



# Operations and Implementation with Cenergistic



# Agenda

---

- Cenergistic overview
- How we achieve results
  - Team
  - Technology
  - Training
- Bringing it all together





**Cenergistic provides continuous training  
and best practice sharing**



# About Cenergistic

---

We are a **technology-driven energy conservation** firm

In 29 years, 1360+ Cenergistic **clients have saved \$3.9B** that otherwise would have been paid to utility companies.

We achieve these with **zero startup costs** for rapid payback.

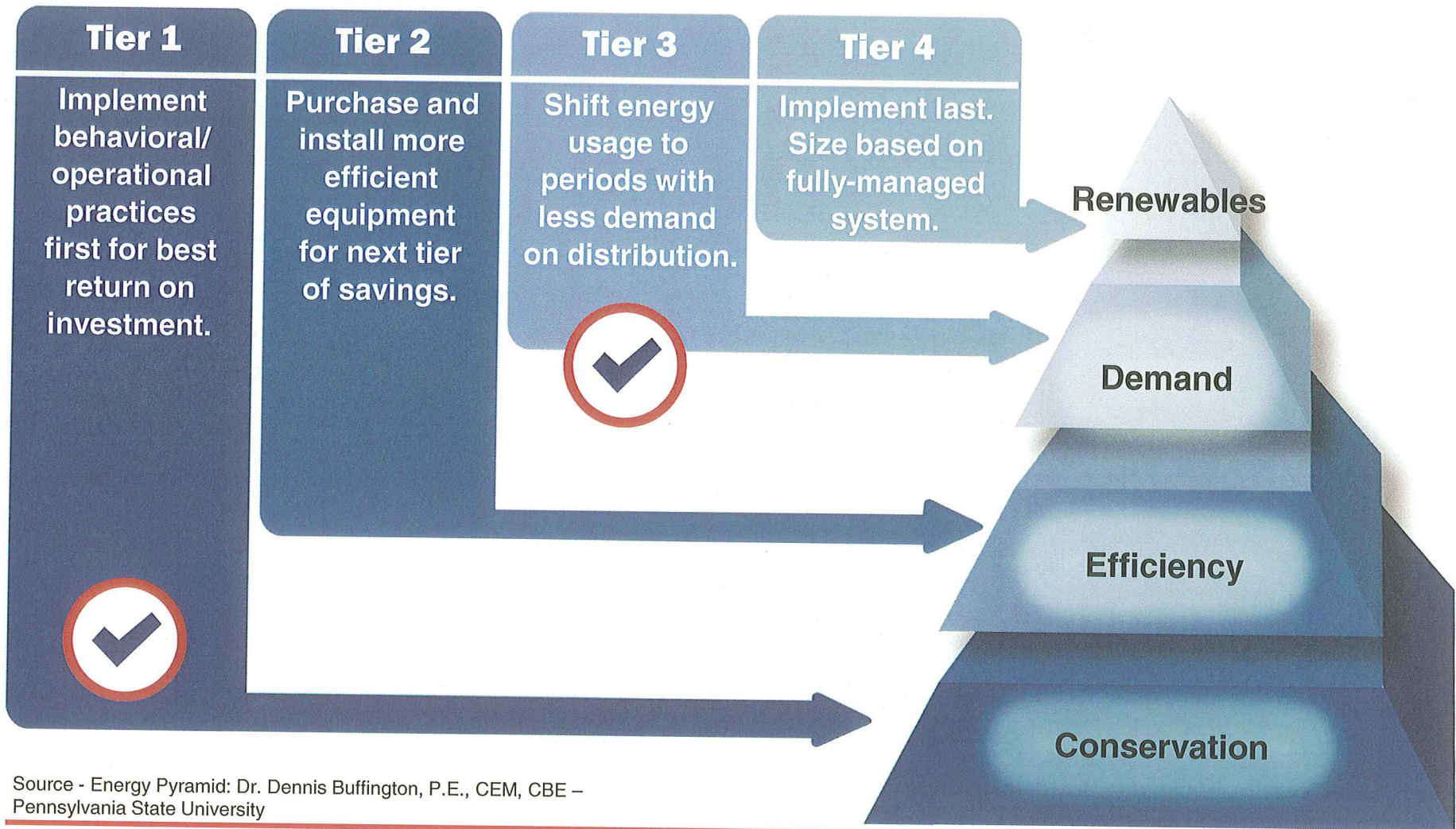
We save money by helping you **optimize how buildings are operated.**

We sustain success through **organizational behavior** principles.



