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# Building integrated photovoltaics (BIPV): costs, benefits, risks, barriers and improvement strategy

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## Abstract

Building integrated photovoltaics (BIPV) is a technology that integrates solar cells into building materials, such as windows, facades, and roofs. This technology has the potential to reduce the carbon footprint of buildings by generating clean energy on-site. However, the widespread adoption of BIPV is still limited by several factors, including high initial costs, technical challenges, and a lack of standardized regulations. This article explores the costs, benefits, risks, barriers, and improvement strategies for BIPV. The study finds that while BIPV offers significant long-term benefits in terms of energy savings and reduced environmental impact, the high upfront costs and technical challenges remain major barriers to its adoption. To overcome these barriers, the article suggests several improvement strategies, including government incentives, standardized regulations, and further research and development in BIPV technology. The article concludes that BIPV has a bright future and its widespread adoption will contribute significantly to sustainable building development.

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policy support and incentives are required in order to promote wider BIPV application. In addition, this research has identified the fact that there was a lack of detailed BIPV cost data (including individual component costs) and lack of methods for BIPV cost–benefit analysis, and there are risks and barriers in BIPV applications. Following this, this research provides a strategic framework and a number of suggestions to industry stakeholders for integration and collaboration within the BIPV supply chain in order to facilitate the cost reduction of BIPV. Finally, this study proposes several topics for future research. It is anticipated that the results presented in this paper have implications not only for government policy and product development and application, but also for academic research.

Keywords:

building integrated photovoltaic (BIPV)

construction

cost–benefit

stakeholder

risk

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supply chain strategy

## Disclosure statement

No potential conflict of interest was reported by the authors.

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