

EARTHDAY2025

ABSTRACT, LEARNING OBJECTIVES, QUESTIONS

FUTURE WEATHER/CLIMATE DATA IS MORE IMPORTANT THAN YOU THINK!

1. Carrie Brown, Ph.D. – Resource Refocus LLC. 8:20am - 9:20am
2. Brian McKinney – JBB Deep Carbon Reduction

Abstract

With the unprecedented rate of extreme weather in 2023 and 2024, it is becoming clear that up-to-date weather data is essential for resilient building design. Considering warming scenarios in equipment sizing can lead to substantially increased equipment sizing and capital cost impacts. With the useful life of new equipment extending 30-40 years into the future and envelope elements lasting even longer, how can we best plan for this changing world & climate?

Timed Outline

1. **8:20am-8:35am.** Understand differences between and appropriate applications of newer weather files.
2. **8:35am-8:55am.** Understand how weather file selection can impact passive design choices.
3. **8:55am-9:10am.** Understand the major factors driving how future weather impacts predicted building energy use.
4. **9:10am-9:20am.** Understand why future weather data has major impacts on HVAC equipment sizing

Learning Objectives / Questions

1. Four types of future weather methodologies in increasing complexity are analog scenarios, morphing (time series adjustment), statistical methods/stochastic models, and dynamic downscaling. TRUE
2. In an exploratory study of the impact of weather file selection on passive strategies, the later/warmer files usually resulted in a higher number of passive hours, but shifted from heating to cooling strategies. TRUE
3. There is a clear need for standardized protocols for future weather files, for both the methodologies used to create them and the specifications for their use. TRUE
4. If we are looking backwards to design resilient buildings of the future, even with the best of intentions, we may select maladaptive solutions. TRUE
5. Warmer climate conditions will generally increase cooling energy consumption and reduce heating energy consumption – TRUE

"The Virtual Engineer World"

Jean-Simon Venne – BrainBox AI - 9:25am - 10:25am

Abstract

This presentation explores the transformative impact of artificial intelligence (AI) on the HVAC service industry. The key learning objectives include demonstrating how AI can increase productivity by tenfold, highlighting the benefits of AI in HVAC asset management, and understanding the evolution and future direction of AI agents.

Timed Outline

1. **9:25am – 9:40am** - The presentation delves into the acceleration of AI advancements, the merging of multiple data sources, and the role of AI in real-time data analysis and decision-making. It explains the concept of agentic AI, which uses sophisticated reasoning and iterative planning to autonomously solve complex problems.
2. **9:40am-10:00am** - The presentation also discusses the productivity gains from AI, including the transformation of the P&L and optimization results in HVAC. A significant focus is on reducing issue resolution time in HVAC services, showcasing scenarios where AI agents can drastically cut down discovery work and site visits, leading to substantial cost savings.
3. **10:00am-10:25am** - The presentation concludes with a vision of every modern business becoming a data business and poses critical questions about the future of AI in the HVAC industry.

Learning Objectives / Questions

1. AI can perform real-time data analysis and decision-making. T
2. Agentic AI uses sophisticated reasoning and iterative planning to autonomously solve complex problems. T
3. The presentation highlights the productivity gains from AI, including the transformation of the P&L. T
4. AI agents can reduce issue resolution time in HVAC services by eliminating initial site visits. F
5. The presentation includes a scenario where AI agents can cut down discovery work from 2 hours to 10 minutes. T

Controls/BMS + AI to Decarbonize NYC Buildings by 2030

Jayson Bursill – Delta Controls 10:35am - 11:35am

Abstract

Artificial intelligence (AI) is being used in many ways across the building industry. This presentation dives into real world applications of AI in Controls including experiences, successes, and lessons learned. Technologies discussed are practical applications of machine learning, including some that connect directly to contemporary AI. The importance and basics of semantic data modeling and metadata management within building automation systems (BAS) to scale AI are also demonstrated at a high level. This presentation also dives into different applications of machine learning and AI with real-life examples of camera-free occupant estimation via sensor fusion, BAS chat bots with large language models, AI-assisted BAS code generation, and predictive control. The goal is to simplify the AI that is out there in the wild and show that it can be an economical path toward significant energy savings and operational improvements if executed effectively.

Timed Outline

1. **10:35am-10:50am** - Real world applications of AI in Controls including experiences, successes, and lessons learned, including machine learning.
2. **10:50am-11:00am** - Semantic data modeling and metadata management within building automation systems (BAS) to scale AI.
3. **11:00am-11:20am** Examples of camera-free occupant estimation via sensor fusion, BAS chat bots with large language models, AI-assisted BAS code generation, and predictive control.
4. **11:20am-11:35am** Simplify the AI that is out there in the wild and show that it can be an economical path toward significant energy savings and operational improvements if executed effectively.

Learning Objectives / Questions:

1. Data driven models must be "black box" (F)
2. A transformer contains deep learning models (T)
3. The biggest barrier to the wide-scale adoption of predictive control in buildings is the model forecast accuracy. (F)
4. Having sensors and other means to measure outcomes is required for any AI setup (T)
5. Video card technology has driven the third boom of AI (T)