Wai‘anae Moku Community Energy Plan

December 2025

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Disclaimer

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Authors

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The planning process that resulted in this strategic energy plan for the Wai‘anae moku was begun by Energize Wai‘anae Moku, an initiative of the LEI Foundation. Partner organizations in this initiative are:

- LEI Foundation, a community empowerment organization focused on increasing the literacy (competence or knowledge in any specified area) of communities through education, training, and career pathways development. The organization’s mission is “Empowering communities through literacy, meaningful engagement, and experiential learning.”
- Wai‘anae Sustainability Cooperative, an organization focused on developing a small community-based renewable energy project for about 80 Hawaiian Homestead homes.
- Sierra Club of Hawai‘i, who over the years has supported the Wai‘anae moku’s environmental needs with information, presentations, and facilitated conversations around stewardship of natural resources. In addition, the organization identified and tracked funding opportunities that align with our community’s environmental stewardship values and concerns around competing priorities with land use.
- Dibshawaii LLC, a Native-Hawaiian-owned dry ice blasting company established in 2009 in the Wai‘anae moku with an innovative solution to complex cleaning problems; lead partner of the Hawai‘i Carbon Capture Storage Utilization consortium founded in 2021.
- Hawai‘i State Energy Office (HSEO) and its Wayfinders who bring additional industry, policy, and legislative proficiency as well as act as interfaces between community and state legislators and departments (e.g., Hawaii Public Utilities Commission).
- National Laboratory of the Rockies (NLR), which administers the U.S. Department of Energy’s Energy Technology Innovation Partnership Project (ETIPP) and provided direct technical assistance throughout this energy planning process.

Mahalo to the following members of the energy planning team who, in addition to report authors, met regularly during development of this plan and contributed to planning and facilitating community workshops and meetings:

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- Kapua Keliikoa-Kamai, Wai‘anae Sustainability Cooperative

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- Center for Resilient Neighborhoods
- City and County of Honolulu Board of Water Supply
- City and County of Honolulu Department of Environmental Services
- City and County of Honolulu Department of Planning and Permitting
- City and County of Honolulu Office of Climate Change, Sustainability and Resiliency
- Department of Hawaiian Home Lands
- Hawaiian Electric
- Leeward O‘ahu School District, particularly the Wai‘anae High School’s Career and Technical Education program
- O‘ahu Metropolitan Planning Organization
- State of Hawai‘i Department of Transportation
- Wai‘anae Coast (#24) and Nānākuli-Mā‘ili (#36) Neighborhood Boards
- Wai‘anae Coast Comprehensive Health Center and `Elepaio Social Services
- Wai‘anae Economic Development Council
- Wai‘anae moku Hawaiian civic clubs
- Wai‘anae moku Hawaiian Homestead associations
- Wai‘anae moku farming, agriculture, and business leaders

- Waiʻanae moku community and social services organizations
- Honolulu City Councilmember Andria Tupola
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- Former state legislators Senator Maile Shimabukuro and Representative Cedric Gates

Mahalo to Waiʻanae moku community members who participated in past learning sessions in 2022-2024 and workshops held in February and July 2025 to share their manaʻo (i.e., thoughts, ideas, beliefs) on community values and priorities; strengths and challenges; energy focus areas; and project ideas for the moku.

List of Acronyms

DER	distributed energy resources
DOE	U.S. Department of Energy
ETIPP	Energy Technology Innovation Partnership Project
GWh	gigawatt-hour
HSEO	Hawai‘i State Energy Office
LEI	Leeward Empowerment Initiatives
MW	megawatt
NLR	National Laboratory of the Rockies
PV	photovoltaic

Executive Summary

The energy landscape of O‘ahu and in Hawai‘i is dynamic, with state and local government entities and organizations developing and enacting plans, policies, and projects to shape the state’s energy future. Organizations representing communities in the Wai‘anae moku (district or region), on the leeward coast of O‘ahu have begun an energy planning process and developed this *Wai‘anae Moku Community Energy Plan, Version 1* to join the conversation. This plan asserts energy priorities identified by community members, articulating what participants in the process do and do not want to see in pursuit of an affordable, reliable, resilient energy future for the moku, in accordance with existing policies and regulations, and advancing changes as needed.

This plan is a work in progress. Version 1 was developed through a structured planning process with a deadline for completion. The energy planning team will continue to work with the community and interested parties to further develop and implement the plan. The geographic planning area, which aligns with that of the Wai‘anae Sustainable Communities Plan (City and County of Honolulu Department of Planning and Permitting, n.d.) is shown in Figure ES-1.

Figure ES-1. Wai‘anae Sustainable Communities Plan planning area

Figure from the City and County of Honolulu Department of Planning and Permitting (n.d.)

This plan was developed by an energy planning team convened by the Leeward Empowerment Initiative (LEI) Foundation with input from community members and interested parties. The process was supported by the U.S. Department of Energy’s (DOE’s) Energy Technology Innovation Partnership Project (ETIPP), with direct support from the National Laboratory of the Rockies (NLR, formerly known as the National Renewable Energy Laboratory or NREL) and Hawai‘i State Energy Office (HSEO) as the ETIPP regional partner for Hawai‘i and the Pacific territories.

LEI Foundation and its partners sought support for the planning process to help address persistent challenges in realizing Wai‘anae moku’s energy vision. These challenges included accessing objective and trusted data, gaining knowledge and expertise on leading-edge technologies and processes, and receiving guidance on evaluating their appropriateness for the community. Community motivations for seeking support are described further in Section 2.1; additional motivations adapted from the community’s ETIPP application are provided in Appendix A.

The primary elements of this plan are a statement of the community’s energy vision (Section 5), energy goals against which to measure progress toward realizing the vision (Section 6), and priority energy projects to achieve the goals (Section 7), based on energy focus areas identified by process participants (Section 4.3). These elements are depicted in Figure ES-2.

The plan also describes the approach taken by the energy team to develop the plan (Section 2), and results of community engagement aimed at defining the community’s values, priorities, strengths, and challenges as they pertain to the community’s energy future (Section 4). The plan includes summaries of related plans and how they intersect with and may conflict with this one (Section 3), and concludes with considerations for implementation of priority projects (Section 8).

As part of its support, NLR conducted an energy baseline assessment and provided considerations and resources for priority projects identified by the community. A summary of the energy baseline is included in this plan (Section 2.2), and detailed results of both activities are available in a separate NLR report, *Energy Baseline Assessment and Project Considerations for the Wai‘anae Moku Community Energy Plan* (Burton forthcoming).

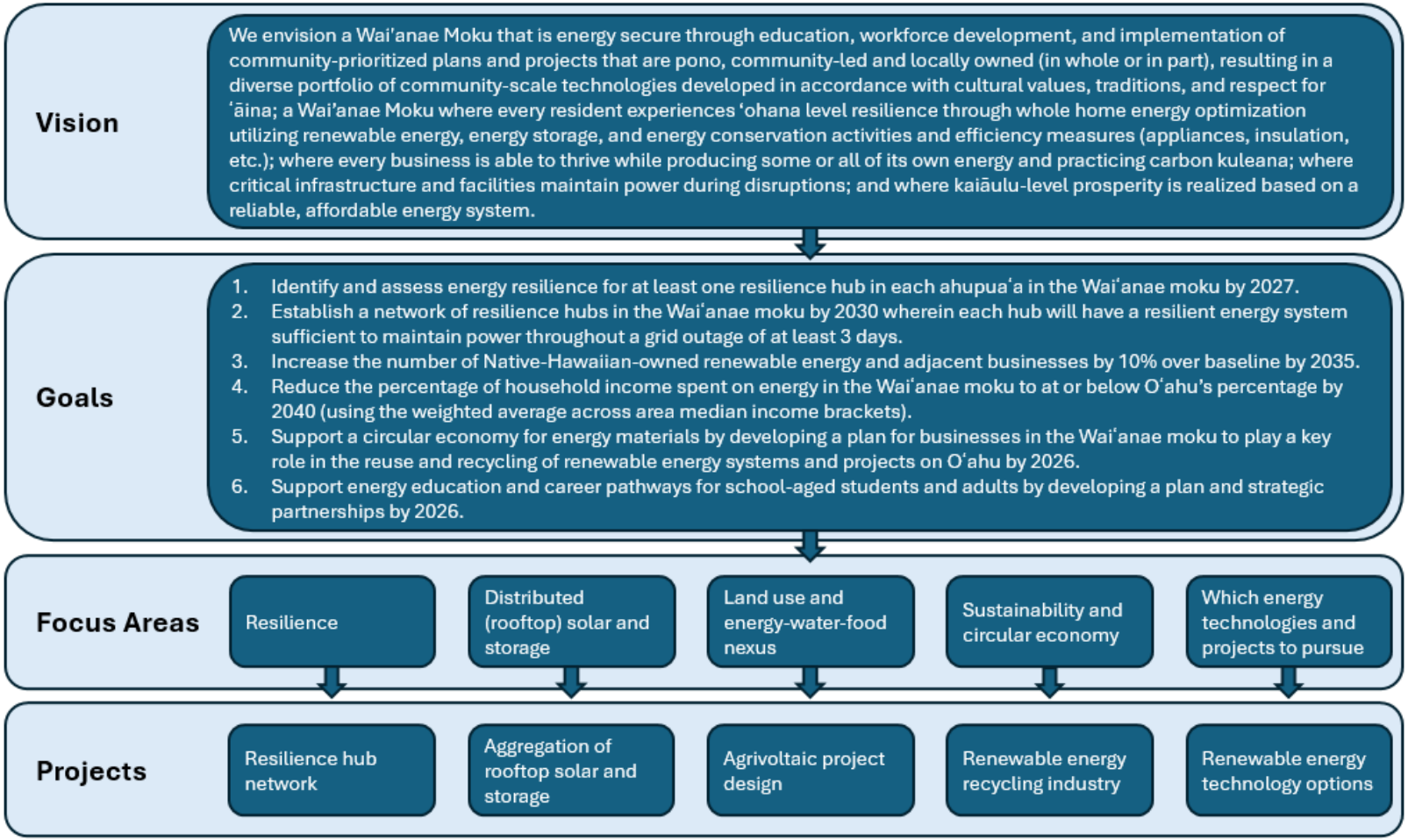

Figure ES-2. Waiʻanae community energy vision, goals, focus areas, and projects

Figure by NLR

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1 Introduction

A strategic energy plan is a roadmap to achieving community energy goals in both the near and long term. The goals are determined by input from people and organizations with a vested interest in local energy projects and activities, leading to a greater likelihood of success over time. The energy planning process considers current reality and leverages local resources; clarifies community energy priorities; identifies high-impact potential projects; maps a path to achieve energy goals; and documents a plan for short- and long-term success.

This plan is a work in progress. Version 1 was developed through a structured planning process with a deadline for completion. The energy planning team will continue to work with the community and interested parties to further develop and implement the plan.

The geographic focus area of the plan is the eight[1] ahupua‘a (land division usually extending from the uplands [mauka] to the sea [makai]) that comprise the Wai‘anae moku, shown in Figure 1.

Figure 1. Wai‘anae Sustainable Communities Plan planning area

Figure from the City and County of Honolulu Department of Planning and Permitting (n.d.)

[1] The area includes the ahupua‘a of Lualualei, which has been combined with Wai'anae in this map.

The primary purpose of this *Wai‘anae Moku Community Energy Plan* is to articulate the community’s vision and goals for its resilient, thriving energy future and identify and prioritize energy projects to help achieve its goals. This plan is intended for multiple audiences and purposes. It was developed through a community-based planning process, led by an energy planning team convened by the Leeward Empowerment Initiative (LEI) Foundation, that entailed approximately 10 months of weekly planning sessions, community workshops, and stakeholder meetings to elicit the community’s energy vision, goals, and priorities (see Section 2 for details).

For elected officials, policymakers, electric utility, public utility commission, developers, and other interested parties, this plan documents what the community does and does not want for their energy future. It is a community-led companion to existing plans developed by other entities, mainly the *Wai‘anae Sustainable Communities Plan* (City and County of Honolulu Department of Planning and Permitting n.d.), currently being updated, as well as others described in Section 3.

For Wai‘anae moku community members, the aim is to foster a sense of ownership of this plan, and for the community to use it to help influence decisions they make and how they live, today and for future generations. In addition, this plan can serve as an educational resource by providing information on past and ongoing energy-related community engagement, other relevant plans, and descriptions of focus areas and potential projects.

This community energy plan was developed in the context of Hawai‘i’s dynamic energy planning landscape. The state has set the following ambitious targets for renewable energy generation and emissions, along with one set by mayors on transportation:

- Hawai‘i passed the first renewable portfolio standard in the United States, calling for 100% of electricity sales to come from renewable energy by 2045 (Act 97 2015)
- Net-negative carbon emissions by 2045 (Act 15 2018) and greenhouse gas emissions at least 50% below 2005 levels by 2030 (Act 238 2022)
- Climate emergency declaration and request for collaboration toward a mobilization effort (Senate Concurrent Resolution 44 2021)
- Public and private ground transportation powered by 100% renewable fuel sources by 2045 (Hawai‘i Mayors 2017).

Hawaiian Electric’s *Integrated Grid Plan* (2023b) and supplemental *IGP: Preferred Plans and Next Steps* (Hawaiian Electric 2023a) lay out a near-term action plan and long-term strategy to meet efficiency, affordability, and reliability goals for customers in its service territory, based on stakeholder engagement and energy system modeling. A new round of integrated grid planning is scheduled to begin in 2025. The preferred plan for O‘ahu is based on a scenario that assumes limited land availability for renewable energy development due to “current land use policies and the balancing of competing state goals for affordable housing, food sustainability and renewable energy” (Hawaiian Electric 2023a). This land-constrained preferred plan would

achieve 55% renewable energy for the island by 2030 and 83% by 2035, the equivalent of a 5-year delay in achieving the same proportion of renewable energy in the base plan scenario.

Figure 2 shows the current and projected mix of installed capacity for electricity generation on O‘ahu by resource type per year from 2023 through 2045, when nonrenewables are planned to be phased out.

