



Loay Akram Hannoudi

**Title:** The Novel Multi-Angled Façade Configuration and Its Impact on Energy Performance and Office Space Sustainability

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**Abstract:**

This research paper examines how multi-angled façade systems improve and optimise energy performance compared to a flat façade and meet sustainability targets for lower energy use to align with UN SDGs 3, 11, 12, and 13. The multi-angled façade system does not tilt up and down. Instead, it employs two different window orientations on a vertical axis (left and right). The large portion orients more to the north to allow more daylight to penetrate inside the room, and the small part is oriented more to the south to provide passive solar heating. The investigations in this research paper were carried out using version 4.8 of the IDA ICE software, and the researchers evaluated the energy consumption, the energy action through the façade, and the building's inside operative temperature. The results of this paper present the simulation findings for primary energy consumption in different scenarios. For example, the researchers explain that one can save 6.3 kWh/(m<sup>2</sup>·year) when using a multi-angled façade system compared to a flat façade. This is in addition to improving the thermal indoor climate that results from using the façades. The conclusions of the research shows that the façade with multiple angles maximises using daylight and optimises solar power, thus avoiding overheating issues.

**Biography**

Loay Akram Hannoudi is an architectural engineer involved in the field of sustainable architecture and how to exploit renewable energy sources in the building design in order to reduce buildings energy consumption and improve indoor environment in addition to reducing impact on external environment. Loay has a PhD from Middlesex University in

London and a Bachelor and Master degree from the Technical University of Denmark in the field of Architectural Engineering.

Noha Saleeb is an Associate Prof at the Department of Design Engineering & Maths/ School Science & Technology at Middlesex University/London, UK. Dr. Saleeb is a Programme Leader of both MSc Building Information Modelling Management and also BSc Architectural Technology at Middlesex University. Dr Saleeb's research interests lie at the intersection of architecture, computer programming and e-learning disciplines specialising in 3D digital architecture and Building Information Modelling.

George Dafoulas is a Professor & Director of Programmes - Computer Science at the Department of Computer Science/ School Science & Technology at Middlesex University/London, UK. Dr. Dafoulas is a course Leader - BSc Business Information Systems and Management; BSc Business Information Systems; transitional students on the BIS Joint Honours provision