**CRC 2022 Paper Report**

**Title**

Association of Occupants Behavior with Energy Cost and Peak Reduction of HVAC System in Demand Response

**Abstract**

Demand response, shifting appliances' time of use to avoid peaks in energy usage profile, is an efficient way of reducing peak and energy cost. Employing HVAC systems, which account for almost 40% of energy consumption in buildings, has been shown to be an effective way in demand response. One of the popular ways of applying demand response is increasing the price of electricity during peak periods. Although this approach has been widely used, it does not consider variations of occupants' behavior. This paper investigates whether occupants' behavior could affect energy cost and peak reduction for an HVAC system. For this purpose, the electricity price data were gathered from the Dominion Energy Company, which provides electricity for eight states in the U.S. A simple controller is used to adjust the HVAC system setpoint based on electricity price. Finally, five similar residential buildings with different occupants' behavior but identical electricity price profiles have been simulated in EnergyPlus. Our results show that occupants' behavior affects energy cost and peak reduction for HVAC systems. The outcomes of this study could help power companies to enhance their pricing policy based on people's behavior.

**Track**

Infrastructure Systems, Sustainability and Resilience

* **At this time, I think this idea is not good and does not provide any valuable information. I have to think about other aspects and other ideas. One of them is MPC. How can use MPC when we have HITL?**
* **RL vs MPC**
* **RL HITL review**
* **MPC review the problem of not obeying comfort? In residential and commercial buildings?**