

Energy Program Island of Hawai`i

Energy Coordinator
Will Rolston
September 2016

Accomplished Energy Project Portfolio

2012-2013-2014

- Green Govt. Action Plan
- Energy Program Update
- No-Cost Initiatives
- Efficiency Retrofits
- 1000 LED Lamps
- PHEV Fleet
- PUC Dockets

2014-2015-2016

- DWS – 3.3 MW Wind Farm
- Biodiesel Transition 20-100%
- PV + Battery + EV Sites
- EV Charger Network
- +9000 LED Lamps
- ASU-Partnerships

STRATEGIC INITIATIVES LAUNCHED

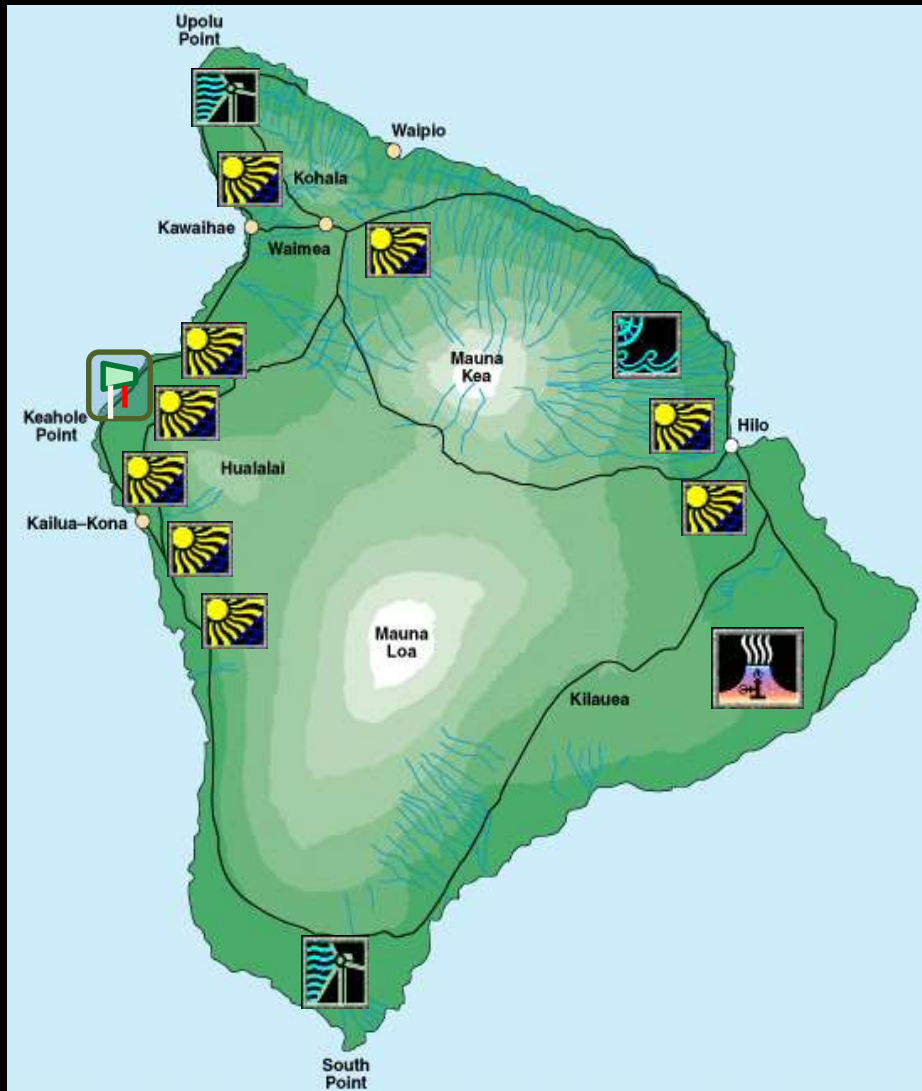
- U.S. & World Leaders in Renewable Energy 50% Trajectory to 100%
- Renewable Energy to Innovative Storage Solutions
- Excess Renewable Generation to Transportation
 - Complete Solutions : PV + EV + Battery
 - NELHA - Energy Research RD&D
 - Biodiesel and Hydrogen Buses
 - Island EV Charger Network



