

Building-level exposed asset value modelling for Germany: an Ahrweiler case study

Response to reviewers

Aaron Buhrmann, Nivedita Sairam, Cecilia I. Nieves, James E. Daniell, Heidi Kreibich, Seth Bryant

Aug 21, 2026

We thank the reviewers and editor for their valuable time. Below is a point-by-point response to the comments provided. Unless otherwise noted, the manuscript has been revised as suggested. Also of note: “Supplementary Data Table 1”, which is hosted on Zenodo at <https://doi.org/10.5281/zenodo.20633867>, will again be registered as an “asset” on the submission form.

Anonymous referee #2, Submitted on 05 Aug 2026

Dear authors,

Thank you for the revisions. The paper was already in a good shape with the first submission, and has indeed improved now. I only have a few small comments left:

Thank you for your kind words and time spent re-reviewing.

In the abstract, line 18-19: "an evaluation of a potential exposure model"

This has been revised to: “To address this gap, we present an evaluation of exposure model workflows”. Note, it remains plural as we are evaluating multiple and we stick with the term ‘workflow’ for consistency and clarity.

In Table 1: it could be useful to include the full name of the datasets there as well

Done.

Line 170-171: could you add one subsentence on what that could mean for your results? will that one contain more buildings, different building types etc? Or maybe that it does not really matter?

The following sentence has been added: “Although the cost bases and four relevant asset categories remain the same, we expect these updated national-account values, finer land-use data, revised settlement-density factors, etc., would materially change the numerical results, without affecting our description of the BEAM methodology or conclusions.”

Line 308: to me not necessarily needed, this one sentence.

This is a style requirement of some journals (to not have back-to-back section headings). The sentence has been corrected to be more useful.

Table 5: I still really don't see much value in this table and the scoring. I really think that the comparison of the models (which is the main text of section 3.4) can be perfectly done without this scoring table. But if you insist on keeping it, I can live with it.

Thank you for this feedback. We agree that the models are sufficiently described in the main text. The value from Table 5 (“scores and weights”) however is to assist modellers in rapid selection of a workflow. Say for example, a modeller desires a highly sustainable workflow for their particular application: the table would assist them in quickly identifying “LoD1+Eurostat”, rather than re-reading the manuscript.