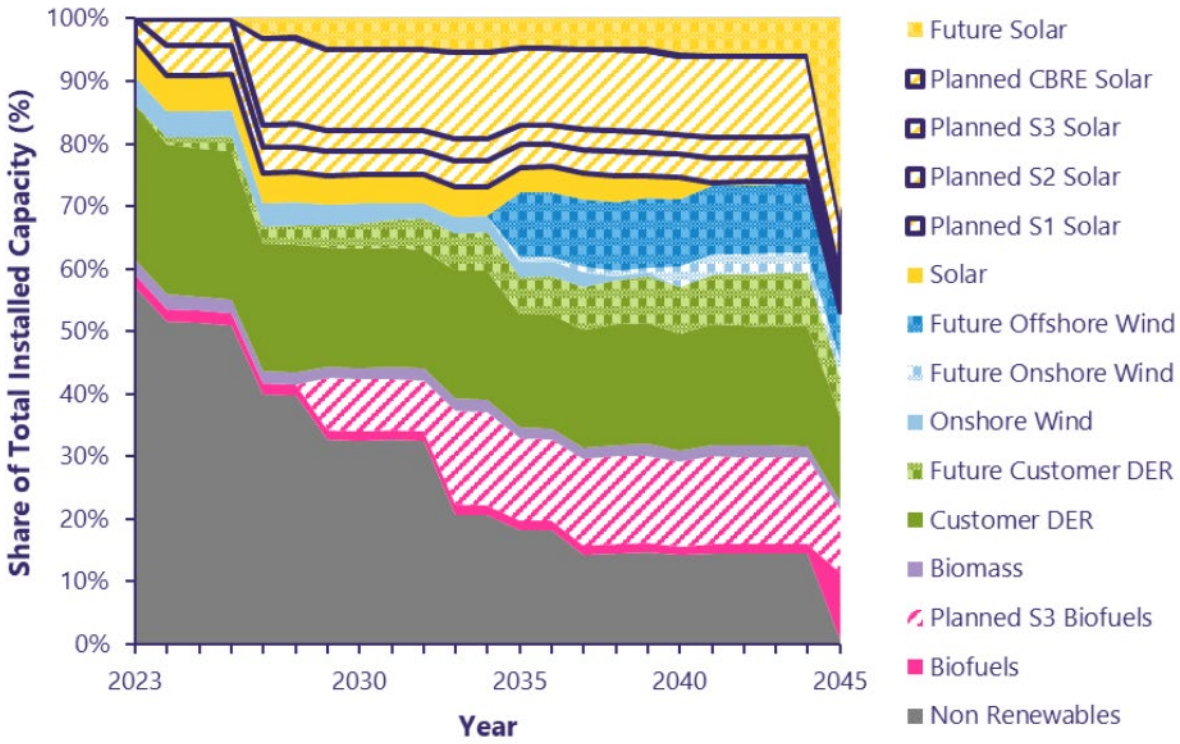


Figure 2. Electric installed capacity mix in Hawaiian Electric's *Integrated Grid Plan Preferred Plan and Next Steps* for O‘ahu, 2023–2045

Note: CBRE = community-based renewable energy; S1, S2, and S3 refer to stages of renewable energy procurement by the utility; DER = distributed energy resources

Image from Hawaiian Electric (2023)

Recently, the governor of Hawai‘i took action to address concerns about energy cost, reliability, and achieving the state’s renewable energy targets. In January 2025 the governor issued Executive Order 25-01 to accelerate Hawai‘i’s renewable resource development to reduce energy costs, prevent blackouts, and reduce emissions (State of Hawai‘i Office of the Governor 2025; Governor of Hawai‘i 2025). The executive order outlines new policy directives for the state, including accelerated renewable development goals for all islands other than O‘ahu to achieve 100% renewable energy by 2035, setting a statewide goal of 50,000 additional distributed renewable energy installations by 2030, and directing state departments to streamline and accelerate permitting of renewable energy projects. For its part, the Hawaii Public Utilities Commission outlined four primary initiatives that support implementing the executive order, including a projected timeline of related docket proceedings (Hawaii Public

Utilities Commission 2025).[2] The subsequent passage in July 2025 of Hawai‘i State Bill 589, “Relating To Renewable Energy,” codifies these and other directives (State Bill 589 Relating To Renewable Energy 2025).[3]

The governor also directed the Hawai‘i State Energy Office to assess new strategies to ensure affordable energy, attract capital, and build a resilient energy system by developing a comprehensive energy strategy to accelerate the replacement of residual fuel oil in electricity generation and foster investments in grid infrastructure and power generation. The resulting Alternative Fuels, Repowering, and Energy Transition Study (Hawai‘i State Energy Office 2025), released in January 2025, finds that land availability and other factors indicate that local energy supply is insufficient to meet both current and forecasted demand, and calls for using liquified natural gas as a temporary replacement for fuel in thermal power plants on O‘ahu, during the transition to renewable energy. The study also states that intermittent renewables (e.g., solar, wind) have not been developed at the scale and pace required to fully retire power plants as described in the current grid planning efforts. Reasons given in the study for slow deployment include lengthy regulatory and permitting processes, interconnection challenges, community opposition and concerns, supply chain delays, and difficulty securing financing.

The role of this plan in the context of these and other plans is to join the conversation and guide decision-making by stating what this community wants and does not want for its energy future.

[2] The four Public Utilities Commission initiatives are 1) power purchase agreement applications for renewable energy generation, 2) distributed energy resources (DER) and grid services policies and programs, 3) efforts associated with integrated grid planning, grid modernization, and resilience, and 4) community-based renewable energy programs.

[3] SB589 requires the Public Utilities Commission to establish an installation goal for customer-sited DERs; tariffs to achieve the goal and for grid services programs, microgrids, and community-based renewable energy; grid service compensation values; and policies and procedures to implement wheeling and microgrid service tariffs. (Wheeling is the transmission of electricity from one source of renewable energy generation or storage through a utility meter for use by a separate account holder.) The bill also ensures that certain levels of compensation are provided for solar and energy storage exports from customer-sited DERs as part of grid service programs; clarifies when a person who constructs, maintains, or operates a new microgrid is not considered a public utility; and authorizes wheeling of renewable energy.

2 Approach

The LEI Foundation received support for the energy planning process that produced this plan through the U.S. Department of Energy’s (DOE’s) Energy Technology Innovation Partnership Project (ETIPP). ETIPP helps coastal, remote, and island communities in the United States increase their ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from energy disruptions.

ETIPP offers two technical support tracks: strategic energy planning and deep-dive technical assistance. Strategic energy planning is a 4- to 8-month effort that supports communities in developing actionable goals for their energy planning. Regional partners and supporting national lab technical experts work with communities to guide the planning effort, resulting in a completed strategic energy plan. For this plan, ETIPP support was provided by a technical team from the National Laboratory of the Rockies (NLR) and regional partner Hawai‘i State Energy Office (HSEO).[4]

The deep-dive technical assistance track is for communities with an existing and current energy plan or specific project that fits within the scope and purview of ETIPP. This track can be between 12 and 24 months and results in a thorough analysis led by national laboratory technical subject matter experts. The Wai‘anae moku is one of 25 communities in ETIPP’s fourth cohort and is in the strategic energy planning track. One intended outcome of this plan is to prepare the community to potentially receive follow-on ETIPP technical assistance on a project focused on its unique energy goals.

Strategic energy planning outlined by the ETIPP program entails seven steps, which the Wai‘anae community followed closely (shown in Figure 3).

[4] Hawai‘i State Energy Office announced that it was selected by the National Renewable Energy Laboratory to be the Energy Technology Innovation Partnership Project regional partner for Hawai‘i and the Pacific territories in this May 2025 press release: https://energy.hawaii.gov/hseo-named-regional-partner-for-etipp/.

Energy Planning Steps and Objectives

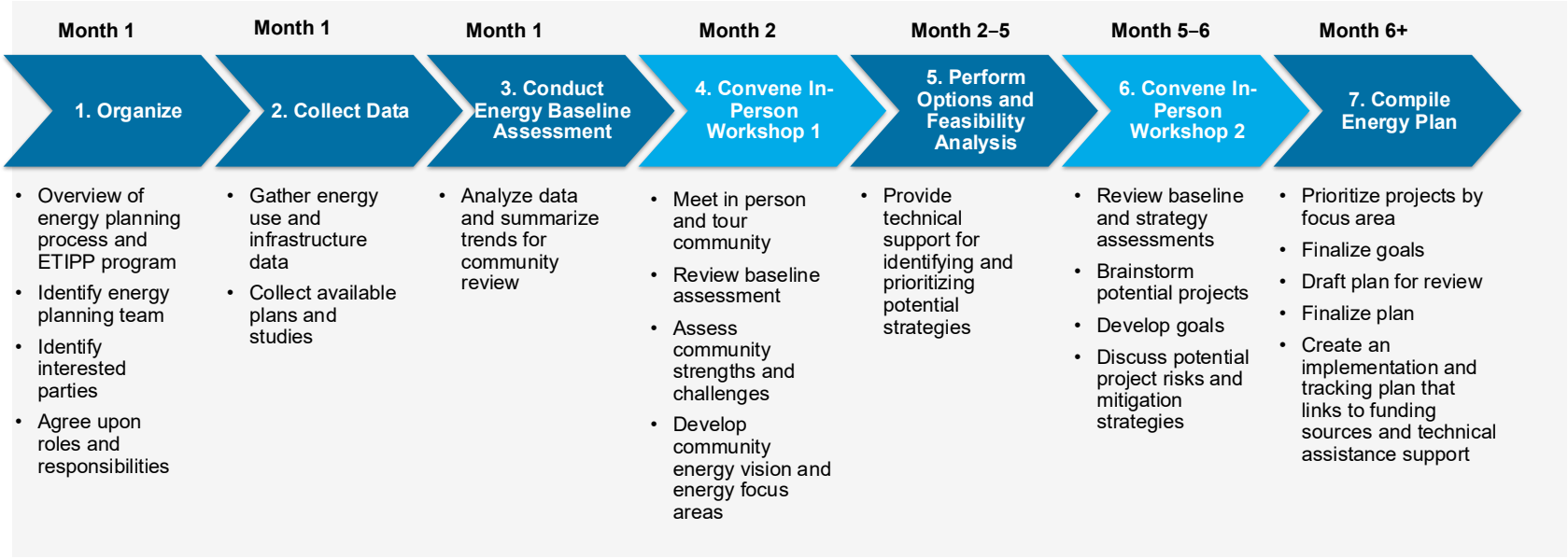


Figure 3. Steps in the 4- to 8-month ETIPP strategic energy planning process

Figure by NLR

2.1 Background and Organization

The first step in the planning process—organize—includes identifying the energy planning team and interested parties, and agreeing upon roles and responsibilities. The energy team for this plan was formed in 2023 in a previous phase of community organizing around energy, during which interested parties were identified and engaged. In this phase, the Energize Wai‘anae Moku initiative was launched by LEI Foundation with support from DOE’s Community Energy Innovation Prize.[5] The objective of Energize Wai‘anae Moku is to cultivate a community that is well-versed and adept at navigating and engaging in renewable and resilient energy spaces by:

- Identifying and training energy champions
- Guiding policy and directing resources
- Leading our own initiatives and supporting community ownership of projects
- Developing local experts with education-to-career pathways, workforce development, and small business/ entrepreneurship development opportunities
- Establishing strong and strategic partnerships and collaborations
- Developing a community energy plan to guide decision-making.

Activities in this phase included community workshops, focus groups, career development for ‘ōpio (youth) on community-led energy design and circular economy, and contributing to revising the Wai‘anae Sustainable Community Plan. Contributing partners to the Energize Wai‘anae Moku initiative are LEI Foundation, Wai‘anae Sustainability Cooperative, Sierra Club of Hawai‘i, Dibshawaii LLC, and HSEO’s Wayfinders program. Additional partners and interested parties are listed in the Acknowledgements section.

Roles and responsibilities of contributors to strategic energy planning for the Wai‘anae moku are shown in Figure 4.

[5] LEI Foundation’s participation in Round 1 is mentioned in a Clean Technica post (2024), https://cleantechnica.com/2024/03/26/u-s-department-of-energy-announces-1st-round-of-community-energy-innovation-prize-winners-for-the-clean-energy-ecosystem-manufacturing-ecosystem-tracks/.
Information about Round 2 is on HeroX: https://www.herox.com/CommunityEnergyInnovation-Round2.

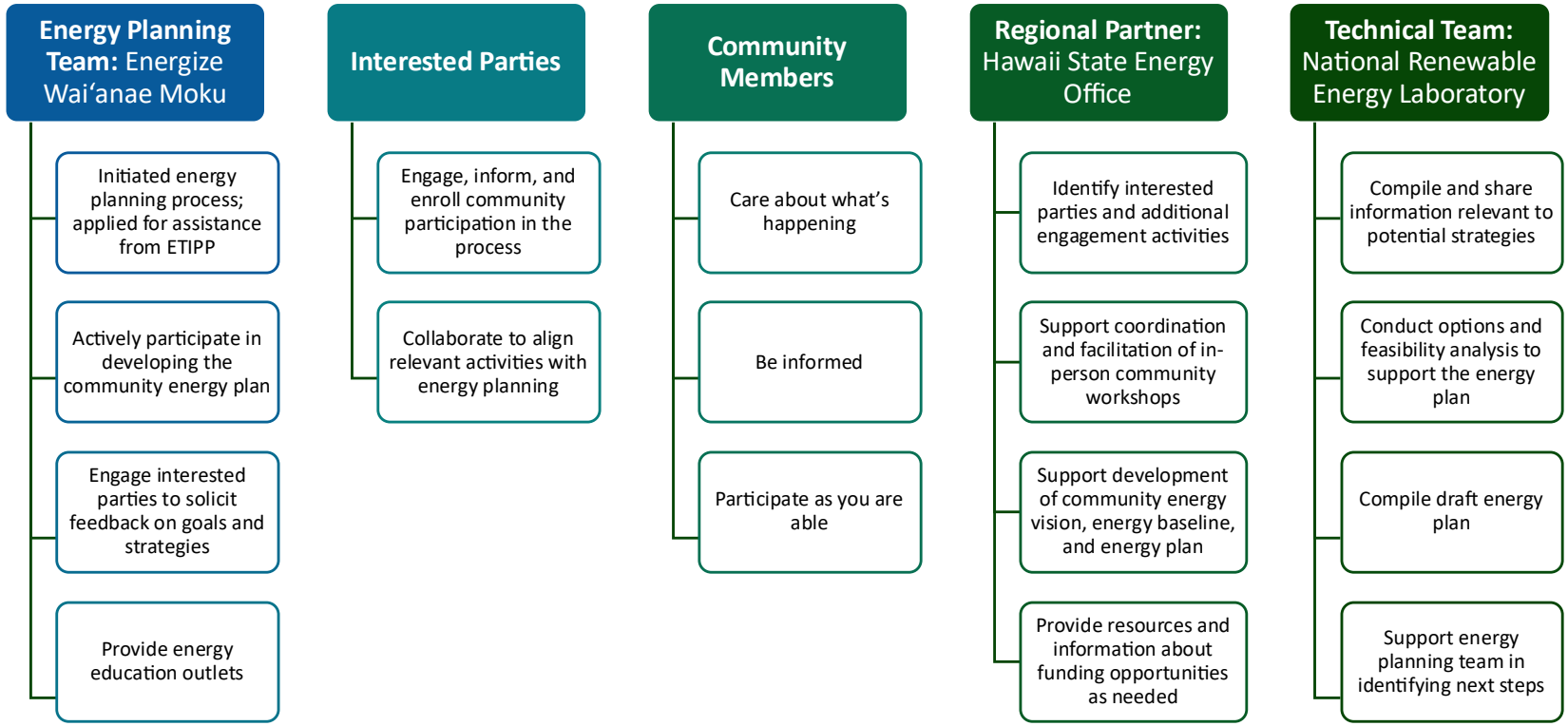


Figure 4. Roles and responsibilities in ETIPP strategic energy planning for Wai‘anae moku

Figure by NLR

2.2 Data Collection and Assessing the Community’s Energy Baseline

The next steps in the energy planning process were to collect data and establish an energy baseline to support informed community participation. This baseline assessment helps to ensure participants have a common understanding of the current energy landscape, and to help inform future planning and goal-setting. To conduct the assessment, NLR used publicly available data to better understand aspects of the energy landscape in Hawai‘i, on O‘ahu, and in the Wai‘anae moku. Results are available in a separate publication from NLR (Burton forthcoming).