# Energy Pyramid

Pyramids are built from the base upwards. For greatest savings and best return on investment, implement your energy management strategy in this sequence.



Source - Energy Pyramid: Dr. Dennis Buffington, P.E., CEM, CBE – Pennsylvania State University



## We Partner with You

**We work with and enhance** your team. We do not replace your team.

Our Energy Specialists work **directly with Operations** to

- Save energy
- Increase building comfort
- Respond to occupants
- Create a culture of conservation

We bring engineering resources to your team. From Professional Engineer-level HVAC design engineers to EMS and irrigation experts — **our experts add to yours.**

**We complement your work** with equipment-driven energy efficiency firms.



# We Make You More Successful

We build on your in-house efforts. **Together we achieve more.**

**TEAM** — We bring unmatched expertise to your team for system-level analysis and engineering deep-dives

We dedicate resources to focus 100% on energy conservation

**TECHNOLOGY** — Our diagnostic and analytic tools improve how your buildings work, and turn opportunities into savings

**TRAINING** — Onsite training by experts includes HVAC systems, building controls, irrigation, and air quality management.

Our success is unmatched:

**26% average savings with existing equipment.**





Team



# Team

---

## Our team members become an extension of your facilities team

- Engineers, EMS experts, Certified Energy Managers work with your team in your buildings
- Technical expertise saves you money and adds to your team's capabilities

## We embed Cenergistic-trained Energy Specialists in your organization

- 80% of their time spent in buildings
- They motivate positive behavior change from staff and students
- Accountable to us & you for ensuring comfort in the learning environment

### **Result:**

Comfort improves. Work orders decrease.



# Cenergistic Program Support Team

---

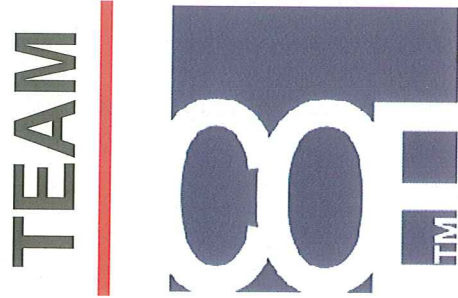
Partnering with Cenergistic expands your facilities team:

- Professional Engineers
- Certified Energy Managers
- HVAC Design Engineers
- EMS Experts
- Certified Measurement and Verification Professionals
- Certified Indoor Air Quality Professionals
- Measurement and Verification Analysts
- Landscape and Irrigation Professionals
- Pneumatics Experts
- Building Energy Assessment Professionals
- Certified Building Commissioning Professionals
- Certified Energy Auditors



# Team Support with Center of Excellence

---



Cenergistic's Engineering **Center of Excellence** (COE) provides staff and clients with technical support for engineering support, remote engineering training, smart meter analytics and savings measurement quality control.

- **Deep, tenured engineering experts, including design engineers, PhD, P.E.**
- **Engineering and data analysis**
- **Energy Management System expertise**





