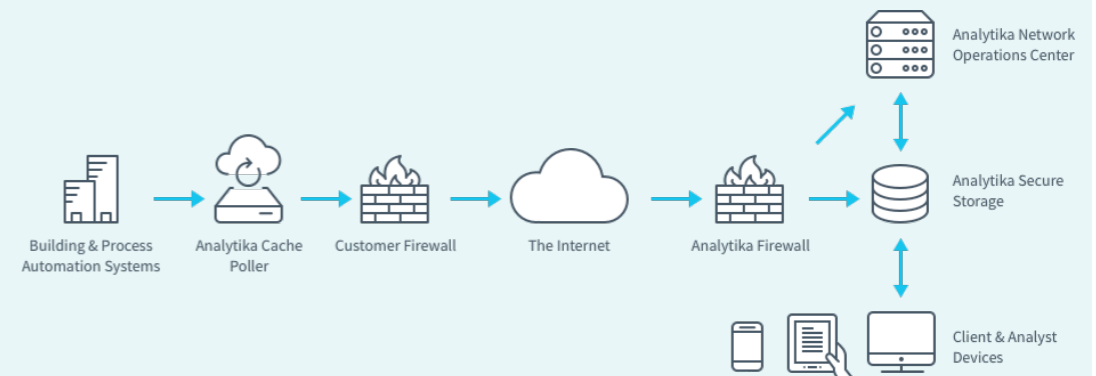


- ▶ BACnet Protocol Stacks
- ▶ Protocol Analyzers
- ▶ BACnet Explorers
- ▶ BACnet Web Services
- ▶ BACnet Routers
- ▶ BACnet OPC Servers
- ▶ Submetering Interfaces
- ▶ SNMP Interfaces
- ▶ RS-485 Networking



ANALYTIKA

- ▶ Analytika is an ongoing commissioning and remote monitoring service
- ▶ Analytika provides Dashboards for real time display
- ▶ Analytika consulting and reports enable clients to reduce energy costs and ensure efficient building systems operations



The Problem

There is a disconnect between construction and operation...

- Financial interests of developers, engineers, contractors are not aligned with long term owners and occupants
- Design build and lifecycle costing are not mainstream and do not solve the problem
- Lack of transparency prevents the long term owner/occupant from understanding the problem
- The industry suffers from an erosion of trust with the customer

And why is it so hard to change?

- Profits in the existing business models are based on this dysfunction
- Facility Management companies are compensated on **Gross** operating cost
- Weather, price changes and lack of data obscure comparisons
- Building operations are understaffed, outsourced and staff is undertrained
- Energy is too cheap to attract the attention of financial decision

Theme: Evolution & Current Market Conditions of Building Services in the U.S.

Evolution

- Products and traditional services have been commoditized.
- Margins diluted on traditional products & services.
- Growth is stagnant
- There has been a lot of confusion in the industry, especially by manufactures, regarding who the customer is (the building owner, the contractor, the channel rep, the specifying engineer, etc.).

Current Market

- Companies who are focused on complete solutions that deliver on High-Priority customer out-comes are growing & have high margin businesses.
- Winning companies are cutting through the confusion to focus on building owners and occupants as the most important customer, and building loyalty by acting as “agents of the customer.”
- Non-incumbents are looking to disrupt parts of the industry (software takes over the world).

Key Question: How can vendors work to earn a relationship with the end customer/user/owner— can existing vendors become agents of the customer?


Theme: The end customer/user/owner's biggest need is not a better air conditioning solution, or a better energy efficiency solution

- The market for building services is stuck in a series of value-destroying failure patterns, much as the U.S. auto industry was in the 1970's and 1980's:
- The process through which customers evaluate their building services needs and make buying decisions is broken (procurement value illusions; loss of internal expertise; strip-mining of facilities balance sheet to shore up the company income statement; naïve outsourcing; internal politics and job-protection driving buying decisions, etc.).
- The end customer's biggest need is a new approach to managing facilities as strategic assets that support the core business—an approach that enables higher quality buying decisions.



Vision for the Future -- Vendors must:

- Provide complete solutions, enabled by sophisticated models and big data analytics
 - Help customers manage facilities as strategic assets
 - Optimizing real value over the building lifecycle.
- Earn customer's trust by acting as ethical agents of the customer with a transparent, auditable model.
- Help customers make higher quality buying decisions that avoid the value-destruction of naïve procurement processes, while assuring that vendors compete on the basis of real value created—short and long term.

An industrial facility with a complex network of white pipes, blue structural beams, and various pieces of machinery. The scene is brightly lit, likely by overhead fluorescent lights. Several speech bubbles are overlaid on the image, each pointing to a different part of the machinery. The overall atmosphere is one of a busy, functional industrial environment.