Key takeaways from this baseline energy assessment are as follows (see the Burton report [forthcoming] for corresponding figures and references):

- In 2023, 29.6% of electric generation capacity[6] on O‘ahu was from renewable sources (e.g., 14.7% customer-sited solar, 6.4% grid-scale solar, 4.4% waste-to-energy [H-Power], 3.8% wind, 0.2% biofuels).
- In 2023, 33% of electric generation[7] in Hawai‘i was from renewable sources (e.g., 13% small-scale solar, 6% large-scale solar, 6% wind energy, 3.2% geothermal, 2.6% bioenergy, 1.6% other, 0.8% hydroelectric); the remaining 67% was from combustion of liquid petroleum (coal was phased out in 2022).
- In 2023, 45.1 megawatts (MW) of electric generation capacity was located in the Wai‘anae moku; 695.1 MW if Hawaiian Electric’s Kahe Power Plant is included. In 2024, this resulted in the generation of 64 gigawatt-hours (GWh) of electricity; 2,614 GWh if Kahe is included.
- In 2023, total electricity use in the Wai‘anae moku was about 170 GWh. This equates to greater than 2.5 times the amount of electricity generated locally if Kahe is not included, and 6.5% of net generation if Kahe is included.
    - In 2023, residential customers accounted for 54.4% of total electricity use in the Wai‘anae moku (92.5 GWh), followed by other (16%), U.S. military (12.1%), office (6.8%), and education (5.5%).
- Hawai‘i has the highest electricity prices in the United States (more than 2 times the national average (sometimes as high as 3 times or more). The average residential price in November 2024 was (in cents/kilowatt-hour):
    - United States: 17.01
    - Hawai‘i: 39.62.

[6] Capacity is the maximum amount of electric power (electricity) that a power plant can supply at a specific point in time under specific conditions.
[7] Generation is the amount of electricity produced by sources of electricity, typically reported in kilowatt-hours or megawatt-hours.

- Electricity prices in Hawai‘i vary by island. The average residential price on O‘ahu in 2023 was 43.22 cents/kilowatt-hour.
- The *simple* average percentage of household income spent on energy is higher in census tracts in the Wai‘anae moku (ranging from 3%–4% for all income levels combined) than elsewhere on O‘ahu (as low as 1%–2% in some areas).
    - Comparing geographic areas, the *weighted* average percentage of household income spent on energy across area median income brackets is highest in the Wai‘anae moku (7.15%), followed by the state of Hawai‘i (4.44%), then O‘ahu (4.02%).
    - The average percentage of household income spent on energy is highest for low-income households (those earning 0%–30% of area median income) in Wai‘anae, O‘ahu, and Hawai‘i, and decreases as income increases.
- Available hosting capacity for solar photovoltaics (PV) in the Wai‘anae moku ranges from up to 5% in Wai‘anae to 50% and greater in Nanakuli.
- The estimated capacity and annual generation for rooftop solar PV and total estimated developable area and generation capacity for large-scale solar PV and land-based wind are shown in Table 1 and Table 2, respectively. See NLR’s interactive Carto maps for alternate scenarios and results for each resource.[8]

Table 1. Estimated Capacity and Annual Generation for Rooftop Solar PV in the Wai‘anae Moku

Type	Capacity	Annual Generation
Rooftop solar PV	355 MW	600 GWh

Table 2. Estimated Developable Area and Generation Capacity for Large-Scale Solar PV And Land-Based Wind

Type	Area	Capacity
Large-scale solar (PV 1–5 scenario)	3.88 square kilometers (km^2)	92 megawatts alternating current (MW_{AC})
Land-based wind (Wind 1–20 scenario)	13.50 km^2	39.5 MW_{AC}

[8] NLR leveraged existing renewable energy resource data from Grue et al. (2020) to provide this quick-response assessment and make the results publicly accessible. Analysis of additional sources of energy generation could be conducted as part of follow-on technical assistance through ETIPP or another program. Solar PV: https://clausa.app.carto.com/map/b4324528-0709-47e0-a7ec-45759834b14c?lat=21.470049&lng=-158.193893; Wind: https://clausa.app.carto.com/map/8a432817-6350-4407-a845-848c4f009eea

2.3 Community Workshops and Meetings

As part of the energy planning process, from February through July 2025, the planning team, with support from NLR and HSEO, engaged with the Wai‘anae community in a variety of formats to ensure local perspectives and priorities were reflected in the plan, and to foster a sense of ownership. The team facilitated two community workshops (Figure 5 and Figure 6), held two virtual meetings and multiple one-on-one conversations with interested parties, and spoke at workshops and meetings held by others. In addition, the team notified the community about workshops by distributing flyers in person and by email (see Appendix B for the workshop 2 flyer).

Through these engagements, the team introduced the planning process and invited participants to share their mana‘o (i.e., thoughts, ideas, or beliefs) on community values and priorities, strengths and challenges, priorities for energy topics and projects to pursue, and energy goals to work toward and measure progress against. In preparation for these workshops, HSEO led development of handouts or “cheat sheets” for participants to provide information on the planning process and support community learning about energy issues for Wai‘anae moku (see examples in Appendix C).

The results of these engagements are summarized in Section 4, Section 5, and Section 6. Interested parties engaged through the process are listed in the Acknowledgments section.

Figure 5. Photo from community workshop 1 on February 3 at Community Learning Center at Māʻili

Photo from Kapua Keliikoa-Kamai, Wai‘anae Sustainability Cooperative

Figure 6. Photo from community workshop 2 on July 16 at Leeward Community College—Wai‘anae Moku

Photo from Robin Burton, NLR

2.4 Priority Projects and Considerations

A cornerstone of this plan is the identification, based on community mana‘o, of priority energy projects for the community to pursue, and high-level considerations to lay the foundation and provide additional background information related to each project idea. The list of projects was derived from initial community input on values, priorities, and focus areas, and was ranked in order of priority during subsequent meetings and events. See Section 7 for the list of project ideas, and Burton (forthcoming) for considerations and resources.

3 Related Plans and Activities

Many existing plans at the state, county, and moku level intersect with, relate to, and in some instances may conflict with energy planning for the Wai‘anae moku. These plans are created by county and state government agencies and other organizations, in addition to Hawaiian Electric. They include varying levels of community input and are developed and updated on different cadences. Some plans are binding and are expected to lead to concrete action, whereas others are more conceptual or aspirational, and it is not always clear which category each plan falls into, or who is responsible for implementation and accountable for impacts.

Topics addressed by existing plans include resilience, climate action, energy, transportation, and general planning. As part of this process, the team identified and reviewed plans that may be relevant to this one; summaries of the plans and an assessment of relevance are provided in this section. How relevant each plan is to this one depends heavily on the energy focus area and projects being considered. For example, transportation plans would be very important if considering a project related to electric vehicle charging. However, if evaluating something like aggregated rooftop solar, a transportation plan may be less directly applicable.

3.1 Action 15 Project Final Report

Center for Resilient Neighborhoods and City and County of Honolulu Office of Climate Change, Sustainability and Resiliency (2023);
https://drive.google.com/file/d/1ovCV5bR9gYulLA3Tjwp6janWLrqRZ7vy/view

The Action 15 Project is very relevant to energy planning in Wai’anae moku. Through the project, which refers to one of 44 actions identified in the *O‘ahu Resilience Strategy*, organizers conducted analysis and engaged with organizations and community members to identify potential sites and services to be provided by a network of resilience hubs, with the aim of selecting a primary hub site for each moku. In the first phase of the project, a suitability analysis to identify potential hub sites considered survey results on community support for microgrids, proximity to critical infrastructure, hazard vulnerability, transportation accessibility, social vulnerability, and hazardous sites. In the second phase, participants in community engagement workshops evaluated maps of potential hub locations, selection criteria, and services to be provided, and made recommendations on next steps. Coordination with lead organizations will be key for implementing energy resilience hubs in the moku.

3.2 Climate Action Plan 2020–2025

City and County of Honolulu Office of Climate Change, Sustainability and Resiliency (2021);
https://www.resilientoahu.org/climate-action-plan

The 2020–2025 Climate Action Plan for the City and County of Honolulu is very relevant to energy planning in Wai‘anae moku. The plan outlines critical actions like expanding renewable energy through rooftop solar installations on homes, businesses, and city-owned properties; prioritizing city lands such as parking lots and rights-of-way for distributed energy projects;

streamlining permitting processes to accelerate community-level solar adoption; and integrating renewable energy into city operations. It also calls for electrifying the public bus fleet and other city vehicles to reduce reliance on fossil fuels and boosting energy efficiency through updated building codes and retrofits for city-managed affordable housing.

3.3 Hawai‘i Pathways to Decarbonization

Hawai‘i State Energy Office (2023); https://energy.hawaii.gov/what-we-do/clean-energy-vision/decarbonization-strategy/

A 2023 report from the Hawai‘i State Energy Office is somewhat relevant to energy planning for the Wai‘anae moku. It identifies challenges and analyzes paths to statewide emissions reductions. It finds that “demand or load reductions resulting from aggressive energy efficiency measures are the most cost-effective measures to reduce emissions.” As of April 2025, most recommendations within the report had not been implemented. With its statewide focus, the report has few specific impacts on Wai‘anae moku energy planning; however, its findings regarding the importance of energy efficiency, electrification of transportation, and workforce development and education can serve as guiding principles.

3.4 Integrated Grid Plan and Preferred Plans and Next Steps

Hawaiian Electric (2023); https://hawaiipowered.com/igpreport/

Hawaiian Electric's Integrated Grid Plan is very relevant to energy planning in the Wai‘anae moku. It includes analysis and planning for O‘ahu, Maui, and Hawai‘i Island’s electric grids to reach the 100% renewable portfolio standard while providing reliable electricity. Of greatest relevance to Wai‘anae moku are planned electricity generation retirements and installations outlined in the preferred plans for each island. Although the retirement of plants is location-specific, new resource procurement is tied to competitive bidding and developer-selected land parcels. Each round of the Integrated Grid Plan includes more community engagement, and the Wai‘anae moku’s opposition to further utility-scale projects has been noted.

3.5 O‘ahu General Plan

City and County of Honolulu Department of Planning and Permitting (2021); https://www8.honolulu.gov/dpp/planning/applying-for-changes/city-and-county-general-plan/

Sections of the O‘ahu General Plan relevant to Wai‘anae energy planning are on transportation and utilities and energy systems; sections that are somewhat relevant include natural environment and resource stewardship and public safety and community resilience. The plan emphasizes the importance of environmental sustainability, and lists examples such as taking action to adapt, mitigate, and respond to the climate crisis; efficient building design to reduce energy consumption; protecting agricultural, natural, and cultural resources; and using renewable energy sources. This general plan for O‘ahu is the top tier of a planning process that includes community development plans, such as the Wai‘anae Sustainable Communities Plan.

3.6 O‘ahu Regional Transportation Plan 2045

O‘ahu Metropolitan Planning Organization (2021); https://oahumpo.org/ortp/

The O‘ahu Regional Transportation Plan is somewhat relevant to energy planning. The plan describes the vision and goals for the future transportation network of O‘ahu, as well as related projects and programs. The section on transportation resilience is particularly relevant, because as a coastal community with one primary access route by land, Wai‘anae experiences the realities of delayed emergency response, long commute times, and lack of multimodal transportation.

3.7 Priority Climate Action Plan and Climate Action Pathway

State of Hawai‘i (2024); https://climate.hawaii.gov/hi-mitigation/

The Hawai‘i Priority Climate Action Plan includes two measures that are relevant to energy planning in Wai’anae moku, notably the statewide Affordable Green Housing Retrofit Program (priority 5) and the statewide Energy for State and County Buildings initiative (priority 17). Other somewhat-relevant initiatives in the Priority Climate Action Plan include Skyline Connect for Rapid Transit (priority 1) and Shared Micromobility Expansion (priority 3), which reduce fossil-fuel dependence in O’ahu’s transportation sector, indirectly addressing energy goals.

3.8 Wai‘anae and Lualualei Regional Plan 2018

Department of Hawaiian Home Lands (2018); https://dhhl.hawaii.gov/wp-content/uploads/2019/09/Wai%CA%BBanae-Lualualei-RP2018.pdf

The Department of Hawaiian Home Land's 2018 Wai‘anae and Lualualei Regional Plan is somewhat-relevant to energy planning in Wai‘anae moku. Although the plan promotes broad goals of community self-sufficiency and mentions the potential for renewable energy development in passing (especially in discussions of self-sufficiency, natural-disaster preparedness, and possibly Kaupuni Village’s green building efforts), it does not contain focused or actionable strategies for clean energy transition, workforce development, or community energy ownership. Instead, the plan's energy-related mentions are secondary to its main focus on disaster preparedness, homestead infrastructure maintenance, safety, and community spaces.

3.9 Wai‘anae Sustainable Communities Plan

City and County of Honolulu Department of Planning and Permitting (2012); https://www.waianaescp.org/

The Wai‘anae Sustainable Communities Plan emphasizes sustainability and environmental stewardship, which are relevant to energy planning in the Wai‘anae moku. The plan advocates for renewable energy sources, energy-efficient infrastructure, and alternative energy systems, such as solar water heating, photovoltaics, and biofuels. The plan also encourages new developments to be powered at least 50% by alternative energy sources, aligning with the

community's desire for self-sufficiency and reduced reliance on imported energy. The focus on renewable energy and energy-efficient systems supports the long-term health of the Wai‘anae moku and aligns with broader goals of reducing carbon emissions and promoting efficient technology.

3.10 Wildfire Safety Strategy 2025–2027

Hawaiian Electric (2024); https://www.hawaiianelectric.com/documents/safety_and_outages/wildfire_safety/2025-2027_wildfire_safety_strategy.pdf

Hawaiian Electric’s Wildfire Safety Strategy 2025–2027 is relevant to energy planning in the moku. The strategy assesses wildfire risk in the utility’s service territory and discusses strategies to mitigate it. A map of wildfire risk areas on O‘ahu, Figure 6 below, shows that the Wai‘anae moku is categorized as a high-wildfire-risk area.

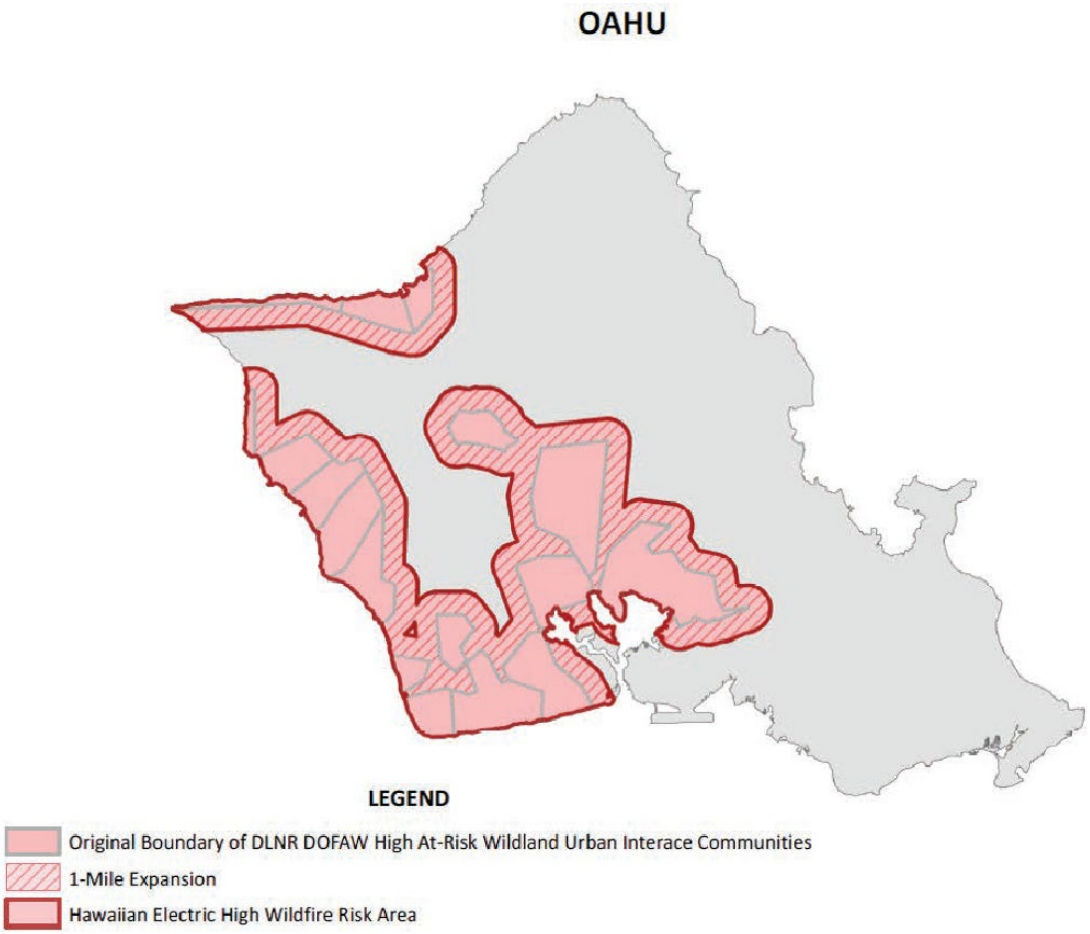


Figure 7. O‘ahu high wildfire risk areas based on Department of Land and Natural Resources risk maps

Image from Hawaiian Electric's 2025-2025 Wildfire Safety Strategy report (2025)

4 Community Perspectives

This section summarizes mana‘o shared by members during workshops and meetings on community values and priorities, strengths and challenges, and focus areas as related to energy resilience and planning. While we summarized and paraphrased community feedback for clarity and brevity in Table 3, Table 4, Table 5, and Table 6 in the following subsections, we aimed to keep the data as “raw” as possible to preserve the meaning and style in which they were expressed. Prompts and discussion questions used to elicit feedback during workshops are shown in Appendix D. All perspectives summarized here are those of the community members. The views expressed do not necessarily represent the views of the DOE or the U.S. Government.

