



Hawaii State Energy Office: Energy Data Portal

Empowering citizens with a state-of-the-art
single source of statewide energy data and
comparative information



Category: Data Management, Analytics, & Visualization

State: Hawai'i

Project Start: November 2021

Project End: November 2022

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EXECUTIVE SUMMARY

Hawai'i is one of the most isolated states in America. Furthermore, the state of Hawaii is comprised of 6 isolated island grids. Energy resilience, efficiency, and renewable energy remain a top priority to not only HSEO but to many stakeholders and customers. If there is a catastrophic event such as a hurricane, tsunami, or fire, each island needs to respond quickly and efficiently to ensure minimal disruption. In order to respond quickly and efficiently, information and easy access to information is needed.

Energy data and information is often technical, complex, and voluminous. It is often difficult for an average citizen to understand the information that is being provided and even more difficult to be able to compare it to any known aggregated data. Ensuring energy equity, transparency, understanding the effects of recent policies, being able to perform even simple comparisons are difficult. For policy makers and decision makers, it is important to have up-to-date reliable and accurate information as the recent Maui wildfires have proven.

This data portal project is the first of its kind in Hawai'i and includes a state-of-the-art cloud infrastructure design. This project provides aggregated statewide energy data and related comparative information that is visually presented and accessible. The entire dataset can be downloaded for further use and analysis with a help-yourself pop up window to make it even easier to access.



Figure 1: The new energy data portal navigation and results view

THE PROBLEM

There were several key factors which provided the impetus for this project including:

- 1) The recent passage of Act 239 in 2023. This law specifically directed HSEO to collect utility bill and energy usage data for state-owned buildings and to make the data publicly available. Data at the time was siloed, in order to provide this information, data needed to be identified, cleaned, aggregated, and presented.
- 2) Act 239 also includes the need to develop, “strategies for evaluating and supporting a transition to a clean energy economy that advances social equity...” HB 239, Act 239 2023 (p. 6). In order to know if social equity is advancing, metrics need to be defined and created to be able to measure it.
- 3) Public access to information was not readily accessible, information was disparate, and had to be formally requested.
- 4) Analysis for responding to catastrophic events and policy making was limited and took effort and resources to provide.



Figure 2: The new energy data portal features stakeholder views and a key word search capability

IMPLEMENTATION

Funding and partnerships: The Energy Data Portal was funded through a \$75,000 grant from the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy. HSEO partnered with Carahsoft Technology Corporation, Cloudwick, and AWS to utilize Amorphic as the unified platform. Amorphic is an embedded data lake built on an AWS design to make it easier for IT, business, and data scientists to use AI/ML to gain competitive advantage from cloud analytics. Built from the ground up, Amorphic provides access to structured data, semi-structured, or unstructured data with a simple, unified interface. Cloudwick's Amorphic Lake House for AWS is a self-service and fully managed Platform-as-a-Service, which deploys directly into your AWS to integrate with 40+ AWS data and analytics services.

The next step was identifying and contacting all the various data sources—two State departments, one City department, two Federal agencies, NHTSA, NREL, and two utility companies.

