Control Contractor's Responsibilities

in

LEED Certification

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Louisville, Kentucky
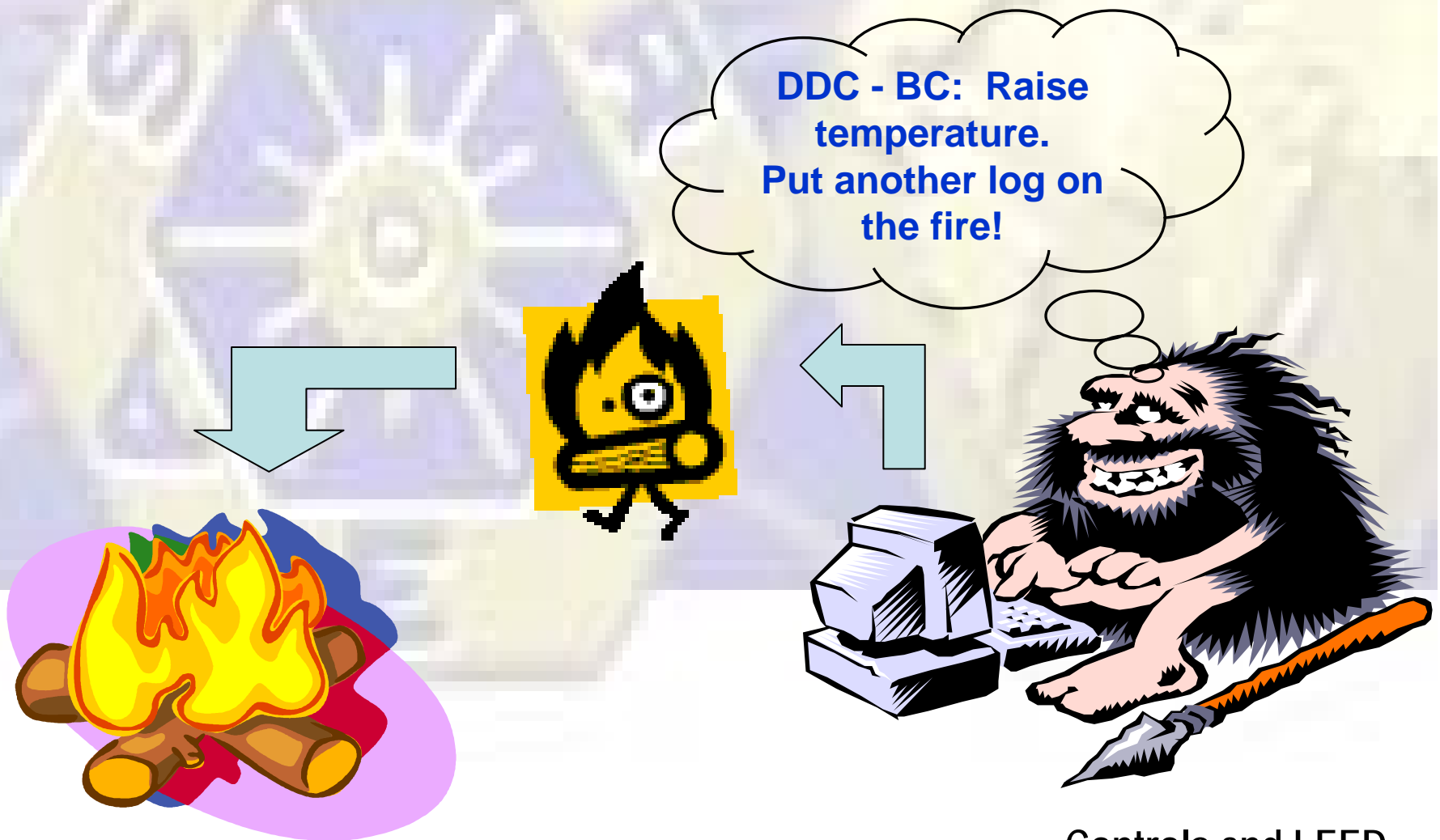
Where are we going in the TCC world??