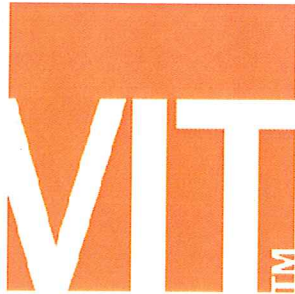
# Technology



# Technology — Supported by Cenergistic Experts



**Cenergistic Command Center** is the information hub for your energy program. Tablet-based energy program management.



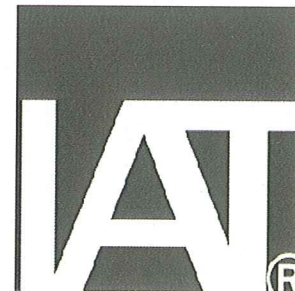
**Visual Inventory Tool**

*VIT is a diagnostic tool for HVAC Systems.*



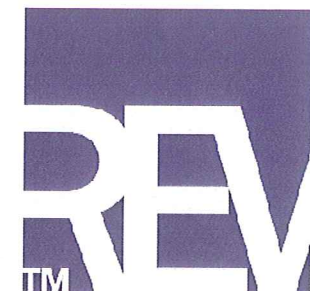
**Advanced Simulation Tool**

*AST separates equipment from behavioral savings.*



**Interval Analytics Tool**

*IAT turns smart meter data into savings.*



**Remote Engineering Verification**

*REVs deliver “on demand” engineering support.*

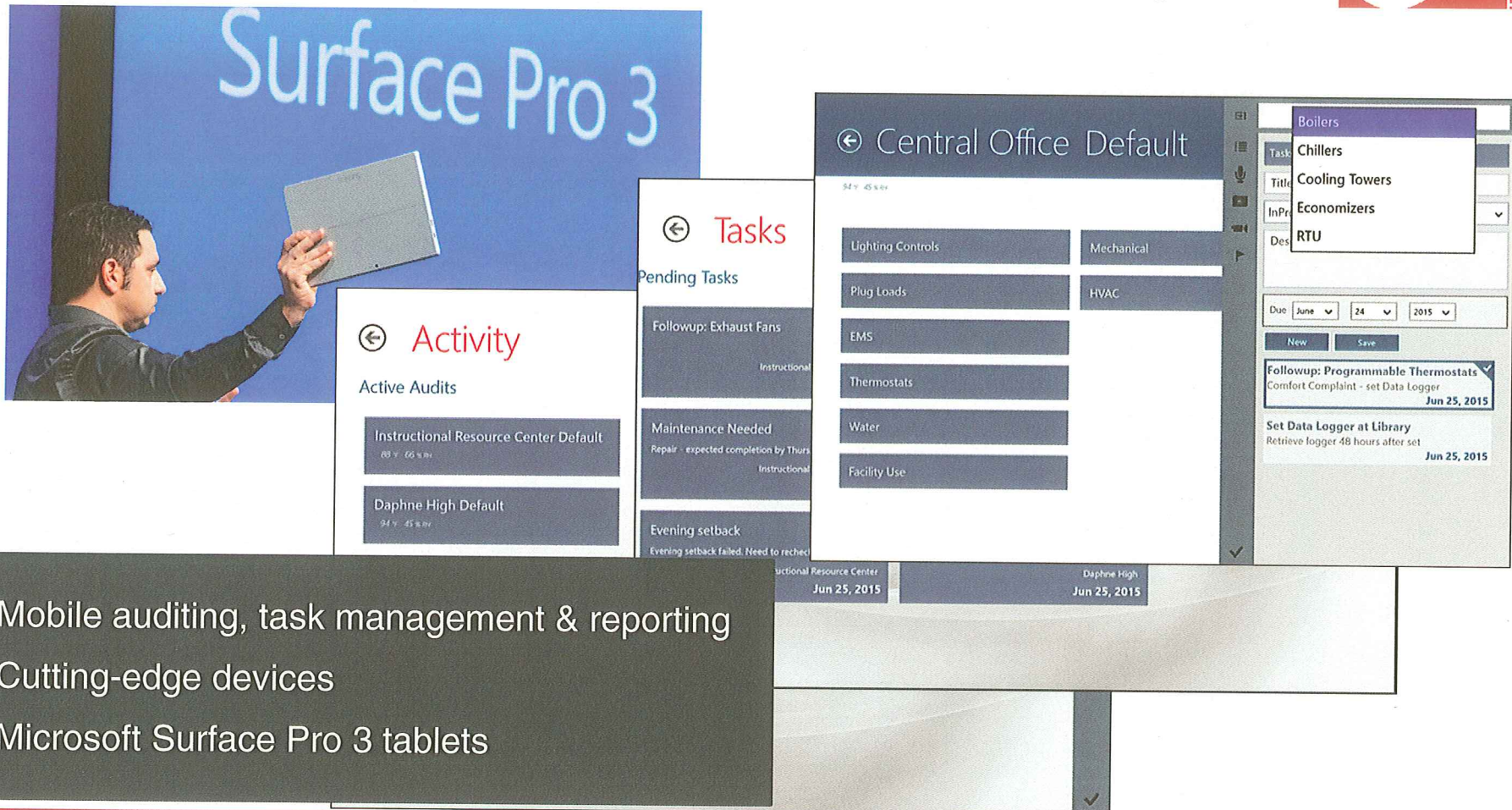
**TECHNOLOGY**



# Cenergistic Command Center

Command Center enables tablet-based energy auditing, task management and reporting for mobile energy program management.

Command Center is the information hub for your energy program.

