

CIE2012: Lighting Quality & Energy Efficiency

DAYLIGHTING and Our Net Zero Energy Building Future

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To:

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Relevant Daylight Design tools for pre-design

Abstract

This paper reviews available Daylight Design Tools and examines the question: has our research of the past 100 years of daylight science provided us with more effective tools than we used 1000 and more years ago?

There seems general agreement within the building performance analysis community **Invalid source specified**. that design decisions made in the first hours and days of the design process are critical to successful performance in use. This has led many researchers to the development of environmental design decision support tools for use early in the design process. This review evaluates the contribution of design tools to these early design phases of a Net Zero Energy Building.

The key component of quality and reliable daylight simulation with a computer that is often overlooked is the quality of the information about the sky. There are several alternative approaches – none of which is 'the best', and each of which has its adherents and its advantages. The digital model of the sky makes it possible to model daylight in a building for every hour of the day and every day of the year. That it is possible is not an argument (yet?) that this is the only way to model daylight. That it is possible has however focused attention more critically on the mathematical models of skies that are used in design.

The advent of computer based tools has opened the way for a far more comprehensive and careful analysis of performance than is feasible with hand calculations or charts, nomograms or overlays. The focus for the user of such software can therefore shift from completing the calculations in a reasonable length of time to Quality Assurance in the performance of the calculation. The focus then is on building and rendering an accurate daylight model.

The review focuses on daylight design tools which have the potential to contribute to the design of Net Zero Energy Buildings (NetZEB).