

## Solar Architecture of Low-Energy Buildings for Industrial Applications

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**Abstract :** This research focuses on the optimization of glazed surfaces and the assessment of possible solar gains in industrial buildings. Existing window rating methods for single windows were evaluated and a new method for a simple analysis of energy gains and losses by single windows was introduced. Furthermore extensive transient building simulations were carried out to appraise the performance of low cost polycarbonate multi-cell sheets in interaction with typical buildings for industrial applications. Mainly, energy-saving potential was determined by optimizing the orientation and area of such glazing systems in dependency on their thermal qualities. Moreover the impact on critical aspects such as summer overheating and daylight illumination was considered to ensure the user comfort and avoid additional energy demand for lighting or cooling. Hereby the simulated heating demand could be reduced by up to 1/3 compared to traditional architecture of industrial halls using mainly skylights.

**Keywords :** solar architecture, Passive Solar Building Design, glazing, Low-Energy Buildings, industrial buildings

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