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Name : **Wan Rahmah Binti Wan Zaki**

Title : **Thermal Comfort, Daylighting And Economic Assessment Of A Hypothetical Passive Terraced Housing Scheme In Malaysia**

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Existing research dealt with thermal comfort and daylighting independently, but these subjects are affected by building design strategies, cohesively. Hence, the application of passive design strategies which is achieved by designing building elements to be climate-responsive, is seen as a rational action. A passive house should attain optimum thermal comfort and daylighting that alleviate the need of mechanical cooling/ventilation and artificial lighting, respectively. This in turn, reduces operational energy demand. Having said that, there was a lack of research on the economic benefit of passive design strategies. Therefore, this study intends to demonstrate thermal comfort and daylighting, collectively, in a Passive Terraced House and assess the related economic benefits, especially when applied with Energy Efficient (EE) appliances and Renewable Energy (RE) system as multi-intervention. This research was carried out in comparison with a Conventional Terraced House so that the outcome could be assessed with the status quo. The methodology began with establishing a Conventional Terraced House and a Passive Terraced House. The former was deduced from the residential market, and later applied passive design strategies as listed in the Malaysian Standard (MS) 1525 to evolve into a proposed Passive Terraced House. Both types of house had the same conventional floor plans and rectangular building form but the party walls in the proposed Passive Terraced House were on the shorter sides, thus the longer sides became the wide frontage of the house creating shallow floor plan that facilitated daylighting and cross ventilation. Both houses were simulated using internationally accredited Indoor Environmental Solutions Virtual Environment (IES<VE>) programme, specifically 'Apache' and 'Radiance' software to ascertain the indoor air temperature and daylighting illuminance, respectively. When bench-marked against the standards, it was found that the proposed Passive Terraced House provided three months thermal comfort but the Conventional Terraced House was in thermal discomfort throughout the year. Similarly, the proposed Passive Terraced House offered plenty of daylighting in all rooms during the day time hours; but the Conventional Terraced House offered limited daylighting in bedrooms only. The economic assessment by means of 30-year Total Multi-intervention Cost (TMC) that includes house price, operational energy and capital costs of appliances, showed that the proposed Passive Terraced House was a cheaper option in the long term compared with the Conventional Terraced House. Each house was also simulated as a mass housing development on a one-hectare site (± 10%). Despite the low number of the proposed Passive Terraced Houses, the return on Gross Development Cost (GDC) was competitively positive (about 30%) when 10% sales premium is assigned due to the wide frontage. The findings of the research demonstrated that the proposed Passive Terraced House was a credible housing alternative, especially in the context of pressing energy issue.