EFFECT OF SPV ON SURFACE UHI

Introduction

- Energy , in the form of fossil fuel, is the driving force of human life.
- The fossil fuels are rapidly depleting resources and have adverse impact on climate/ environment.
- The world energy consumption is poised to grow by 56% by 2040 according to the International Energy Outlook 2013.
- A drive towards renewable energy has been initiated.
- Solar photovoltaic is at the forefront due to the abundance of solar power.

Need of the study

- India is an energy poor country and Solar PV installations are inevitable to achieve energy independence.
- It's necessary to explore this phenomenon in Indian conditions, considering Ministry of New and Renewable Energy's ambitious target of 1,00,000 MW, out of which 40,000 MW is solar roof top PV installations in India by 2022.
- This relatively new technology is still in its infantile phase so its adverse effects are unknown.
- Thus, systematic, holistic and environment friendly implementation is the key.

Global ongoing research



(Turney D, Fthenakis V 2011)

Global ongoing research



Urban Heat Island Effect



The need of studying UHIE



UHI types



WHY DELHI

- 97.5% urbanized
- High density, rising population
- Increasing energy demand
- Higher solar PV installations, especially on rooftops

Delhi



Method

Techniques to study Urban Heat Island Effect

- Multi scale phenomena
- Observational approaches
- Thermal remote sensing
- Field measurement
- Small scale modelling
- Simulation approaches
- Energy balance model

Landsat Data Extraction



Location of L01, L02, L03

L 01: Terminal 3 Indira Gandhi International Airport

LST of 3 sites was extracted, having different land use and surroundings such as roads, a water body and green area in Delhi NCT region and are named L 01, L 02 and L 03 respectively.



L 02: Gas power station - IP Estate



L 03: NTPC Piyala Power Plant Jhajru

L01, L02, L03 (before and after SPV installation)





LST at L01, L02, L03 (before and after SPV installation)



BEFORE SPV Installation



AFTER SPV Installation



Green Buildings and Sustainable Engineering pp 3-24 | Cite as

LST Mapping of SPV to Gauge Their Influence on Near-Surface Air Temperature of New Delhi City

Au	th	ors
710		013

Authors and affiliations

Khushal Matai 🖂 , Shweta Manchanda

Conference paper First Online: 15 July 2018



Part of the Springer Transactions in Civil and Environmental Engineering book series (STICEE)

Abstract

New Delhi, the capital of India, is one of the fastest growing urban conglomerates with several issues such as rising pollution levels, stress on urban infrastructure, and urban heat island effect. The city is dependent on nonrenewable energy sources mostly, which have detrimental effect on the environment, generate extensive greenhouse gas emissions, and induce climate change. India is an energy-poor country; therefore, renewable energy installations are inevitable to achieve energy independence, and decentralized Rooftop SPV and Building-Integrated SPV will go a long way in diffusing energy crisis in Delhi. As the rooftop solar installations and solar farms increase, it is critical to research the effect of this technology still in its nascent phase, considering Ministry of New and Renewable Energy's ambitious target of 100,000 MW installation in India, out of which 40,000 MW is solar rooftop PV, by 2022.

Keywords

LANDSAT 8 LST Solar photovoltaic (SPV) Urban heat island effect Built environment

Khushal Matai Department of Architecture, School of Planning and Architecture, New Delhi <u>arkhushal@live.com</u> +91 9983 454645