DDC / Windows Based Graphics

DDC's Future
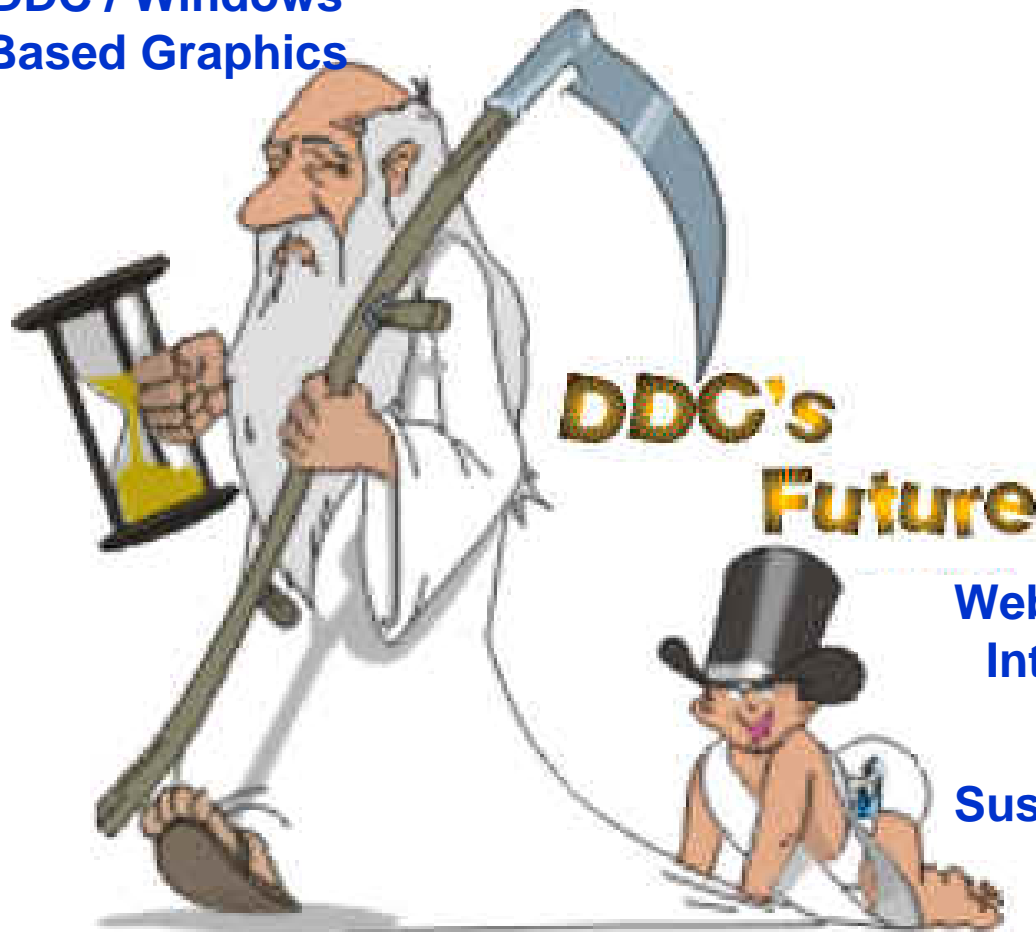
Web Services Integration M&V
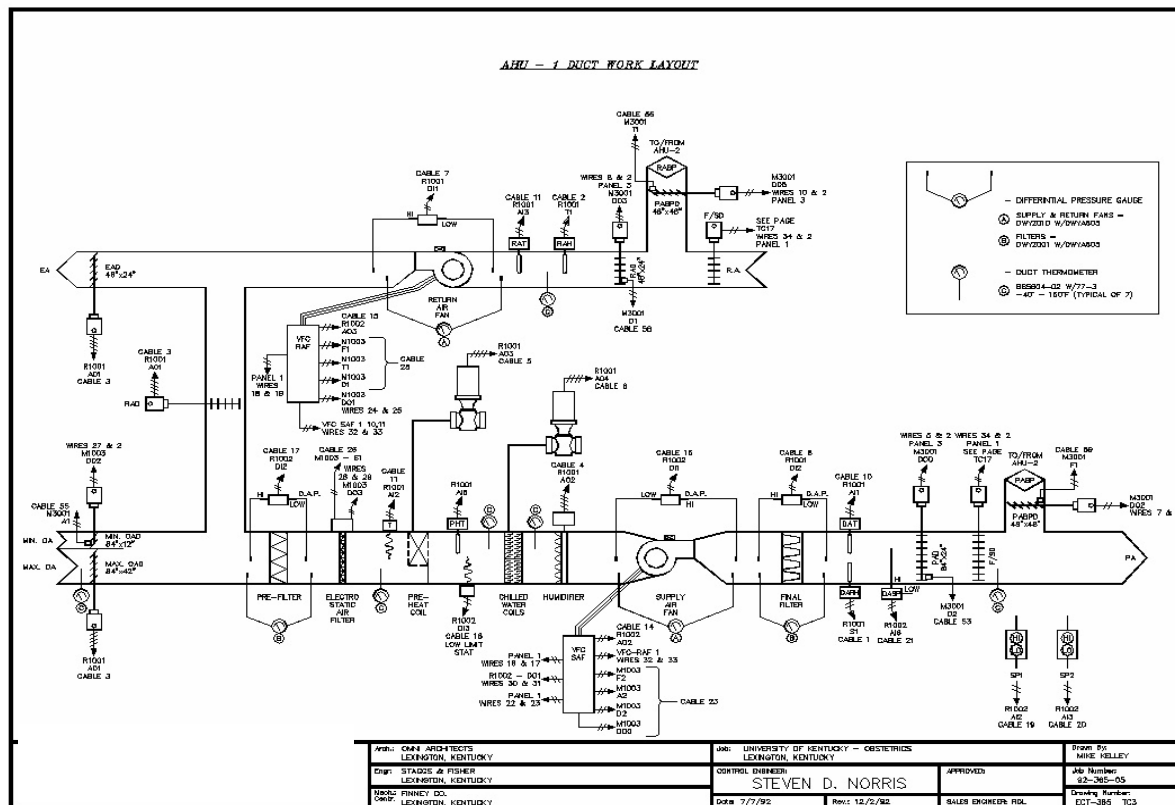
Sustainability

