

Hawaiian Electric Company, Inc.

ARTHUR SEKI

EDUCATIONAL BACKGROUND AND EXPERIENCE

Business Address: Hawaiian Electric Company, Inc.
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Position: Director of Technology
Energy Solutions & Technology Dept

Years of Experience: 28 years

Education: Master of Science in Civil Engineering
University of Hawaii, 1976

Bachelor of Science in Chemical
Engineering
Arizona State University, 1974

Experience: 2002 – present
Director of Technology
Energy Solutions & Technology
Hawaiian Electric Company, Inc.

1990 - 2002
Energy Specialist
Engineering Department
Hawaiian Electric Company, Inc.

1976 - 1990
Research Associate
Hawaii Natural Energy Institute
University of Hawaii at Manoa

Other Curriculum: Corporate Training Course
Hawaiian Electric Company, Inc.

Previous Testimony:

HECO IRP
Docket No. 7257

HELCO IRP
Docket No. 7259

MECO IRP
Docket No. 7258

Current Status of HECO's efforts to Meet RPS levels

What is HECO doing to meet the RPS?

HECO's strategy aims to (1) pursue commercially available renewable energy generation in the near term, and in parallel, (2) invest in RD&D for emerging technologies and resources that are not currently commercially available or economically viable in the near term. This strategy will ensure that the HECO is not only taking action to use as much renewable energy as is commercially and economically viable today, but also are helping to develop future sources of renewable energy.

HECO's activities and initiatives are described in detail below:

(1) PURSUE COMMERCIAL RENEWABLE ENERGY PROJECTS

The HECO utilities are pursuing commercial renewable energy projects by (1) keeping *existing* commercial renewable energy projects operating and (2) pursuing *new* commercial renewable energy projects.

Keep Existing Commercial Renewable Energy Projects/Resources on the System

A key component of the HECO utilities' renewable portfolio strategy is to maintain the existing sources that are currently contributing renewable energy to the State's energy mix.

Puueo Hydro Rehabilitation

The existing 1.5 MW HELCO-owned run-of-river Puueo hydroelectric plant will be rehabilitated. The PUC approved HELCO's plans to rehabilitate the damaged generator by installing a modern, more efficient turbine generator with a capacity of roughly 2.28 to 2.4 MW.

Lalamilo Wind farm

The Lalamilo wind farm is an existing 2.28 MW HELCO-owned facility located in the Waimea area (Big Island). HELCO is presently considering options for increasing the output of this facility.

Puna Geothermal Ventures (PGV)

Due to well problems, the normal capacity of 30 MW at PGV had been reduced to an average of 5.6 MW from April to December 2002. PGV has drilled a new source well and converted KS-11 into a re-injection well, which has enabled PGV's output to slowly increase. PGV indicates that as of January 2004, it has been able to export roughly to 27 MW on a consistent basis.

Hawaiian Commercial and Sugar Company (HC&S)

MECO and Hawaiian Commercial and Sugar Company (HC&S) have agreed to have their power purchase agreement remain in effect at least through December 31, 2007, thus continuing the export of bagasse-generated and hydroelectric energy to the grid.

Continue existing DSM programs

Since its beginnings in 1996, our residential solar water heating program, the largest in the nation, has paid over \$24 million in rebates to help 23,000 Hawaii households install solar. Over 4,700 Hawaii businesses have received an additional \$18 million to help pay for energy efficient technologies such as lighting, cooling, heating and motors.

In their second Integrated Resource Plan reports, HECO, HELCO and MECO all determined that their demand-side management (DSM) programs, including solar water heating and heat pumps, should continue to be included in future resource plans. Future rebates for solar water heating systems will provide an important incentive to encourage the adoption of solar water heating in the future. The HECO utilities continue to work towards obtaining PUC approval to continue, and expand, its DSM programs in the future.

In addition to utility planning efforts, the 2003 Legislature demonstrated vision and commitment to renewable energy by passing the Renewable Energy Tax Credit. This legislation in conjunction with the utility demand-side management programs provides a positive incentive for both solar water heating and other renewable technologies.

Pursue and Facilitate New Commercial Renewable Energy Projects

HECO utilities are also pursuing programs to facilitate the commercial development of wind and biomass resources, as well as a program to enhance the positive integration of renewable energy systems with the electric grid.