4.1 Values and Priorities

When describing values of Wai‘anae moku, answers from community members included kuleana, education, self-sufficiency, sustainability, entrepreneurship, and interconnectedness. Kuleana is a Hawaiian word that roughly translates to “responsibility” or “privilege.” More broadly, the concept encompasses the relations between an individual and the communities and lands to which they belong. At community workshop 1 in February 2025, attendees discussed kuleana as including responsibilities to people, ‘ohana (family), future generations, kūpuna (elders), and traditions and culture.

Education and learning were also frequently cited as community values, and were often tied to other values and specific uses such as intergenerational kuleana and agriculture. Education is important to teach people to be self-sufficient, to value the land, and make informed decisions about their community’s energy future.

Self-sufficiency and sustainability were the two last interrelated community values. A large part of both values is the community’s relation to the land, or ‘āina. Mālama ‘āina and aloha ‘āina, which translate to care for and love of the land, are key parts of Hawaiian culture. Part of the importance of ‘āina stems from Hawai‘i’s remote location. For much of Hawai‘i’s history, people were completely dependent on the ‘āina to produce 100% of the food and materials necessary for survival. These land constraints ensure that community members are keenly aware of the trade-offs inherent to energy development. Community members stressed the importance of energy development that works with ‘āina, multipurpose development, and food security.

At workshop 2 in July 2025 participants added the values of entrepreneurship and interconnectedness, which echo values previously identified while expanding them. Participants discussed the interconnectedness of everything—energy, water, and food—and how energy is needed everywhere. Participants also discussed an entrepreneurial mindset prominent in the moku. This value is related to self-sufficiency, highlighting local ingenuity and aptitude to customize equipment, build things, and solve problems.

Community priorities included local benefits and workforce development, affordability, resilience, self-determination, and sustainability. Many Wai‘anae residents expressed a

perception that the moku has more burdens than benefits from existing energy infrastructure. Examples of benefits provided by community members included reduced electricity bills, workforce development, local job creation, education, and support for locally owned businesses, as well as the possibility of community-owned energy resources.

Like the community values described earlier, sustainability was described as preserving and protecting the land and ocean, thinking intergenerationally, and planning for reuse and recyclability of energy materials. Wai‘anae moku residents often shared that currently they feel they do not have a say in the development of energy projects, from siting and type of technology to community benefits. Self-determination would include both the ability to participate in those decision-making processes and being empowered with the knowledge to do so meaningfully.

See Table 3 for a summary of community values and priorities pertaining to energy resilience shared by workshop participants.

Table 3. Summary of Community Values and Priorities Pertaining to Energy Resilience Shared by Workshop Participants in February 2025

Values	Priorities
Malama ‘āina (protecting and caring for the land); teaching younger generations the highest value of land	Educating students, local people, and policymakers; sharing complex information in an understandable way
Kuleana (responsibility) for people, ‘ohana, and future generations; respecting kūpuna; honoring traditions and culture	Local community benefits, prioritizing local businesses, good jobs, and workforce development, training in entrepreneurship
Independence and self-sufficiency	Energy self-determination
Land-use priorities (land for people and food over solar), energy-water-food nexus (systems that work with ‘āina, multiple purposes)	Considerations for energy projects: identifying best parcels, wildfire mitigation, providing service to the unhoused
Fire mitigation	Resilience
Renewable energy project development: for the community; consider scale and life cycle of projects	Sustainability
Sustainability mauka to makai (solutions that work with the environment like natural ventilation and efficiency), local sourcing, and circular economy (what do we do with waste?)	Affordability
	Consumer protection

4.2 Strengths and Challenges

Wai‘anae moku is known throughout Hawai‘i as a strong, proud community. Workshop participants’ comments reflected this. Community members are proud of having close ties and a shared, collaborative approach to energy. Again, the relationship to the ‘āina (land) was

mentioned here with community members describing Wai‘anae moku as being closer to the soil. Participants were also proud of the resources that Wai‘anae moku currently has, from food and energy connections to solar projects.

At the same time, Wai‘anae moku faces challenges. Jobs are scarce and wages are low. Many residents make the long commute to Honolulu daily. Like the rest of Hawai‘i, land is scarce and land use is a hotly contested issue. In relation to energy, participants brought up that projects are not adapted for Hawai‘i, there is a lack of energy education, and too much bureaucracy. Wai‘anae has many old homes and off-grid businesses, which limit the potential for rooftop solar and the financial benefits of it. At the same time, energy usage is increasing in the moku as high-energy-use activities like air conditioning are increasing.

See Table 4 for a summary of community strengths and challenges pertaining to energy resilience shared by workshop participants.

Table 4. Summary of Community Strengths and Challenges Pertaining to Energy Resilience Shared by Workshop Participants in February 2025

Strengths	Challenges
Motivation: leaders who are motivated to have reliable energy and lower costs	Economics (high costs of energy, development, and shipping; people who do not have electricity because they cannot afford it)
Available resources: solar, wind, water, land; ability to produce energy	Appropriateness of technology: projects not currently adapted for Hawai‘i; renewable energy companies not accountable to homeowners when there are issues
Desire for shared energy projects, connected to food systems, adapted to local environment	Energy project planning and development: land scarcity, permitting challenges, fire risks, PV not required in new housing, giving up things that cannot be recovered
Strong community and culture	Increased energy demand, air conditioning usage; energy abundance leads to taking it for granted
	Information gaps; long learning curve for energy and resilience education
	Differing community priorities
	Workforce needs; local jobs that pay well
	Coastal vulnerability

4.3 Energy Plan Focus Areas

Table 5 presents focus areas for the energy plan identified by participants in the first community workshop in February 2025.

Table 5. Summary of Energy Plan Focus Areas of Interest to Workshop 1 Participants in February 2025

Energy Projects and Focus Areas
Which energy technologies and projects to pursue: hydrogen, natural gas, bridge fuels, experimental technologies, microgrids, small wind, agrivoltaics, alternatives to large-scale wind and solar
Whether to pursue more energy projects
Community ownership models
Distributed (rooftop) solar and storage
Transportation: additional EV charging and parking
Energy education and workforce development; learning spaces outside of school hours; green hydrogen production with students; utilizing solar/renewable energy to uplift community priorities
Sustainability and circular economy (but we do not want to be the recycling/waste center)
Land use and energy-water-food nexus
Policy and regulation

4.4 Energy Goal-Setting

During the second community workshop in July 2025, in small groups participants discussed concepts in support of energy goal-setting (Table 6). Mana‘o from this and previous discussions were used by the energy planning team to derive goals in Section 6.

Table 6. Summary of Energy Goal-setting Concepts from Workshop 2 participants in July 2025

Energy Goal-Setting Concepts
Regarding energy entrepreneurship in the moku, develop a directory of Native-Hawaiian-owned energy and energy-adjacent businesses to understand the landscape in Wai‘anae and set a baseline, then set a goal to increase the number and provide support. For workforce development, assess what kinds of jobs will be created, and how many.
Regarding education and learning, develop programs to expose students and opio to the energy sector to get them interested and educated about career pathways. There’s a need for energy literacy, learning opportunities, educational pathways, school programs; perhaps a competition for different/ best way to generate electricity. Look at various age groups (20-40-year-old range) and engage. Consider a paid energy youth position, such as a Wayfinder for Wai‘anae.
Need to find leaders and organizing entities to help support and continue the plan. Could set a goal to develop someone or multiple people to take over in a certain amount of time.
For rooftop solar and storage, develop a benchmark of what we have, then track to see the changes in adoption over time. What will it be 2, 5, or 10 years from now?

For those who can’t install solar because of issues with the roof, we need funds to fix roofs before installing solar.
Would like to see one ahupua‘a be self-sufficient.

5 Community Energy Vision

A community energy vision for the Wai‘anae moku was first developed through Energize Wai‘anae Moku community engagement, and refined through the energy planning process. The energy vision that guides this plan is presented here.

We envision a Wai'anae moku that is energy secure through education, workforce development, and implementation of community-prioritized plans and projects that are pono, community-led and locally owned (in whole or in part), resulting in a diverse portfolio of community-scale technologies developed in accordance with cultural values, traditions, and respect for ‘āina; a Wai’anae moku where every resident experiences ‘ohana level resilience through whole home energy optimization utilizing renewable energy, energy storage, and energy conservation activities and efficiency measures (appliances, insulation, etc.); where every business is able to thrive while producing some or all of its own energy and practicing carbon kuleana;[9] where critical infrastructure and facilities maintain power during disruptions; and where kaiāulu-level prosperity is realized based on a reliable, affordable energy system.

[9] The planning team uses the term carbon kuleana from the knowledge that carbon is the building block of all life, and therefore what we do affects everything and everyone else around us. Practicing carbon kuleana means being responsible for the way we live and do business that reduces and eliminates adverse impacts, while supporting pono solutions to critical needs and leveraging the natural nexuses of a remote and isolated coastal community.

6 Community Energy Goals

During workshop 2, participants were prompted to identify 3–5 energy-related goals they would like to see the community achieve. The aim was to set goals based on energy values, priorities, and focus areas identified throughout the planning process, and achieved by completing priority energy projects. Participants were encouraged to develop goals that were specific, measurable, achievable, relevant, and time-bound, and to consider availability of data to track progress toward goals.

Informed by notes taken during workshop 2 and group discussions held throughout the planning process, the energy planning team developed the following six energy goals for this plan:

1. Identify and assess energy resilience for at least one resilience hub in each ahupua‘a in the Wai‘anae moku by 2027.
2. Establish a network of resilience hubs in the Wai‘anae moku by 2030 wherein each hub will have a resilient energy system sufficient to maintain power throughout a grid outage of at least 3 days.
3. Increase the number of Native-Hawaiian-owned renewable energy and adjacent businesses by 10% over baseline by 2035.
4. Reduce the percentage of household income spent on energy in the Wai‘anae moku to at or below O‘ahu’s percentage by 2040 (using the weighted average across area median income brackets).
5. Support a circular economy for energy materials by developing a plan for businesses in the Wai‘anae moku to play a key role in the reuse and recycling of renewable energy systems and projects on O‘ahu by 2026.
6. Support energy education and career pathways for school-aged students and adults by developing a plan and strategic partnerships by 2026.

6.1 Discussion and Tracking Progress

Goals 1 and 2

The first two energy goals focus on establishing resilience hubs throughout the Wai‘anae moku. These hubs will likely be established at existing structures or facilities where capacity could be built for resilience as well as handling emergencies. Through outfitting existing structures as resilience hubs, those structures can become safe gathering points during emergency and nonemergency situations. Wai‘anae, a moku with one primary access road in and out, requires a network of hubs to help residents prepare for potential disruptions or emergencies that may leave them unable to evacuate their valleys. Existing facilities such as Wai‘anae Comprehensive Community Health Center that serve as nexus points between emergency response capacity building, everyday life, and community needs are already moving toward becoming resilience hubs. Going forward, the Wai‘anae community energy planning team will consider other

community-based organizations or institutions to serve as resilience hubs, which may have the added benefit of supporting workforce development.

In support of achieving this goal it will be necessary to 1) define what it means to have identified a site (having assessed the location and feasibility of a site, secured commitment of the site owner or operator to host the resilience hub, and so on); 2) determine what completion of an energy resilience assessment for each site entails; and 3) identify what it means to have established a network of at least one hub per ahupua‘a (e.g., site secured, resilience energy system installed and operational).

Goal 3

The third energy goal focuses on local business and workforce development to increase the number of Native-Hawaiian-owned renewable energy or adjacent businesses in the Wai‘anae moku. Necessary for this goal is to clearly define businesses of interest and gather data to establish a baseline of businesses that meet that definition. With this understanding of the business landscape of Wai‘anae, we can plan appropriate follow-up actions and track progress toward this goal.

Expanding the local energy business community and developing a localized energy workforce will help residents afford the cost of living in Wai‘anae. Increasing the energy workforce will also support community energy literacy as well as the capacity for community knowledge and engagement in energy conversations. As cost of living and energy costs force many residents to move out of the community, energy affordability can assist with residents’ capacity for living and thriving in Wai‘anae. An additional aspect of this goal to ensure the availability of training and technical assistance programs to help new businesses enter the industry, and funding and financing such as through community development financial institutions (CDFIs) and other entities that provide access to basic financial services, affordable credit, and investment capital to new businesses.

Next steps for determining the baseline and tracking this goal include clearly defining what we mean by Native-Hawaiian-owned renewable energy or adjacent businesses, and how to establish parameters for setting the baseline. Aspects to consider include how ownership is defined, geographic boundaries of business locations, and business types, such as by using North American Industry Classification System (NAICS) codes. Additional research may be needed to define energy-adjacent businesses, such as roofing businesses that do upgrades necessary to install rooftop solar, or that integrate solar PV installation at the time of a roof replacement. Next will be to conduct the baseline assessment of existing businesses that meet the definition. Once complete, we can determine the number of new businesses needed to meet the goal, and conduct a survey of existing businesses on training needs and barriers to entry and success in the industry.

Goal 4

The fourth energy goal aims to make energy more affordable. Energy efficiency, nonfuel dependent sources of energy, and ownership of distributed energy resources are all ways that

Wai‘anae residents can decrease their monthly energy bills. Ensuring that community members are aware and can take advantage of available incentives and financing for energy efficiency and adoption of renewable energy, such as from Hawai‘i Energy and the Hawai‘i Green Infrastructure Authority, will help with achieving this goal.