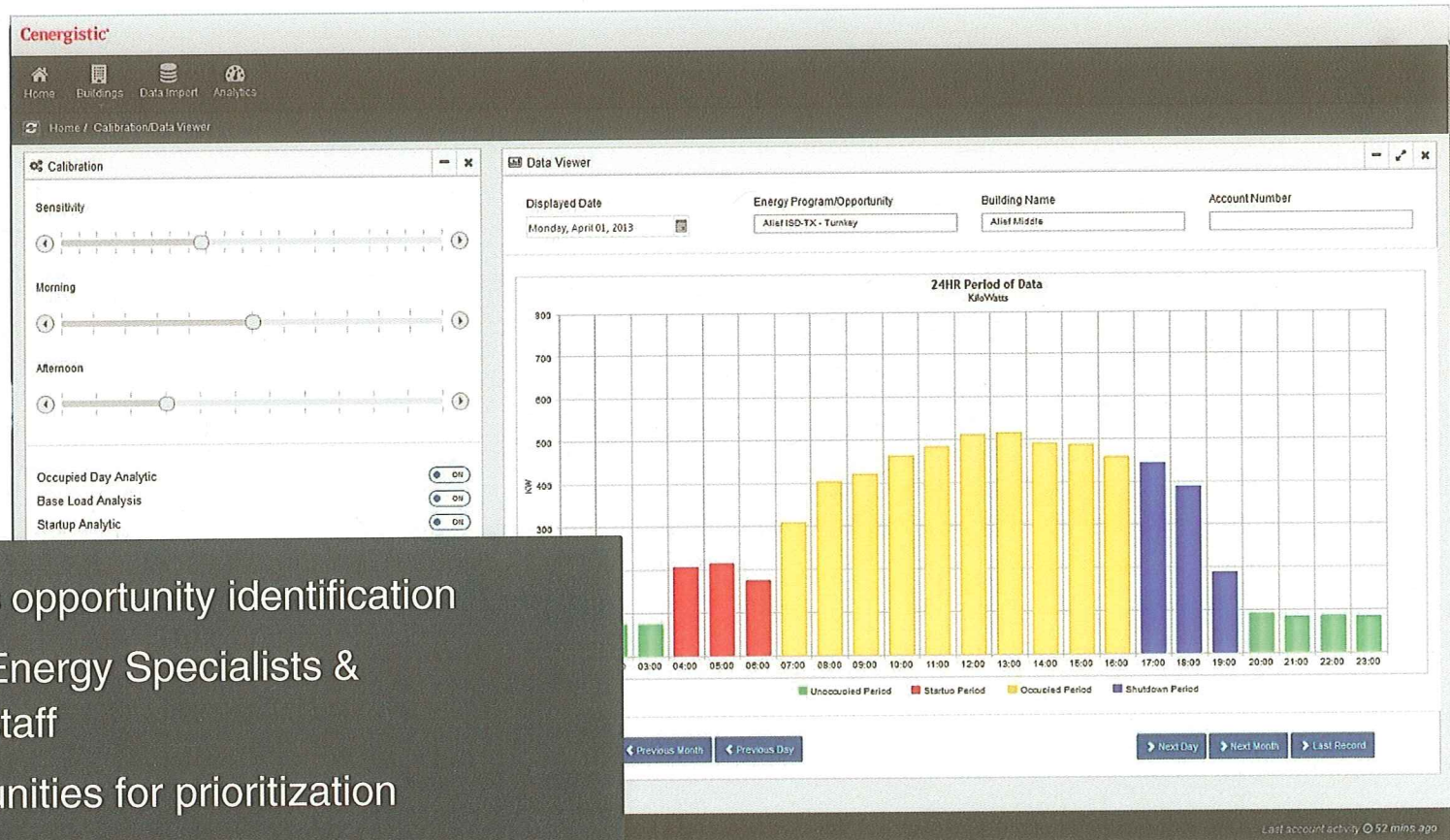
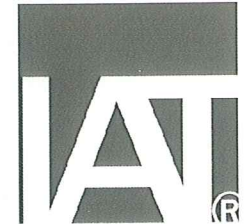




# Interval Analytics Tool (IAT®)

IAT's advanced engineering algorithms identify savings opportunities from smart meters.

IAT turns smart meter data into savings.



