

Designing Sustainable Energy Efficient Buildings through Passive Strategies

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Abstract

Expected to surge, around 30% of the world's final energy consumption is in the building industry. Such a figure shows how important is the role of this sector in energy demand and supply. Governments have tried to encourage designers and clients to move toward low energy building designs through incentives like subsidies and tariffs. In line with this trend several solutions have been proposed in both academia and industry. However, a conclusive pathway that can highlight the suitable sustainable energy efficient design is yet to be investigated. The main key to reach this goal might lay in the concept of 'vernacular architecture' that focuses on the local style or indigenous designing pathways. Such a concept falls within the passive design solutions that have long been discussed in many studies to not only reduce energy consumption in the building industry but reaching sustainability. The importance of integrating this concept in building energy demand reduction is to consider building energy designs beyond the general regulations and seek the answers in the past design mindsets. It should be noted that in the olden days when the heating, ventilation and air conditioning (HVAC) systems were not developed, people used to design their buildings in a way that was most adapted to the local environment and could harness its powers in the favor of providing the heating and cooling demand. One of the well-known systems that was invented thousands of years ago is the wind-catcher structures. This magnificent design provided cooling energy without any need for the modern HVAC systems. With all said, the main solution in building energy consumption reduction lies in passive design strategies by integrating vernacular architecture concept in energy designs.

Keywords

Building energy demand, Passive design, Sustainability, Vernacular architecture, and Wind catcher design.

Acknowledgements

This abstract is a part of the PhD studies of Mehdi Gholami Rostam at UNSW, Canberra.

Biographies

Mehdi Gholami Rostam is a PhD student in project management at the University of New South Wales in Canberra. He has started his studies in 2020 and is in the last stages of his PhD project which is focused on building energy optimization and efficiency. His background is in Civil engineering and Environmental sciences as bachelor's and master's degrees, respectively.

Dr Alireza Abbasi is the Director of Postgraduate Studies at the School of Engineering and IT at UNSW Canberra. His research aims to enhance better functioning and performance of complex socio-technical systems, which primarily lies in the emerging field of Social Computing, leveraging the capacity to collect and analyze data to reveal patterns of individual and group behavior.