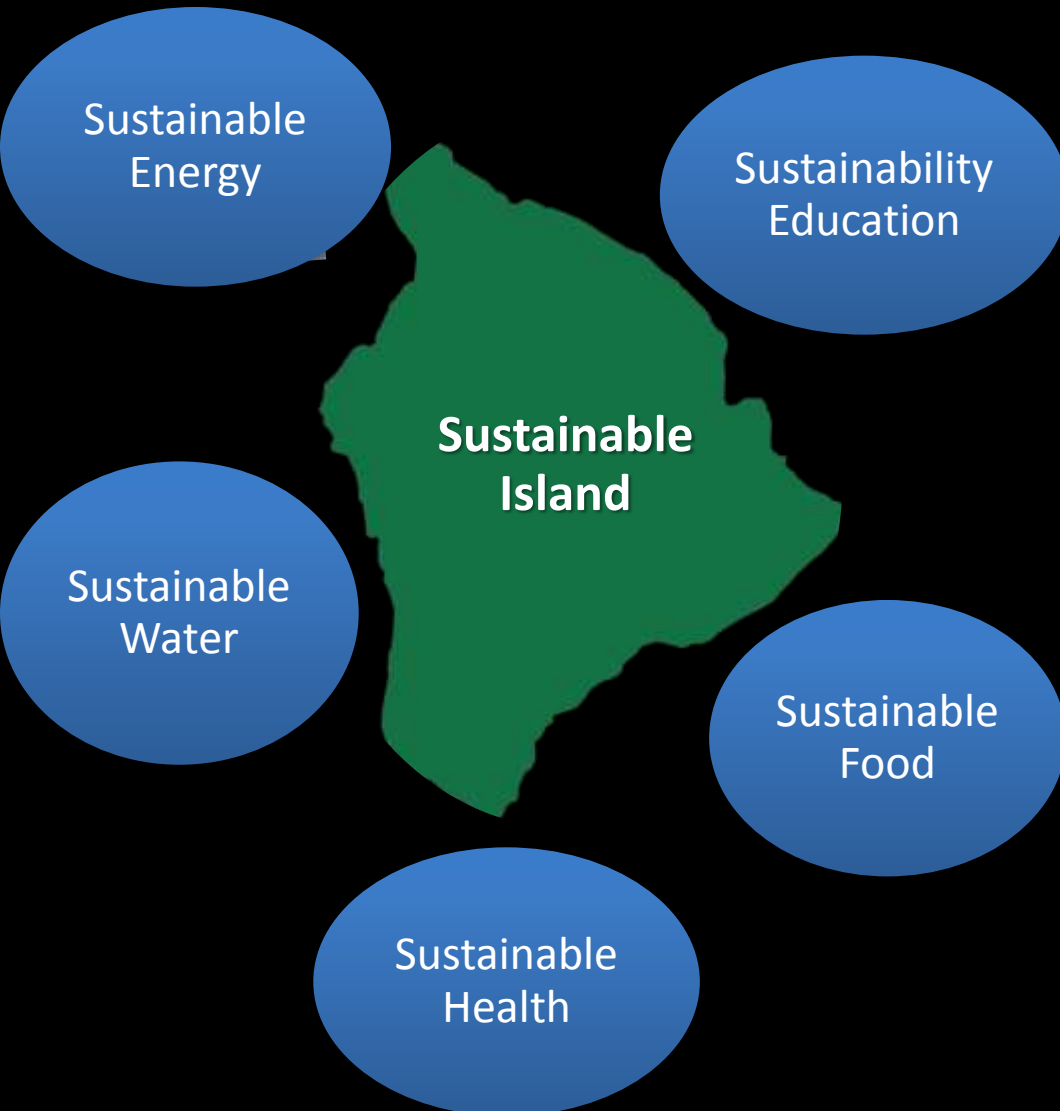
Island of Hawai'i 50% Renewable State of Hawaii Energy Leader