Faster savings opportunity identification  
Roadmap for Energy Specialists & Maintenance staff  
Values opportunities for prioritization  
Patent pending



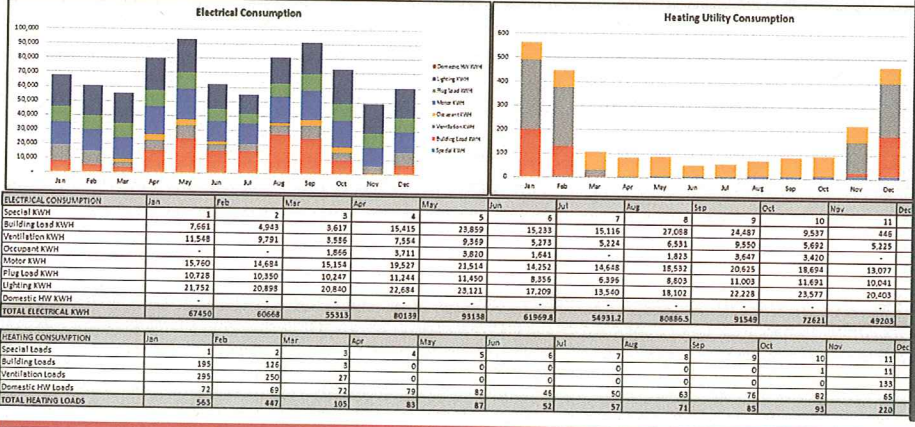
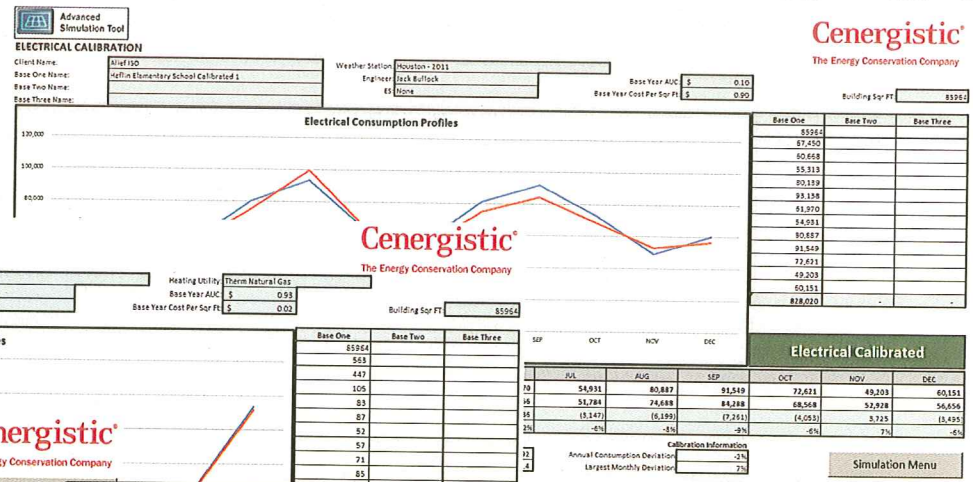
# Advanced Simulation Tool (AST®)

AST's advanced engineering simulations validate system design & building operation, and value the effect of building system changes.

AST separates equipment savings from behavioral savings.



**Cenergistic®**  
The Energy Conservation Company



Experienced engineers validate building operation, diagnose system problems

Allows separation of savings based on source

Values impact of recommendations

IPMVP Option D compliant

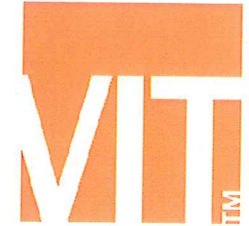
Patent pending



# Visual Inventory Tool (VIT)

VIT provides diagnostic HVAC system analysis to find savings opportunities and maintenance issues.

VIT identifies HVAC problems for your facilities team.



**EMAP Garland Texas**  
Energy Management Action Plan (EMAP)

Completed, O=Completed and Ongoing Date Created: 10/30/14

ITEM	SITE NAME	SYSTEM NAME	ASSIGNED	TARGETED DATE	STATUS
3	Garland High School	Chiller Plant			50 degrees. This means that the chiller is the chillers outside air lockout to 60 degrees. Cenergistic Engineer to resolve the issue.
4	Garland High School	Chiller Plant			Return the chillers set temperature in the summer and consult with a lead water supply temperature set point to
5	Garland High School	Chiller Plant			It is below the design of the coils. Return the design temperature in the summer and consult the chilled water supply temperature set point
6	Garland High School	Chiller Plant			to optimize the energy savings of the system.
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					

Smart system analyzer  
 Speeds HVAC analysis  
 Identifies failed sensors & misconfiguration  
 Generates action items  
 Managed by trained Cenergistic engineers



# Remote EMS Verification (REV)

Cenergistic's professional engineers work with your EMS team to optimize building controls through REV sessions.

