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A CALL TO ACTION “GREENBUILD 2015”

By Victoria Herrero-Garcia, Sustainability Consultant

Climate change and future repercussions of increasing global CO₂ emissions are well-known topics for everyone in the green building industry. Instead of belaboring these topics at the US Green Building Council’s annual Greenbuild conference, the USGBC made a call to action for all design and construction professionals to raise the bar in green building and get things done.



Because the building sector accounts for nearly half of the total US carbon dioxide (CO₂) emissions, developers, building owners, designers, contractors and consultants can make a significant difference in reducing building emissions. This year, for the first time, the annual United Nations Framework Convention on Climate Change (UNFCCC) Conference has included a “Buildings Day” into its agenda, thereby implying the importance of the building sector in minimizing

emissions. According to Architecture 2030, the objective is to “develop an unprecedented alliance of organizations committed to placing the building sector on the path to zero carbon by the year 2050.”

The LEED v4 rating systems further encourages low carbon emissions through new ways to select sustainable building materials such as Life Cycle Assessment (LCA) and Environmental Product Declaration (EPD), as well as increases the amount of achievable points on building reuse from 3 points on LEED v2009 to 5 points on LEED v4. A [case study](#) of DPR Construction San Francisco Office Building shows that



reusing an existing building reduced approximately 70% of the emissions related to construction materials' embodied energy compared to the same building if built as new construction.

Buildings are not only responsible for increasing outdoor CO₂ levels but also for increasing the potential for poor indoor air quality since they have become more

airtight. A recent [study](#) from Harvard T.H. Chan School of Public Health's Center for Health and the Global Environment, SUNY Upstate Medical University, and Syracuse University has found that on average, the cognitive performance of people in well-ventilated offices and with lower levels of indoor pollutants and CO₂ doubled as compared to people who worked in conventional building environments. The study concludes that recommended indoor CO₂ levels should not be higher than outdoor levels of CO₂.

Ultimately, because building occupants' salaries represent approximately 90% of the life cycle cost of the building (the remaining 10% being from building design, construction, and operations), it is clear that every building should address the health and wellbeing of their occupants, not only with good indoor air quality but also with improved acoustics, thermal comfort, connections with nature and efficient daylight and lighting strategies. With rating systems such as LEED, SITES, WELL, LBC, etc. we have the guidelines and tools to make it happen, so let's do it!

USING SKYSPARK'S ANALYTICS FOR EXISTING BUILDING CX

By Steven Wancewicz, Commissioning Engineer

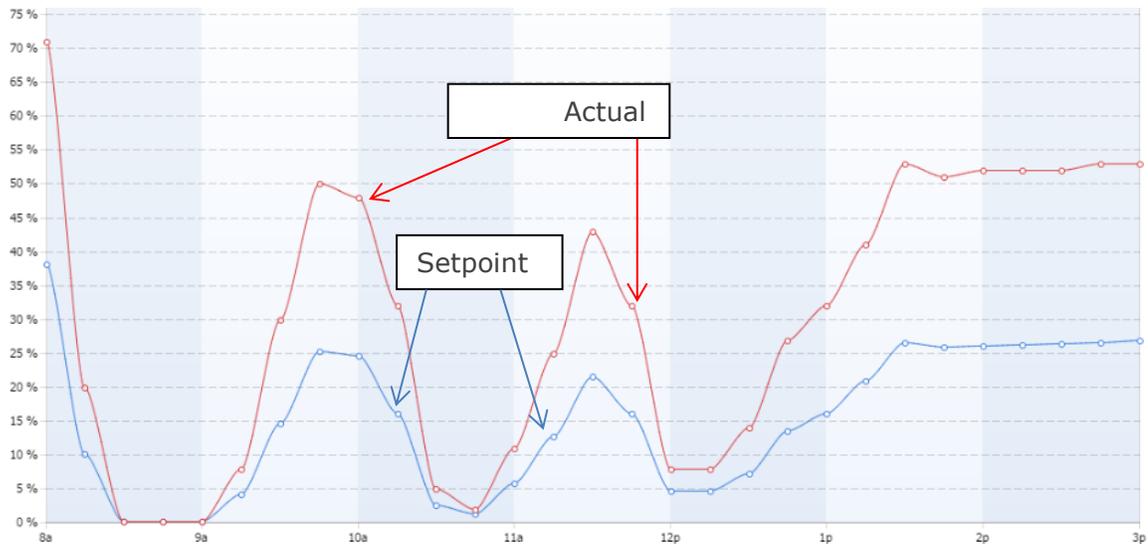


Figure 1. Issue Identified Through Automated Rule Finds Excess Heating Energy Usage

Skyspark is a web-based trend data analytics software used for existing building commissioning. The software makes it easy to analyze and interpret trend data. Analyzing the trend data helps building owners save energy and reduce headaches by finding issues early.

Setting up rules takes time, so a rule based approach is most cost-effective when a building has a significant number of the same or similar equipment. The best example of a significant number of the same or similar equipment in a building is VAV Boxes. VAV boxes are often overlooked and are only investigated when an occupant complains. In this paper, I will outline different rules applied to VAV boxes to look for issues.

To test the sequence, the best test is to make sure equipment is meeting setpoint. A rule written to compare zone temperature setpoint to zone setpoint and rank the

unit	percentFail	testableTime
B - La Plata TB-8	40.486 %	210.32hr
B - La Plata TB-5	23.838 %	210.32hr
B - La Plata TB-6	7.608 %	210.32hr
B - La Plata TB-2	1.426 %	210.32hr
B - La Plata TB-7	.713 %	210.32hr
B - La Plata TB-1	.475 %	210.32hr
B - La Plata TB-3		
B - La Plata TB-4		
B - La Plata TB-9		

equipment that is furthest away from setpoint makes sense. For example, in the screenshot shown below, we can see the units we need to investigate in order of priority from highest percent fail to lowest percent fail. We don't need to investigate all the VAV boxes, either.