Multiple data sources are available to support tracking progress toward this goal. It will be important to establish the methodology and data source to be used for consistency in tracking. NLR’s supplemental report used data from DOE’s Low-income Energy Affordability Data Tool[10] to calculate the weighted average of percent of income spent on energy across area median income brackets. The results show Wai‘anae at 7.15%, O‘ahu at 4.02%, and Hawai‘i at 4.44%. In this case, simple averages show lower percentages but tend to mask income disparities across geographic areas. The State of Hawai‘i regularly publishes a report with relevant data (see the most recent version from Department of Business, Economic Development & Tourism 2025), which could help inform the energy team’s approach.

Goal 5

The fifth energy goal relates to developing a renewable energy recycling industry and markets, as well as associated workforce development, in the Wai‘anae moku. This topic has been a persistent interest for members of the energy planning team. It came up during the discussion of community values around sustainability and concern about what to do with waste from renewable energy in workshop 1. It was also discussed during the energy goal-setting discussion in workshop 2. In working toward this goal and planning around the related priority energy project described in the next section, a comment from a workshop participant about not wanting the moku to be the recycling/waste center for the island may warrant consideration.

Goal 6

Topics related to education and learning opportunities for students and community members, and career development more generally, was prominent throughout the energy planning process. While an energy project on this topic was not defined, the team developed this goal to articulate the need to formalize a plan for energy education and workforce development. This plan may include working with schools, teachers, workforce development programs, community organizations, and learners themselves about how best to increase the level of knowledge on energy topics and pathways to work in the sector. This goal also encompasses the desire to create more opportunities for the community to continue to learn about energy, what they can do at home and at work to conserve energy and become more resilient, and get involved in implementation of this plan.

[10] https://www.energy.gov/scep/slsc/lead-tool

This goal is aligned with HSEO’s efforts with schools, including Wai‘anae High School, career and technical education programs, the Clean Energy Sector Partnership, Good Jobs Hawai‘i, and the Wayfinders program.

7 Priority Energy Projects

Host to numerous solar projects and located relatively close to fossil-fuel facilities, Wai‘anae moku residents have experience with energy infrastructure that many Americans do not. Because of these experiences, many conversations began with what the community does not want. Some participants expressed that they do not want more utility-scale solar or wind projects in the moku to preserve land for other uses, though some are open to smaller “community-scale” energy projects. In fact, community members asked specifically what options are available other than wind and solar. Potential ideas on alternatives included agrivoltaics, generators, hydrogen, microgrids, rooftop solar, liquified natural gas, and community solar.

After an iterative process between the energy planning team, technical team, and regional partner, the group arrived at five potential project ideas, presented in this section. NLR’s supplementary report (Burton forthcoming) provides high-level considerations and resources to support the first project idea—expansion of a resilience hub for the Wai‘anae moku—as well as some additional background and considerations for the other four.

1. Establish support for resilience hub design and analysis, as an extension to the Wai‘anae Coast Community Health Center. This effort could include:
    - Identifying additional sites in the moku to participate in a network of resilience hubs
    - Assessing energy resilience options for the expansion sites of the resilience hub network
    - Considering workforce development aspects in response to community interest in good-paying local energy jobs in the community, and for energy projects in the community to be implemented by locals
    - Determining what is the role for deployability and accessibility in and out of Wai‘anae, especially in emergency situations.
2. Aggregate rooftop solar and storage for resilience at the ‘ohana and community level. This effort could include:
    - Assessing different configurations of aggregated power as well as the pros and cons of each type (e.g., microgrids, virtual power plants)
    - Understanding models of community ownership of distributed energy systems, and examples from other communities (in Hawai‘i, across the ETIPP network, in communities with demographics similar to the Wai‘anae moku)

- Identifying the types of distributed energy resources that could be aggregated, such as small, ground-mounted systems (e.g., in response to community interest in options such as Utili-TREES)[11]
- Developing a workforce development component
- Building on ongoing initiatives such as Solarize808.[12]

3. Engage in agrivoltaic project design.[13] This effort could include:
   - Developing agrivoltaics as part of a resilience hub, microgrid, and/or community solar project (community-based renewable energy)
   - Conducting a review and providing examples from other communities.
4. Develop a renewable energy recycling industry and workforce.[14] This effort could include:
   - Exploring pathways for a local industry in West O‘ahu that is responsible for end-of-life management of renewable energy materials (e.g., solar panels, lithium-ion batteries), including decommissioning and recycling of residential and commercial renewable energy systems.
4. Assess additional renewable energy technologies for the moku. This effort could include:
   - Ocean thermal energy conversion
   - Other marine energy technologies
   - Green hydrogen.

7.1 Discussion

The first two energy project ideas received the most support from community and energy sector stakeholders. Support for resilience hub design and analysis was chosen because of its alignment with Wai‘anae moku values and strengths such as sustainability and resilience. This project would also identify additional sites in the moku to participate in a network of resilience hubs. It could include solar and storage for the expansion sites. Importantly, workforce development aspects would be considered in response to community interest in good-paying

[11] https://www.utili-trees.com/
[12] The Council for Native Hawaiian Advancement describes Solarize808 as, “a campaign for affordable, accessible, and locally generated rooftop and community solar led by Ko‘olauloa and Wai‘anae community organization, but open to all O’ahu residents.” https://www.hawaiiancouncil.org/solarize/
[13] In response to community interest in energy-water nexus and connection to the land and local food systems.
[14] This topic is less aligned with the Energy Technology Innovation Partnership Project technical assistance program, but captured here as an area of community interest possibly to be addressed in another way.

local energy jobs in the community, and for energy projects in the community to be implemented by local residents.

The aggregation of rooftop solar and storage for resilience would involve assessing different configurations of aggregated power and identifying the pros and cons each type (e.g., microgrids, virtual power plants). It would also seek to understand models of community ownership of distributed energy systems, and examples from other communities (e.g., in Hawai‘i, across the ETIPP network, in communities with demographics similar to the Wai‘anae moku). This work could build on initiatives such as Solarize808 and the U.S. Environmental Protection Agency’s Solar for All program.

Agrivoltaic project design reflects the community values of respect for the ‘āina, as well as interest in the energy-water nexus and local food systems. It could possibly be developed as part of a resilience hub, microgrid, and/or community solar project (e.g., community-based renewable energy). Analysis could include reviewing examples from other similar communities.

A renewable energy recycling industry and workforce development project would explore pathways for developing a local industry to handle residential and commercial energy waste, including decommissioning and disposal of renewable energy systems in West O‘ahu.

Finally, in response to community members’ desire to learn more about other renewable energy technologies, an assessment of options such as ocean thermal energy conversion, other marine technologies, and green hydrogen could be useful. This assessment would include technical feasibility, cost, and regulatory and policy considerations.

8 Implementation Considerations

Among the energy focus areas and priority projects identified through this planning process, expanding a resilience hub network in the Wai‘anae moku was ranked as the top priority among participants in three separate meetings. Resilience hubs are of increasing importance for community groups and government entities throughout Hawai‘i. This project idea could be further explored and supported by technical assistance through ETIPP, which could include analysis that supports selecting sites, and detailed technical analysis of energy resilient systems for one or more sites. Past ETIPP projects have estimated resilience hub energy needs and modeled potential ways to power them. See Burton (forthcoming) for considerations and resources related to this top-priority energy project.

The other four priority energy projects—rooftop solar and storage aggregation, agrivoltaic project design, additional renewable energy technologies assessment, and renewable energy recycling industry development—may be explored through other community initiatives and funding mechanisms.

8.1 Community Commitment and Capacity Building

As the energy planning team prepares to implement this plan, it will be important to remain committed to the process and continue to build consensus around the energy vision and goals. These efforts may be strengthened by continuing to build the energy planning team, recruit additional members, and create pathways for students and early career professionals to get involved. Additional next steps could be to establish an online presence for Energize Wai‘anae Moku or another entity to share information about the plan and progress toward goals, invite visitors to sign up for updates, and continue to build a list of individuals and organizations who can be counted on to participate in ongoing planning and implementation of Wai‘anae moku’s energy future.

8.2 Engagement and Coordination With Interested Parties

To implement expanding the resilience hub network, further coordination is needed between other groups working on resilience hubs on O‘ahu including Center for Resilient Neighborhoods, the City and County of Honolulu Office of Climate Change, Sustainability and Resiliency, and HSEO’s Resiliency, Clean Transportation, and Analytics Branch, contacts at current and prospective resilience hub sites, Hawaiian Electric, other interested parties in the community and energy sector, and the Energize Wai‘anae Moku energy team. An early step in implementing this project will be to engage with these parties to share information on the plan and formally engage them in the process. It may be beneficial to form an advisory group of interested parties to convene periodically for updates and information sharing, in addition to establishing separate work streams as needed by the project.

8.3 Policy and Regulatory Landscape

The policy and regulatory landscape around energy resilience for the hub network is another important consideration. Policies such as those related to tariffs on microgrid services,

community-based renewable energy, customer-sited distributed energy resources, and grid services may affect implementation of the priority project. These topics are addressed, among other statutes and PUC dockets, in 2025’s Hawai‘i State Bill 589 relating to renewable energy. The bill seeks to address some of the barriers that exist in the current regulatory framework, related to wheeling and microgrids, and may be relevant to implementation of this project.[15]

8.4 Funding Sources

It is imperative that funding sources are identified and secured for successful implementation of energy projects and for the community to achieve its goals. DOE’s *Guide to Community Energy Strategic Planning* provides potential pathways and institutions for funding. As the community goals and projects are solidified, the next step is identifying key community members to review different methods and funding sources and creating a list of funding options that fit the community goals and needs.

[15] Wheeling is the transmission of electricity from one source of renewable energy generation or storage through a utility meter for use by a separate account holder.

Glossary

Term	Definition
ahupua‘a	Land division usually extending from the uplands (mauka) to the sea (makai)[16]
‘āina	Land generally (e.g., a farm, field, country, or island[17]
aloha ‘āina	Love of the land[18]
kaiāulu	Community, neighborhood, village[19]
kuleana	Right, privilege, concern, responsibility[20]
kūpuna	Grandparents or ancestors; someone who is wise and highly respected, a keeper of knowledge and a living treasure of the community[21]
mālama ‘āina	Kuleana to care for the land[22]
mana‘o	Thoughts, ideas, beliefs
moku	District or region
‘ohana	Family or household

[16] https://wehewehe.org (English version)
[17] https://wehewehe.org (English version)
[18] https://www.tpl.org/our-work/aloha-aina-love-land
[19] https://www.hawaii.edu/news/2023/04/25/hawaiian-word-of-the-week-kaiaulu/
[20] https://www.hawaii.edu/news/2023/01/10/hawaiian-word-of-the-week-kuleana/
[21] https://www.hiphi.org/kupuna/
[22] https://www.oha.org/aina/

References

Act 15 Relating to Environmental Protection, H.B. NO. 2182, Hawai‘i State Legislature (2018). https://health.hawaii.gov/cab/files/2023/05/SLH2018_Act15.pdf.

Act 97 Relating to Renewable Standards, H.B. NO. 623, Hawai‘i State Legislature Twenty-eighth Legislature (2015). https://luc.hawaii.gov/wp-content/uploads/2019/10/Exhibit-23-Act-097.pdf.

Act 238 Relating to Climate Mitigation, H.B. NO. 1800, Hawai‘i State Legislature (2022). https://health.hawaii.gov/cab/files/2023/05/SLH2022_Act238.pdf.

Burton, Robin. Forthcoming. *Energy Baseline Assessment and Project Considerations for the Wai‘anae Moku Community Energy Plan*. National Laboratory of the Rockies (NLR).

City and County of Honolulu Department of Planning and Permitting. n.d. “Wai‘anae Sustainable Communities Plan.” City and County of Honolulu. https://www.waianaescp.org/about.

Governor of Hawai‘i. 2025. “Executive Order No. 25-01: Accelerating Hawai‘i’s Transition Toward 100 Percent Renewable Energy.” January 27. https://governor.hawaii.gov/wp-content/uploads/2025/01/2501085_Executive-Order-No.-25-01.pdf.

Grue, Nick, Katy Waechter, Travis Williams, and Jane Lockshin. 2020. Assessment of Wind and Photovoltaic Technical Potential for the Hawaiian Electric Company. National Laboratory of the Rockies. https://www.hawaiianelectric.com/documents/clean_energy_hawaii/integrated_grid_planning/stakeholder_engagement/stakeholder_council/20210730_sc_heco_tech_potential_final_report.pdf.

Hawai‘i Mayors. 2017. “Hawai‘i Mayoral Proclamation of 100% Renewable Ground Transportation by 2045.” City and County of Honolulu Office of Climate Change, Sustainability and Resiliency. https://www.resilientoahu.org/commitments.

Hawaii Public Utilities Commission. 2025. “Implementation of Executive Order No. 25-01.” https://puc.hawaii.gov/energy/implementation-of-executive-order-no-25-01/.

Hawai‘i State Energy Office. 2025. *Alternative Fuels, Repowering, and Energy Transition Study*. https://energy.hawaii.gov/alternative-fuels-repowering-and-energy-transition-study/.

Hawaiian Electric. 2023a. *IGP: Preferred Plans and Next Steps*. Hawaiian Electric. https://hawaiipowered.com/igpreport/IGP_SupplementalResponse_Nov-14-2023.pdf.

Hawaiian Electric. 2023b. *Integrated Grid Plan*. Hawaiian Electric. https://hawaiipowered.com/igpreport/IGP-Report_Final.pdf.

Hawaiian Electric. 2025. *Wildfire Safety Strategy 2025-2027*. https://www.hawaiianelectric.com/documents/safety_and_outages/wildfire_safety/2025-2027_wildfire_safety_strategy.pdf.

Senate Concurrent Resolution 44 Declaring a Climate Emergency and Requesting Statewide Collaboration Toward an Immediate Just Transition and Emergency Mobilization Effort to Restore a Safe Climate, S.C.R. NO. 44, Hawai‘i State Legislature Thirty-first Legislature (2021). https://www.capitol.hawaii.gov/sessions/session2021/bills/SCR44_HD1_.htm.

State Bill 589 Relating To Renewable Energy, SB589, Hawai‘i State Legislature Thirty-third Legislature (2025). https://www.capitol.hawaii.gov/sessions/session2025/bills/SB589_.HTM.

State of Hawai‘i Department of Business, Economic Development & Tourism. 2025. “Electricity Burdens on Hawai’i Households: 2022 Update.” January. https://files.hawaii.gov/dbedt/economic/data_reports/reports-studies/Electricity_Burdens_on_Hawai%E2%80%99i_Households_Jan_2025.pdf.

State of Hawai‘i Office of the Governor. 2025. “News Release: Governor Green Signs Executive Order to Promote and Expedite Renewable Energy, Reducing Energy Costs.” January 28. https://governor.hawaii.gov/newsroom/office-of-the-governor-news-release-governor-green-signs-executive-order-to-promote-and-expedite-renewable-energy-reducing-energy-costs/.

U.S. Department of Energy. 2013. *Guide to Community Energy Strategic Planning*. https://www.energy.gov/sites/prod/files/2014/05/f15/cesp_guide.pdf.

Appendix A. Motivations for Wai‘anae Moku Community Energy Planning

This appendix describes the motivation for community energy planning in Wai‘anae, adapted from the Leeward Empowerment Initiatives Foundation’s application for support from the Energy Technology Innovation Partnership Project:

From the application: “Despite our progress engaging the community, we still face many challenges in realizing our resilient energy vision. These challenges include accessing objective and trusted data, gaining knowledge and expertise on ‘new to us’ leading-edge technologies and processes, and guidance on evaluating their appropriateness for our community.