Controls and LEED

Traditional Role of the TCC – Knowledge Responsibilities

Think about what a TCC should know:

Individual components of mechanical systems

How about systems themselves, Chillers, Variable Speed Pumping, Primary/Secondary, 2-pipe, 4-pipe, VAV, CV, WSHP's, S/S's, and RTU's to name a few.

Controls and LEED

How about the ASHRAE Standards that apply to these:

Standard 15-2004 – Safety Refrigeration Standard
Standard 62.1-2004 – Ventilation, IAQ Requirements
Standard 90.1-2004 - Energy Standards for Buildings
Standard 135-2004 – BACnet

Common Denominator? "2004"
Meaning "are we staying up to date?"
or
How do we stay up to date?

Today the TCC must
also be
aware of changing
standards

Controls and LEED

Now……..let's add in some more

How about Green Buildings Council?

How about LEED?

How about M&V / sustainability

How about interfacing requirements between crafts:

Fire alarm, Security, Electrical, TCC, TAB, and now IT Departments, with new Construction Managers and Commissioning Authorities they never heard of.

Let's throw in web based DDC temperature controls systems and of course internet new XML protocol, and of course the new "Integration" concepts.

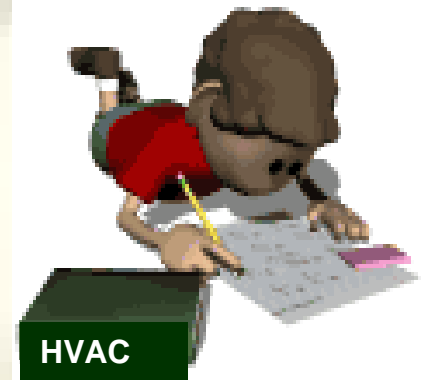Question is, "How does TCC master all the Division 15 Sections?"

