

Assessment and Optimisation of Building Services Electrical Loads for Off-Grid or Hybrid Operation

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Abstract : In building services electrical design, a key element of any project will be assessing the electrical load requirements. This needs to be done early in the design process to allow the selection of infrastructure that would be required to meet the electrical needs of the type of building. The type of building will define the type of assessment made, and the values applied in defining the maximum demand for the building, and ultimately the size of supply or infrastructure required, and the application that needs to be made to the distribution network operator, or alternatively to an independent network operator. The fact that this assessment needs to be undertaken early in the design process provides limits on the type of assessment that can be used, as different methods require different types of information, and sometimes this information is not available until the latter stages of a project. A common method applied in the earlier design stages of a project, typically during stages 1,2 & 3, is the use of benchmarks. It is a possibility that some of the benchmarks applied are excessive in relation to the current loads that exist in a modern installation. This lack of accuracy is based on information which does not correspond to the actual equipment loads that are used. This includes lighting and small power loads, where the use of more efficient equipment and lighting has reduced the maximum demand required. The electrical load can be used as part of the process to assess the heat generated from the equipment, with the heat gains from other sources, this feeds into the sizing of the infrastructure required to cool the building. Any overestimation of the loads would contribute to the increase in the design load for the heating and ventilation systems. Finally, with the new policies driving the industry to decarbonise buildings, a prime example being the recently introduced London Plan, loads are potentially going to increase. In addition, with the advent of the pandemic and changes to working practices, and the adoption of electric heating and vehicles, a better understanding of the loads that should be applied will aid in ensuring that infrastructure is not oversized, as a cost to the client, or undersized to the detriment of the building. In addition, more accurate benchmarks and methods will allow assessments to be made for the incorporation of energy storage and renewable technologies as these technologies become more common in buildings new or refurbished.

Keywords : energy, ADMD, electrical load assessment, energy benchmarks

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