

1.9 Lighting Costs

Costs are always a major concern for any project and it is important to consider these before any work is undertaken. Both the capital cost and the running, or operational, costs must be considered at the outset. If the two cost elements are not considered together in terms of life cycle costing, then a solution which has a low capital cost but a high operational cost could be more costly overall than an installation with a more expensive capital cost but a low operating cost.

A conflict of interests may arise if the two cost elements are paid for from different budgets or organisations. Here the designer needs to present a balanced view of the options to enable the clients to decide on the best approach. The capital costs include the cost of the design process, the equipment and the installation process, both physical and electrical. It also includes the commissioning and testing of the installation. Allowance must also be made for any builder's work that forms part of the lighting installation. Any other costs that are particular to the lighting design need to be included. It is important that the capital cost is agreed upon an early stage if a lot of time is not to be wasted. The operational costs include the cost of the electricity consumed, which comprises items such as network charges, maximum demand charges and electricity unit costs. They will also include the cost of maintenance, which comprises cleaning and relamping throughout the life of the installation. In some cases charges may have to be

budgeted for the disposal of redundant equipment although this may be borne by the supplier or manufacturer.

2.0 Photopic or Mesopic Vision

The photometric quantities used to characterise lighting are all based on photopic vision (see Chapter B / 2.2 and following). This makes sense for interior lighting where the luminances are usually high enough to ensure the visual system is operating in the photopic state but there may be problems for exterior lighting. This is because for adaptation luminances below about 2-3 cd/m² (this means approx. 15-50 lux) peripheral vision is operating in the mesopic state (see Chapter B / 2.2.3) and exterior lighting sometimes produces luminances below this level.

This is a problem because the spectral sensitivity of the peripheral retina changes continually during mesopic vision depending on the adaptation luminance, the peak sensitivity moving from the 555 nm to 507 nm as the adaptation luminance decreases to the scotopic state.

There is no CIE mesopic observer and, therefore no system of mesopic photometry. In this situation, the simplest approach to ensuring good mesopic vision in exterior lighting is to use a light source with a scotopic/photopic (S/P) ratio greater than 1.5. Such light sources provide stimulation to both the cone and rod photoreceptors of the retina.