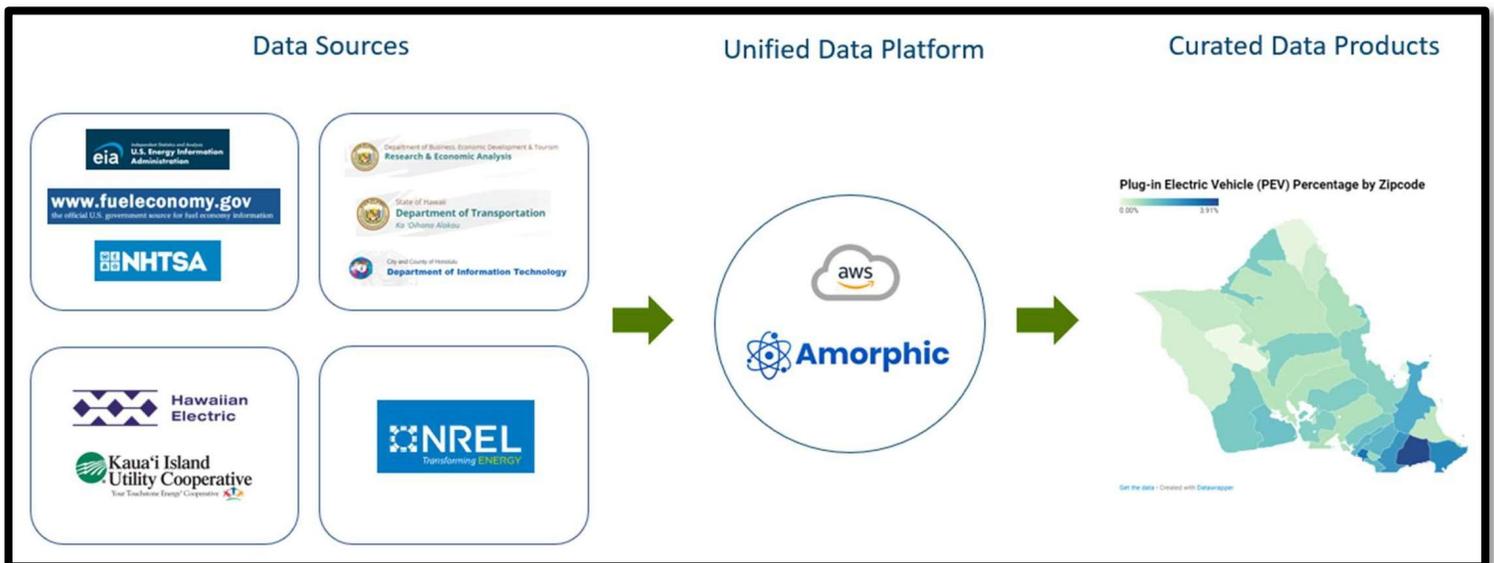


Figure 3: The Roadmap

The following data sets were collected:

1. Vehicle Registration Data Monthly Updates
2. HECO Smart Meter Data
3. NHTSA API Vehicle Descriptor Data
4. US EPA Fuel Economy Data
5. DBEDT Economic Data Warehouse
6. U.S. Energy Information Administration: Following API Sources
 - a. Crude Oil Imports by Country for State of Hawaii
 - b. Net Electricity Generation by Fuel Type for Each Energy Source
 - c. Plant Level Generation and fuel consumption data for all power plants in Hawaii
 - d. SEDS Energy Consumption by End Use Sector in Physical Units and Btu for the State of Hawaii, for all energy sources. Include metadata from definitions.
 - e. Natural Gas consumption by end use by area for Hawaii, for each end use (residential, industrial, vehicle fuel, etc.)
7. Other U.S. Energy Information

