

Mosque Energy Performance, Part II: Monitoring of Energy End Use in a Hot-Humid Climate

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ABSTRACT. In regions with harsh climatic conditions mosques, like other buildings, have to be mechanically air-conditioned in order to achieve the desired thermal conditions. However, mosques are characterized by a unique intermittent operation schedule as compared to typical types of buildings. Within a given region and time zone, mosques are operated at the same time. This could have an impact on the demand for energy particularly in areas with high demand for air-conditioning and/or heating that frequently coincides with peak energy demand periods. Monitoring of building energy is a practical tool for providing realistic and empirical field data that represent actual building energy performance and quantify changes over time. Monitoring helps in segregating energy uses over time and in assessing the thermal performance of buildings subject to alternative design and operating strategies. In this study, energy uses of a representative sample of five typical mosques were monitored for a two-year period. Energy use records were measured utilizing 5-minute and 1-hour intervals in order to establish the actual intermittent operating profile for mosques. This study is part II of a comprehensive investigation of mosque energy systems, overall thermal performance and operation strategies. It summarizes the analysis and results of monitored energy use data for different types of typical mosques in the hot-humid climate of the eastern region of Saudi Arabia. The monitored data were analyzed and compared to long-term (5-year) average electric energy utility bills data.

KEYWORDS: Energy use, mosques, monitoring, utility bills.