



Solar energy is a significant contributor to the renewable energy mix. Many urban developments are making investments to install solar systems across feasible areas. The allocation of solar systems relies on the land's geography and the amount of solar radiation received. The purpose of this study is to apply to determine the best sites for solar installations in urban areas. Using the TCU area of Fort Worth, Texas as a case study, this study will use ESRI's ArcMap and ArcGIS Pro to estimate the solar power potential of different residential rooftops. The results will be useful in showing what households are most suitable for solar installation based on their expected energy yield.

Introduction

The adoption of renewable energy as an alternative to fossil fuels is key to mitigating the negative effects of climate change. Current studies show that the amount of emitted radiation depends on i) elevation, ii) surface area, and iii) time of the day. To determine the most suitable sites for solar



installation, this study used the solar radiation tool in ARCMAP and ARCGIS Pro to estimate the average electric power produced by TCU building rooftops. Our results show an average of 0.25 < x < 32 MWh of electric production from 120 buildings. Our research findings will be vital in extending our research to future solar based projects.

Objective

To map solar energy in the TCU area of Fort Worth, Texas while finding suitable rooftops and calculating which have the most solar power potential.

Data

Files	Source
Tarrant County Building Footprints. shp	Hub.arcgis.com
LIDAR Map of the TCU Area	https://tnris.org
Dark Gray Canvas Base- map	ArcMap

Estimating Solar Power Potential in Fort Worth, Texas

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Abstract

Color	Count	Maximum (MWh)	Minimum (MWh)	Mean (MWh)	Standard Deviation (MWh)	
Red	121	32.85	0.25	0.542	2.96	
Orange	329	0.03	0.02	0.03	0.004	
Yellow	510	0.01	0.0006	0.011	0.005	



This study used ArcMap and ArcGIS Pro tools to calculate the estimated electric energy yielded from the house rooftops in the TCU area. Results from the study yielded a maximum average electric power of 32.85 MWh from 121 buildings. Based on the estimated calculations, the most suitable sites for solar installation included the TCU Greek housing area, Amon G. Carter Stadium, Commons area, and Campus store.



Results & Discussion

. Our results show that about 121 buildings produced a maximum average electric power of 32.85 MWh. The maximum production covered a range of buildings including the Greek housing area, Amon G. Carter Stadium, Commons area, and the Campus store.

The rest of the buildings (count: 839) yielded a maximum average power range of 0.01 MWh – 0.003 MWh with a standard deviation of ~ 0.005 . Most of these buildings included the neighboring residences and housing complexes located north and south of the subject area.

Conclusion