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Integrated Grid Planning Stakeholder Council

December 5, 2022

Hawaiian Electric

Agenda

- Geothermal Presentation
- IGP Stakeholder Council Follow-up
- Resilience Update
- Stage 3 RFP Update

Geothermal Presentation

Stakeholder Council and TAP Follow-up and Recap

November 30 Stakeholder Council Draft Takeaways

Status quo not an option, must act with urgency to achieve goals; however, need to be realistic about what's possible in terms of future grid-scale and rooftop solar build. Implementation and execution now critical.

- Policy and State or Legislative Support for Goals
  - Even if we acknowledge policies may need to be adjusted, that will take time, need to work within existing processes and streamlining them to move forward
  - Yes, everything is important but need the State to prioritize what's important in terms of land use
  - Evaluate having an entity or group to focus on specific tasks/goals/outcomes. Powering Past Coal Tsk Force potentially a good model
    - Standardize permitting across counties
  - Need statewide entity to lead and coordinate economywide decarbonization, pull pieces together across sectors – HSEO currently leading strategy. However, implementation plans and execution in specific sectors also be needed
  - Workforce development, partnerships with schools and universities
- Community Engagement and Equity
  - Community outreach and engagement, coordinated message across multiple entities – work on messaging to ensure customers understand what's needed to get to 100% renewable energy and its benefits
  - Direct benefits to communities. Availability of funding for communities beyond what's available or coming from developers to communities
- Land Needs and Issues
  - Acknowledgement of the cost of land that will be needed to decarbonize the economy
  - Complex land issues in Hawaii (i.e., different landowners)
  - No process currently to seek state or federal land availability
  - Need a community renewable energy (zone) map that outlines pragmatic and practical availability.

November 30 Stakeholder Council Follow-up

- Recording and notes will be emailed out to Stakeholder Council when available
- Proposed next steps: Gather recommendations and insights from the Stakeholder Council meeting and propose specific actions and develop strategy to move forward on policy goals that the Stakeholder Council can refine and advance.
- Are there any additional recommendations from the Stakeholder Council on next steps? (e.g., using feedback to inform next round of procurements or programs, specific REZ process)
- Was the in-person meeting beneficial? Schedule for next meeting?

December 1 Technical Advisory Panel Recap

- Appreciation for practical realities of achieving renewable and decarbonization goals
- The challenge is getting things built, strong need to identify best/most probable option and what are the options that meet the minimum requirements but not always most optimal
- Need to move to flexible, rolling planning as things change, don't let perfect be enemy of good.
- There are economic, policy, and political challenges that interact with technical challenges that TAP deals with
- Some of the current issues are not technical or scientific, they are policy related. Needs to be more mechanisms to have utility and PUC talk given the number of dockets and initiatives that interact with one another.
- Sense of moving to more pragmatism of how to get to 2030. What is the expected case, how do we define that from a planning standpoint. How do we take action to move forward
- Moving away from debate on what's the perfect answer, to how to get things done.

December 1 Technical Advisory Panel Recap

- Overall modeling results seem to be on the right track, no fatal flaws.
- If land is going to be an issue, potentially evaluate a scenario that is land constrained but with a binding constraint to achieve 70% GHG by 2030.
- Consider looking at different storage durations as part of resource adequacy analysis.
- Need to establish reliability criteria/metrics – can the PUC rule on the appropriate reliability criteria?
- Be clear what the 2030 needs are and tradeoffs.
- System security analysis seems to be on track.
- Agreed may be beneficial to supplement TAP with ISO/TSO/Utility perspective, protection experts.
- May make sense to meet in-person at the end of March – useful to interact with Stakeholder Council.

Resilience and Energy Transitions Initiative Partnership Project Update

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Climate Adaptation Transmission & Distribution Resilience Program Update

December 5, 2022

Hawaiian Electric

Recap and update since our last meeting

November 2021 IGP Stakeholder Council Meeting	Since Our Last Meeting:
• Provided context and need for resilience investment. • Discussed the roles of preventive and mitigation solutions to enhance resilience. • Discussed the early-stage maturity of T&D resilience in the industry and the need to proceed with “no-regrets” investments while we further develop resilience knowledge and capabilities. • Provided a work-in-progress portfolio of resilience investments for a 5-year program totaling $307M (Capital and O&M).	• Program scope was 1) refined to prioritize highest value investments, and 2) adjusted to consider more recent impacts of contractor availability and supply chain disruptions that became increasingly salient over the course of 2021-2022. • Filed application with the Commission seeking approval for $190M (Capital and O&M) in T&D resilience investments over 5 years. • Decided to pursue application for federal funding through Infrastructure Investment and Jobs Act (IIJA) to help offset costs to customers. • Refining scope and priorities, including engagement with key infrastructure partners.

Key Points

Hawaiian Electric plans to implement $190M in targeted T&D resilience enhancements over 5-years, subject to PUC approval (applying for IIJA funding that could offset nearly half the cost of the program).

