Economic feasibility of maximising daylighting of a standard office building with efficient electric lighting - DTU Orbit (08/11/2017)

Economic feasibility of maximising daylighting of a standard office building with efficient electric lighting

This paper investigates the cost of developing various daylighting strategies for a standard office building in relation to their ability to reduce electric lighting consumption. The reference building design for this study corresponds to a typical configuration that minimises the construction costs and is typical of the French market. We have compared scenarios that entail moving service spaces to the periphery, increasing ceiling height and adding light wells of various shapes. These special features increased the proportion of the indoor area with sufficient daylight by up to 40%, with an increase of construction costs ranging between 1.3% and 15.5% of the cost of the building. The extra cost of adding light wells was estimated at an average of €344 per work place, or €34 m-2 for a standard building with a distance between facades of 18 m. This value has to be compared with typical construction costs of €1500 m-2. Payback time on investment based only on savings on lighting electricity appeared to be far too long (from 41 years to 540 years depending on the configuration tested) for this alone to justify the investment. However, benefits should be assessed in relation to the occupants' well-being, safety in case of an electrical black-out, and rental and resell value.

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