200 MW Electric System

- Geothermal - 38 MW
- South Wind Farm – 20 MW
- North Wind Farm – 11 MW
- Hydro – 16 MW
- Photovoltaic – 70+ MW
- NELHA OTEC – 100 kW



Sustainable Island of Hawai`i Vision : Energy, Education, Water, Food & Health Nexus



❑ Vision from Partners:

- Model Island of Hawai`i Systems
- Energy System as Sustainable Island
- Demonstration for wider applications

❑ Partnership Vision:

- Sector Integration: water, energy, food, health and education systems
- Sustainable Energy Sector: Integration of Supply & Demand
- RE, EE, Transportation Resiliency

❑ Vision from Hawai`i:

- Revive traditional "affluent subsistence"
- Demonstrate 21st century technologies
- World Leader



On-Site Renewables Generation + Storage + Transportation



On-Site Renewables

West Hawai`i Civic Center:

- LEED Silver Certified
- 250 kW Photovoltaic Array
- 100 kW – 250 kWh Lithium-Ion Battery
- 100% Renewable Government Center
- 5 Plug-in Hybrid Electric Vehicles
- 6 Level 2 Chargers



Lālāmilo Wind Farm



On-Site Renewables

Lālāmiilo Wind Farm:

- Wind Turbines Up - April 2016
- Wind Farm Power - September 2016
- Up to \$1 Million Savings to Ratepayers
- Top Wind Site in Hawai`i & United States
- Fifty (50) year Low-cost Lease with DLNR
- Electricity is 50% Cost of Water Distribution
- 3.3 MW Wind Farm = 5 x 660 kW Wind Turbines



Electric Vehicles



Biodiesel

- **A fuel for Any Fossil Diesel Engine**
- **Non-toxic and Biodegradable**
- **Non-flammable / Renewable / Recycled**
- **Superior Lubrication**
- **Low Emissions**
- **Ultra Low Sulfur (<15 ppm)**



BIG ISLAND BIODIESEL

- First commercial scale refinery built in the State in four decades
- Price is competitive – in some areas it is cheaper than diesel fuel
- Capacity is 5.5 million gallons per year = 50% annual amount diesel
- Plan another 5.5 million gallon refinery on West-side when market arrives



Transportation Initiatives

- Electric Vehicle Fleet Begins
- Bio-Diesel for Mass Transit, Fire, DPW
- Electric Vehicle Charging Network Begins
- Hydrogen Fueling Station to be built at NELHA
- 2 Hydrogen Buses for Volcanoes National Park
- 1 Hydrogen Bus for County of Hawai`i Kona Routes
- County of Hawai`i Initiates Large Fleet Owners Association
- Fleet Optimization Partnerships Initiated with Utility & Private
- Bio-Diesel Refinery for Transportation up to 5M Gallons/year