Our electric grid is vulnerable to severe events that are projected to increase in frequency and intensity due to climate change.

Improving resilience for Hawaii will require investments in *both* damage prevention (system hardening) and impact mitigation (e.g., microgrids). These investments are complementary and are *not* substitutes for one another.

This program emphasizes foundational, “no-regrets”, high “bang-for-buck” hardening investments.

This 5-year program is intended as an initial step as part of a long-term effort. *There is much more that needs to be done.*

Expediency is key: The next severe event has no obligation to wait while we spend years analyzing and perfecting our plans. Program was designed at a high level to allow for ongoing refinement as the program proceeds.

Resilience solutions can target both damage prevention and impact mitigation. This program is focused on foundational damage prevention investments

Solutions to Prevent Outages or Damage

Outages or Damage

Solutions to Mitigate Impacts if Preventive Solutions Fail

Preventive Solutions

- Transmission hardening
- Hardening critical circuits
- Hardening critical poles
- Wildfire prevention
- Pole/line relocation to avoid threats
- Vegetation management
- Undergrounding
- Substation flood monitors

Mitigation Solutions

- Microgrids
- Critical Customer Hubs
- Minigrids
- DER
- Distribution feeder ties
- Backup generators
- Grid automation
- Emergency response and restoration

Damage prevention must be a key focus considering Hawaii's unique resilience challenges

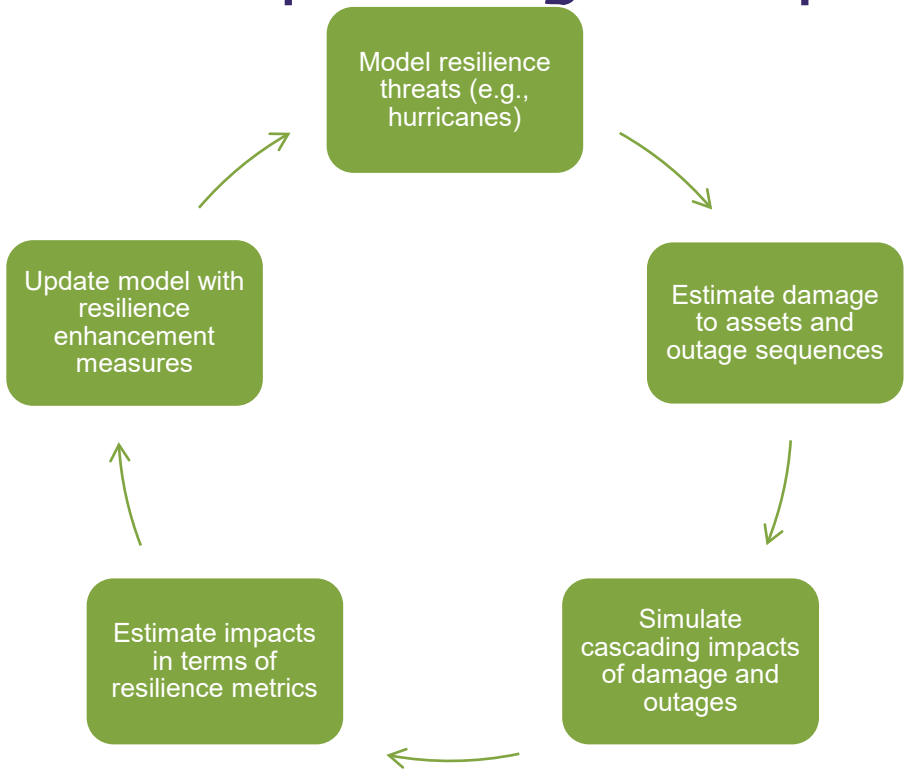
- Extreme isolation. 5 separate small island grids located far from the mainland US
- No interconnections between the island grids or to a larger grid
- Limited evacuation options in a severe event scenario
- Concentration of population in more vulnerable coastal areas
- Extreme topography. Transmission lines run across steep, rugged terrain with limited access
- Mutual aid from mainland utilities and material re-supply logistical complexities and lead times

