



(FCL) FUTURE CITIES LABORATORY 未来城市实验室

## Collaborative Research at CREATE Leads to Improved Modelling of Urban Heat Island Effect in Singapore

26<sup>th</sup> June 2015: A new study by a team of researchers from TUM-CREATE and the Singapore-ETH Centre Future Cities Laboratory (SEC-FCL) has developed an improved approach in gauging and modelling the Urban Heat Island effect in tropical megacities like Singapore. This work was recently accepted in the journal *Sustainable Cities and Society*.

Air-conditioning is predominant in Singapore due to its tropical location, and the electricity consumption for cooling and other purposes generates waste heat that contributes to the Urban Heat Island phenomenon. As Singapore's urban space is intermittently filled with high-rise and lower buildings, the full picture on buildings' electricity demand and its contribution to its surrounding climate is unclear due to the lack of detailed calculations on the energy consumption in a given area.

In this paper, the researchers first used a bottom-up approach where datasets of geographic information systems obtained from the Urban Redevelopment Authority and the Singapore Land Authority were used to create a database that captures the size of the buildings and its type of use. Following that, the researchers developed a top-down approach, where electricity consumption statistics from the Energy Market Authority is broken down into sectoral load profiles. These two approaches were then combined to generate high-resolution heat emission maps, and which revealed that heat emissions as a result of electricity consumption from human activity in Singapore are at a greater scale and more diverse than previous models and estimates. This approach can be applied to accurately model the Urban Heat Island effect in cities where energy demand data is scarce.

Click [here](#) to access the published manuscript. To know more about the technological capabilities of TUM-CREATE and SEC-FCL, please visit the CREATE website for more information.

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