Control Contractor’s Responsibilities in LEED Certification

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Brief Background of Controls

1st Automation Control System

- DDC - BC: Raise temperature. Put another log on the fire!
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.
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
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 one section of Division 15
Temperature Controls

What do “QUALIFIED” TCC Contractors have to know?

What do “QUALIFIED” TCC Contractors have to do?

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.
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.
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
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
Which leads us to LEED and TCC responsibilities

• With renewed interest in energy conservation, there has come an increased interest in Green Buildings:
    • 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?
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.
• 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
• 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.
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?
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
Sustainability:
• Focus on whole life of facility
• Continual real time feedback
• Energy/Efficiency based evaluations
• Identifies energy performance deficiencies

Controls and LEED
Using Automation for Sustainability

• **What Automation Does:**
  
  • 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
What affects the energy use in a building?

• Weather – so collect weather data
• Occupancy – so track scheduling hours
• Equipment run times and set points
• 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
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
• 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.
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.
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
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.
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
The End
and
Thanks for
the Attention.

It's QUESTION TIME!!