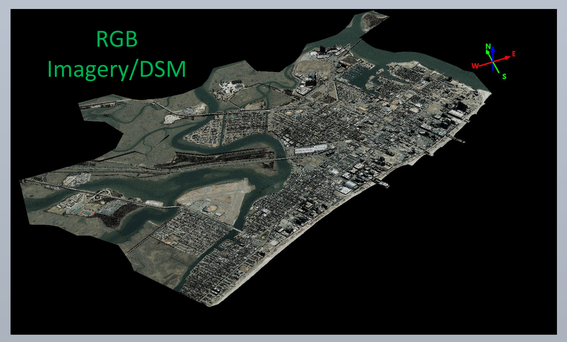
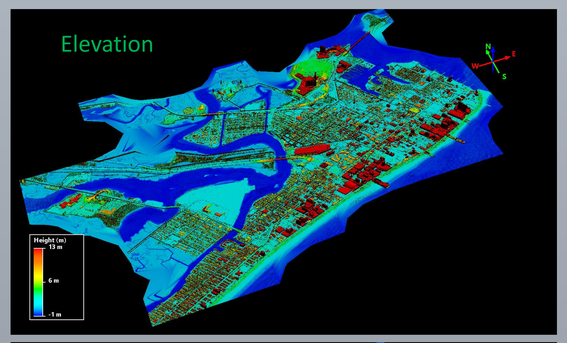
LiDAR & Solar PV Suitability: Atlantic City, New Jersey

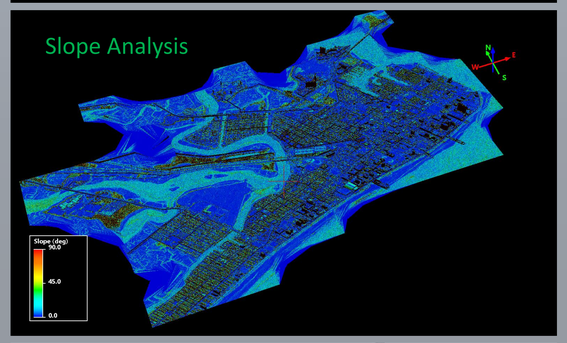
State of New Jersey
Department of Environmental Protection
Air Quality, Energy & Sustainability

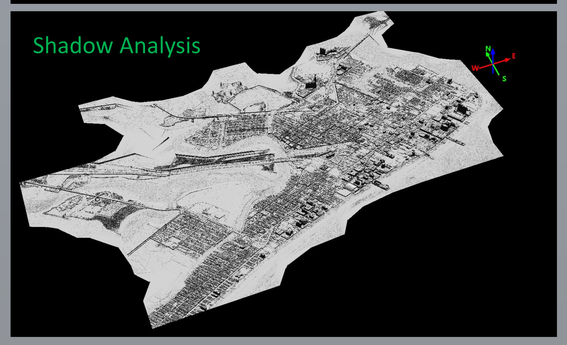
Anthony Bevacqua NJDEP Bureau of Energy & Sustainability