REVs deliver "always on" engineering support.



The screenshot displays the REV software interface within an Internet Explorer browser window. The browser address bar shows a local URL: `http://rv1.staff.riato.local:conection/riato/rev/rev.jsp?webs=0`. The interface is divided into several panes:

- Left Pane:** A tree view showing the building structure for 'Rialto Middle School', including spaces, equipment, generic, points, and graphics.
- Top Pane (Aaon\_AC1):** Displays 'Graphics (Custom)' for 'Aaon\_AC1' with a 'Culinary\_Arts' graphic. It shows 'Outdoor Conditions' with a temperature of 67°F and Humidity of 66%.
- Bottom Pane (ACE-2):** Displays 'Graphics (Custom)' for 'ACE-2' with a 'Building\_E\_Roof' graphic. It shows 'Outdoor Conditions' with a temperature of 68°F and Humidity of 66%.
- Right Pane (Data):** Lists various HVAC parameters:
  - Occupancy Status: Unoccupied
  - Occupied Cooling Setpoint: 69.5 °F
  - Occupied Heating Setpoint: 68.5 °F
  - Unoccupied Cooling Setpoint: 65.0 °F
  - Unoccupied Heating Setpoint: 60.0 °F
  - Mixed Air Temperature: 73.9 °F
  - Stage 1 Cool Start/Stop: Off
  - Stage 1 Heat Start/Stop: Off
  - Supply Air Temperature: 72.4 °F
  - Space Temperature: 73.4 °F
  - Space Temperature Setpoint: 65.0 °F

Quickly identify savings opportunities in control systems  
Staffed by Engineering Center of Excellence licensed PEs  
Detailed knowledge of all EMS control systems



# Measurement and Verification (M&V)

---



## Measurement and Verification

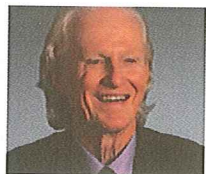
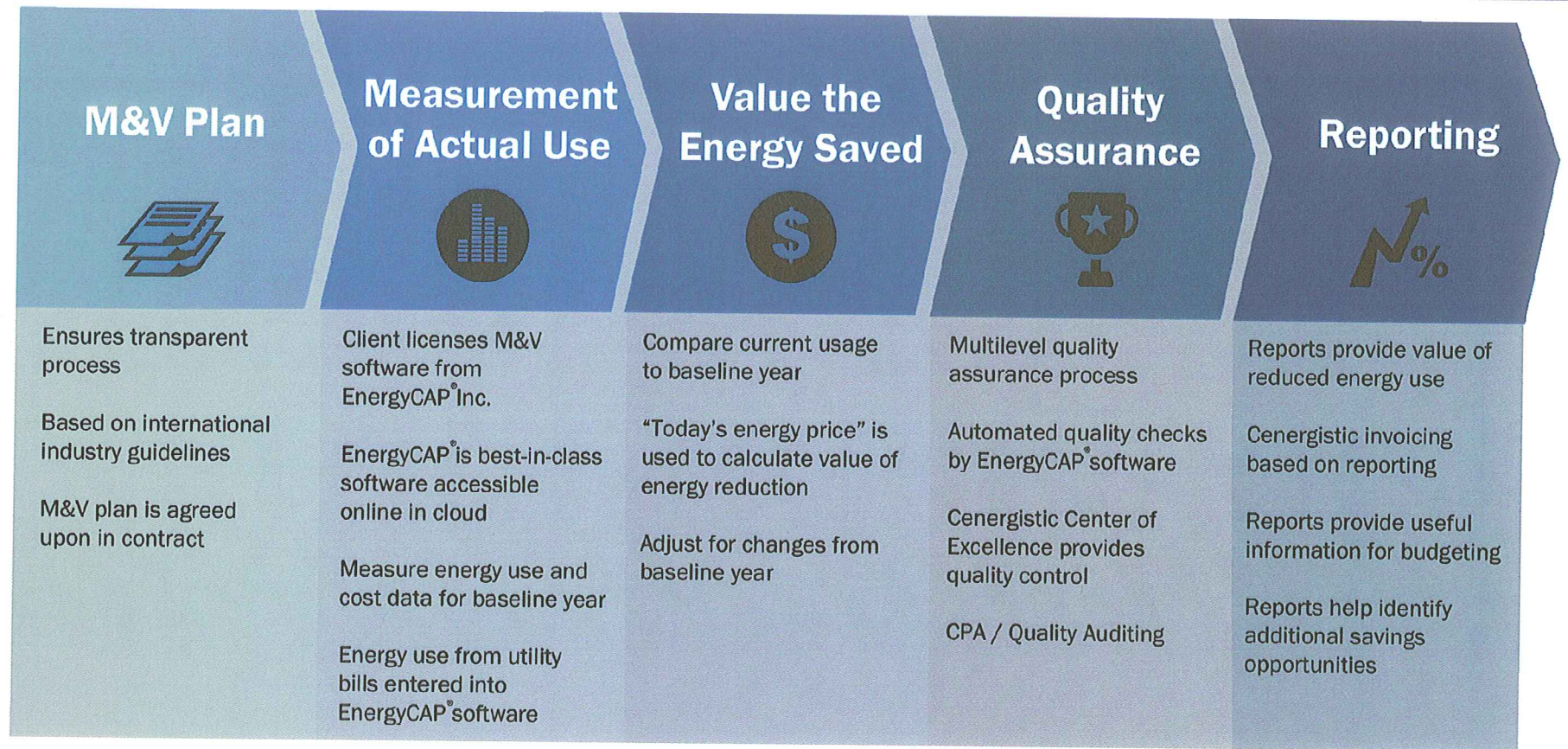
*Our process ensures savings are measured accurately and transparently.*