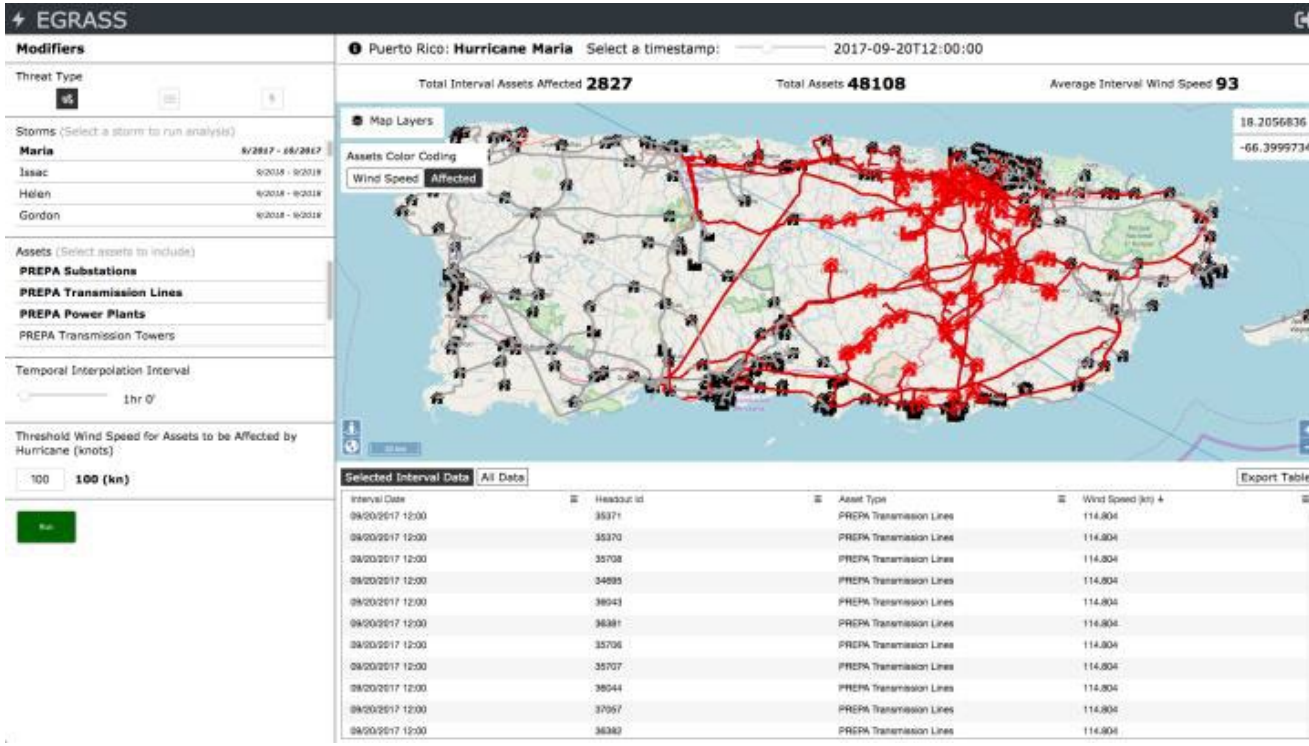
Considering Hawaii's unique resilience vulnerabilities and challenges, ***damage prevention is imperative***. Less damage requires fewer crews and heavy equipment for restoration and reduces total length of restoration.

The overarching theme of the program is to reduce damage/failures on the transmission and distribution system. These are things we can start doing ***now***

- Strengthen the most critical transmission lines to withstand extreme winds
- Incrementally hardening distribution lines serving critical community lifeline facilities
- Hardening highway crossings that could significantly impede restoration if they failed in a storm
- Upgrade infrastructure and deploy devices to prevent wildfires
- Install flood monitors in vulnerable substations to reduce flood impacts
- Remove hazard trees so they don’t fall into lines in a severe event
- Move selected lines underground on O‘ahu
- Install circuit ties on Maui to enable power to be restored more quickly in the event of an outage

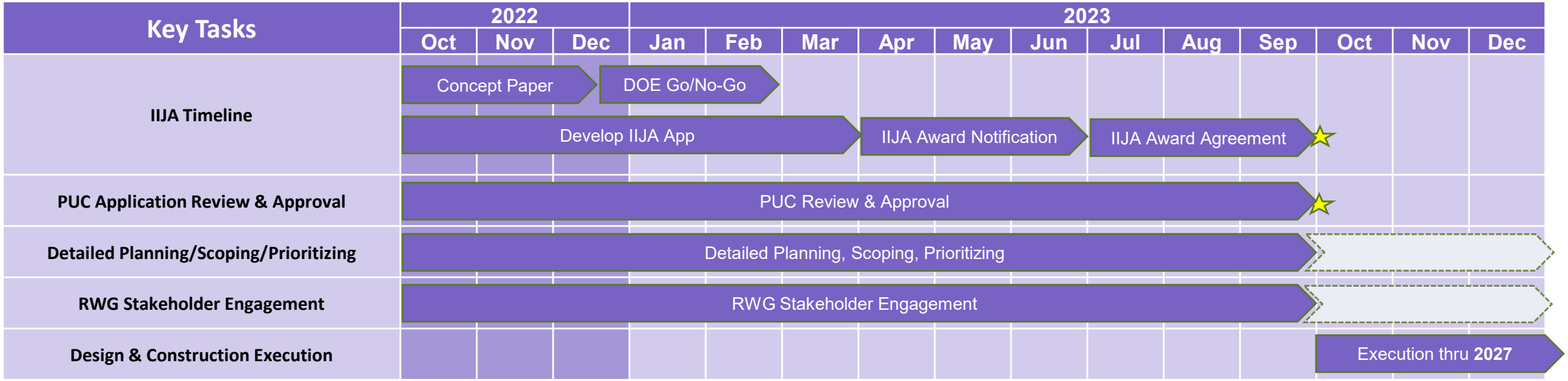
We are pursuing advanced resilience modeling to support future resilience planning and options analysis





- ❖ No formal metrics or methods to evaluate power system resilience or perform cost-benefit analysis of investment options have received widespread acceptance or adoption.
- ❖ Partnering with PNNL to leverage their research and modeling to develop performance-based methods to evaluate resilience and compare investment options in terms of expected damage and recovery.
- ❖ This effort can support better cost-benefit/options analysis and resilience portfolio development.

