

“How Energy Efficient is our Campus?”

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Paul is currently employed as Facilities Director for Massey University's Manawatu Campus in Palmerston North, New Zealand. Paul has held facilities management appointments in four different sectors including: a major regional authority, commercial insurance national headquarters, defence force property and most recently tertiary education. He has a broad range of professional qualifications that encompasses a time-served marine engineering apprenticeship, a BSc(Hons) in Quantity Surveying and a Master of Technology degree majoring in Energy Management. Paul was elected Member of the Royal Institution of Chartered Surveyors in 1996. Originally from the UK, Paul is based in New Zealand since 2003. Paul's professional interests include sustainable building and transport and energy efficiency.

Assessing the energy efficiency of the university campus using a benchmarked simulation model, with reference to Massey University's Turitea Campus.

University campuses are large users of energy and the potential financial and environmental savings from good energy management are considerable. Senior executives of the university require reports on key budgets such as energy to be presented in a way that, while accurate, are also succinct. The question, “How energy efficient is our campus?” is a very important and topical one but it is very hard to answer both accurately and succinctly. There exists a need for a method of summarising the energy performance of the university estate, at a whole-campus level, in comparison to industry benchmarks. No such method for whole-site, rather than building- or infrastructure system-level, assessment of university campuses currently exists.

Current good or best practice in energy benchmarking in the tertiary education facilities management sector was discovered by a Literature Review and Industry Survey. The industry survey included TEFMA members who are experts in the energy management field and also the results of the benchmarking discussion forum at the TEFMA Carbon Foot Printing Workshop 2009.

The possible factors that have a significant influence on energy efficiency at a whole-campus level were identified. By means of a Case Study their statistical degree of influence on metered energy consumption at a whole-campus level was analysed using statistical methods.

The most appropriate benchmarking methods for analysis of energy consumption at whole-campus level were identified. Three new benchmark measures were proposed:

1. Major Factors Driving Campus Energy Consumption. This consists of detailed commentary on the major influences on campus energy consumption and their significance over time.
2. Residual (Undefined) Energy Consumption. This indicates, “the unknown”, the energy consumption that cannot be readily identified and explained, for example by operational factors not easily captured.
3. Ratio of Actual Energy Consumption to Benchmark Target. This is the ratio of the actual total energy consumption (adjusted for weather conditions in that year) with a benchmark target energy consumption. It examines how the campus's energy efficiency is performing in relation to what one would normally expect, given the type, number and age of buildings on site and how that evolves over time.

To test the above a Case Study analysed the Massey University's Turitea campus and useful insights were gained into the current state of, and ways of continuing to improve, the energy efficiency of the campus.

The results of the Case Study are presented. There are some useful findings about what works best for benchmarking the energy efficiency of the whole campus. Also some insights from the statistical analysis are presented, showing what really has the most significant effect on whole-campus energy consumption.