UNIVERSITY OF CAMBRIDGE
Department of Engineering

CONSTRUCTION ENGINEERING MASTERS DISSERTATION ABSTRACT

Understanding Lighting Energy Performance in the Contemporary Hospital Environment

Lighting design for UK hospitals is a specialised field that uses national guidance, in the form of NHS Health Technical Memoranda and Chartered Institute of Building Services Engineers [CIBSE] design guides, and designer experience. Lighting falls within the over-arching NHS carbon reduction targets and the Carbon Trust reports [2010] lighting schemes can account for over 20% of a hospital's total energy consumption. Lord Carter has identified potential savings available to NHS Trusts within their Estates and Facilities functions, money they can keep to enhance clinical care.

The study set out to understand the lighting energy performance of Alder Hey Children's Hospital NHS Foundation Trust, a new build 51,000m2 mixed use acute hospital recently completed in the north west of England. This is a classic single case study research exercise. Over 1700 energy meters have been embedded within the hospital's mechanical, electrical and plumbing systems which provided an opportunity to identify positive and negative contributors to lighting energy performance. The investigation then set out to further understand this using data gathered through surveys and observations within the hospital.

The study identified a 21.2% over consumption of total electrical energy against design stage estimates and specifically a 29.3% over consumption of lighting energy, where lighting accounted for approximately 19% of the total electricity energy used. Investigation into each department identified that there was no dominant factor causing the lighting energy performance gap with accountability split across design, products, installation, occupant behaviour and external factors. In its conclusion the study reflected on the annual energy estimate as a baseline and the definition of the new term, lighting energy assumption gap.

Tim Coey

January 2018