

## Integration of a Self-Cooling Photobioreactor to Building Envelop

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**Abstract :** This review focuses on the integration of self-cooling photobioreactors into building envelopes as an approach to sustainable architecture. We emphasize the urgency for eco-friendly design advancements and explore the incorporation of plants, particularly microalgae photobioreactors, into building facades. This entails a discussion of the building envelope's components and definition, challenges posed by algal technology in architecture, and adaptations for varied structures such as skyscrapers, residences, and townhouses. We further evaluate the influence of geographic factors, with a spotlight on warm and temperate regions like Western Australia. Concluding, we analyse the cost-effectiveness and practicality of this integration, focusing on its potential application in the upcoming Harry Butler Science Centre building. Through comprehensive literature scrutiny, we aim to shed light on the prospects and obstacles of embedding self-cooling photobioreactors in pursuit of an eco-aware architectural future.

**Keywords :** microalgae photobioreactors, building envelope, sustainable architecture, eco-friendly design advancements.

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