The motivations to engage in strategic energy planning were to:

- Develop education and training modules on renewable energy technologies for community awareness
- Craft education-to-career pathway content from this experience
- Increase economic opportunities for the Wai‘anae moku including workforce development and small business and entrepreneurship development
- Increase internal and interpartner capacity to meet and exceed the community’s need for energy literacy and resiliency
- Identify three to five technologies that could be developed into energy projects after community engagement and discussions
- Lower electricity costs.

Activities the community envisioned engaging in as part of technical assistance through the Energy Technology Innovation Partnership Project include:

- Enhancing internal and inter-partner capacity to meet and exceed the community’s needs for energy literacy and resiliency
- Using the knowledge and experience gained to identify three to five technologies for community engagement and discussions. Initial technologies of interest are appropriate green hydrogen production systems and processes and the possibility of using the city’s treated wastewater and energy generation into a power purchase agreement, ocean energy, and other appropriate leading-edge technologies
- Conducting feasibility studies to develop one or more energy projects
- Crafting education and training modules on renewable energy technologies for community education and awareness, technoeconomic analysis, life cycle assessment modeling, and education-to-career pathway content

- Increasing economic opportunities for Wai‘anae moku, including workforce development and small business and entrepreneurship growth
- Gaining access to resources and funding to support Wai‘anae’s energy plans.

Appendix B. Promotion for Community Workshop 2

A flyer distributed in person and by email to invite Wai‘anae community participation in workshop 2 is shown in Figure B-1.

POWERING OUR FUTURE: WAI‘ANAE COMMUNITY ENERGY PLANNING WORKSHOP

Energize Wai‘anae Moku aims to cultivate communities that are adept at navigating and engaging in the energy and decarbonization spaces, and developing our own Energy Plan and projects. Attend our next **community energy planning workshop** to contribute to building a more resilient moku.

JOIN US TO:

- Get updates about our strategic energy planning process for the Wai‘anae Moku
- Hear about potential energy projects based on community priorities
- Contribute to an energy vision and goal-setting for the community
- BONUS: Learn about various renewable technologies available

SOURCE: WAI'ANAE SUSTAINABLE COMMUNITIES PLAN, HTTPS://WWW.WAIANAESCP.ORG/ABOUT#RTMPCF.

Be part of our small group discussions, guided by facilitators, to explore questions such as:

- What actions will help our community be more energy resilient at all times?
- What projects should we prioritize for the overall resiliency of our community?
- How do our actions contribute to Hawaii's overall goals?
- Your mana‘o and questions to help guide our future work.

WORKSHOP DETAILS

JULY 16, 2025

LOCATION: LEEWARD COMMUNITY COLLEGE - WAI‘ANAE MOKU
87-380 KULAAUPUNI ST. *NEXT TO MĀ‘ILI ELEMENTARY AND THE PARK

TIME: **5:30PM – 8:00PM**
5:30PM - 6:00PM REFRESHMENTS WHILE THEY LAST
6:00PM - 8:00PM WORKSHOP

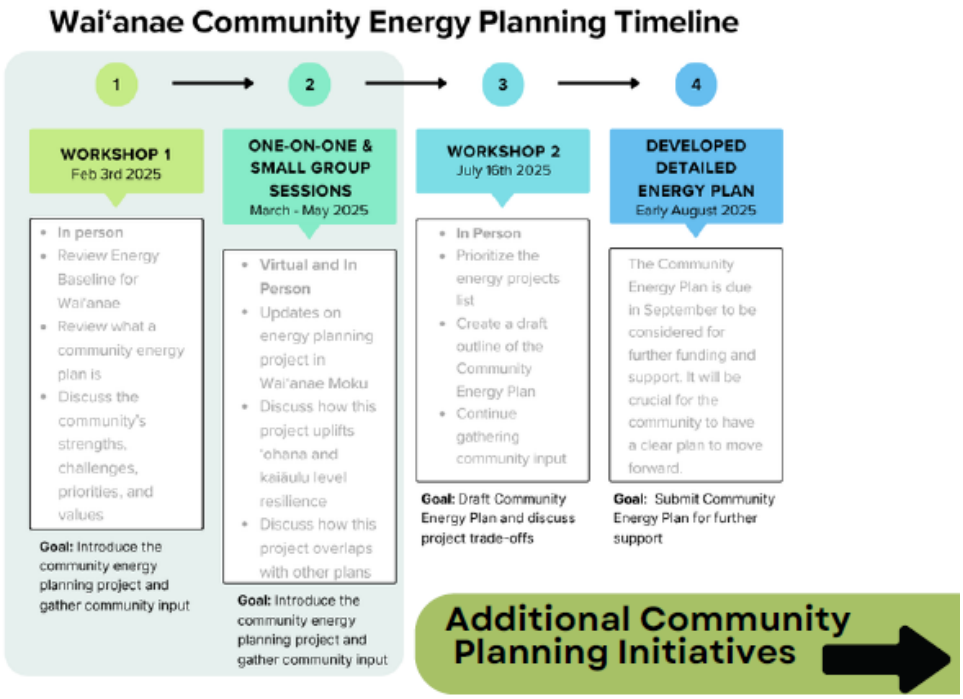
RSVP

LEI Foundation is an awardee of the Energy Technology Innovation Partnership Project (ETIPP)

Figure B-1. Flyer promoting community workshop 2

Appendix C: Energy Outreach Materials

Hawai‘i State Energy Office developed outreach materials, referred to by the team as “cheat sheets,” to distribute to participants in workshop 1 and workshop 2. These materials are presented as Figure C-1, Figure C-2, Figure C-3, Figure C-4, and Figure C-5 in this appendix.



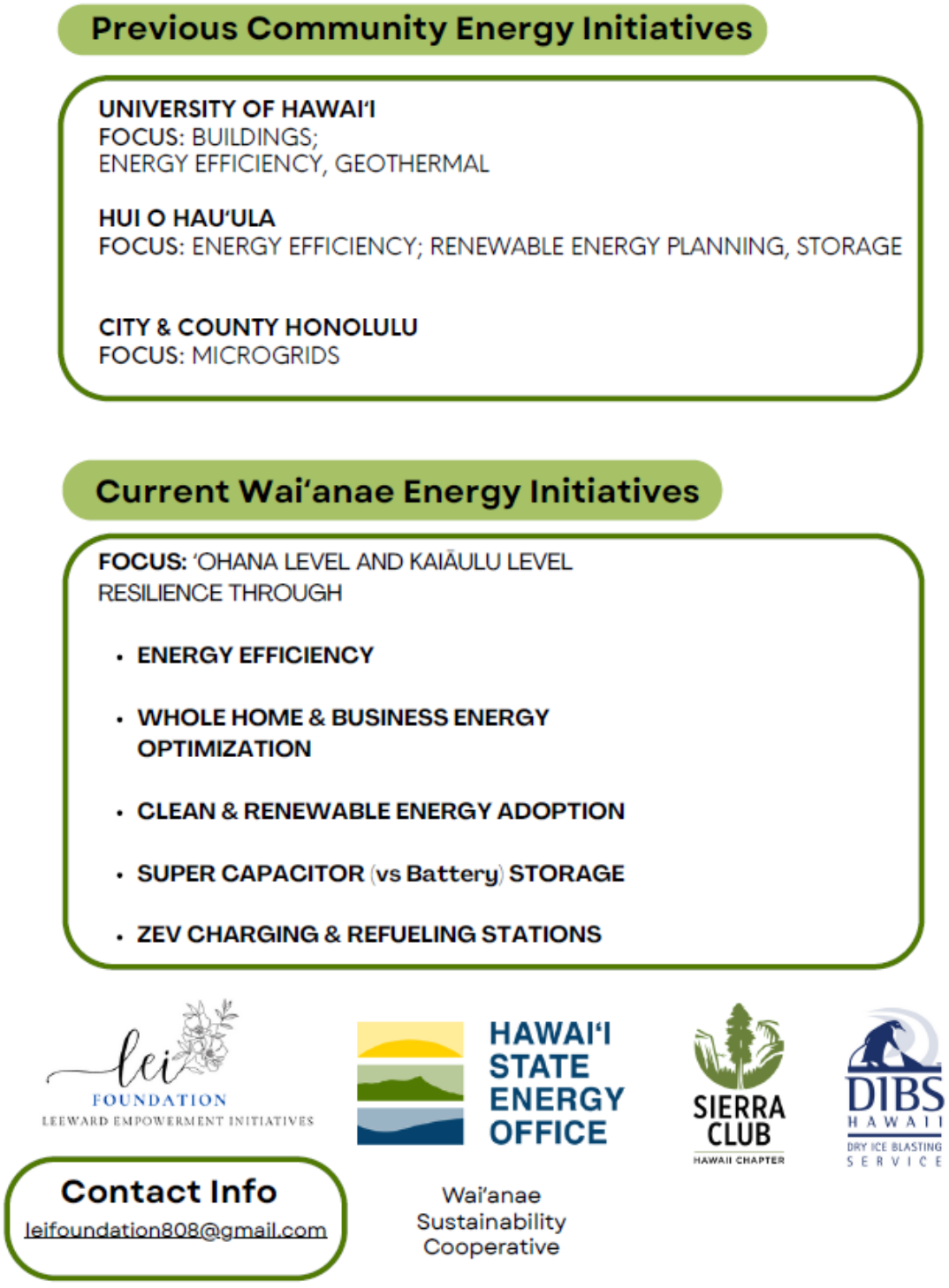


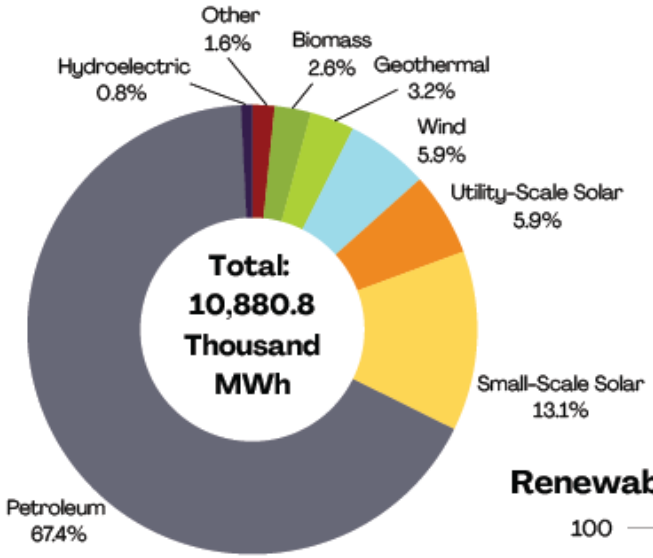
Figure C-1. “What is Community Energy Planning?” cheat sheet (2 pages)

Hawai‘i’s Electricity Landscape

What are Hawai‘i’s Current Energy Goals and emission reduction goals?

100% renewable electricity generation by 2045 (Act 97, 2015)
Net-negative carbon emissions by 2045 (Act 15, 2018)
Greenhouse gas emissions at least 50% below 2005 levels by 2030 (Act 238, 2022)

Statewide Net Electricity Generation (2023)



Source: Hawai‘i Energy Data Portal

Energy Challenges

Continued reliance on imported oil (~70% of electricity generation)

Separate electric grids on each island

Limited land availability

High electricity prices (varies from 2x to 3x national average)

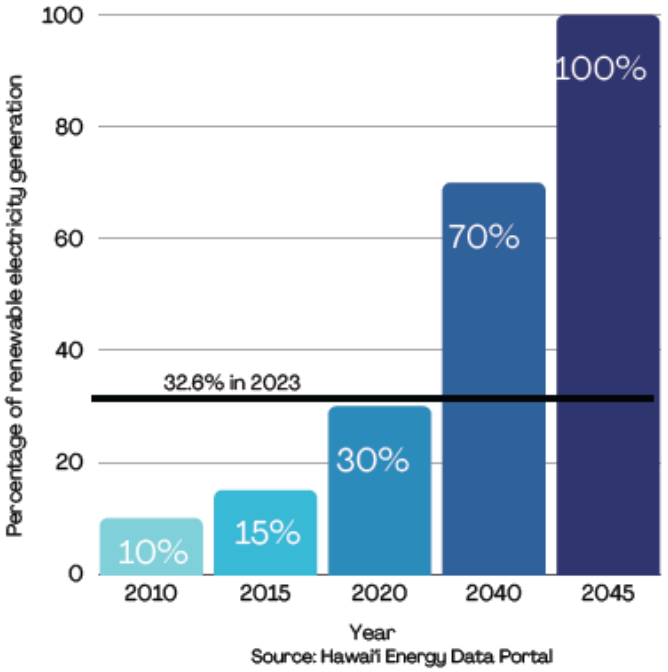
Scan of Click Below For More Data :

Hawai‘i Statewide Energy Flowchart

Hawai‘i Energy Data Portal

HAWAI‘I STATE ENERGY OFFICE

Renewable Portfolio Standard (RPS) Goals



Source: Hawai‘i Energy Data Portal

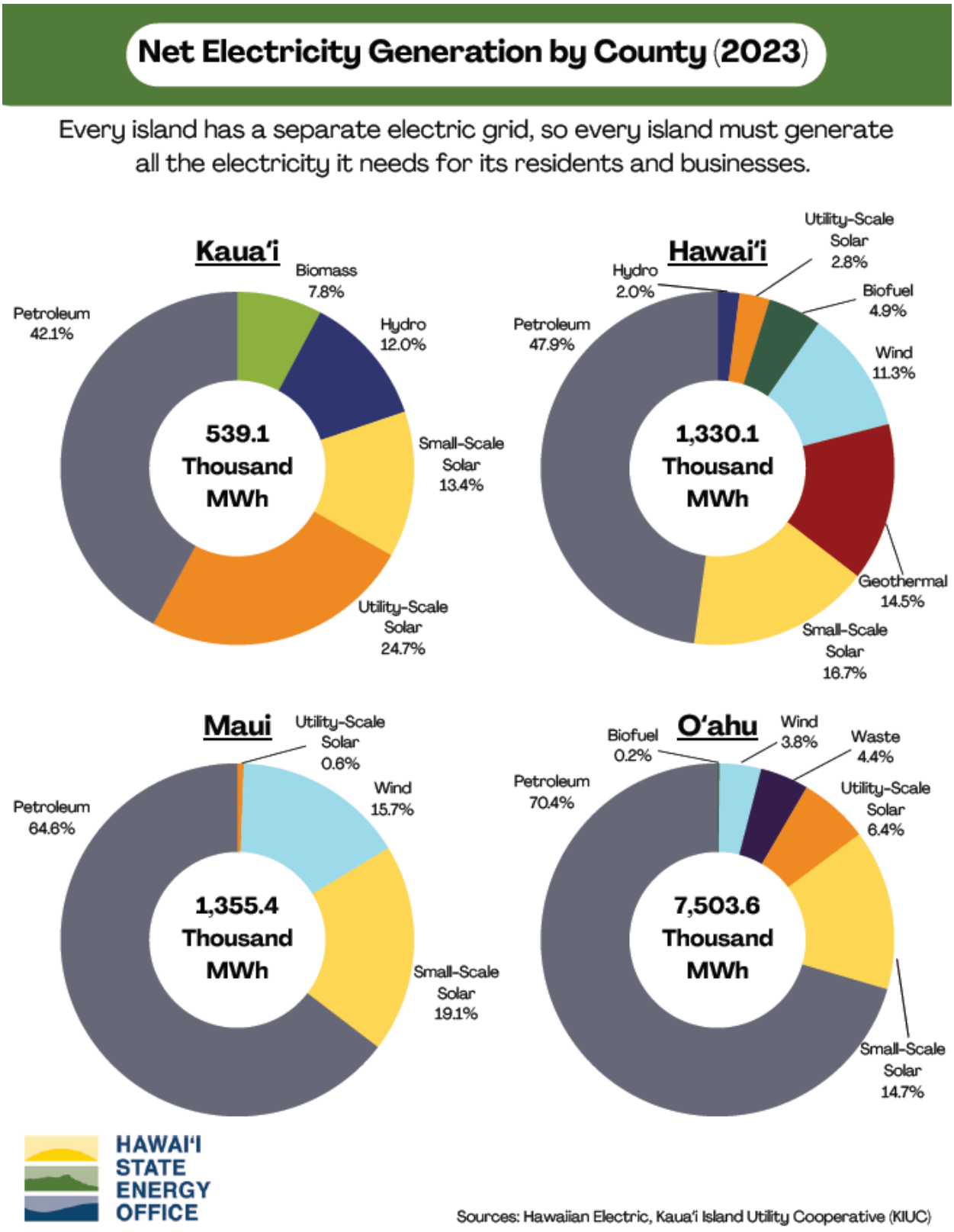
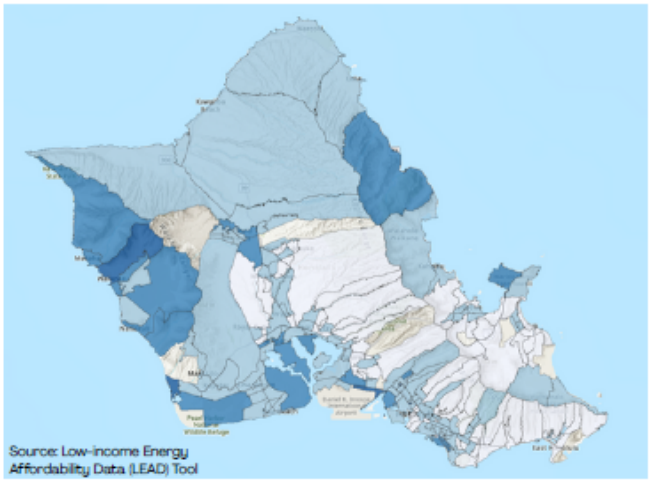