Status and Timeline



Currently in regulatory proceedings

Working on application for Bipartisan Infrastructure Bill funding to offset costs to customers by close to 50%

- After reviewing concept papers, DOE will encourage a subset of applicants to submit full applications

Refining scope of work and priorities for each initiative

Meeting with key infrastructure partners to identify and prioritize critical facilities for Critical Customer Circuit Hardening

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Energy Transitions Initiative Partnership Project (ETIPP)

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Energy Transitions Initiative Partnership Project

The U.S. Department of Energy's (DOE) Energy Transitions Initiative Partnership Project (ETIPP) works alongside **remote, island, and islanded communities** seeking to transform their energy systems and **increase energy resilience through strategic energy planning** and the implementation of solutions that address their specific challenges.

Objective: Provide customers with a map identifying areas that are good candidates for hosting hybrid microgrids to improve electrical infrastructure resilience.

Considerations: Electric grid layout, customer-sited resources, reliability, equity, etc.

Evaluating Hybrid Microgrid Hosting Locations

1

CRITICALITY

Where are the critical loads, facilities and services?

- **Emergency**: emergency shelters, fire stations, EOC
- **Medical**: hospitals, out-patient facilities, surgical centers, skilled care facilities
- **Infrastructure**: water sources & treatment, internet exchange points, transmission towers, dams, bridges, ports, airports

2

VULNERABILITY

What parts of the grid currently and are projected to endure the longest or most frequent outages?

- **Natural hazards and inaccessibility**: flood, sea-level rise (through 2050), landslide, tsunami, remoteness
- **Outages** (2011-2021)

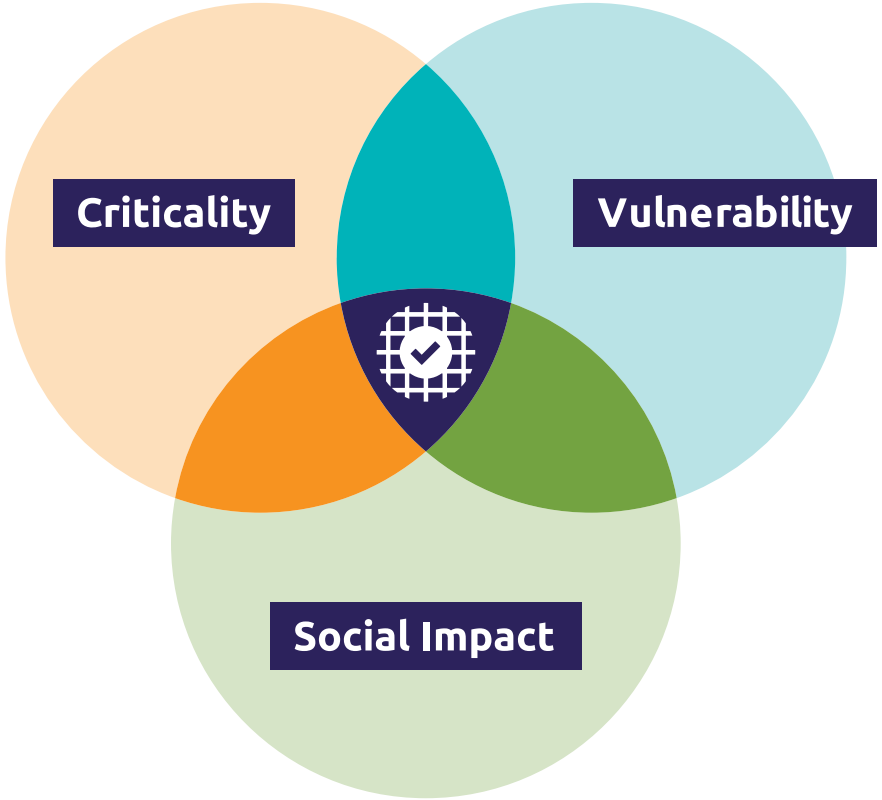
3

SOCIETAL IMPACT

What other locations would significantly impact communities if they lost power?