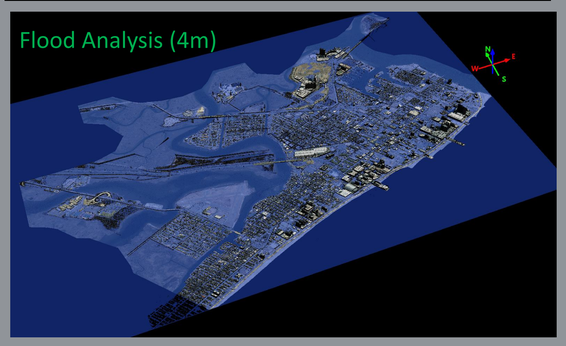
Municipality-Wide Insights from DSM



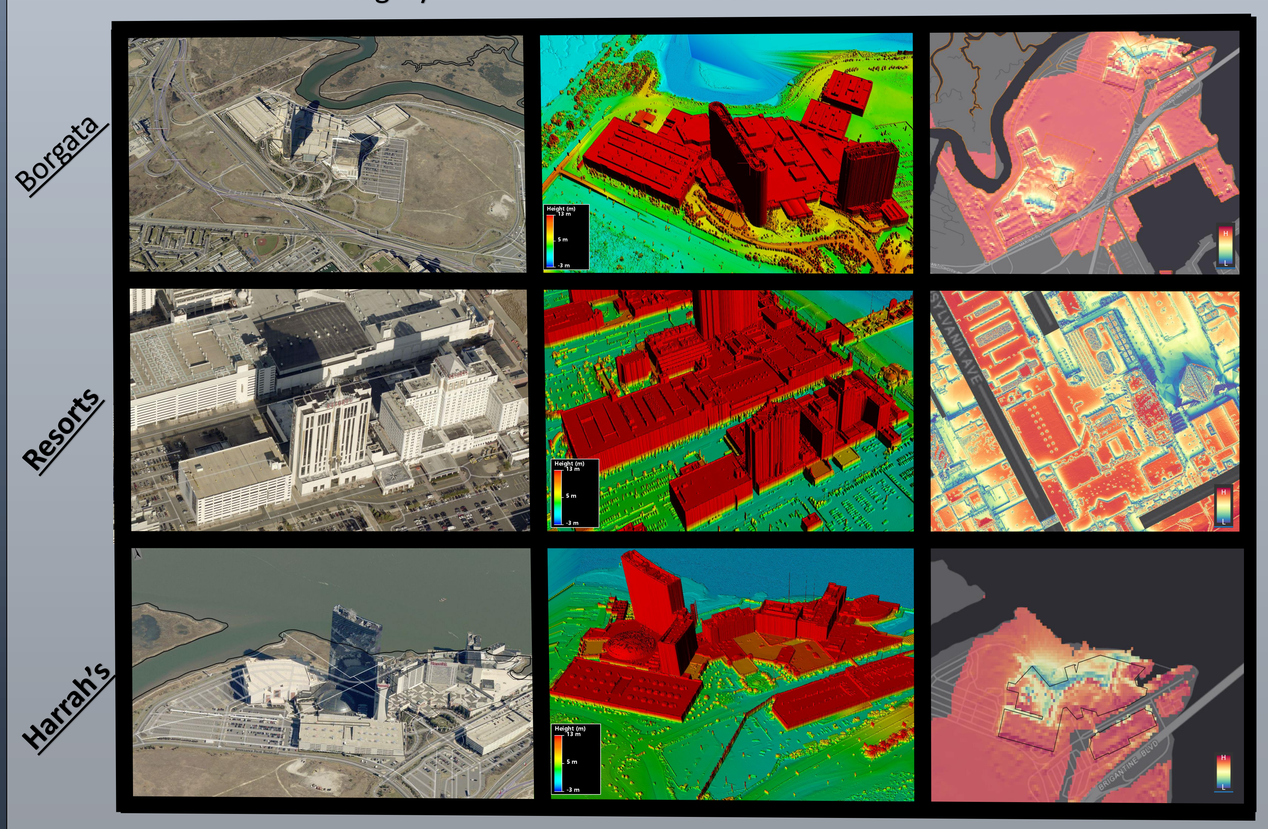




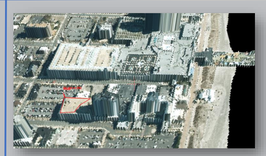


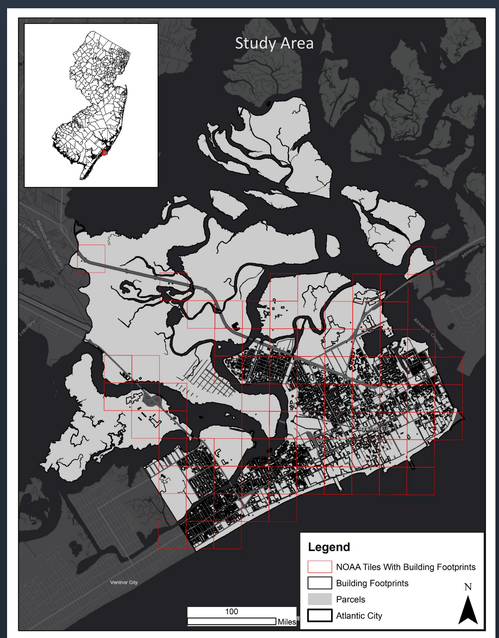


Local Solar Suitability Models



Optimal Array Location & System Size Estimate

	Usable Space	Approx. Square Meters	PVWATTS System DC Estimate
Borgata		10,000 m^2	16,000 KW
Resorts		3,700 m^2	592 KW
Harrah's		21,000 m^2	3,360 KW



Abstract

The purpose of this work is to present alternative methods for siting solar photovoltaics. The current methods for most projects includes time consuming in situ measurements of available space, solar shading, and roof conditions. The research shown here highlights the potential for the use of remote sensing techniques that utilize Light Detection and Ranging (LiDAR), and Oblique Imagery to gain siting information remotely. When this data is available, assessment time and costs are drastically reduced. This information can be used in project planning and design, as well as policy development.

Methods

First, data was collected including the municipal boundary, the building footprints, the compressed LAZ files, and 2017 DEP Imagery. The LiDAR collection tile index was used to select tiles that contained building footprints. From this, a study area wide Digital Surface Model (DSM) was created. From this model, slope analysis, shadow analysis, and flood analysis was performed across the municipality. The next step was to identify commercial buildings that could support PV systems large enough to participate in net metering, grid supply, or community solar programs. Once these three local sites were identified, solar radiation analysis was performed to identify optimal locations for PV technology. Finally, the PVWATTS estimate of system size and available space was used to estimate the potential size PV system that could be adopted.

Results

The results of this research include a municipality-wide analysis of Solar PV Suitability. The remote sensing data of Imagery and LiDAR yielded fine resolution spatial data that can be used to identify suitable areas for PV adoption. Additionally, three locations were identified of varying potential.

Discussion

Remote sensing offers significant advantages to siting large scale PV projects. When used in conjunction with other tools such as the NJDEP Solar Siting Analysis, and in situ measurements, the siting and design process for solar PV can be made more efficient. Additionally, this type of high resolution analysis can be used in clean energy policy development.

Acknowledgements

Thank you to NOAA for making this LiDAR collection available, Bing & Microsoft for sharing their building footprint data, and to NJDEP Bureau of GIS for their data, technical support and for hosting the event.

For more information on how the NJDEP Bureau of Energy and Sustainability is using GIS go to our Spatial Analysis Research page at https://www.nj.gov/dep/aqes/gisresearch.html