EuroSciCon

June 21-22, 2018
Paris , France

World Summit on
Climate Change and Global Warming

Expert Opin Environ Biol 2018 volume: 7
DOI: 10.4172/2325-9655-C1-021

URBAN ENERGY MODEL FOR SMART CITY INFORMATICS

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Current global environmental challenges have led city governments worldwide to set ambitious goals in reducing their Greenhouse Gas emissions, such as 60% by 2025 in San Francisco and 80% by 2050 in New York City and Boston. Among all sectors, buildings account for a major part of energy use worldwide and over 60% of this is used for heating, ventilation, and air-conditioning purposes alone. Energy production and energy use have environmental impacts. Energy use is an essential factor in building energy management systems and planning support systems in sustainable urban development. Therefore, it is essential to develop and implement efficient methods to optimize the energy use of buildings, thereby, reducing their environmental impacts related to operational energy use. Urban energy models (UEM) can help as effective tools in numerical simulation and optimization of building energy loads for the city of Gainesville and in result, support the city managers in their decision-making towards sustainable urban development. This presentation will discuss the tool under development, UEM for Smart city informatics, is based on physics-based mathematical models for estimation of electric demand of the city, i.e., individual buildings situated in the City of Gainesville, Florida, USA. The aim is to virtually test the feasibility of implementing green building technologies on a city-wide scale. The tool can also be used by utility providers to accurately predict the demand of the city in the future and mitigate risks such as oversizing etc. It can also help the city to manage its energy mix as it moves towards time variable sources of renewable energy such as solar and wind. The tool can be used to provide a correct estimate of the cities energy requirement at any time frame.

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