

# **Abstract**

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## **A BIM based approach for configuring buildings' outer envelope energy saving elements**

This study introduces a novel approach to configuring buildings' outer envelopes with the objective of optimizing Life Cycle Cost. This approach is based on the assumption that not all building elements constituting the outer envelope are subjected to the same amount of thermal transmission losses solar radiation. Therefore, an optimization approach based on segmenting external facades and roofs into independent objects in a building information model was developed. A Genetic Algorithm is coupled with Industry Foundation Classes, an Energy Simulation software tool and a Life Cycle Cost estimation model to achieve an optimal allocation of energy saving elements to buildings' external envelopes, the use of which allows for a positive return on additional investment in energy saving elements. The developed approach is applied to a case study of a desert building in Egypt. The paper also investigates the influence of Egyptian energy prices subsidization policy relevant to energy saving costs using the case study.