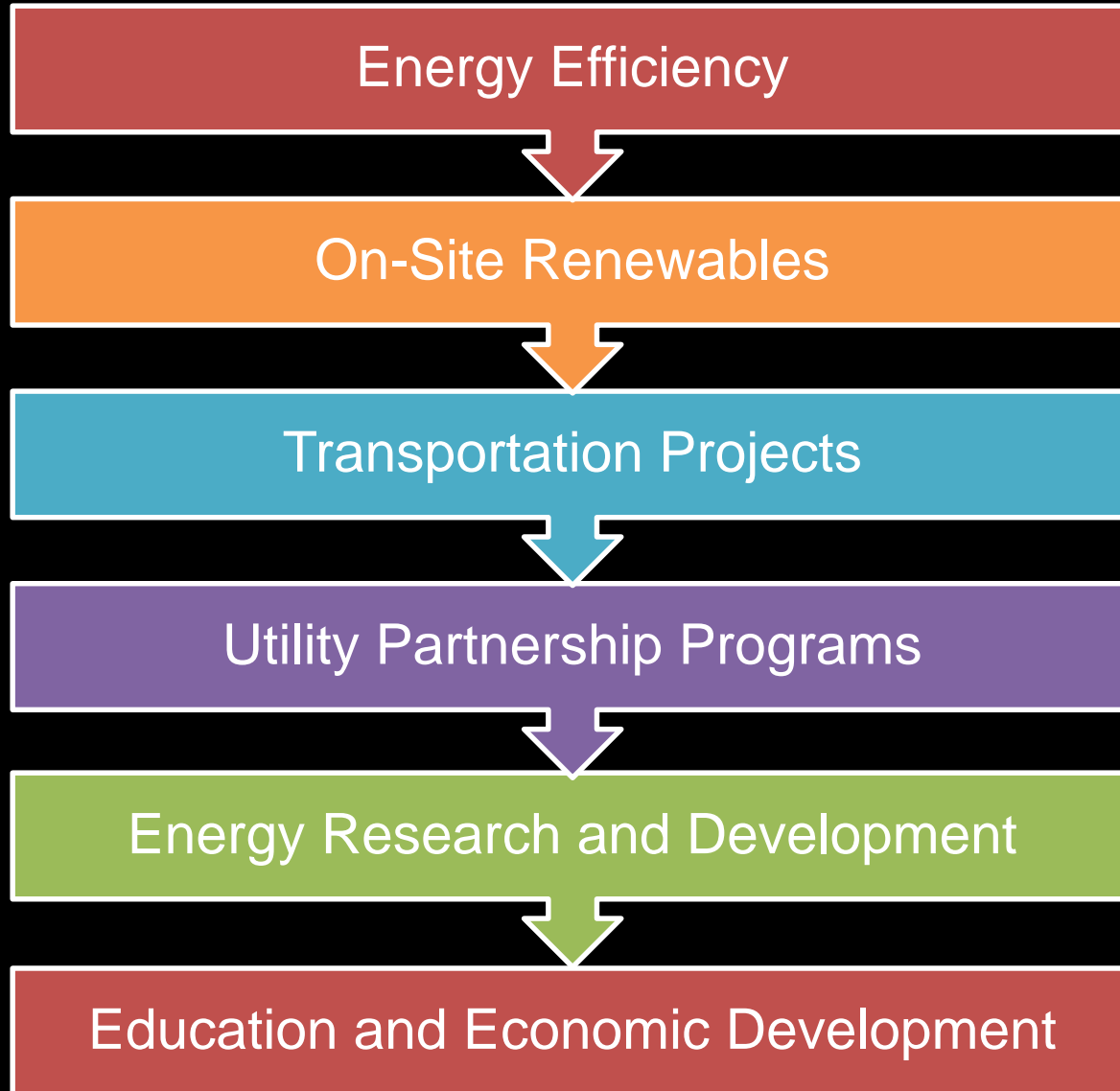


County of Hawai`i Responsibility

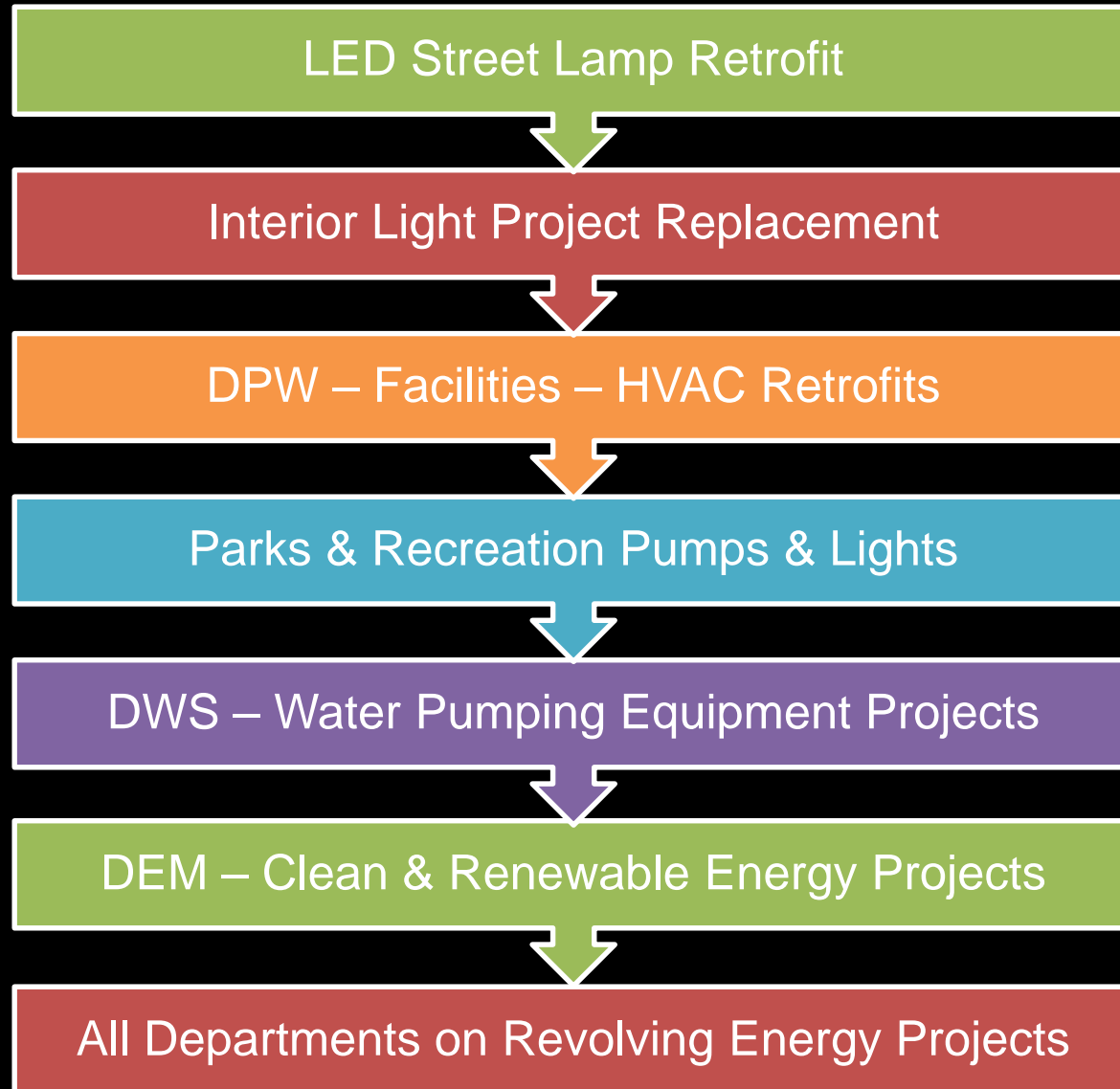
- Advocate to reduce energy costs, promote economic development and preserve environments
- Engage all sectors: residents, businesses, independent power producers and utilities
- Prepare for emergencies



County's Approach to Energy



Energy Efficiency Education



Research and Development Energy Program Project Analysis

- Quality of Life
- Return on Investment
- Economic Development
- Public-Private-Partnerships
- Power Purchase Agreements
- Biofuels Evaluation Framework
- Technical & Financial Analysis Tools



Light-Emitting-Diode (LED) Lamp



High-Efficiency LED Lamps to Darken the Night Sky
Fifty (50)% Reduction in Electricity Costs
Astronomy Community Approved
High Visibility = Safer Roads
Human and Animal Friendly



PUC Dockets

- Intra-Governmental Wheeling (COH Intervener – Docket Open)
- Energy Efficiency Portfolio Standards (COH set high Energy Efficiency Standards and drove Energy Efficiency \$ to low-income residents)
- Reliability Standards Working Group (COH led Demand-Side Options Group – starting new PUC Docket in Demand Response)
- AKP Biodiesel (PUC closed)
- Integrated Resource Planning (COH Intervener)
- Decoupling (COH Intervener revised interest rate)
- NextEra and HEI Merger (COH Intervener - PUC closed)
- Power Supply Improvement Plans (COH Intervener – Docket Open)
- Potential PUC Dockets on:
 - Utility of the Future
 - Business Model of the Future
 - Regulatory Model of the Future



Young Geology = Steep Bathymetry Access to Pristine Ocean



Hawaii Ocean Science and
Technology Park
administered by the
Natural Energy Laboratory of
Hawaii Authority



