A Modeling Framework for Estimating Demand Flexibility of VAV Systems in Commercial Buildings

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Motivation

Demand flexibility in buildings is expected to provide the operational flexibility for the sustainable integration of renewable energy in the power grid [1].

It is expected that this technology has national benefits that exceed \$15 billion/yr. by 2030 in avoided generation capacity, avoided T&D capacity, ancillary services, and energy costs [2].



Buildings are a significant portion of electricity demand (EIA 2016)



Space Cooling and Heating are a large portion of this use (EIA 2017)

Research Approach

Leverage existing data and information models available for modern buildings to develop a modeling framework for air distribution systems in VAV systems with the goal of enabling commercial buildings to participate in advanced grid services.



Research Vision



[1] M. Neukomm, V. Nubbe, and R. Fares, "Grid- Interactive Efficient Buildings," Apr. 2019.

[2] R. Hledik, A. Faruqui, T. Lee, and J. Higham, "The National Potential for Load Flexibility: Value and Market Potential through 2030," 2019.

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