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TECHNICAL PERFORMANCE DECAY

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## LIFE CYCLE OPERATING ENERGY SAVING FROM WINDOWS RETROFITTING IN HERITAGE BUILDINGS ACCOUNTING FOR TECHNICAL PERFORMANCE DECAY

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**Abstract**

Given the high energy saving potential obtainable from windows retrofitting, such measures are frequently implemented in the case of historic and heritage buildings. However, often, fenestration retrofitting is interpreted as windows replacement. Rarely is the energy saving potential allowed by windows maintenance or non-destructive measures investigated. Even more rarely, the validity of retrofitting measures is assessed in the long term considering their performance obsolescence.

In this study, the Life Cycle (LC) operating energy saving potential allowed by different retrofitting options - from windows maintenance to total replacement- is discussed with regard to a heritage building in Antwerp. The study evidences that if taking into account the retrofitting interventions technical obsolescence, instead of assuming constant the technical performance throughout the retrofitting Service Life (SL), the results significantly vary. This adds a methodological concern to be considered during retrofitting design and evaluation.

The results pointed out that performing basic fenestration maintenance enables in itself Life Cycle (LC) operating energy savings. Moreover, it was evidenced that, destructive retrofitting techniques, such as windows replacement, not necessarily allow for the largest energy savings. Indeed the installation of single or double glazed internal windows may allow for similar or even more significant savings.

Graphical abstract:

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