▲ Hualalai
Elevation: 8,271 ft

Captian Cook

Kailua-Kona

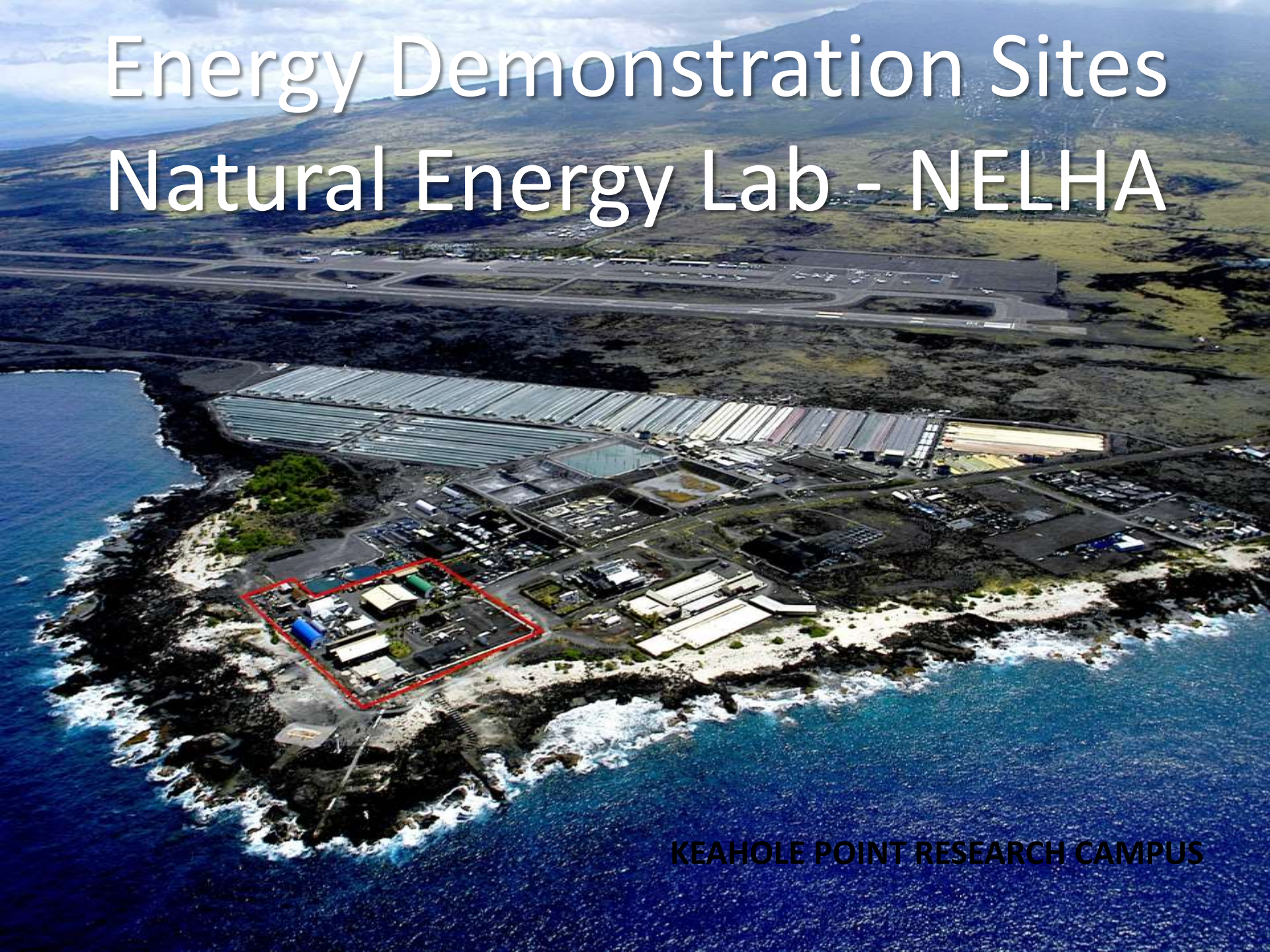
Queen Kaahumanu Highway

Kona International Airport



Energy Demonstration Sites

Natural Energy Lab - NELHA



KEAHOLE POINT RESEARCH CAMPUS

MAHALO