Controls and LEED

Now let's just talk about <u>one</u> section of Division 15

Temperature Controls

What do "QUALIFIED" TCC Contractors have to know?

What do "QUALIFIED" TCC Contractors have to do?

HVAC

TCC's do not provide a lot of HVAC equipment, but they must co-ordinate many vendors, the mechanical contractor, the consulting engineers, the general contractor, the electrical contractor and the balance contractor.

Oh….. That's right…….there is an owner in this mix too !!!!!!!!!!!

The owner lives with what the TCC put in for the life of their building.

Controls and LEED

TCC must also be aware of the different protocols i.e.:

BACnet Proprietary LON MODbus JAVA   HTML   XML SOAP

ASHRAE Standards

Green Buildings Council Directives

Test, Adjust, and Balance Procedures

Training Personnel and People Skills

Integrators

IT and Internet Literacy

**In other words, there is a lot to consider to
have a successful controls system.**

Controls and LEED

Which leads us to LEED and TCC responsibilities

LEED-NC   LEED-E

Brief LEED History:

- **Developed by the US Green Building Council**

- **Is a rating system**

- **Created to develop high performance buildings**

- **Created to develop sustainable buildings**

- **Develops a common measurement standard**

- **Raise consumer awareness of green building benefits**

L E E D ™
LEADERSHIP IN ENERGY & ENVIRONMENTAL DESIGN

Controls and LEED

Which leads us to LEED and TCC responsibilities

Brief LEED History Continues:

•**Works on a points rating system**

   •**General Certification   26 - 32 points**

   •**Silver Certification   33 – 38 points**

   •**Gold certification   39 – 51 points**

   •**Platinum certification   52 – 69 points**

   More info visit usgbc.org

Controls and LEED

Which leads us to LEED and TCC responsibilities

- With renewed interest in energy conservation, there has come an increased interest in Green Buildings:

- The US Energy Policy Act of 2005 (EPAct 2005) went into effect December 31, 2005

    - Created new tax incentives for energy efficiency measures

    - Up to $1.80 p/sq ft. tax credit for buildings achieving a 50% reduction in annual energy cost to the user

Bottom Line – how do you measure and how do you maintain sustainability?