Stimulate renewable energy market

HECO formed a non-regulated subsidiary in December 2002 called Renewable Hawaii, Inc. to seek passive investment (providing a reasonable return) opportunities in cost-effective, commercial renewable energy projects in the State. With initial approval to invest up to \$10 million, Renewable Hawaii's formation builds on HECO's ongoing commitment to increase Hawaii's use of renewable energy. The primary objectives of Renewable Hawaii are to stimulate the addition of cost-effective, commercial renewable energy in Hawaii, promote viable projects that will integrate positively with the utility grid, and encourage renewable energy generation activity where such is lacking in targeted categories. (Technologies requiring research and design, prototype development, or demonstration will not be considered.)

Renewable Hawaii is attempting to stimulate the renewable energy market by releasing a series of island-specific Renewable Energy Request for Project Proposals (RE RFPP). The following summarizes Renewable Hawaii's efforts thus far:

- Island of Oahu
A RE RFPP for the island of Oahu was released on May 22, 2003 and closed on August 22, 2003. Eight proposals were received with three proposals passing the screening process and currently undergoing detailed evaluation.
- Maui County (islands of Maui, Molokai, and Lanai)
A RE RFPP for the islands of Maui, Molokai, and Lanai was released on September 4, 2003 and closed on December 4, 2003. Five proposals were received; three proposals passed the screening process and are currently undergoing detailed evaluation.
- Big Island of Hawaii
A RE RFPP for the Big Island of Hawaii was released on January 22, 2004. Proposals are due April 22, 2004.

Wind Program

Wind has a high potential for near-term commercial development because of the potential resource availability in Hawaii and the maturity of the technology. HECO has launched various wind initiatives:

- High Resolution Wind Resource Maps
A new project funded by HECO, the Department of Business, Economic Development and Tourism (DBEDT), and the Department of Energy's National Renewable Energy Laboratory (NREL) has been initiated to update the State's wind resource maps. Preliminary high resolution wind resource maps, which graphically show wind power densities and wind speed, for the islands of Oahu, Big Island of Hawaii, Maui, Molokai, and Lanai have been developed to help identify new wind sites that could lead to commercial wind development.
- Commercial Wind Assessment
In response to the findings of the high-resolution wind resource maps, HECO will pursue site-specific assessments for wind farm development to investigate commercial development opportunities.
- Offshore Wind Assessment
In anticipation of the findings of the high-resolution wind resource maps, HECO hoped to conduct an assessment of potential offshore wind development on Oahu. However, the wind maps revealed that the offshore wind speeds were too low in areas having shallow depths (50 foot depths are necessary for offshore wind development using today's technology) and that the depths were too deep in areas having high wind speeds. Therefore, a study is not planned at this time.
- Hawaii Wind Working Group
HECO and DBEDT co-chair the federal-sponsored Hawaii Wind Working Group (HWWG) as part of the Department of Energy's Wind Powering America program. The functions of the HWWG are to provide a forum for information exchange on wind energy among member organizations, the public, and decision makers and to encourage the development of technically and economically feasible wind projects. Formed in 2002, the HWWG has held several meetings to exchange information.

Bioenergy Program

Biomass has a high potential for near-term commercial development because of the potential resource availability in Hawaii and the maturity of the technology. Initiatives to explore agricultural wastes and biofuels are underway.

- Hawaii Biomass Program
HECO is working with HC&S and the University of Hawaii at Manoa to develop the Hawaii Biomass Program. This proposed multi-year program would take a collaborative approach in developing a policy and technology framework that would lead to commercialization of an economically viable way to make full use of the total sugarcane material (including the use of cane trash) as a biomass energy resource (i.e., implement a comprehensive dual-use crop strategy to economically produce both sugar and energy).
- Biofuels Program

The potential utilization of biofuels (e.g., biodiesel, ethanol, and biofuel blends) in existing and new power generation units is being explored under HECO's Biofuels Program. The use of biofuels in electric power generating units represents a potential near-term renewable energy option. Before biofuels can be used on a commercial basis, however, the technical feasibility of firing stationary power generating units will need to be evaluated and demonstrated. Program activities include the following:

- HECO is funding a project to obtain information on biofuel properties, supply, availability, and pricing (Phase 1 of a planned multi-phase, multi-year biofuels assessment study).
- HECO is examining the feasibility of using boiler-grade fuel derived from used grease trap oil (such as the waste oil produced by restaurants) in its generating units.
- MECO is evaluating the use of biodiesel during start-up operations in two of its generating units the Maalaea Generation Station.
- After a one-year pilot program, HECO has converted its entire fleet of diesel-fueled trucks and associated refueling stations to use B20 fuel (20% biodiesel and 80% diesel).

Facilitate Non-Utility Projects

HECO, HELCO, and MECO receive and evaluate proposals from independent power producers seeking to sell power to the utilities. The following projects are either under review, in negotiations, or in the case of the Hawi project completed with negotiations.

