Envelope integrated Strategies for Solar Management in Jeddah, Saudi Arabia

Keywords: Solar Management, Saudi Arabia, Residential, Energy efficiency, Building Envelope

Architectural Engineering + Technology Department
Architectural Façades & Products [AF&P] Research Group
Area of Research: Design Engineering – Façades & The Making

Research Summary: Worldwide, the energy efficiency is growing due to preserving natural resources. Yet, developing countries are still under the process of implementing energy efficiency principles. Saudi Arabia has started applying sustainability through the Saudi 2030 Vision. According to the Saudi energy efficiency report, the primary energy consumption per capita is over three times higher than the world average. Saudi Arabia also ranks as one of the ten largest CO₂ emitting countries. Currently, the residential buildings cause half of the energy consumption of the building stock which is due to many defects in the building code, design processes, and construction applications. The key driver is the hot-arid climate which in turn causes a need to cool properties in order to provide indoor comfort. The solar management strategies in building envelopes could promote the future investments decisions in KSA towards energy efficiency through decentralized renewable energy sources in buildings. This research project aims to test the possibilities of architectural application of solar management strategies on building envelope, to optimize the residential buildings user comfort, in a matter of energy efficiency and cost-effectiveness.

Research Methodology: The research project deals with the integration of two aspects “Saudi building energy performance and retrofitting strategies” as inputs for articulating solar management strategies for Saudi building envelopes. The investigation needs evaluation and assessment of current residential building energy performances and the possible retrofitting strategies to define a framework. This framework is a drive for suitable solar management applications that lead to strategies. The research will use reviews, definition, and evaluations, to help to illustrate the research sequence. The simulations, surveys, and interviews methods will be embedded in the needed stages. The research will be divided into six chapters; the first three chapters will help to formulate the baseline for the fourth and fifth chapter. The fifth chapter is a consequence from the previous chapters that will be evaluated in the same chapter and discussed in the last chapter.

Key Publications: None

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Main question:
To what extent can solar management strategies be developed with respect of the cost-effectiveness to help to optimize the residential buildings energy efficiency in KSA?

Deliverables:
This research project aims to test the possibilities of architectural application of solar management strategies on building envelope, to optimize the residential buildings user comfort, in a matter of energy efficiency and cost-effectiveness.

Link(s):
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