

HIGICC August 2019 Newsletter



NEWSLETTER / August 2019

Upcoming HIGICC Events!!

Don't forget to visit our [website](#) and RSVP for these fabulous events

HIGICC FREE EVENT

VISIT & TOUR
MAGIS
MAPS / AERIALS / GIS



Come talk story and check out our:

- » Early/Historical Maps
- » Aerials
- » Special Collections

...and see our facilities and operations
15 years after the 2004 flood

AUGUST 14, 2019
3:00 – 4:30 PM

RSVP here: <https://www.higicc.org/>

Government Documents and Maps Department
Ground Floor, Hamilton Library, UH Manoa,
2550 McCarthy Mall, Honolulu, HI 96822
<https://guides.library.manoa.hawaii.edu/magis>



Magic Island Fireworks Pau Hana
Friday, August 23rd, 2019
5:00PM - 9:00PM



Join us for a sunset potluck BBQ!
Where: Ala Moana Magic Island
(Look for the Frontier Precision tent!)

**We will provide: BBQ pits, Coolers & Ice,
Tent, Tables, Plates, Utensils & Napkins.**

**You provide: A dish to share, your own tasty
beverages, chair, family & friends**

A Family-friendly networking event brought to you by a
partnership between HIGICC and Frontier Precision

The Hawaii Statewide GIS Program Special Achievement in GIS Award



The Hawaii Statewide GIS Program was the recipient of a Special Achievement in GIS award at the 2019 Esri User Conference, held recently in San Diego, CA. The Program was honored for its work in empowering state employees to leverage GIS technology to improve decision making, coordination, information sharing and collaboration. The program has been able to use Esri solutions provided by the State's Enterprise Agreement (EA) and Esri Enterprise Advantage Program (EEAP) to extend support across agencies. The State's Open Geospatial Data Portal, use of ArcGIS Online and the ability to provide training to a broad audience of State users were recognized, as were a variety of projects undertaken by State agencies, including those involving voter registration, transit oriented development, and vector control.



Hawaii Statewide GIS Program Data Catalog Getting Started Contact News & Updated Data

Hawaii LiDAR

The Hawaii Statewide GIS Program, in partnership with ERI and our many data partners, is happy to provide a new elevation service to support visualization, analysis and download of elevation data and related products. Let's Explore!

Hawaii LiDAR Data Products

LiDAR (light detection and ranging) is a state-of-the-art technology which relies on the projection of millions of short laser pulses to the ground from a specially equipped aircraft. The result is extremely detailed ground elevation data.

The Hawaii Statewide GIS Program processed LiDAR collected over the islands and created a Digital Terrain Model (DTM or "bare-earth"), a Digital Surface Model (DSM) and an Elevation ArcGIS Server service for general use. Access to these services and other data visualizations are listed below, as well as a map that can be used to download the data.

<p>DSM service</p> <p>DSM data published as an ArcGIS Server Image Service. The DSM includes buildings, trees, etc. exactly as they would appear beneath the aircraft.</p> <p>Web Map</p>	<p>DTM service</p> <p>DTM ("bare-earth" terrain model) data published as an ArcGIS Server Image Service. Trees, vegetation and structures have been removed from the DTM model, showing the "bare earth" underneath.</p> <p>Web Map</p>	<p>DSM Aspect</p> <p>Aspect (or slope aspect) is the compass direction that a slope faces. The ArcGIS Server Image Service for the DSM and DTM provides server side processing for aspect. The aspect of a slope can affect soil characteristics, local climate conditions, etc.</p> <p>Web Map</p>	<p>DSM Hillshade</p> <p>The DSM Hillshade is a grayscale representation of the surface as it appears under the aircraft with the sun's relative position taken into account for shading the image.</p> <p>Web Map</p>
<p>Web Map</p>	<p>Web Map</p>	<p>Enabled Layer</p>	<p>Web Mapping Application</p>

2019 HIGICC Mark Lierman Memorial Scholarship

HIGICC is happy to announce that the 2019 Mark Lierman Scholarship has been awarded to Yoko Uyehara, a senior undergraduate student pursuing a degree in Geography and Environment degree at the University of Hawai'i at Mānoa. Yoko's academic and professional experience is being recognized together with her ambition and interest in the applications of GIS and remote sensing in her studies. We want to wish her well as she continues her studies. Join us at the annual meeting to learn more about her interests and academic direction as she looks toward pursuing a Masters degree.