- Residential care facilities, community homes
- Schools, daycares, libraries
- ALICE program
- Disadvantaged communities

Criteria for Hybrid Microgrid Mapping

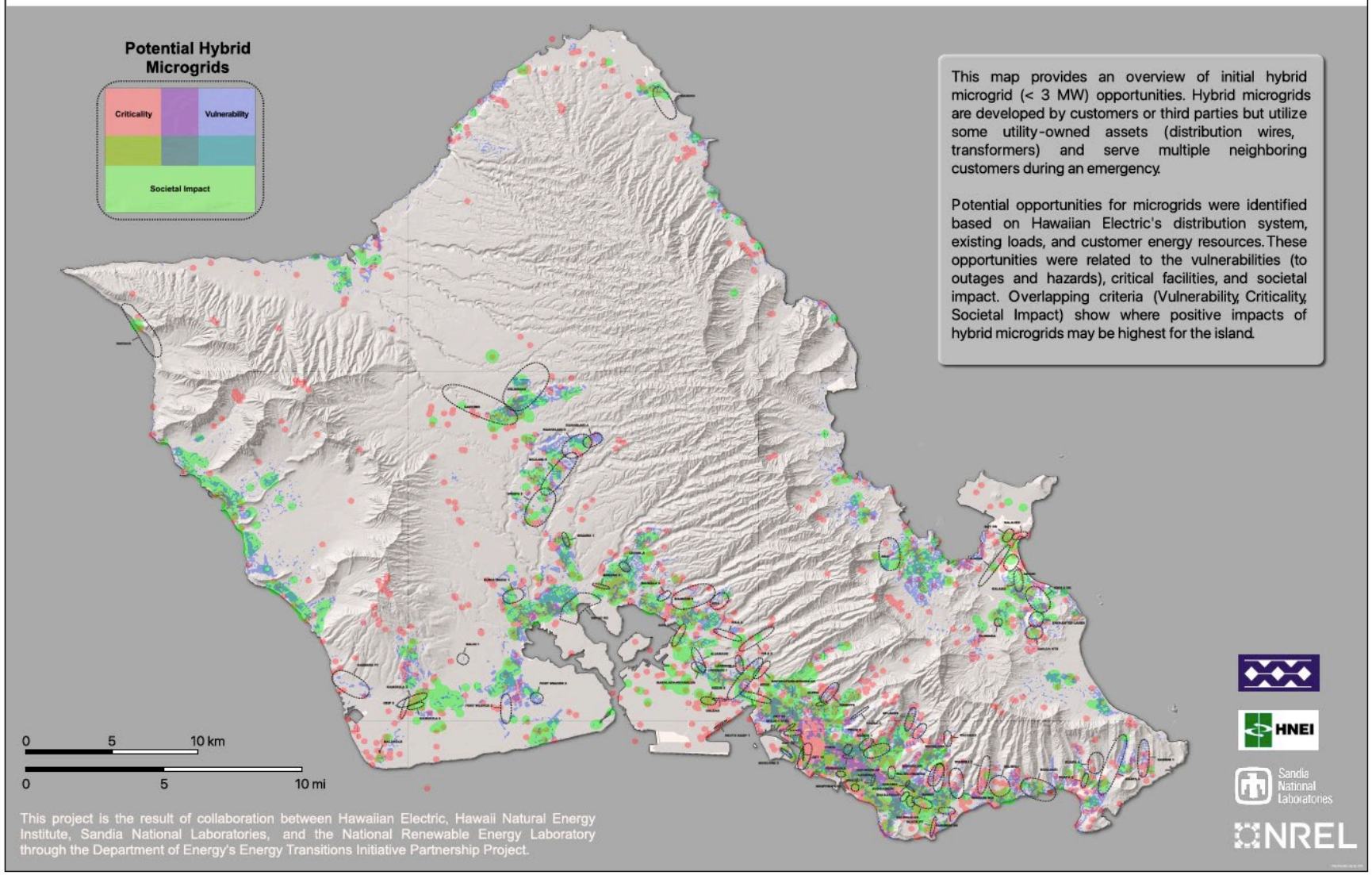


Included in analysis*

- Wastewater Treatment Plants
- Towers: AM and FM Transmission, Broadband, Cellular, Microwave, TV Analog and Digital Transmitter,
- Emergency Medical Stations
- Fire Stations
- Local, State Emergency Operations Centers
- National Shelter System Facilities
- Internet Exchange Points
- Ports
- Public Refrigerated Warehouses
- Local Law Enforcement Locations
- Hospitals
- Dialysis Centers
- Nursing Homes
- Urgent Care Facilities (ambulatory)
- Airports, Aircraft Landing Facilities

