

Sustainability Assessment of Perovskite Solar Cells

Application for Emergency Shelters

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Abstract

Concise summary of objectives, methods, key findings, and conclusions.

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1 Introduction

This study conducts a comprehensive sustainability assessment of emergency shelter tents¹, examining their environmental footprint, economic viability, socio-environmental trade-offs, and social implications. Focusing on energy systems, we analyze and compare the most widely-used shelter technologies in disaster response scenarios.

1.1 Product Selection and Justification

This assessment compares three distinct emergency shelter power solutions:

- **Perovskite-integrated shelters:** The primary focus, representing an emerging technology with potential advantages in efficiency and manufacturing cost compared to conventional options.
- **Silicon solar-equipped shelters:** Serving as the baseline renewable alternative, with established performance data and widespread deployment in field operations.
- **Diesel generator systems:** Representing conventional power solutions for shelters in grid-independent scenarios, despite their known environmental drawbacks.

The selection encompasses both mature and emerging technologies to provide a balanced perspective on sustainability trade-offs in disaster response applications.

By comparing perovskite-integrated shelters with traditional options, this work seeks to evaluate the potential benefits and trade-offs in their use during disaster response scenarios.

¹ An emergency shelter tent is a portable structure, often lightweight and easy to set up, designed to provide temporary protection from the elements in emergency situations. It offers a safe and sheltered space, especially in scenarios where traditional housing is unavailable or inadequate, as noted by Gala Tent (2024) and ICBrintle (2022)

text

2 References

1. GalaTent (2024). *Emergency Medical Tents and Shelters*. [online] Available at: <https://www.galatent.co.uk/uses/emergency-medical-tents-and-shelters>.
2. ICBrintle (2022). *Rapid Deployment Inflatable Emergency Shelters*. [online] Available at: <https://icbrindle.com/rapid-response-inflatable-shelters/inflatable-emergency-shelters-tents.html>.