Referee #3: Guilherme Samproгна Mohor, Submitted on 08 Jul 2026

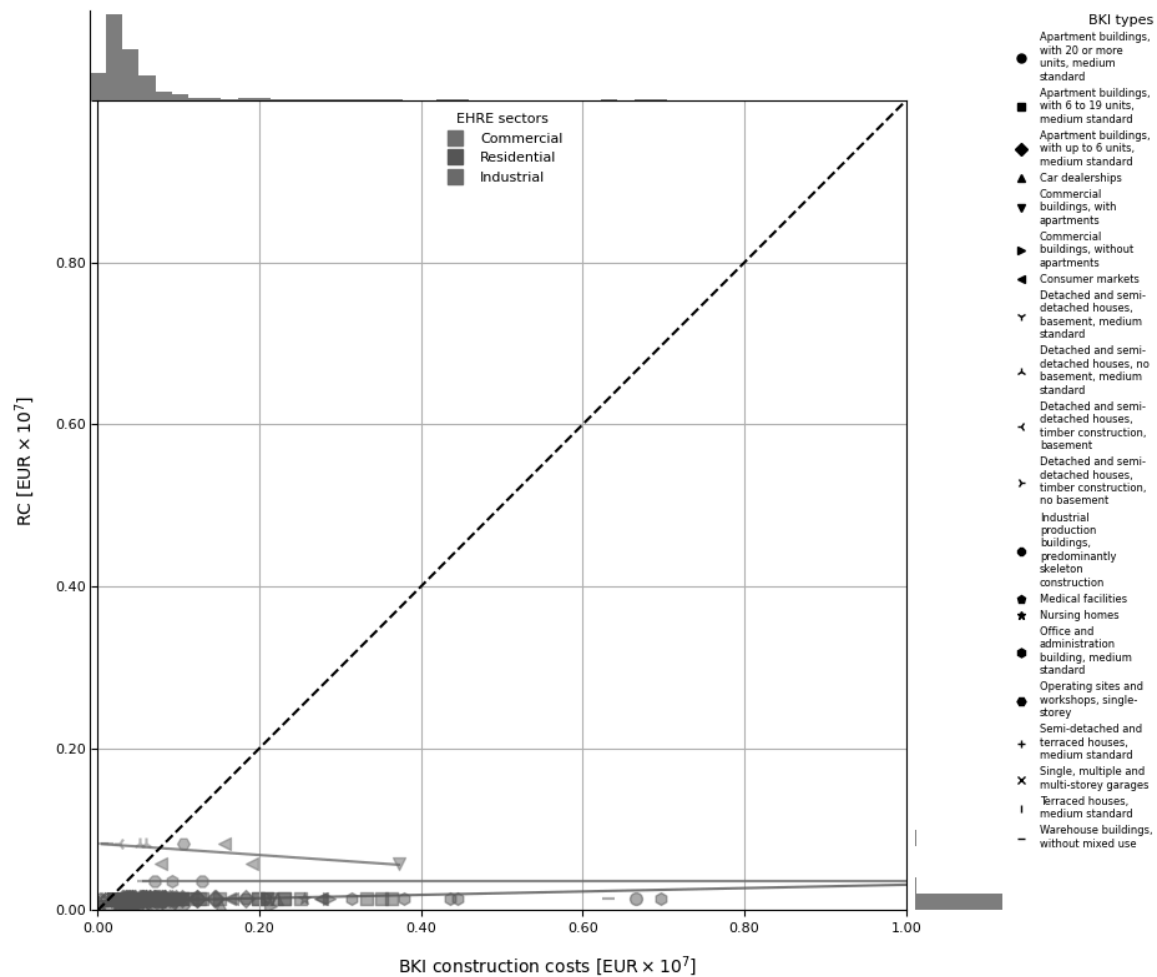
Dear Authors,

I fully acknowledge the complexity of the work, which mirrors the complexity in presenting it in a manuscript. The changes made have greatly improved the understanding of the input data used as well as the methodology performed by the authors.

I do have one new and final remark:

While I do understand that the complex geometry of LoD1 and the simple polygons of OSM don't always match, as clearly illustrated in the figure S2, considering that Figure 8 provides a comparison with the benchmark dataset –and as shown in Figure 7 you could match buildings from EHRE and the Benchmark dataset– I failed to see why the assessment of EHRE is missing in Figure 8. I understand, the objects shown would be different objects than the ones currently shown in Fig.8 (a) and (b). Yet, I do not deem this as problematic and in my view the assessment would be valid and informative. While this is not a necessity for the manuscript, it could benefit the discussion section.

Thank you for this comment and for reviewing a second time. We agree, a consistent comparison with EHRE is desirable upon first consideration. Indeed, this was our original intention. However, after implementing this, we became convinced the complexity and confusion introduced by this plot (provided below) are outweighed by the benefits. The main complications are summarized in the manuscript and reproduced below for completeness. The following sentence has been added: “Future work should explore frameworks for comparing complex and disparate asset value models like these; ideally in a way that balances complexity with interpretability.”



“Unlike the LoD1-based workflows and the benchmark dataset, EHRE is object- rather than geometry-distributed, assigning asset values using probabilistic construction types from ESRM20's regional totals.

In other words, EHRE preserves regional average replacement costs (from ESRM20) whereas the LoD1-based workflows considered here preserve asset-level unit costs.

Further, because EHRE's OSM geometry basis provides a simpler more consolidated footprint-based representation of buildings, whereas LoD1 --- designed for 3D buildings --- represents complex buildings with multiple features, building-by-building value comparison is subjective and challenging (unlike categorical comparison).

Even the relatively similar aggregate inventories mask important differences in object definition and sector composition, so total count agreement should not be interpreted as asset-level comparability across LoD1 and EHRE.

Our early attempts to address this evaluation challenge failed to find a satisfactory definition of a building object between the two datasets (esp. for large complex structures), ...”