

Title: Urban surface temperature behaviour and heat island effect in a tropical planned city

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Abstract: Putrajaya is a model city planned with concepts of a "city in the garden" and an "intelligent city" in the tropics. This study presents the behaviour of the surface temperature and the heat island effect of Putrajaya. Findings show that heat island intensity is 2 °C on average at nighttime and negligible at daytime. But high surface temperature values were recorded at the main boulevard due to direct solar radiation incident, street orientation in the direction of northeast and southwest and low building height-to-street width ratio. Buildings facing each other had cooling effect on surfaces during the morning and evening hours; conversely, they had a warming effect at noon. Clustered trees along the street are effective in reducing the surface temperature compared to scattered and isolated trees. Surface temperature of built up areas was highest at noon, while walls and sidewalks facing northwest were hottest later in the day. Walls and sidewalks that face northwest were warmer than those that face southeast. The surface temperatures of the horizontal street surfaces and of vertical façades are at acceptable levels relative to the surface temperature of similar surfaces in mature cities in subtropical, temperate and Mediterranean climates.