Oahu Rooftop Photovoltaic Farm Location Suitability Analysis
GEOG 489 - Yoko M. Uyehara, May 2019
 University of Hawai'i at Mānoa

INTRODUCTION

Hawaii Governor David Ige has signed a legislative bill, HB2182, to make the state of Hawaii to be the first state in the country committing to Zero Emissions and Carbon Neutrality by the year 2045. To ensure that the power utility, Hawaiian Electric Company, Inc (Oahu, Maui and Hawaii) and Kauai Island Utility Cooperative, need to change the existing electricity production method of burning fossil fuels to renewable energy methods. One of these methods is to harness abundant energy from the sun. Since the state of Hawaii, especially Oahu, has nearly 70% of days 271 days in a year, with more than 6.5 hours (Energy Research, 2016), it is ideal for obtaining energy from the sun through rooftop Photovoltaic Panels or solar farms. There are currently several solar farms in operation, they are under construction, and three locations are pending approval by the Public Utility Commission and community forums.

Since the solar farm requires a large and relatively flat land, finding suitable solar farm locations on Oahu Island becomes challenging because most land area used for the solar farms are used for agriculture land or agricultural use. It is crucial to target the agricultural areas to maintain the current state of Hawaii's sustainability.


Given this challenge, rooftop of commercial buildings and private homes, are the preferred solution because rooftop solar does not impact undeveloped and protected natural land use.

Since the bill, HB2182, was approved, Hawaii has made the commitment to achieve Zero Emissions and Carbon Neutrality by the year 2045 and utilizing rooftop solar can help to accelerate meeting this goal. Oahu is especially challenged with the highest power load and limited space than utilizing existing roof top area to deploy Photovoltaic Solar panel appears to be the best option.

OBJECTIVES

- 1) To investigate how much solar radiation the rooftop surfaces receive.
- 2) To assess feasibility of 100% renewable energy commitment by the year 2045 using the building rooftop photovoltaic panel.

STUDY AREA: Island of Oahu



DATA

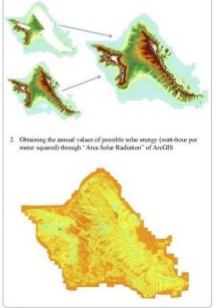
- 1) Digital Surface Model of Oahu
- 2) Digital Elevation Model of Oahu
- 3) Building Footprints of City and County of Honolulu
- 4) Census Block Group 2010 Boundary

CRITERIONS


- 1) Greater values of Annual Solar Energy Availability
 - i. Higher Elevations
 - ii. Flatter the Surface
 - iii. Northely Facing Surface than Northely Facing Surface
- 2) Larger Rooftop Area Sizes

METHODS using ArcGIS

1. Combining DSM and DEM of Oahu due to unavailable data area of DSM generated from LiDAR data with Raster Calculator
 - Raster Calculator
 - Zonal Statistics as a Table
 - Rasterify
2. Obtaining the annual values of possible solar energy (hour-hour per meter squared) through "Area Solar Radiation" of ArcGIS



3. Clipping the solar energy value layer by rooftop

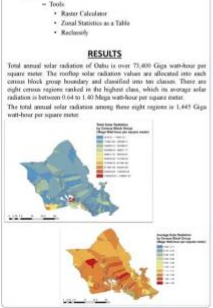


4. Analyzing the rooftop Photovoltaic suitability using Census Block Group

- Tools
- Zonal Statistics as a Table
- Rasterify

RESULTS

Total annual solar radiation of Oahu is over 71,400 Giga watt-hour per square meter. The rooftop solar radiation values are allocated into each census block group boundary, and classified into two classes. There are eight census regions ranked in the highest class, which its average solar radiation is between 1.6 to 1.8 Mega watt-hour per square meter. The total annual solar radiation among these eight regions is 1,447 Giga watt-hour per square meter.