Administration

<https://www.eia.gov/petroleum/imports/companylevel/>

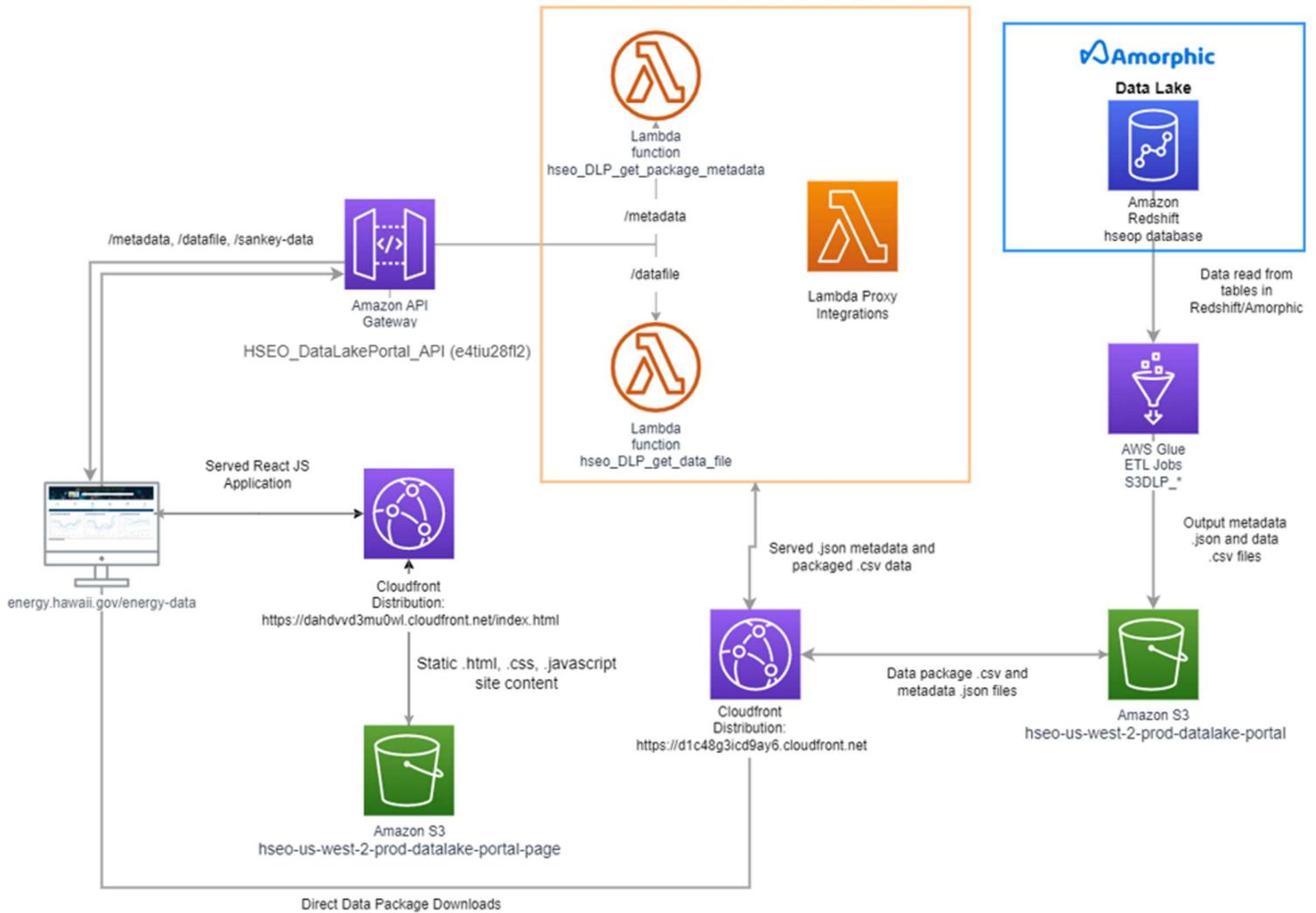


Figure 4: Amorphic deployment architecture

The data was analyzed, scrubbed, and entered into the datalake.

HSEO staff then worked with data science fellows from the University of Hawai'i to curate more than 30 data sets now in the portal from a catalog of about 70 raw datasets from public and private sources. Cloudwick created the different views for the various stakeholders-electricity, energy, non-renewables, renewables, transportation, energy efficiency.

IMPACT

This project has accomplished its purpose and is a great success. By partnering with various stakeholders, HSEO was able to leverage their knowledge to build a reliable and useful system. And HSEO also has a means of measuring progress, performance, and trends to help make better policies and attain renewable energy goals. Additional benefits include:

1. There is now a **free, easily accessible, user-friendly Statewide energy information resource**. The datasets are downloadable, energy stakeholders including the public can utilize the free tools and help themselves to the information directly.



Figure 4: Chart showing a pop-up window to access the downloadable full data set

2. There is **rich metadata**. Through this project, the HSEO creates meaningful and useful charts using reliable aggregate data from many different types and sources of information.

3. There is **insight generation**. Users can look at charts and graphs to see trends and correlations to help make better policies and analyze the effects of various policy making and hazards impact.