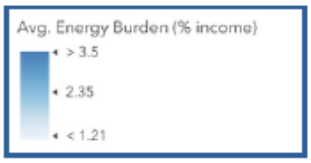
Figure C-2. “Hawai‘i’s Electricity Landscape” cheat sheet (2 pages)

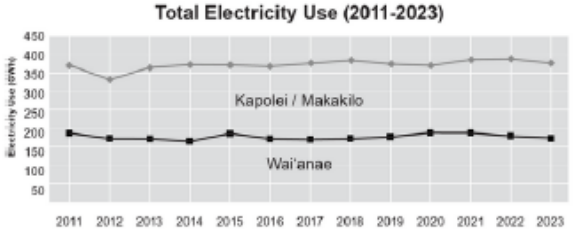
Energy Landscape in Wai‘anae Moku

The Wai'anae Moku presents a unique energy landscape shaped by its distinctive geography, climate, and cultural heritage. As Hawai'i advances toward its goal of 100% renewable energy generation by 2045, the Wai'anae Moku stands at a critical intersection of energy transition, environmental stewardship, and community resilience.



- Wai'anae households' electricity expenses are a disproportionate share of their income compared to the rest of the island.
- Wai'anae hosts a majority share of energy infrastructure.
- Wai'anae remains heavily reliant on outside sources for energy, burning crude oil for electricity generation.





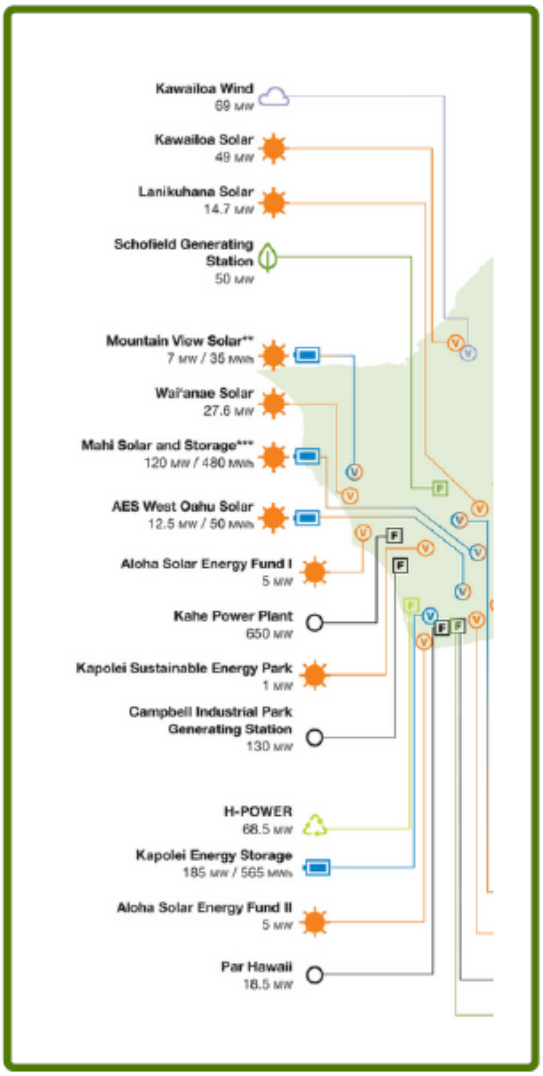
These graph are from the HECO West O'ahu Report 2023-2024. The pie chart depict energy usage by sector. Residential, US miliary and other are the top users. The other graph tracks total electricity use in comparison to Kapolei/ Makakilo

Source: 2023-2024 West O'ahu Report

Large Electricity Generation and Storage Projects in Wai'anae

Name	Ahupua'a	Status	Technology	Size (MW)
EE Wai'anae Solar	Wai'anae	Permitting	PV Solar	27.6
AES Mountain View Solar	Wai'anae	Active	Solar+BESS	12.5MW/50.0 MWh BESS
Aloha Solar Energy Fund 1	Wai'anae	Active	Solar PV	5
Kahe Power Plant	Honouliuli	Active	Oil	609

The renewable energy projects in this table represent a combined total of 45.1 MW of electricity generation capacity based in the Wai'anae Moku.



Map of major Energy sources on the Westside of O‘ahu
Source: 2024-2025 HECO Sustainability Reports and Maps

HECO West
O‘ahu Report

Figure C-3. “Energy Landscape in Wai‘anae Moku” cheat sheet (2 pages)

Wai‘anae Moku Energy Planning

Project Goals: Our Energy Our Future

Wai'anae Sustainability Cooperative

The Wai'anae Community Energy Plan Project is rooted in our people, the ‘āina (land), and our cultural values of pono, interconnectedness, and mutual care. To build a plan that considers our past, present, and future we must develop local expertise, create pathways (especially) for our youth, and support community-driven technologies. The plan should be a collective resource that will guide us and reflect community values of sustainability, resilience, and transparency. The Wai'anae Community Energy Plan Project is a collaborative effort lead by the LEI Foundation.

What we have discussed so far

We held our first Energy Planning Workshop on **February 3rd,** bringing together community members to begin our collective journey toward energy planning for Wai'anae. This initial session provided an opportunity to introduce energy planning concepts while gathering valuable input on our community's values, priorities, and focus areas. The summary below highlights key feedback from questions that were asked.

Community members in attendance split into groups and discussed each question. Each discussion lasted for about 15 minutes, and each question was given equal time.

What are community Values and what are Community Priorities?

Discussion 1
What community values guide energy planning for the moku? What are the community's priorities, generally and as they relate to resilience?

Values	Priorities
Sustainable food security that accounts for land use, and the people tending to it.	Taking steps towards projects and decisions that benefit Wai'anae residents, and ultimately improve the cost of living in Wai'anae.
Mālama ‘Āina. Continuing cultural practices on our land, on Wai'anae's terms for generations to come.	Educating community members, and giving them access to green jobs to help them live in Wai'anae. Developing a workforce that can make a living here.
Lifecycle accounting for food and resources. Where they come from, and where they go when we are done with them.	Developing energy resiliency that cares for the ‘āina, and all its inhabitants.
Prioritizing kupuna, ohana, and the ‘āina. Understanding and honoring the traditions and culture of Wai'anae moku.	Sustainable development in Wai'anae. Protecting and prioritizing ‘āina, and works for the long term.

Wai'anae Community Strengths and Challenges for Resilience

Discussion 2
What are the strengths, generally and related to energy? What are the community's challenges, generally and related to energy?

Strengths	Challenges
Strong collaborative community concerned with improving the lives of community members.	The high cost of living is an obstacle to staying and developing in Wai'anae.
Good land that can be used for agricultural production, and must be considered with any new project.	Wai'anae shoulders a large burden of energy development that they do not benefit from. Rather, Wai'anae gives more than it gets.
Resource rich community, and can help Wai'anae thrive.	Differing community values, and disagreements over leaders and project value for Wai'anae.
Desire to adapt energy to the landscape, making use of agricultural land and energy.	The long process of developing a project. Waiting for permits, land, and bureaucracy.

Energy Projects and Focus Areas for the Energy Plan

Discussion 3
What kinds of energy projects, technologies, programs, or other topic ideas would the community and interested parties like to see included in the plan, and ultimately to implement?

What focus areas (categories or themes) could the project and program ideas be grouped under, such as the following?
1. Energy Efficiency 2. Renewable Energy 3. Resilience 4. Workforce Development 5. Education and Awareness 6. Policy and Regulation

Energy Projects, Tech, and Programs	Focus Areas/Themes
Educate our communities on existing and emerging technology, and prepare Wai'anae for building its next project.	Finding the right energy projects for Wai'anae. Wind and solar may take up too much agricultural land or housing land, so thinking of how to power and feed Wai'anae conjoined with smaller scale projects.
Efficient water use and conservation, supporting agriculture and helping mitigate fire hazards.	Education for everyone, empowering the community for greater independence as well as food resiliency.
Whether to build more energy projects, or build more homes.	Prioritizing water, and the use of the land.
Exploring different energy projects outside of solar and wind, such as microgrids and bridge fuels.	Incorporating the community into project planning and lifecycle. Developing a workforce that can produce and maintain.

What's Next

This was the first of several meetings for the Wai'anae Community Energy Plan. These are the beginning discussions around energy planning, and the conversation and concepts will be revisited throughout the process. Join us in future workshops to share your mana'o!

Learn more about Community Energy Planing

Figure C-4. “Wai‘anae Moku Energy Planning” cheat sheet (2 pages)

Energize Wai‘anae Moku
Community Energy Planning Workshop

and Wai'anae Sustainability Cooperative

Workshop 2 Summary

July 16, 2025 5:30-8:00 p.m
Leeward Community College
Wai'anae Moku Campus
87-380 Kulaaupuni St.
Wai'anae, HI 96792

Meeting Objectives:

- Share updates on community energy plan and feedback received
- Outline the plan moving forward
- Review information on renewable energy technologies
- Seek additional mana'o and feedback to inform community energy plan

Energize Wai‘anae Moku Vision:

Energize Wai‘anae Moku aims to cultivate a well-versed community that is adept at navigating and engaging in the resilient energy and decarbonization spaces, and becoming successful developers of their own energy projects.

Virtual Workshops Recap: Input that is Shaping Our Energy Future

Virtual workshops were held on May 6, 2025 for community members and May 13, 2025 for energy sector professionals. We used Mentimeter to capture quick feedback on values, priorities, strengths, challenges, and support related to energy planning from our community and energy industry participants.

Community Values

1) **Respect and Aloha**
   These foundational principles guide all energy planning decisions in our moku
2) **Cultural Alignment**
   Energy projects must reflect and honor our cultural values and traditions
3) **Land Stewardship**
   Protecting agriculture and minimizing impact on our precious land resources
4) **Equity, Health & Safety**
   Ensuring all community members benefit from and are protected by energy decisions

Community Priorities

1) **Clean and Sustainable Resources**
   Protecting our water, air, and food systems while managing waste responsibly
2) **Energy Security**
   Building self-sufficient systems that keep our services running without interruption
3) **Disaster Resilience**
   Creating infrastructure that can withstand and quickly recover from natural disasters

Community Strengths

1) Strong Community Unity
Wai‘anae's cohesiveness and collaborative spirit drive effective planning for our energy future
2) Abundant Natural Resources
Our moku is blessed with rich energy sources including solar, wind, and hydro power
3) Community Collaboration
Our community's willingness to work together has already helped us plan and prepare for tomorrow's energy needs

Community Challenges

1) High Energy Costs
Despite hosting multiple energy projects, Wai‘anae faces significant energy burden and expense
2) Limited Decision-Making Power
Our community lacks final say in energy projects that affect our land and people
3) Inequitable Returns
Overuse of our land has provided minimal benefits back to the community

Energy Sector Values

1) Value of Aloha
2) Community-Led Collaboration
3) Longevity and Sustainability

Energy Sector Priorities

1) Continuous Service Delivery
2) Partnership and Transparent Communication
3) Inclusive & Low-Impact Approach
4) Adaptive Infrastructure

Energy Sector Support

Working towards community driven resilience that builds from community collaboration and guidance. Providing safe and reliable water and long-range land use for a resilient future.

Workshop 2 Discussion Questions:

Discussion 1: Gain Consensus on Community Values and Priorities, Strengths and Challenges
How much do you agree or disagree with the identified community values and priorities, strengths and challenges? Is there anything pressing to add?

Discussion 2: Energy Focus Areas and Priority Energy Projects
How would you rank previously identified energy project ideas? What other energy project ideas would you add?

Discussion 3: Energy Goals
Is there anything else you would like to see included in the energy plan? What energy-related goals would you like the community to achieve?

Proposed Energy Projects and Focus Areas

and Wai'anae Sustainability Cooperative

I. Resilience Hub Network

Create a network of facilities that strengthen Wai'anae's ability to weather storms, support residents during emergencies, and build long-term energy security while creating local economic opportunities.

- Support for resilience hub network design and analysis, as an extension to the Wai'anae Coast Comprehensive Health Center.
- Identify additional sites in the Moku to participate in a network of resilience hubs.
- Retrofit older buildings and design new buildings for withstanding disasters to increase response capacity and bounce back to normal service delivery in less time.
- Could include solar and supercapacitor storage for the expansion sites of the resilience hub network.
- Consider workforce development aspects in response to community interest in good-paying local energy jobs in the community, and for energy projects in the community to be implemented by local people.
- What is the role of accessibility in and out of Wai'anae, especially in emergency situations?

Center for Resilient Neighborhoods (CERENE)

Energy resilience: NREL defines resilience as "the ability to anticipate, prepare for, and adapt to changing conditions and withstand, respond to, and recover rapidly from disruptions through adaptable and holistic planning and technical solutions." (https://www.nrel.gov/security-resilience/energy-resilience)

II. Aggregation of rooftop solar and storage

Aggregated solar brings together multiple home and business solar systems to work as a connected network, making clean energy more affordable and reliable for everyone. Instead of each house having its own separate solar system, homes can share power, costs, and benefits as a community.

- Programs or technology that can make rooftop solar and storage more accessible, affordable, and resilient at the 'ohana and community level.
- Assessment of different configurations of aggregated power; pros and cons of types of aggregated power (microgrids, virtual power plants).
- Understand models of community ownership of distributed energy systems, and examples from other communities (in Hawai'i, across the ETIPP network, in communities with demographics similar to the Wai'anae moku).
- Could include identification of the types of distributed energy resources that could be aggregated, such as small ground-mounted systems, in response to community interest in options such as Utili-TREES (https://www.utili-trees.com).
- Could also include a workforce development component
- Build upon ongoing initiatives such as Solarize808 (https://www.hawaiiancouncil.org/solarize).