Cenergistic's process to measure and verify your savings is rigorous, transparent and conforms to accepted industry guidelines. Third-party software and quality checks at every step of the process ensure the accuracy of your savings information.

- **The International Performance Measurement and Verification Protocol (IPMVP)** is a set of industry standards published and maintained by the international non-profit Efficiency Valuation Organization, EVO ([evo-world.org](http://evo-world.org))
- **EnergyCAP, Inc.** — an independent company — publishes EnergyCAP, energy management and accounting software that complies with IPVMP
- Cenergistic's **M&V Center of Excellence** is staffed by M&V professionals who ensure your data is accurately tracked and presented



# Measurement and Verification Process



*“Cenergistic’s process of measuring energy savings follows international guidelines that are considered to be best practice. Cenergistic’s quality assurance and quality control programs provide the checks and balances needed for a transparent process for its clients.*

*Cenergistic has an energy conservation process that adheres to accepted industry standards and results in reports of energy savings that reflect the actual experience of its customers.”*

Wayne C. Turner, Ph.D.  
 Regents Professor Emeritus, Oklahoma State University  
 Fellow, Association of Energy Engineers (Hall of Fame member)  
 Editor-in-Chief, Energy Engineering

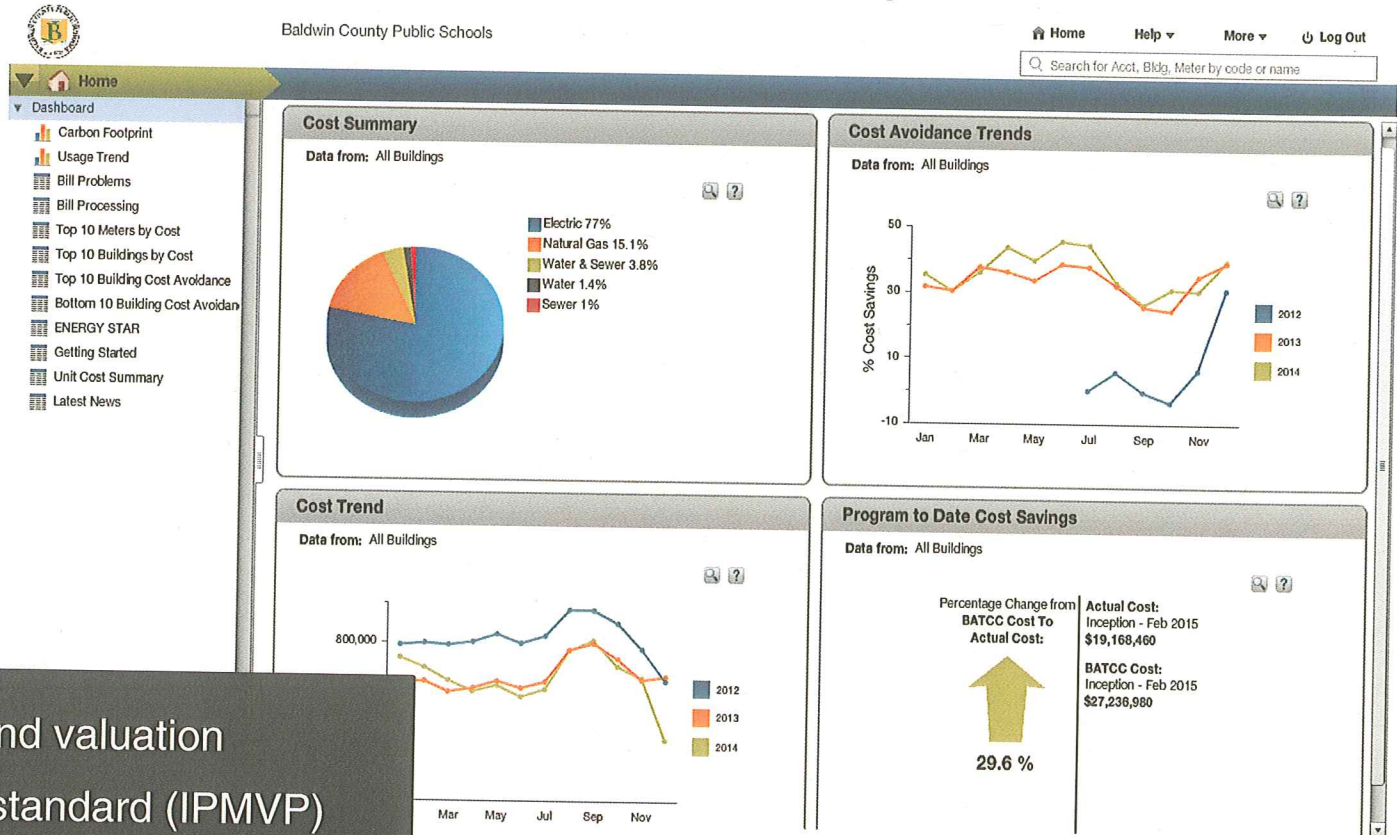


# EnergyCAP®: Performance Monitoring & Reporting

EnergyCAP, the world's leading energy accounting software, compares actual use to pre-program use.



