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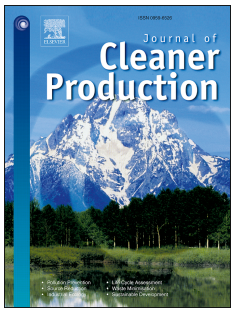

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Environmental assessment of a building-integrated linear dielectric-based concentrating photovoltaic according to multiple life-cycle indicators

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ABSTRACT

Building-integrated concentrating photovoltaic systems are of great interest, offering several advantages for building and environment. The present study is an advancement towards the life-cycle assessment of a linear dielectric-based building-integrated concentrating photovoltaic system by means of multiple life-cycle impact assessment methods and environmental indicators (ReCiPe, Eco-indicator 99, ecological footprint, USEtox, ReCiPe-based and Eco-indicator 99-based payback times, etc.), providing a detailed analysis. Two configurations (with and without reflective film) are examined, for different cities (Barcelona, Exeter and Dublin). By focusing on material manufacturing (system with reflective film), in general, ReCiPe (endpoint/single-score; points) results are in accordance to Eco-indicator 99 (single-score; points) findings and based on both methods PVs have the maximum contribution for ecosystems/ecosystem quality and human health. Moreover, based on USEtox results, there is a remarkable difference between the footprint of PVs and the impact of the other components. With regard to the payback times, taking into account both configurations with/without reflective film, Barcelona presents the lowest ReCiPe and