

Accuracy of Peak Demand Estimates for Office Buildings Using Quick Energy Simulation Tool

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Abstract : The New Jersey Department of Military and Veteran's Affairs (NJ DMAVA) operates over 50 facilities throughout the state of New Jersey, U.S. NJDMAVA is under a mandate to move toward decarbonization, which will eventually include eliminating the use of natural gas and other fossil fuels for heating. At the same time, the organization requires increased resiliency regarding electric grid disruption. These competing goals necessitate adopting the use of on-site renewables such as photovoltaic and geothermal power, as well as implementing power control strategies through microgrids. Planning for these changes requires a detailed understanding of current and future electricity use on yearly, monthly, and shorter time scales, as well as a breakdown of consumption by heating, ventilation, and air conditioning (HVAC) equipment. This paper discusses case studies of two buildings that were simulated using the QUick Energy Simulation Tool (eQUEST). Both buildings use electricity from the grid and photovoltaics. One building also uses natural gas. While electricity use data are available in hourly intervals and natural gas data are available in monthly intervals, the simulations were developed using monthly and yearly totals. This approach was chosen to reflect the information available for most NJ DMAVA facilities. Once completed, simulation results are compared to metrics recommended by several organizations to validate energy use simulations. In addition to yearly and monthly totals, the simulated peak demands are compared to actual monthly peak demand values. The simulations resulted in monthly peak demand values that were within 30% of the measured values. These benchmarks will help to assess future energy planning efforts for NJ DMAVA.

Keywords : building energy modeling, eQUEST, peak demand, smart meters

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