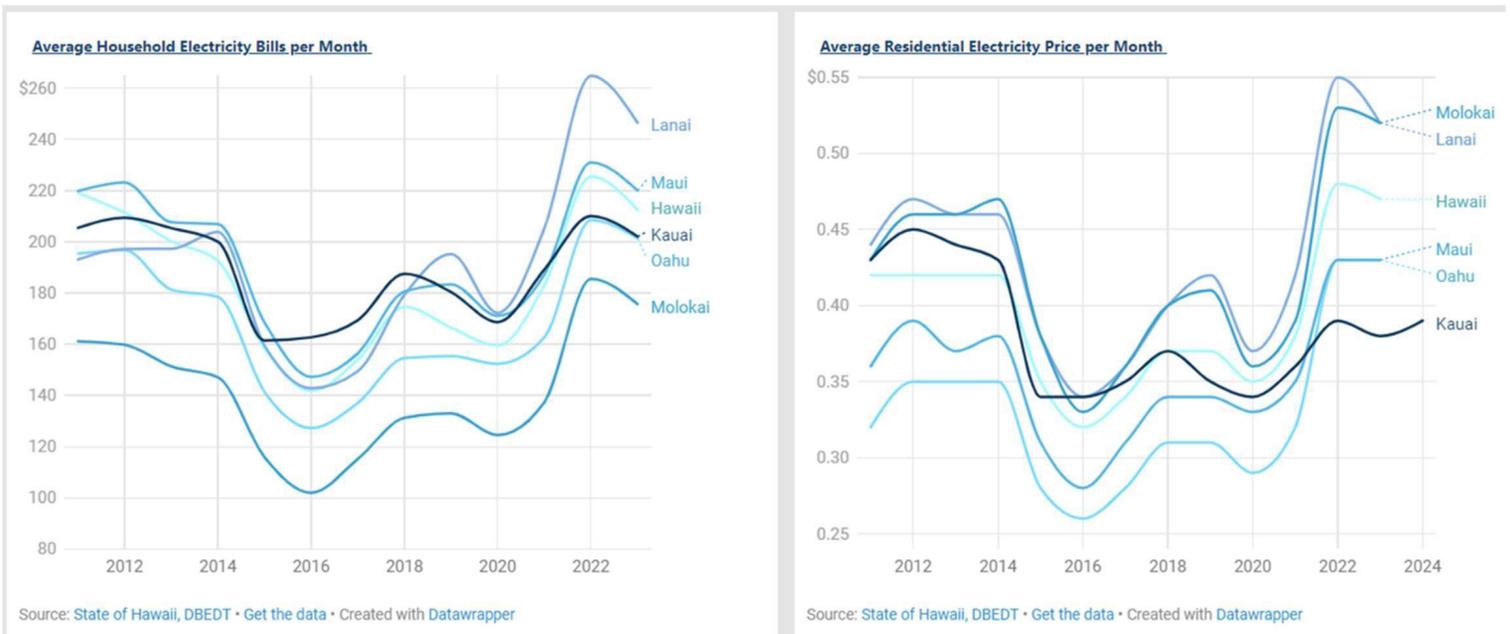


Figure 5: Average Household Electricity Bill per Month chart and Average Residential Electricity Price per Month chart

For example, it can be noted that Molokai has one of the highest electricity rates, however, one of the lowest household bills. One would assume a direct correlation between the electricity rate and electricity bill; however, this is not the case and warrants further investigation. Also, why does O’ahu, with the highest population, not have the lowest rates? Moreover, why did Kaua’i with the 4th largest population have the lowest rates? One can also begin to think about the price sensitivity or elasticity on demand for electricity.

4. **Compliance with Act 239-** State facilities energy usage data is available fulfilling Act 239’s requirement.
5. **Increased transparency and knowledge of energy related information.** And makes easy to understand data more accessible to the general population.

NEXT STEPS

The next step is to continue to add raw data sets and develop curated data sets to further enhance and improve benchmarking and analysis of energy policies while ensuring accessibility and transparency to the public. And to also increase public awareness further about the availability of this insightful and informative resource through outreach and work in the communities.