

Peer Review

Review of: "Housing Stock and Utilities Under the Highest Temperature"

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Overall Contribution

- The study addresses a highly relevant issue in Japan's housing sector—energy efficiency in aging housing stock—through a detailed thermal and cost analysis. This is a timely and important contribution, especially in the context of carbon neutrality and the increasing demand for sustainable retrofitting strategies.

Strengths

- **Methodological Rigor:** The use of TRNSYS for thermal load simulation and the stepwise approach to evaluating insulation retrofits add robustness to the analysis.
- **Practical Relevance:** The focus on real-world renovation scenarios, including cost implications and DIY feasibility, enhances the applicability of the findings for designers and policymakers.
- **Data Richness:** The manuscript provides extensive quantitative data, including seasonal variations, occupancy effects, and material specifications, which are valuable for replication and further research.

Areas for Improvement

- **Clarity of Structure:** The manuscript would benefit from clearer sectioning and transitions between topics (e.g., from thermal analysis to cost evaluation). Consider using subheadings to guide the reader more effectively.
- **Terminology Consistency:** Terms like "DK," "UA value," and "retrofit" should be briefly defined or clarified for international readers unfamiliar with Japanese housing terminology.
- **Visual Aids:** Figures and tables are informative but could be better integrated into the narrative. Ensure each visual is explicitly referenced and interpreted in the text to enhance comprehension.

- **Limitations and Scope:** While the study acknowledges its thermal focus, a more explicit discussion of limitations—such as assumptions in occupancy schedules or insulation material performance—would strengthen the credibility of the findings.

Suggestions for Enhancement

- **Interdisciplinary Integration:** Consider linking the thermal and cost findings to broader sustainability metrics, such as lifecycle carbon emissions or social equity in housing access.
- **Policy Implications:** The manuscript could be enriched by a brief discussion on how the findings align with or challenge current Japanese housing policies, especially regarding ZEH standards and rental market dynamics.
- **Future Research Directions:** The conclusion hints at the need for a database and stepwise evaluation. Expanding on this with concrete proposals (e.g., pilot programs, regional comparisons) would add depth.

Declarations

Potential competing interests: No potential competing interests to declare.