I was never installed correctly.

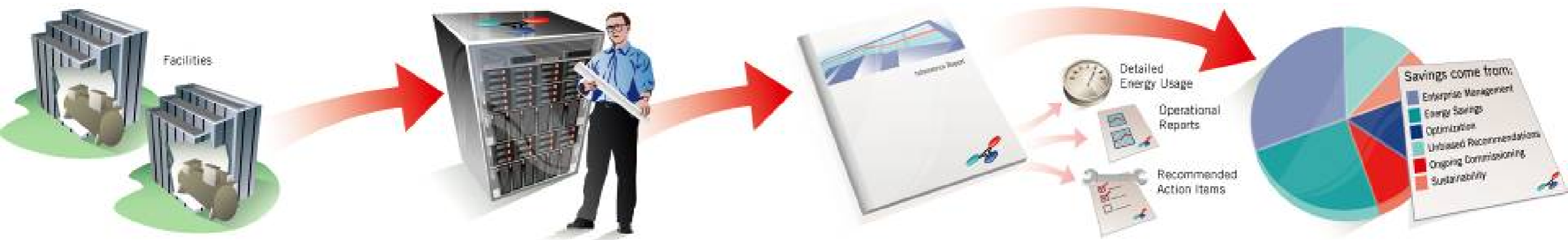
I'm stuck in open position.

I've been running for three months continuously.

My control sequence is backwards.

Turning data into value.

Typical Analytics Business Process



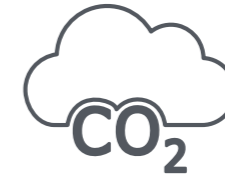
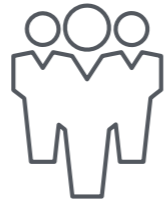
Connectivity is established with existing/upgraded building equipment and controls.

Information is transmitted to the Analytics Lab on an ongoing basis where it is captured, stored and analyzed.

Analytics are compiled in a periodic report with prioritized actionable recommendations.

Operational recommendations are implemented by in-house staff or outside vendors, resulting in savings.

ANALYTICS VALUE PROPOSITION



10-20%
Energy

5-10%
Maintenance

5-20%
Labor
Resources

3-15%
Comfort

Commissioning

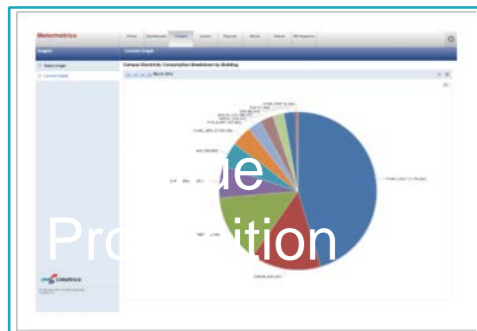
GHG
Emissions

Regulatory

Benefits

- ▶ Energy Savings
- ▶ Predictive Maintenance
- ▶ Fault Detection: Chillers, Boilers, AHU, VAV, etc.
- ▶ Root Cause Analysis
- ▶ Submetering (Electric, Gas, Steam, BTU, Water)
- ▶ Oversight of Vendors
- ▶ Peak Remediation
- ▶ FDA and Joint Commission Compliance

BENEFITS OF ANALYTICS



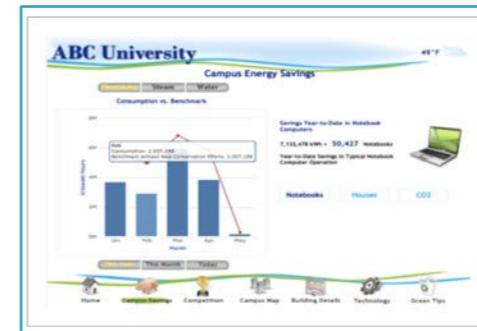
Energy Diagnostics



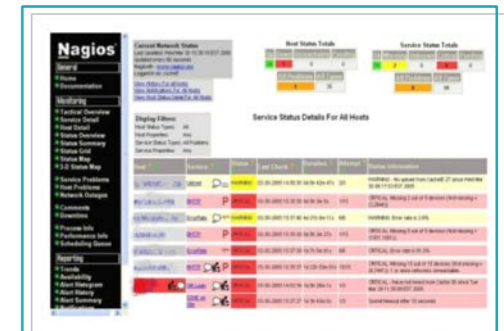
Fault Detection and Analysis



Performance Forecasting



Executive Dashboard



Work Order Integration

TURNING INFORMATION INTO VALUE!