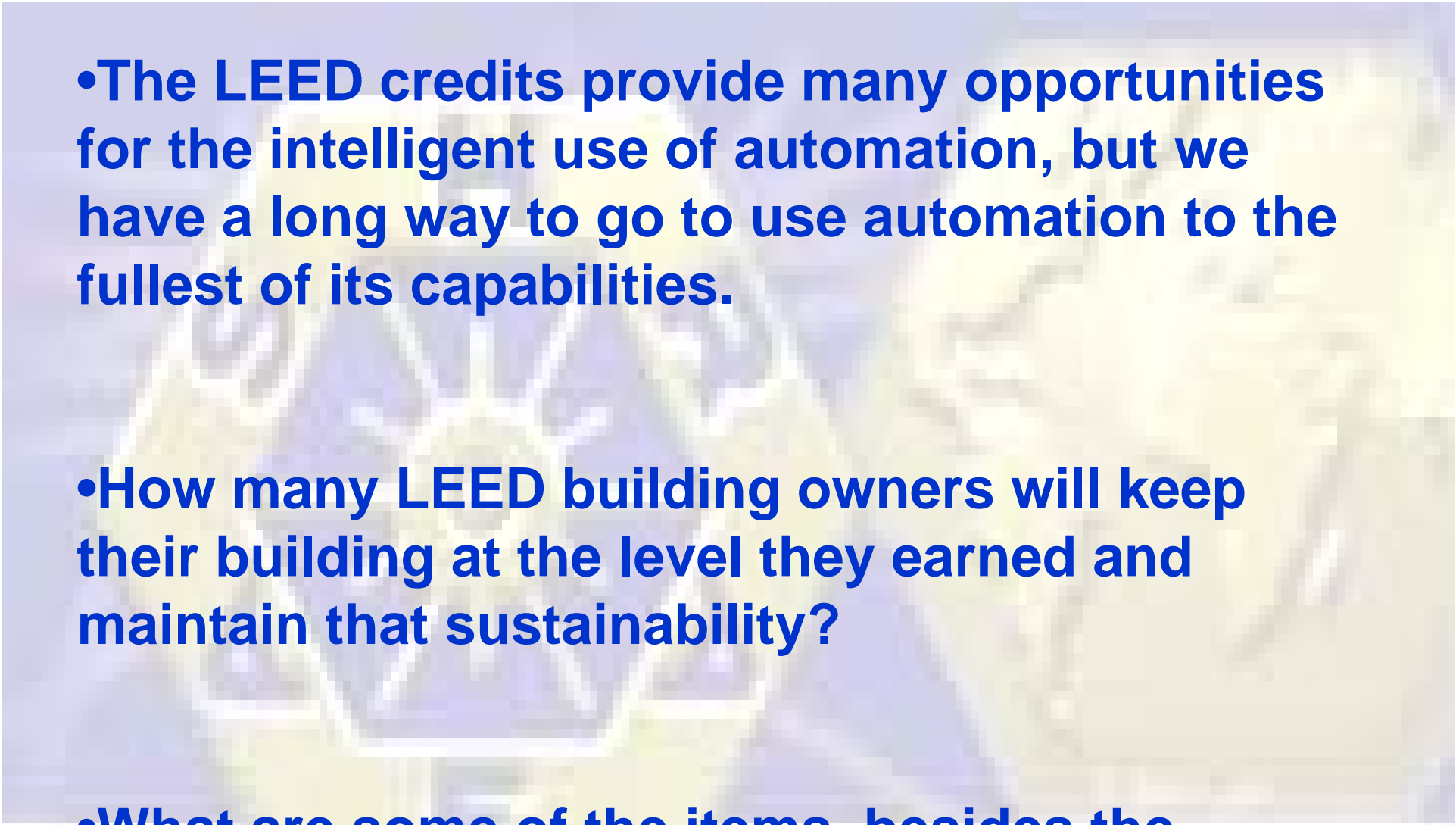Controls and LEED

Yesterday during the Plenary Session:

- The word "Green" was said 5 times

- The word "Sustainability" was said 6 times

- We learned that ASHRAE Headquarters will undergo renovation to bring their building up to Green Standards

- You would find it difficult to pick up a publication of our industry without mentioning the words Green or LEED or Sustainability.

Controls and LEED

- **Temperature Controls have evolved to be easily reconfigured to grow and adapt with today's buildings**

- **The building controls system can be the backbone of sustainability**

Controls and LEED

• **New opportunities are constantly being introduced to allow the building control system to become a better tool.**

• **New web services are constantly being introduced that will allow 3rd party access for multiple buildings, allowing for a single entity to be responsible for the sustainability.**

Controls and LEED
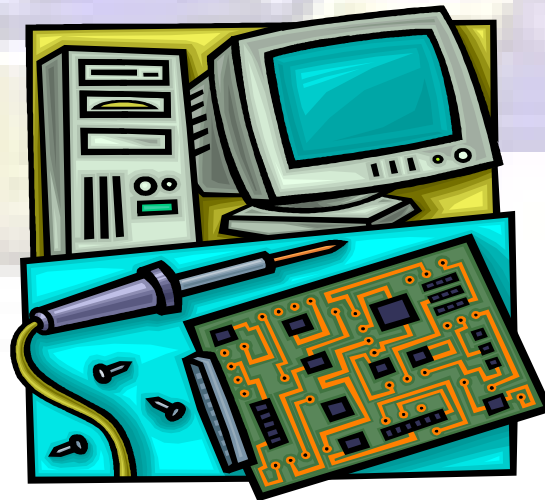
- **The LEED credits provide many opportunities for the intelligent use of automation, but we have a long way to go to use automation to the fullest of its capabilities.**

- **How many LEED building owners will keep their building at the level they earned and maintain that sustainability?**

- **What are some of the items, besides the routines, that can make a positive impact on building's life long energy use?**

Controls and LEED

Automation can:

Turn solar panels for optimum sun exposure

Close blinds

Lower awnings

Keep IAQ acceptable (adjust OA without over ventilating)

Lighting inside and out

Irrigation

M&V the final ingredient for Sustainability in LEED

How do we get there?