**From Department of Homeland Security*

Initial Hybrid Microgrid Opportunities on Oahu

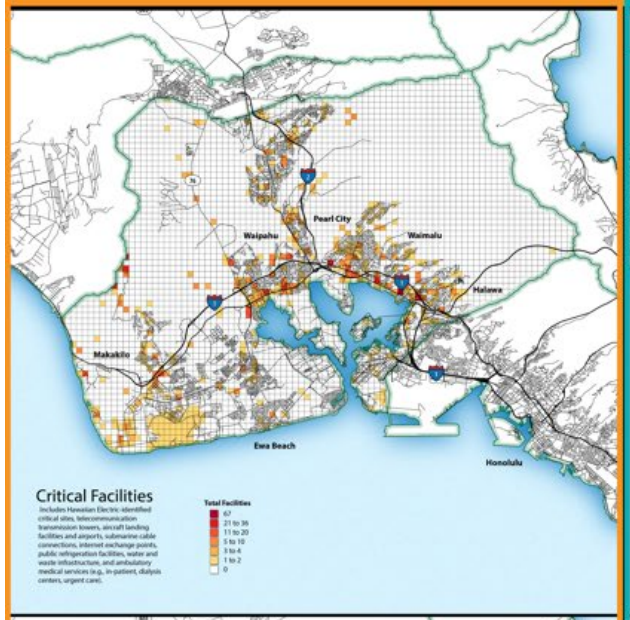


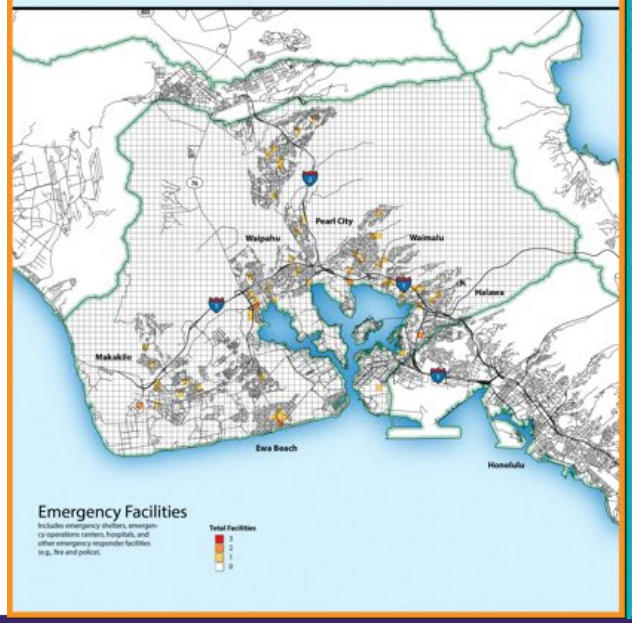
This map provides an overview of initial hybrid microgrid (< 3 MW) opportunities. Hybrid microgrids are developed by customers or third parties but utilize some utility-owned assets (distribution wires, transformers) and serve multiple neighboring customers during an emergency.

Potential opportunities for microgrids were identified based on Hawaiian Electric's distribution system, existing loads, and customer energy resources. These opportunities were related to the vulnerabilities (to outages and hazards), critical facilities, and societal impact. Overlapping criteria (Vulnerability, Criticality, Societal Impact) show where positive impacts of hybrid microgrids may be highest for the island.

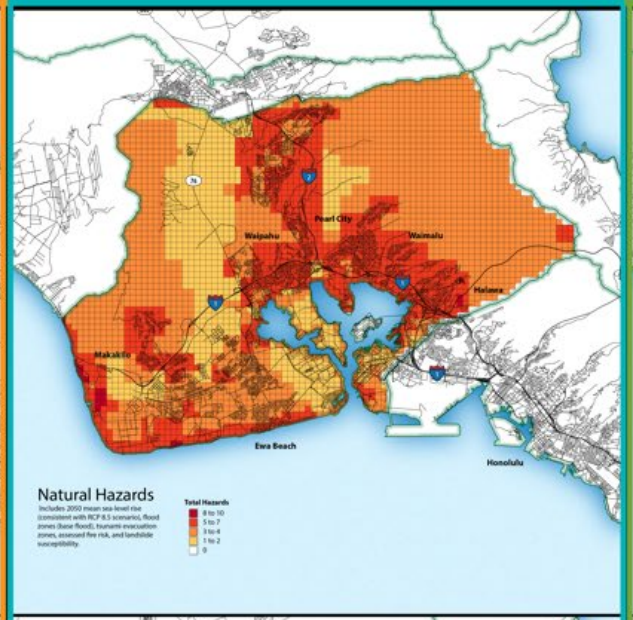
This project is the result of collaboration between Hawaiian Electric, Hawaii Natural Energy Institute, Sandia National Laboratories, and the National Renewable Energy Laboratory through the Department of Energy's Energy Transitions Initiative Partnership Project.

