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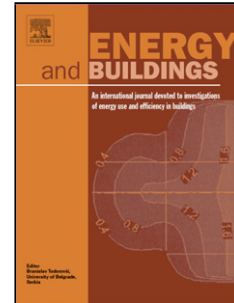
Title: A new systemic approach to improve the sustainability performance of office buildings in the early design stage

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1 A new systemic approach to improve the sustainability performance of office buildings in the early design stage

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14 **Keywords:** *Building certification, ÖGNI/DGNB, building sustainability assessment, multi-criteria design optimization, systemic*
15 *approach, network analysis, LCA, LCCA, BIM*

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17 **Abstract:**

18 Different users and investors' project preferences, often lead to trade-offs during the early design phase of a project. Currently,
19 decisions of design options and their technical measures are mainly reduced to an instantaneously assessed criterion (i.e.
20 energy efficiency) within the sustainability assessment of buildings. Due to criteria interdependency, the current linear applied
21 approach used in building certification neglects criteria trade-offs and is therefore only partly suitable for holistic building
22 improvement processes. In order to fulfil stakeholder interests on the one hand and a high sustainability performance on the
23 other, it is crucial to identify appropriate design measures. Based on the Austrian building certification system ÖGNI/DGNB, we
24 applied a systemic approach for building sustainability-improvement, using a case study of a public office building in Graz,
25 Austria. The main part of the study describes the important steps required for the systemic optimization of building sustainability.
26 The method applied in this study allows the quantification of the relative influence and the identification of the individual
27 optimization potential of design options on each single assessment criterion. The proposed systemic approach clearly
28 demonstrated the improvement potential of the currently most developed building certification system considering the
29 interdependency between the individual criteria.

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