CONCLUSION

Through the rooftop photovoltaic location suitability analysis, it is confirmed that Oahu does not have the ability to meet the Zero Emissions and Carbon Neutrality by the year 2045 without further land conversion from agricultural suitable land or vegetation areas to mega solar farms. According to Hawaiian Electric's sustainability report 2018, almost 3 Gigawatts of renewable energy were produced by solar, wind, and other sources. This 3 Gigawatts are equivalent to 25% of the entire demand of Oahu. Based on these numbers, the total amount of the energy load in the 2018 was determined to be 13.54 Gigawatts. There are at least 11.04 Gigawatts must come from the renewable energy, but Oahu rooftop photovoltaic farms can have 14,300 Giga watt-hour per square meter 1.48 Gigawatts, which is over 2 Gigawatts short.

In conclusion, the building rooftop photovoltaic solution cannot meet the energy demands of Oahu, but Oahu has a great potential to meet the 100% renewable energy commitment by 2045 with the combination with the mega solar farm developments. Further study is necessary.

FUTURE IMPROVEMENTS

- To include the following aspects:
 - Mega Solar Farm Location Suitability
 - Battery Storage Capacity
 - Building's Built Year
 - Younger buildings are better
 - Quantity of Buildings by Census Block Group
 - Analyze the quantity, implementation is faster
 - Flooding Issue
 - Avoid flooding area for stable energy production

REFERENCES

2018 Sustainability Report. (2018). [online] Honolulu: Hawaiian Electric. p.6. Available at: <https://www.hawaiianelectric.com/zero-emissions-report/> [Accessed 27 Apr 2019].

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Hawaiianelectric.com. (2019). Power Facts. [online] Available at: <https://www.hawaiianelectric.com/about-us/power-facts/> [Accessed 27 Apr 2019].

ACKNOWLEDGEMENT

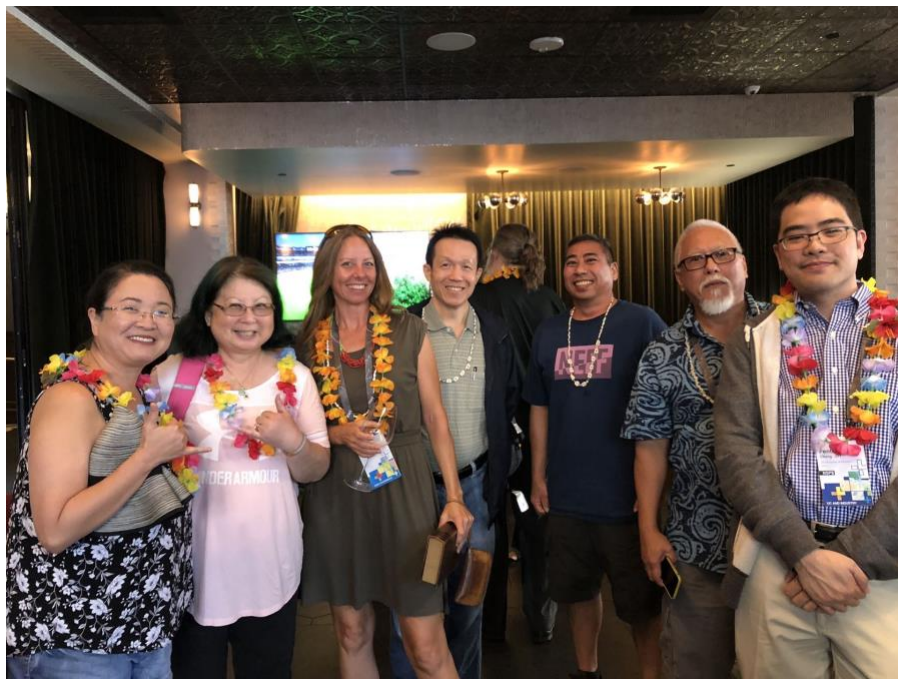
This Oahu Rooftop Photovoltaic Farm Location Suitability Analysis is a part of GEOG 489 course at the University of Hawaii at Manoa. I am grateful to Dr. (Ong) in encouraging me to start the work, making suggestions, and finally to complete it. I would like to thank Mr. Julian Pook and Ms. Madelyn Louquet for providing the useful ArcGIS techniques and suggestions. Lastly, I would like to acknowledge with gratitude, the support and love of my family – my husband, Bekko, and my beautiful sons, Felix and Lucas. They all helped me to continue this sustainability analysis project.