Issue Tracking and Resolution

Track the status of issues/recommendations and their impact on operation

Issue Name	Issue #	Date Opened	Date Closed	Cimetrics Comments
Central chilled water plant is not optimized. Low Temp in primary loop with multiple chillers running.	ABC-WC-001	8/2009	8/11/2009	As of August 11, only a single chiller was operating.
Several points are questionable or appear to be duplicates.	ABC-WC-003	8/2009		Investigate removing or replacing points not used.
Some of the air handling units are over-ventilating based on building plan design values.	ABC-WC-004	8/2009		This issue will be re-addressed when outdoor air conditions dictate.

DECISION SUPPORT

Outline proposed solutions and proposed cost savings, giving clients all necessary financial decision support information.

Issue Name	Issue #	Report Month/ Year	Calculated Annual Savings	FY08 Savings
Central chilled water plant is not optimized. Low ΔT in primary loop with multiple chillers running.	ABC-WC-001	8/2009	\$27,122	\$27,122
Excess hours of operation for AHUs.	ABC-WC-007	8/2009	\$7,614	\$7,614
Exhaust Fans are commanded "ON" during excessive hours.	ABC-WC-018	9/2009	\$1,313	\$1,313
Economizer cycle not optimized in WC AHUs.	ABC-WC-019	10/2009	\$2,105	90% \$1,895

CARBON DIOXIDE EMISSIONS REDUCTIONS REPORTING

Issue Name	Issue #	Report Month/Year	Estimated Annual CO ₂ Savings (Metric Tons)	Implemented CO ₂ Savings (Metric Tons)
AHU-02 heating coil valve appears to be leaking.	HUB-CRB-011	11/2006	65.4	65.4
AHU-01 heat recovery increasing DAT when not needed.	HUB-CRB-012	11/2006	48.2	48.2
AHU-03 heat recovery increasing DAT when not needed.	HUB-CRB-013	11/2006	46.1	46.1
AHU-02 heat recovery increasing DAT when not needed.	HUB-CRB-014	11/2006	31.7	31.7
Heat recovery appears in bypass mode below 38F OAT.	HUB-CRB-017	1/2007	1,624.0	50% 812.0

Sample Customer CO₂ Emissions Reductions in the past year:

Customer 1



3,288.2

metric tons

Customer 2



946.2 metric

tons

Customer 3



3,605.9

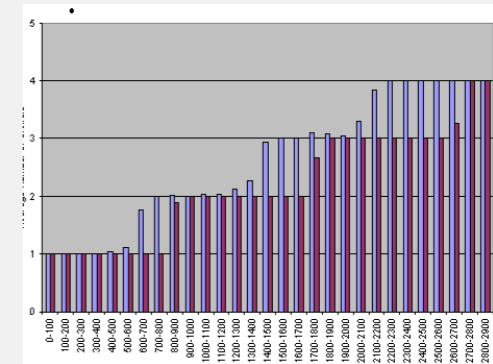
metric tons

KEY COMPONENTS (continued)

Detailed situation analysis with informative descriptions

Includes zone, AHU and plant level performance analysis combined with industry benchmarks, regulations and customer-specific needs

To the right is an illustration of the AVERAGE number of chillers online and the OPTIMUM number of chillers online for different plant (cooling) loads during July. It appears that extra chillers are running when the chilled water plant sees between 600 and 800 tons (running 2 chillers when only 1 is necessary), between 1,400 and 1,800 tons (running 3 chillers when only 2 are necessary) and when the chilled water plant sees between 2,000 tons and 2,700 tons (running 4 chillers when only 3 are necessary).



Actionable Improvement recommendations

Recommended control strategies, optimization and additional hardware needs are identified