EnergyCAP measures savings accurately & transparently



Energy accounting and valuation  
Adheres to Industry standard (IPMVP)  
Independent third party software



# EnergyCAP Clients

An independent software firm established in 1980, EnergyCAP Inc.'s software adheres to industry standards and is the most respected M&V software in the industry. *Some prominent users include:*

## Government



## Higher Education



## Commercial





# Training



## **We Continually Train Our Team — and Yours**

---

- **Detailed System-level Reviews/Audits**
  - Investigation, Optimization, Surveys, Inventory
- **Cenergistic Classes for Energy Specialists**
  - C1 – Cenergistic Foundations
  - C2 – Advanced Analytics
  - C3 – Building Systems
- **National Training Conferences Twice per Year (bring your team)**
- **Virtual Training Conferences**
- **Program Liaison Training**
- **Measurement & Verification Training**
- **IAQ / Humidity and Moisture Control Training**
- **Water, HVAC and EMS Management**



# Summary



# Implementation Methodology

**Cenergistic — 29 years of process and innovation**

## Expertise

- Program Managers
- Engineers & Analysts
- Center of Excellence
- Training Programs

## Technology

- Command Center
- Building Simulation
- Smart Meter Interface
- Equipment Diagnostics

## Analytics

- EnergyCAP®
- Opti-Commissioning
- Data Logging
- Remote Verification

*implemented through*

## Energy Specialist(s)

- Embedded Support Staff
- Boots on the Ground
- Face of the Program

*yields*

**Changed habits, behavior, operations and culture**

**RESULT**

**\$\$\$: Electricity, Gas & Water Consumption Reduced 20 – 30%**