TCC's Role

Controls and LEED

Using Automation
for
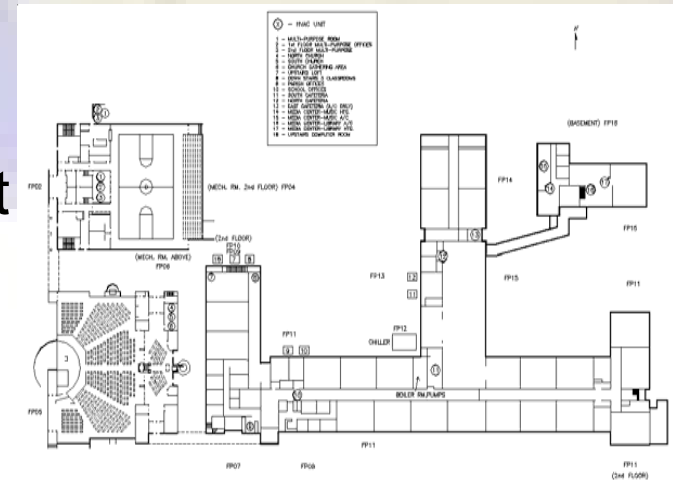# Sustainability

M & V definition:

– Validation, compare against a base

– Performance assessment

Why should M & V be considered?

– Building Construction = $800 Billion annually

– Employs nearly 10 million professionals and trade jobs

– M & V can have a significant impact on energy efficiencies

– A small improvement can make a huge difference in sustainability

Controls and LEED

Sustainability:

- Focus on whole life of facility
- Continual real time feed back
- Energy/Efficiency based evaluations
- Identifies energy performance deficiencies

Controls and LEED

- ## **<u>What Automation Does:</u>**

  - Continuous Energy Cost Reduction and Maintenance Monitoring through Direct Digital Controls

  - Provides a tool, **if used properly,** will allow for continuous sustainability

  - Will monitor and trend items necessary for Sustainability
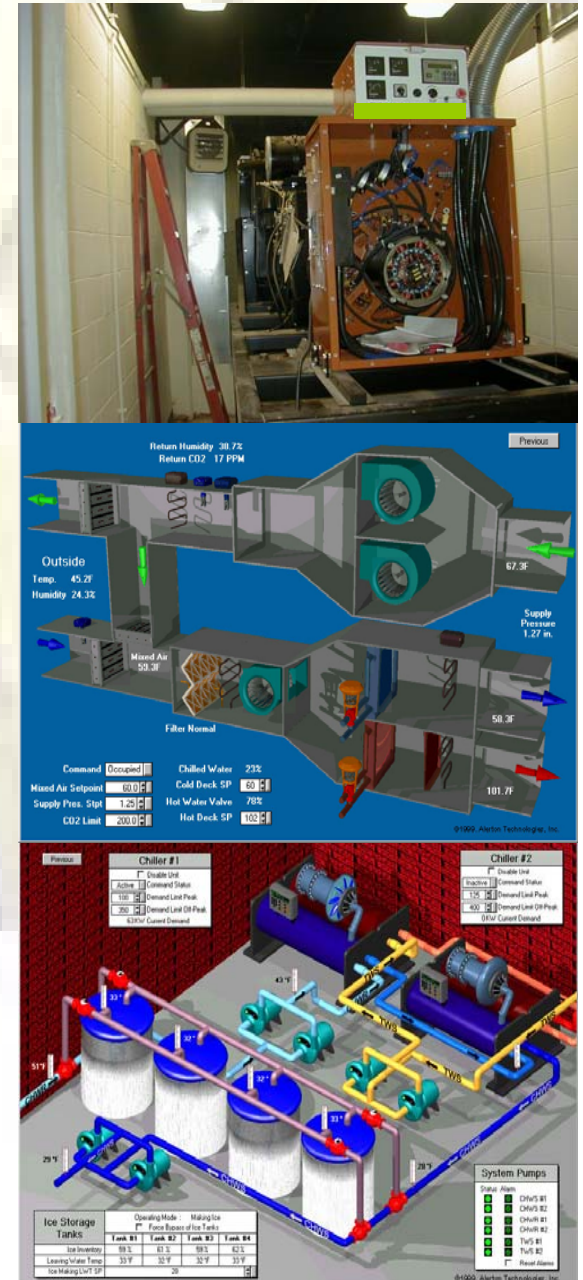
Using Automation for Sustainability

