

Abstract

In this paper, a new environmental sustainability indicator (ESI) is proposed to evaluate photovoltaic (PV) cells utilizing Life Cycle Analysis (LCA) principles. The proposed indicator is based on a model that employs a fuzzy logic algorithm to combine multiple factors, usually used in multiple LCAs, and produce results allowing a comprehensive interpretation of LCA phase sub-results leading to standardized comparisons of various PV cells. Such comparisons would be essential for policymakers and PV cell manufacturers and users, as they allow for fair assessment of the environmental sustainability of a particular type of PV with multiple factors. The output of the proposed model was tested and verified against published information on LCAs related to PV cells. A distinct feature of this fuzzy logic model is its expandability, allowing more factors to be included in the future, as desired by the users, or dictated by a new discovery. It also provides a platform that can be used to evaluate other families of products. Moreover, standardizing the comparison process helps in improving the sustainability of PV cells through targeting individual relevant factors for changes while tracking the combined final impact of these changes on the overall environmental sustainability of the PV cell.

Citation

MB Salim, DE Demirocak & N Barakat. A Fuzzy Based Model for Standardized Sustainability Assessment of Photovoltaic Cells, *Sustainability*, 2018, 10, 4787.