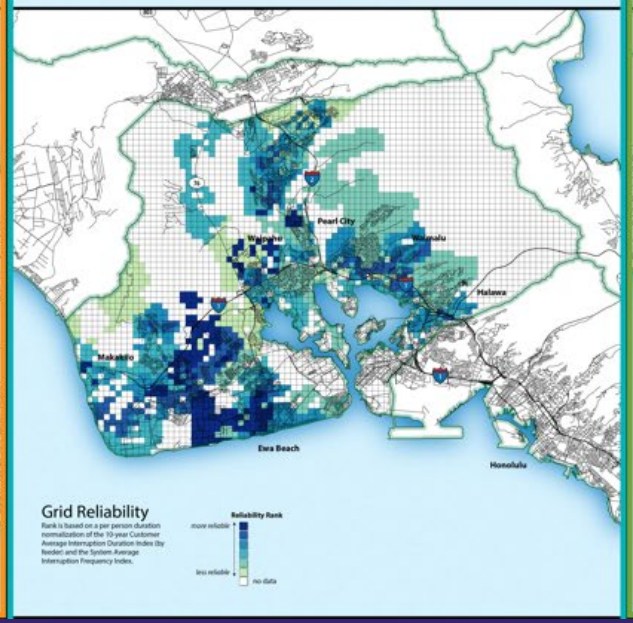
CRITICALITY



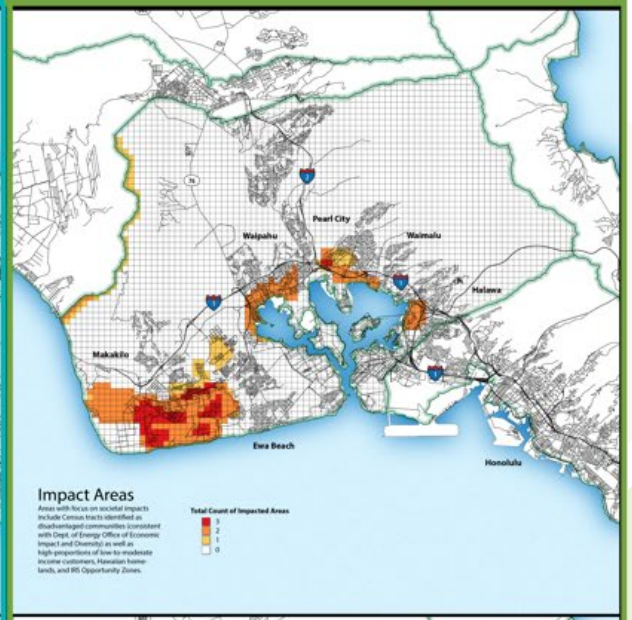


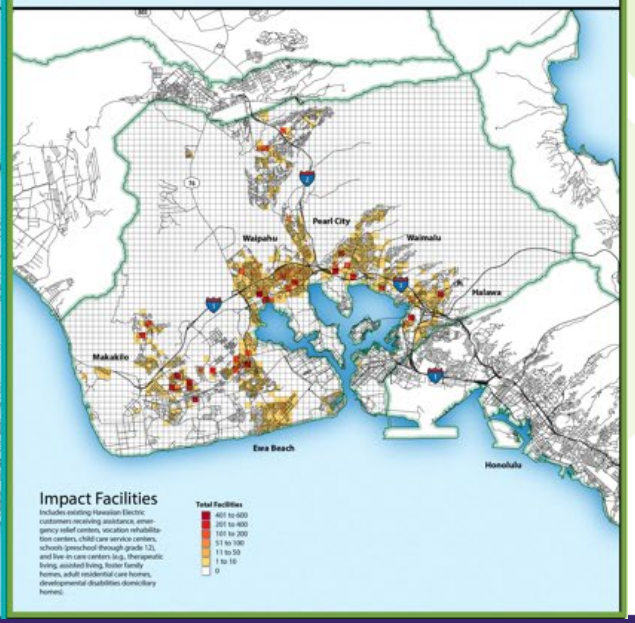
VULNERABILITY



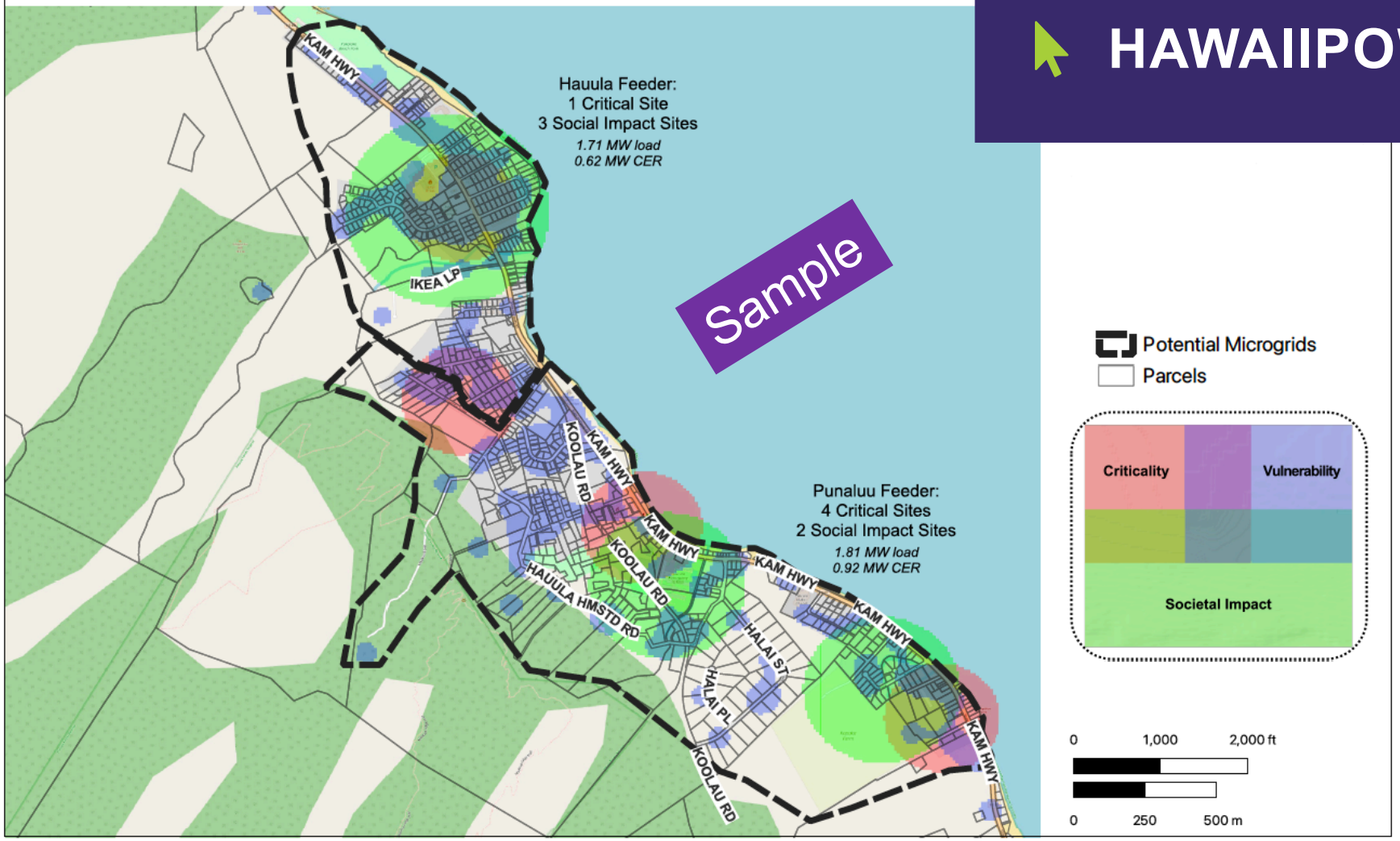


SOCIETAL IMPACT





Hauula Potential Hybrid Microgrids



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Stage 3 RFP Update

Stage 3 RFP Update

Stage 3 Hawaii Island RFP in-progress.

- Issued on November 21, 2022.
- Proposals due February 24, 2023.
- Selection of Proposals August 31, 2023.

Stage 3 Oahu and Maui RFP approved with modifications

- Expected to be issued Mid-January 2023.
- Proposals expected to be due Mid-April 2023.
- Selection of Proposals expected in December 2023.

Stage 3 Community Benefits

- Proposals require a community benefits package (CBP) with an annual minimum commitment of $3,000 per MW.
- These funds can either be used for actions and/or programs aimed at specific needs or can be committed to a community-based 501(c)(3) not-for-profit organization to directly address such needs.
- The Commission emphasizes that the size of the CBPs should be proportionate to the needs of the communities affected by the project, with considerations, for example, of the share of Low to Moderate Income and underserved populations in these communities.