Trended Data can be a valuable resource to utilize data for:

- Common faults in equipment operation

- Utility benchmarking for future comparison

- Calculating energy costs against a base

- Actual run hours vs. scheduled run hours

Controls and LEED

What affects the energy use in a building?

- Weather – so collect weather data

- Occupancy – so track scheduling h

- Equipment run times and set point

- Electrical Use – so track KW and kwh profiles

- Large equipment performance – Chillers, VFD pumping,   Boilers, etc – monitor efficiency

- Lighting – Monitor and control

All of these affect sustainability

Samples
Chillers

With controls, why not use other common protocols for information in the sustainability arena?

- Chiller load (tons)

- Chiller energy consumption (KW/kwh)

- BACnet allows for accessing the information needed without redundant points being installed

- Calculate chiller operating costs for different loads, using real energy rates. Factor in purge pumps, cooling towers and VFD pumping

Samples
Chillers continued

•Now the automation system can be programmed to estimate the best way to meet the load required at the least cost.

•Regardless of the utility costs, the automation system can report a variance from normal based on calculations defined as the base line.

•The technology exists today, and with creative thinking, we can use automation for sustainability.

•It is our duty as engineers, vendors, and contractors to provide these tools for our clients that need life long assurances of cost effective HVAC equipment, especially in the LEED certified building

Controls and LEED

How can the TCC help? What is our role?

- Many times the design team is chosen and consists of the major subs, sometimes the equipment is selects, the remainder of the contractors, including the TCC is solicited on a poor performance spec and low bid.

- The controls is the heart of the system and can monitor every bit of a building guaranteeing sustainability.

- Maybe the TCC is not marketing themselves properly to show their value.

Controls and LEED

How can the TCC help? What is our role?

- •I believe better education of all the major players is necessary, owner, architect, and engineer

- •I believe first cost still drives much of the TCC market

- •The TCC should market themselves to get on board during the design stage of any LEED project

- •Most TCC's can share stories of disaster projects that can better help avoid future disasters

Controls and LEED

How can the TCC help? What is our role?

- TCC can educate the importance of not only obtaining LEED certification, but also sustaining LEED certification

- TCC should bring all the available control options to the design table, especially the monitoring points that can be compared against a base line.

- Many owners consider the whole controls scheme a puzzle, and need intimate help on not only understanding how to use the Controls, but to use for sustainability of their building.

Controls and LEED
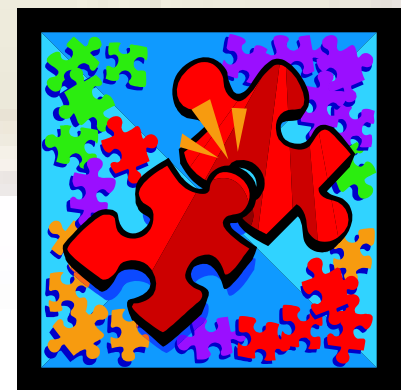
Summary
TCC's Responsibility in LEED Certification

• Push the selection process for a TCC early in the design stage

• Most LEED teams understand the possibilities for control applications, and will implement them

• The TCC "English Language" Sequence of Operations" and description of establishing building "baselines" should be embraced (and enforced)

• The one single item that I truly believe makes a difference in LEED Certification and Sustainability is owner training and use of the power of the controls system to maintain that sustainability

Controls and LEED

The End
and
Thanks for
the Attention.

It's QUESTION TIME !!