



# Hawai'i Natural Energy Institute Research Highlights

## Energy Policy & Analysis

### Hawai'i State Energy Office Support

**OBJECTIVE AND SIGNIFICANCE:** Following extensive discussions with the Hawai'i State Energy Office (HSEO), HNEI and HSEO identified several potential project areas in critical need of additional resources for continued progress for Hawai'i's energy transition. An agreement was reached for HNEI to support the HSEO to conduct work in various areas with the objective to address critical energy transition needs.

**BACKGROUND:** In February 2019, the Research Corporation of the University of Hawai'i, on behalf of the University of Hawai'i's HNEI entered into an agreement with the State of Hawai'i, Department of Business, Economic Development, and Tourism, State Energy Office to conduct work and accelerate state progress in the areas of Energy Efficiency, Renewable Energy Generation Diversification and Support, Grid Opportunity Assessment, and Clean Transportation. In July 2021, following a period of limited activity the agreement with DBEDT was modified to include the following activities:

Task 1: Renewable Energy (RE) Generation Diversification and Support to support professional and technical services, subject matter expertise, analysis, and/or support in the development and diversification of renewable energy generation toward meeting state energy policies and goals. The objective of this Task is to provide information and coordination assistance to facilitate permitting and interconnection of renewable energy projects to support project siting and reduce project conflicts and delays. This task explicitly included support for the Powering Past Coal task force in support of Act 23, Session Laws of Hawai'i 2020, and statewide coordination tasks assigned to the Hawai'i State Energy Office by Act 122, Session Laws of Hawai'i 2019, and in Chapters 125, 141, and 196 of the Hawai'i Revised Statutes.

Task 2: Grid Opportunity Assessment to support development of models for energy and decarbonization policy considerations for alternative pathways to achieve a particular end-state. HSEO proposed that a University of Hawai'i at Mānoa's Data Science Institute Fellow ("Fellow") will create and run modeling scenarios, generate datasets, and communicate the results with data visualizations to provide insights on the relative benefits and impacts

to the electric sector of achieving state policy through different strategies, such as straight fuel switching (gasoline to electric) versus a combination of fuel switching (gasoline to electric) and transportation efficiencies.

Task 3: Clean Transportation Transition Support is intended to support professional and technical services, subject matter expertise, analysis, and/or support to promote an accelerated transition to clean ground transportation and advance state transportation energy policies and goal. The objective of this task is to automate the collection and preparation of data sets, load the data into a database accessible to both internal and external stakeholders to the extent possible, perform analyses, and develop data visualizations to address policy and technology questions relevant to Hawai'i's transition to a net negative carbon economy by 2045.

**PROJECT STATUS/RESULTS:** HSEO has reported substantial progress in each of the three tasks. Highlights of those accomplishments by task are summarized below.

Task 1 RE Generation Diversification and Support:

- a) HSEO staff supported of the [Powering Past Coal Task Force](#), conducting approximately monthly meetings and development of a Master Schedule. Separately, HNEI developed an easy to use tool to assess monthly O'ahu grid reliability for different build-out scenarios for the Stage 1 and Stage 2 solar plus storage plants.
- b) HSEO staff participated in and provided input to a coordination effort convened by the County of Maui in response to a [Public Utilities Commission and Maui Electric Company letter](#). The Maui-focused group, the Maui County Accelerating Clean Energy and Decarbonization Implementation Technical (ACED-IT) Working Group, was intended to emulate the success of O'ahu's Powering Past Coal Task Force. As stated in the letter, "one of the lessons from retiring the AES coal plant on O'ahu is that cooperation with local government and community engagement improves the likelihood of success for the entire set of needed actions. Based on our successful experience with Governor Ige's Powering Past Coal Task Force

on O‘ahu, we are requesting an opportunity for similar collaboration with your Administration.”

- c) Important data, geospatial analysis, and general project development and permitting information have been provided to support the appropriate and effective siting of future renewable energy projects. Examples include maps used in presentations and on the HSEO website, input on land use ordinance revisions, estimates of greenhouse gas emissions, continued work on property tax issues, community outreach, and formal comments to the utility and Public Utilities Commission regarding the Stage 3 request for proposals seeking firm and renewable generation on O‘ahu, Maui, and Hawai‘i Island.

updated version of the HAVEN web application, an immersive data visualization tool tailor made to facilitate comparative analytics of capacity expansion and production cost scenario outputs. The decarbonization of transportation scenarios are expected to be prominent components of HSEO’s Act 238 Decarbonization Pathways report.

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#### Task 2 Grid Opportunity Assessment:

- a) The Fellow incorporated technology and resource inputs and specifications from Hawaiian Electric’s IGP Inputs and Assumptions workbooks into the O‘ahu and Hawai‘i Island open source Engage model developed by NREL. Baseline runs to test the model’s stability and ability to run scenarios that incorporate generic capacity expansion and existing generation resources have been performed.
- b) The Fellow supported development of written documentation detailing the source of all inputs, constraints, technology configurations, resource profiles that are in the current working HSEO’s O‘ahu and Hawai‘i Island Engage model.
- c) The Fellow has also provided support on the Maui, Moloka‘i, and Lāna‘i Engage models and the development of a data pipeline that will enable the outputs from capacity expansion and decarbonization scenarios that are run within engage to be loaded into the HAVEN web application for comparative analytics and immersive visualization.

#### Task 3 Clean Transportation Transition Support:

- a) The Fellow contributed to the development of an updated version of the HAVEN web application, immersive data visualization tool tailor made to facilitate comparative analytics of capacity expansion and production cost scenario outputs. The Fellow completed a beta version of an