Figure 2 Ranking of Terminal Boxes from Worst to Best Based on Test of Meeting Zone Reheat Setpoint

When looking at this list of VAV boxes, we can see that TB-8 has an issue 41% of the time. Upon further inspection, the reheat valve position is always 2x the setpoint. The issue causes the building to heat more than necessary. This example is only a small window into what can be done to find issues early. Early detection leads to fixing the issues quickly, which leads to reduced energy consumption and an improved O&M process. If you're interested in learning how Ambient can help your facility implement trend analysis, contact us today!

ASHRAE ENERGY MODELING CONFERENCE

By Eric Ringold, Building Performance Engineer



Recently, I enjoyed the opportunity to represent the Ambient Energy Building Performance Engineering team at this year's ASHRAE Energy Modeling Conference in Atlanta, Georgia. As a recent addition to the team, but with almost five years' experience as a building energy analyst, the conference was an excellent chance to sample the latest in building energy analysis tools and methods identify where Ambient Energy stands within the field, and what the future holds for our building performance services.

After a rousing and fascinating keynote by former US Marine, physician, and NASA astronaut Story Musgrave, the conference proceeded with two and a half days of presentations covering a wide range of topics surrounding building energy modeling. Methods for improved modeling of outside air infiltration, savings from plug loads, ground heat transfer, and life-cycle cost optimization underscored the continued development of exciting new analysis tools to enable a more complete picture of building energy dynamics and their financial implications. Some presentations emphasized ways the Ambient Energy team is already innovating to enhance the impact of energy analysis, such as with model automation and output visualization. With new tools and methods, Ambient Energy is poised to continue to advance our services, with more timely and meaningful application of modeling to the design process.

Finally, presentations exploring the dual roles of compliance versus high-performance design modeling and a need for greater clarity about model uncertainty provoked great discussion among the conference-goers, and later among the Ambient Energy team as we continue to improve how we use energy analysis to

impact building design. Finally, the 'LowDown Showdown' competition between teams using various whole-building energy modeling software packages to model a net-zero energy building fortified Ambient Energy's focus expertise with multiple

simulation tools. My experience at the ASHRAE EMC was just another way that Ambient Energy is devoted to innovation and collaboration, using energy analysis to best impact highly efficient building design.

A VISIT TO LAWRENCE BERKELEY NATIONAL LAB'S FLEXLAB



By Devika Kumar, Sustainability and Commissioning Consultant

Devika Kumar and Renee Azerbegi visit LBNL's FlexLab with design builder teams for potential use for San Francisco International Airport's Terminal 1 project.

What is FLEXLAB?

It is the Facility for Low Energy experiments in Buildings (FLEXLAB). This is the first test bed in the world that can evaluate efficiency of major building

systems. The conventional method of building a highly efficient building is to select components that are tested individually and considered energy efficient. At the FLEXLAB we have an opportunity to create a mockup and measure the efficiency of an Integrated Building System.

Why is this facility so COOL?

- At present, there are 4 test labs.
 - One of the labs includes a 25 foot high ceiling, where you can build a mezzanine level.
 - One rotational facility to test performance with all orientations.
 - Two cells testbed side by side for comparison testing.
- Climates of 48 states can be simulated.

- Interchangeable elements include windows, walls, skylights, floors, lighting, HVAC systems, and other architectural elements.
- If the challenge is to build an energy efficient office building, the team can do an interior fit-out to replicate the design. Desks and chairs are installed, acoustic boards and even mannequins sitting on chairs with heat, humidity and temperature sensors attached to them to ensure occupant comfort are also provided
- They have a robust controls data base that can create several sequences of operations.
- This facility gives a chance to optimize emerging technology, energy production of PVs, glare and heat production
- The facility is equipped with innovative mechanical systems such as radiant slabs, radiant panels etc.
- A Commissioning Agent can perform testing on the test cells to ensure the mock up is operating as designed



The FLEXLAB provides a platform to optimize the energy and carbon footprint before it is completely built. This helps keep the planet COOL!

ON THE BOARDS NATIONWIDE:

- University of Northern Colorado, Campus Commons, Sustainability and Energy Consulting, Greeley, CO
- Santa Clara Valley Courthouse, Contractor Support for LEED Compliance, San Jose, CA
- Orlando Airport On-Call, Program and Project Management Services, South Terminal C, Phase I, Orlando, FL
- Private Residence, Living Building Challenge Consulting, Boulder, CO
- Alliance Center Ongoing Commissioning, Direct Current (DC) Power Migration Programming Support, Denver, CO
- Denver International Airport, Facility Conditions Assessment On-Call, Denver, CO
- South Dakota Army National Guard, ASHRAE Energy Audits, Various sites, SD

SPEAKING ENGAGEMENTS AND ACTIVITIES:

- December 3, Mayor Hancock Sustainability Summit, University of Denver
- December 26 to December 31, Ambient Energy's Denver Office Closed
- January 6, Rocky Mountain ASHRAE, Dinner meeting, The WELL Building Standard and Energy Impact
- January 6, Fort Collins ASHRAE, Lunch meeting, The WELL Building Standard and Energy Impact
- January 13, San Francisco Department of Environment, Green Building Task Force Meeting, An Intro to the WELL Building Standard