Solarize808 Website

Proposed Energy Projects and Focus Areas

III. Agrivoltaic project design

Agriculture + Photovoltaics = Agrivoltaics

Agrivoltaics combines solar energy production with farming on the same piece of land. Solar panels are installed above crops or grazing areas, allowing the land to produce both clean electricity and food simultaneously. This dual-use approach maximizes the value of limited land while supporting both energy independence and local food production.

- An integrated and collaborative project between food and energy, making the most of available land while honoring agricultural traditions.
- Potential to be developed as part of a resilience hub, microgrid, and/or community solar project (community-based renewable energy).
- This is raised in response to the community's interest in and emphasis on the intersection of food, water, and energy.

Hawai'i Agriculture Research Center

IV. Renewable energy recycling industry and workforce development

To combat the challenges of renewable energy waste, a local renewable energy recycling industry would handle the safe removal, processing, and reuse of these materials. In addition, a new facility could contribute to workforce development and job training.

- Explore pathways for developing a local industry in West O'ahu to handle residential and commercial energy waste, including decommissioning and disposal of renewable energy systems.
- A demonstrated topic of interest for the community and should be discussed throughout energy planning process, but it is **not eligible for technical assistance.**

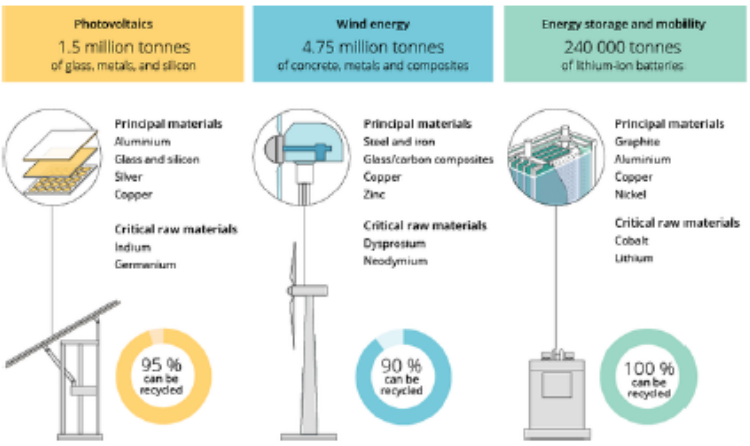


Image From the European Environment Agency demonstrating potential material use for energy projects (https://www.eea.europa.eu/publications/emerging-waste-streams-opportunities-and)

V. Assessment of additional renewable energy technologies

There are many different renewable energy technologies that are not yet commercially viable at scale. However, these may be options that community members are interested in learning more about as we look toward the future of energy in Wai'anae moku.

- Ocean Thermal Energy Conversion (OTEC)
- Other marine energy technologies
- Green hydrogen
- Emerging technologies

Related Plans and Projects

and Wai'anae Sustainability Cooperative

Plan Title	Year	Organization	Jurisdiction	Relevance
Action 15 Project Final Report	2023	Center for Resilient Neighborhoods (CERENE) and City and County of Honolulu Office of Climate Change, Sustainability and Resiliency (OCCSR)	Island / County	Very
Climate Action Plan 2020-2025	2021	City and County of Honolulu OCSR	Island / County	Very
Hawai‘i Pathways to Decarbonization	2023	Hawai'i State Energy Office	State	Somewhat
Integrated Grid Plan and Preferred Plans and Next Steps	2024	Hawaiian Electric	State	Very
O‘ahu General Plan	2021	City and County of Honolulu Department of Planning and Permitting	Island / County	Very
Oahu Regional Transportation Plan 2045	2021	Oahu Metropolitan Planning Organization	Island / County	Somewhat
O‘ahu Resilience Strategy	2024	City and County of Honolulu Office of Climate Change, Sustainability, and Resilience	Island / County	Very
Priority Climate Action Plan (PCAP) and Climate Action Pathway (CAP)	2024	State of Hawai'i	State	Very / Somewhat
Wai‘anae and Lualualei Regional Plan 2018	2018	Department of Hawaiian Home Lands	Moku / Region	Somewhat
Wildfire Safety Strategy 2025-2027	2024	Hawaiian Electric	State	Very
Wai‘anae Sustainable Communities Plan	2012	City and County of Honolulu Department of Planning and Permitting	Moku / Region	Very

Renewable Energy Technologies

The Hawaiian Islands host a variety of renewable energy projects. This document highlights some of the available renewable energy technologies that Hawai'i has used or is considering. This information, unless otherwise cited, comes from the HSEO Renewable Energy Resources webpage (https://energy.hawaii.gov/energy-landscape/renewable-energy-resources).

Solar Energy

Solar energy—derived from the Sun's light and heat—is harnessed primarily through two technologies: solar photovoltaics (PV) and solar thermal systems. In Hawai'i, both technologies contribute to the state's clean energy goals by generating electricity and reducing reliance on fossil fuels.

Photovoltaics (PV)

Photovoltaic systems convert sunlight directly into electricity using solar cells, without the need for moving parts or steam. When sunlight strikes a solar cell, it creates a voltage difference, generating a direct current (DC) that can be used on-site or fed into the electric grid after conversion to alternating current (AC).

Solar Thermal

Solar thermal systems use sunlight to heat fluids for various applications, including heating up water for a solar hot water heater.

Battery Energy Storage System (BESS)

Battery energy storage systems (BESS) store electrical energy for later use and are essential for integrating renewable energy sources into the grid. When renewable technologies like solar and wind generate excess electricity during peak production periods, BESS capture and store this energy. The stored power can then be released during periods of low renewable generation, such as when the sun isn't shining or the wind isn't blowing, ensuring a continuous electricity supply.

Geothermal Energy

Geothermal energy is derived from the heat within the earth's core and can be used for electricity generation or heating and cooling purposes. In Hawai'i it is currently only used on Hawai'i Island where there are still active volcanos. Geothermal energy can be generated anywhere there is adequate subsurface heat with underlying geology that allows for "optimum geothermal play" or a geological setting that includes a heat source, a migration pathway, a heat reservoir, and potential for economic recovery.

Geothermal is a low-carbon energy resource that may be accessed through wells that tap into steam, hot water, or geothermal fluid that when brought to the surface can be used to turn turbines, which in turn drive generators to create electricity.

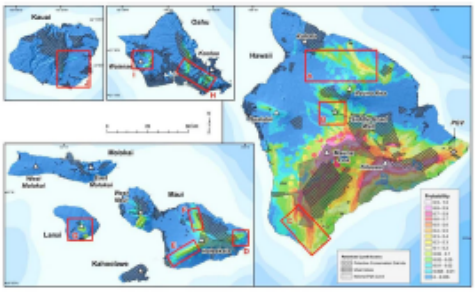


Image sources: Lautze, N., Thomas, D., Waller, D., Frazer, N., Hinz, N., & Apuzen-Ito, G. (2017).

"The map shows probability, but not certainty. Geothermal wells are needed to provide certainty. Areas with restricted land access are shown in striped and crosshatch patterns (e.g., National Park lands, protective conservation districts, and urban areas). Red boxes outline areas proposed for the Phase 2 study. White triangles indicate the calderas of the main shield volcanoes. White stars mark the locations of the Saddle Road well and Puna Geothermal Venture (PGV)." (https://energy.hawaii.gov/geothermal).

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Bio Energy

Bioenergy comes from organic materials (anything that used to be alive or parts of a living thing, such as leaves, branches, wood chips, paper, algae, or manure). Biomass can be used to produce electricity, can be converted into liquid fuels (called "biofuels"), or can be burned to produce heat for cooking or other uses (such as wood in a barbecue grill).

Biofuel

Biofuels are liquid fuels made from processing organic materials such as biomass and oil crops, waste cooking oil, food and animal wastes, or sewage and landfill wastes. Biofuels can include:

- Ethanol
- Biodiesel
- Bio-based diesel fuel (green diesel)
- Bio-based gasoline (green gasoline)
- Bio-based jet fuel (including sustainable aviation fuel)
- Bio-based pyrolysis oils
- Hydrogen (from biomass sources)

As defined in HRS §486J-1 (https://www.capitol.hawaii.gov/hrscurrent/Vol11_Ch0476-0490/HRS0486J/HRS_0486J-0001.htm)

Wind Energy

Wind is the largest source of renewable energy in the United States, providing clean electricity to homes, communities, and cities nationwide (https://www.nrel.gov/research/re-wind). Nine utility-scale wind projects account for 8.1% of the total energy sales in the state in 2021.

Onshore

Onshore Wind Onshore wind projects have been developed on O'ahu, Maui, and Hawai'i Island, with nine utility-scale facilities providing 8.1% of the state's total energy sales in 2021. However, onshore wind development has been limited in areas with endangered bird populations, such as Kaua'i, where large seabird colonies make wind projects environmentally problematic.

Offshore

Offshore Wind Offshore wind has not yet been developed in Hawai'i, with no current timeline or specific development plans. Discussion has focused on projects near O'ahu due to its high population, electricity demand, and limited land availability for renewable energy.

Hydrogen

Hydrogen is an energy carrier or energy storage mechanism with diverse applications across multiple industries such as transportation, electricity generation, and industrial sectors. Hydrogen is not an actual energy source itself, but must be created using other energy sources.

Green Hydrogen

Green hydrogen is made using a process called electrolysis utilizing electricity from renewable energy sources.

Gray Hydrogen

Gray hydrogen is the most common form of production for hydrogen. This hydrogen is created from natural gas through a process called steam methane reformation.

Hydrogen is not currently economically feasible at scale, but as renewable energy prices lower and economies of scale change, hydrogen may be more commercially viable.

Renewable Energy Technologies

Hydroelectric Energy (Hydropower)

Hydroelectric power uses the kinetic energy of falling water to generate electricity, whether that be in existing free-flowing water bodies or manufactured systems where water is moved and then released through a turbine.

Run-of-River

Free flowing water in streams or rivers spins a turbine to generate electricity in these power plants, and these were some of the original power plants for the islands. Currently only Kaua‘i, Hawai‘i, and Maui have operational hydroelectric power plants.

Pumped Storage

Pumped storage utilizes excess electricity to pump water from a lower reservoir to a higher reservoir. When electricity is eventually needed, the water from the higher reservoir is released through a turbine to the lower reservoir.

Water housed in hydropower facilities and reservoirs can also be used in supporting communities through agricultural use, fire risk mitigation, and clean drinking water.

Ocean-Based

There are abundant sources of energy within the ocean coming in multiple forms such as temperature differences created by sunlight, waves created by wind, and tidal fluctuations from the Sun and Moon’s gravitational forces.

Thermal Energy

Sea Water Air Conditioning (SWAC) and Ocean Thermal Energy Conversion (OTEC) utilize the difference in thermal energy between deep sea waters and surface temperatures to draw heat out of spaces or to generate electricity.

“The Hawai‘i Ocean Science & Technology Park at the Natural Energy Laboratory of Hawai‘i Authority (NELHA) on the Kona coast of Hawai‘i Island hosts Hawai‘i’s only active OTEC project — a pilot project developed by Makai Ocean Engineering called the Ocean Energy Research Center. NELHA also uses sea water air conditioning for its visitor center and other buildings on site.”

Marine Hydrokinetic Energy (Wave, Tidal)

This technology creates electricity by using the motion of the ocean, either bobbing a piston up and down or spinning a turbine. Marine Hydrokinetic (MHK) technologies can harness the power of short range ocean changes from trade winds or the long range differences of tidal swell, two viable options in Hawai‘i.

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Renewable Natural Gas (RNG)

Renewable Natural Gas (also known as biogas) is a gaseous product made from the decomposition of organic material. The sources can range from animal solids, wastewater biosolids, and food wastes submitted to anaerobic (no oxygen) conditions.

O'ahu hosts the state's only RNG plant, harnessing the methane produced from the Honouliuli Wastewater Treatment Plant.

Other Energy Technologies

Liquified Natural Gas (LNG)

Liquified Natural Gas is a natural gas that has been chilled to a liquid state, which is around -260° Fahrenheit. In this condensed state it is easier to transport the fuel source to areas that are not accessible via pipeline.

Once transported to its intended port, LNG can be processed, regasified, and distributed through pipelines to industrial partners, distribution centers, and electricity generation facilities (https://www.energy.gov/fecm/liquefied-natural-gas-lng).

Figure C-5. “Workshop 2 Summary” cheat sheet (10 pages)

Appendix D. Community Discussion Prompts

This appendix includes prompts and discussion questions from community workshop 1 in February 2025. In workshop 2 in July 2025, participants reviewed a summary of mana‘o shared during workshop 1 and were asked to express their level of agreement with what had already been shared and add anything that may be missing.

Values and Priorities

In small groups, workshop participants were prompted to discuss community values and priorities for energy resilience. First, the facilitators shared the following community values and priorities for resilience previously identified:

> The Wai‘anae moku has identified our community’s energy needs in our desire and need to shift from a profit-driven energy system to a people-powered pono (well-intentioned, just, hope-inspiring) system and promoting a local energy economy that puts local people and ‘āina (the collective of land, air, water, ocean, and people) at the center of design and decision-making. Through these conversations with the community, we hope to build momentum around reimaging and acting on a whole new energy paradigm that institutes values of pono energy solutions, one that is:

- **Localized**. Power is produced where it is needed. We want to have deep discussions around decentralizing our grid so each moku (region of land) is responsible for addressing its energy consumption patterns.
- **Democratized**. Communities have the power to decide how environmental, economic, and social needs are met.
- **Distributed**. All people have access to clean, affordable energy without sacrificing the well-being or health of any community.
- **Diversified**. Community-scale energy systems are designed to work in harmony with our ‘āina, protecting biological and cultural diversity.

Then the groups were asked to respond to discussion questions:

Discussion Questions

- What community values (for resilience) can guide energy planning for the moku?
- What are the community’s priorities, generally and as they relate to resilience?

Strengths and Challenges

In small groups participants were prompted to discuss strengths and challenges in the Wai‘anae moku, in response to the following questions.

Discussion Questions

- What are the community’s strengths, generally and related to energy?
  This is what we have heard so far:
  - Engaged community with strong and consistent leadership
  - Prior progress on completing successful energy projects
  - Sufficient resource potential (e.g., wind, solar,) for high levels of renewable generation
  - Prioritizing workforce development and training on renewable energy for future deployment.
- What are the community’s challenges, generally and related to energy?
  This is what we have heard so far:
  - High dependence on imported fossil fuels; volatile fuel prices
  - High construction and maintenance prices for renewable energy projects
  - Some households not well-suited to their own solar and storage
  - Some households have separate contracts for solar and storage, or have experienced challenges with integrating electric vehicle charging
  - Navigating how best to adopt solar and storage, fielding sales proposals, and sizing systems.

Energy Plan Focus Areas

Workshop participants were prompted to discuss energy focus areas and possible project ideas, in response to the following questions.

Discussion Questions

- What kinds of energy projects, technologies, programs, or other topic ideas would the community and interested parties like to see included in the plan, and ultimately to implement? What we’ve heard so far:
  - Technologies appropriate for this community
  - Battery storage safety
  - Transportation electrification.
- What focus areas (categories or themes) could the project and program ideas be grouped under? Such as:
  - Energy efficiency

- Renewable energy generation
- Resilience
- Workforce development
- Education and awareness
- Policy and regulation.