DR. RUI ZHU

WHAT'S IN MY PORTFOLIO

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Cities occupy 2 percent of the Earth's land surface, but they consume 60 to 80 percent of global energy. Of these, over 70 percent comes from fossil fuels, which exacerbate air pollution and global warming. Today, 55 percent of 7.7 billion people live in cities. This is expected to rise to 68 percent, or 9.7 billion, in 2050. Therefore, cities will become one of the main battlefields in confronting climate change.

Our study suggests that vehicles produce a significant amount of the heat and air pollution present in Hong Kong. It is imperative to promote renewable energy in cities. Widely available, solar energy is a renewable energy with zero emissions that could be an alternative energy resource for developing liveable cities.

It is important to estimate annual solar irradiation on urban envelopes accurately in order to utilize solar energy effectively. Urban morphology may alter solar distribution radically, thus creating solar accumulative or dispersive areas within the city. Solar accumulative areas are just the right locations to equip with solar panels.

Our team at SMART has developed a model to create a three-dimensional solar city. Comparison of annual solar irradiation with 10 cities across the world suggests that Singapore is one of the best cities to utilize solar energy, considering its geolocation, urban morphology and historical weather.

Estimating solar irradiation can be used in many applications, including identifying locations of photovoltaic cells, evaluating solar urban planning, and providing solar charging for shared electric scooters.

For example, solar accessibility of current buildings will be transformed at different times of the day or in different seasons when the neighborhood builds up new blocks.

Some buildings may not be able to receive any sunshine throughout the day; this cannot be ignored in real estate development of urban areas. Our model could evaluate and optimize solar transformation from the current state of a city to the future vision of the city. [P]

Watch our video interview with Dr. Rui Zhu on www.portfoliomagsg.com


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