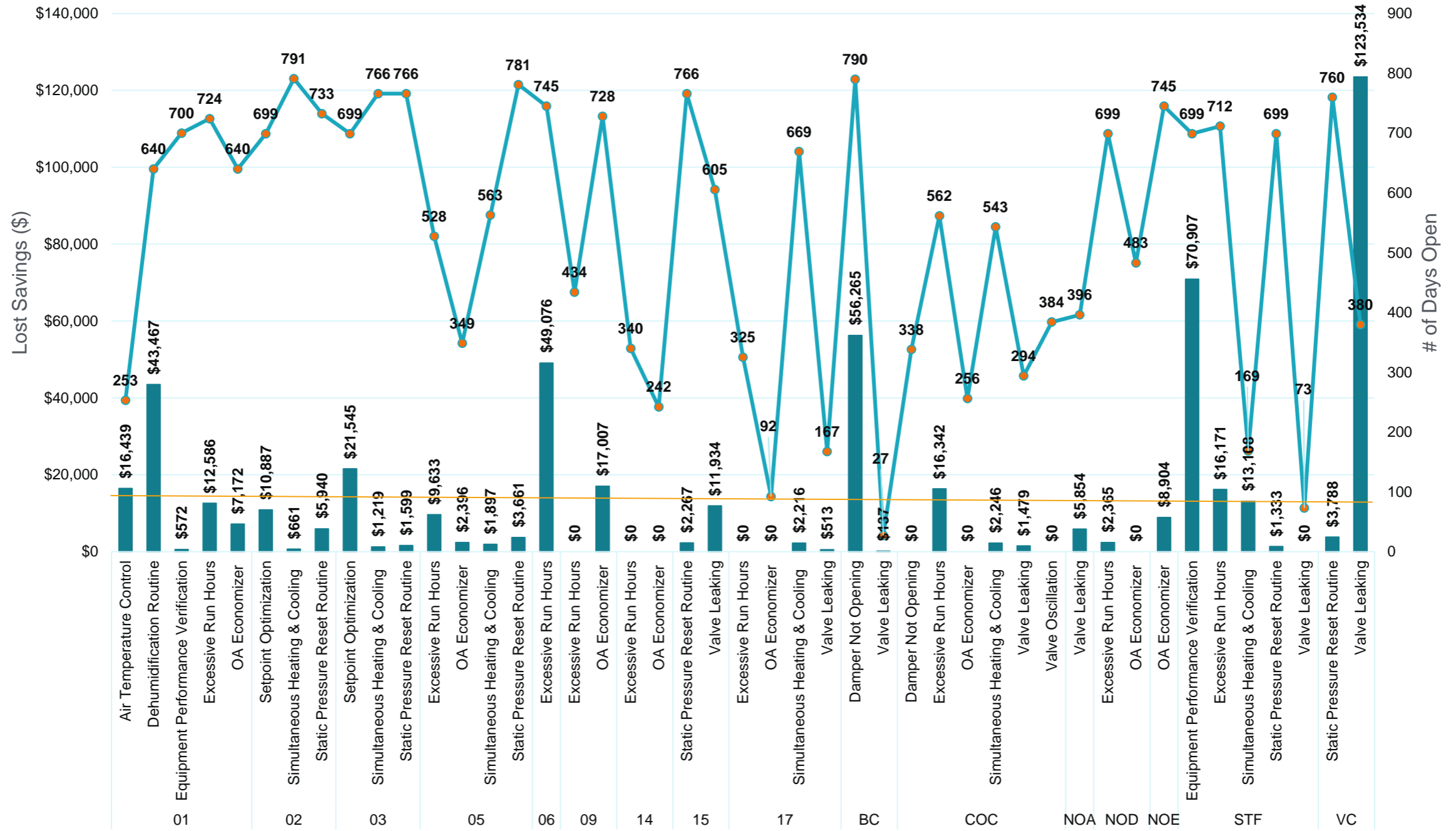
It is recommended that a common chilled water supply temperature sensor be installed so that total chilled water plant load can be more accurately determined. The optimum number of chillers is based on the central plant switch over values shown:

0-850 tons	Use (1) chiller
850-1,750 tons	Use (2) chillers
1,750-2,650 tons	Use (3) chillers
2,650-3,550 tons	Use (4) chillers
3,550 tons & up	Use (5) chillers

VENDOR MANAGEMENT – Response Time

Analytika # of Days Open & Lost Savings

Average Days Open: 489
Total Lost Savings: \$545,120



Target Implementation = 60 Days (Orange Line)

■ Lost Savings ● # of Days Open

Owners need to adapt to this Brave New World

- In next downsizing, please recommend your procurement department for the next series of cuts. By continually taking away decision making authority from business and technical decision makers, procurement has been the largest net destroyer of value in the industry. Professional services do not lend themselves to commodity purchasing processes.
- Implement change management to take advantage of the transparency provided by the analytics—who will do the fixes?
- If big brother is coming, do I want to hide from it or embrace it?
 - Take control of big brother
 - Placebos will not cut it—other analytics will expose the fraud.

The best fault detection systems is one that doesn't find fault: "Hey boss, I bought the best FDD system and it says we're doing a great job."

Summary

The historical organization of the industry leads to inefficiency

- Financial interests of developers, engineers, contractors are not aligned with long term owners and occupants
- Bidding based procurement methodologies result in a bad outcome every time--especially when products and services are not commodities
- Lack of transparency prevents the long term owner/occupant from understanding the problem
- The industry suffers from an erosion of trust with the customer

Transparency is the solution

- Green washing is giving way to new hard hitting technologies that allow visibility deep into a owners systems (including business systems)
- Vendors must evolve their business to focus on owners and value
- Building owners must evolve their procurement practices
- Building owners must create business processes to take advantage of the new information/transparency

Continue the conversation!

www.newdeal.blog

jimlee@cimetrics.com

www.analytika.com

www.cimetrics.com