- Within 30 days of Priority List Notification: (1) the Companies will provide feedback to Proposers that advance to the Priority List regarding their Community Outreach Plan and Cultural Resource Impact; and (2) Proposers will respond to requests for clarification and work to resolve potential issues identified by the Companies.

Procurement Targets

- **Hawaii Island**: 325 GWh of renewable energy, annually by 2030.
- **Oahu**: 928 GWh of renewable energy by 2027, 300-500 MW of renewable firm energy by 2029, and 200 MW by 2033. (Energy from the withdrawn Barber's Point Solar project will be added to 928 GWh)
- **Maui Island:** 350 GWh and 40 MW of firm renewable energy by 2027.

Commission directive on Firm Renewable Energy:

- The Commission is inclined to treat the "firm" component of the Stage 3 RFPs for Oahu and Maui as an assessment for the market's potential to provide such renewable generation resources on a cost effective basis to meet customer needs.
- The Commission believes that the current targets should be treated as a preliminary indicator of the capacity that may be necessary in the near term; the resulting amount of new resources that are procured will be informed by further analyses in the IGP proceeding and robust cost-benefit analyses using the actual prices from any conforming bids.
- A properly evaluated portfolio that includes firm renewable generation may be acceptable, so long as it provides benefits to customers at a reasonable and justifiable cost and is superior to alternative approaches.