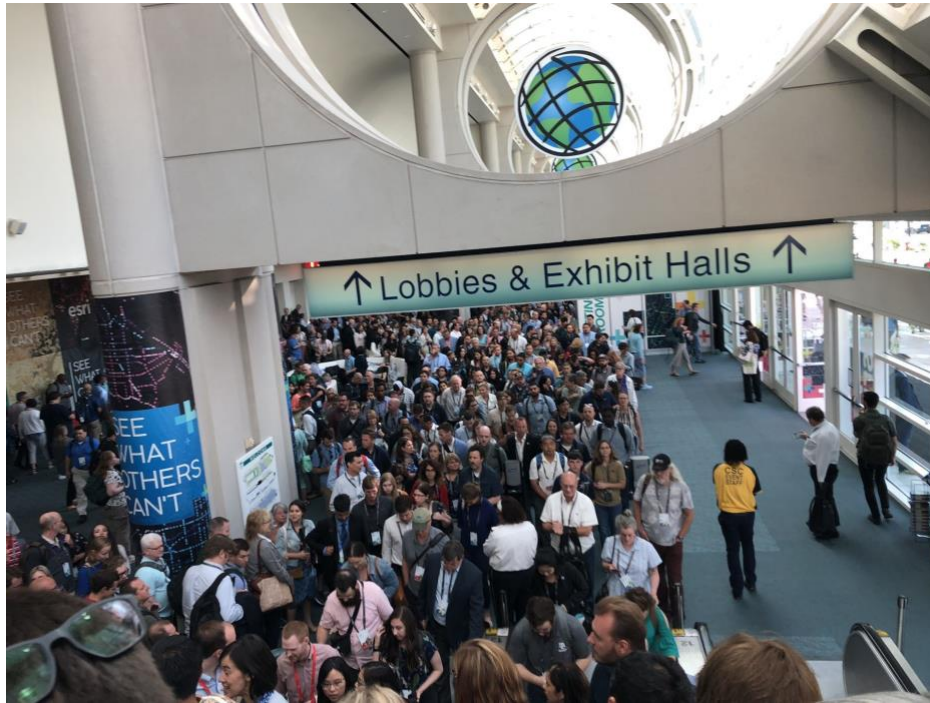
Aloha ESRI UC

It was another great year at ESRI UC in San Diego on July 8-12, 2019! Inspiring keynotes and fabulous tech sessions! See what's new and watch the videos on the ESRI youtube channel:

https://www.youtube.com/channel/UC_yE3TatdZKAXvt_TzGJ6mw

Thank you to the ESRI staff, HIGICC members and friends that joined the Hawaii users pau hana event! It is always great to connect with fellow GIS professionals from all the islands.





[Job Announcements](#)

Find links to current job announcements below.

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Mahalo to our sponsors. For sponsorship info [click here](#).

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