- Union Mill Hydroelectric Project (HELCO)
Power Tech Industries, Inc. is proposing an 800 kW hydroelectric facility (Union Mill) located at Hawi, Hawaii.
- Tradewinds (HELCO)
Tradewinds, LLC has proposed to build and operate a wood processing plant to process eucalyptus trees into various wood products. The plant would include a cogeneration facility to generate electricity fueled by wood waste with excess electricity to be utilized on the HELCO grid. Tradewinds continues to pursue this project and HELCO has been in discussions with Tradewinds on the possible forms this project could take.
- Apollo Kamao'a Wind Farm (HELCO)
Apollo Energy Corporation (Apollo) is proposing to repower its existing 7,000 kW wind farm (Kamao'a Wind Farm) located at South Point, Hawaii. Under the plans, the repowered wind farm would increase in size to 20,500 kW. There is an agreement in principle between Apollo and HELCO on almost all of the key issues in a power purchase agreement (PPA).
- Hawi Wind Farm (HELCO)
Hawi Renewable Development LLC (HRD) and HELCO signed a power purchase agreement (PPA) on December 30, 2003 for as-available energy from a 10,560 kW wind farm at Hawi, Hawaii. The PUC approved a signed PPA between HELCO and Hawi Renewable Development, Inc. (HRD Inc.) for as-

available energy from a 5,280 kW wind farm at Hawi, Hawaii. However, HRD Inc. decided to proceed negotiate for and upon, PUC approval, construct and operate a 10,560 kW wind farm, which would incorporate the original 5,280 kW wind farm at the same site.

- GE Wind Energy/HRD Kaheawa Wind Farm (MECO)
GE Wind Energy/HRD has proposed to develop a 20 MW wind farm on conservation land at Kaheawa Pastures, Maui. The Board of Land and Natural Resources decided to award a land lease for the site to GE Wind Energy/HRD, thus rendering a competing proposal moot. The current proposal is for a 17.8 MW wind farm at the site.
- Sea Solar Power OTEC (HECO)
Sea Solar Power, International, LLC (SSPI) is proposing a 100 MW ocean thermal energy conversion (OTEC) facility to be anchored off Kahe Point, Oahu. The proposal received in late December 2003 proposes a July 2008 in-service date. If the project proves to be technically and economically feasible, the facility would be the first commercial OTEC facility in the world. HECO and SSPI are at the preliminary stages of discussions.
- H-Power Expansion (HECO)
There have been informal, verbal comments by H-Power personnel that the City & County of Honolulu may want to expand the facility by adding a third boiler.
- Hawaii Energy Group Makila Hydro (MECO)
Hawaii Energy Group, the consultant to the owner of Makila Hydro, is requesting an "as available" power purchase contract, for the proposed repowering of an existing 500 kW hydro generator located above Lahaina, (previously interconnected to Pioneer Mill).

Streamlined Power Purchase and Net Energy Metering Agreements

In response to the passage of Act 272, HECO utilities worked hard to be ready for implementation of the new law before the Governor signed Act 272 into law on June 25, 2001. This allowed the utilities to implement the customer billing modification, a streamlined NEM Agreement, and a NEM Tariff on the same day the legislation was signed into law. This streamlined net energy metering process, coupled to the existing power purchase contract governing systems less than 10 kW (referred to as the PV-10 contract), creates an environment that encourages the operationally-positive integration of customer-sited NEM systems.

Utilize Standardized Interconnection Agreement

H.C.R. No. 172, H.D. 1 of the Twenty-Second State Legislature, dated April 1, 2003, directed the Consumer Advocate (CA) "to form an ad hoc advisory group to investigate and make recommendations regarding the implementation of standard offer contracts and standardized interconnection agreements to facilitate the purchase of electricity from renewable energy producers in Hawaii." HECO is part of the ad hoc advisory group. The Consumer Advocate submitted an interim report of the ad hoc advisory group to the Legislature in December 2003.

Renewable Energy Integration Program

The intermittent and variable nature of wind can put a major strain on the existing utility systems in terms of being able to control system frequency and power fluctuations,

which can impact the reliability of power provided to customers. The smaller the system, the greater the impact these fluctuations may have on utility and consumer electrical equipment. HECO, HELCO, and MECO are conducting various projects to address this issue with the ultimate goal of allowing more wind on the utility systems.

- Electronic Shock Absorber
To help stabilize operation of grid-connected wind turbines and minimize power fluctuations on an electric grid that is connected to a number of wind farms, HECO, HELCO, and MECO have teamed with a private company to conduct a study and confirm that a device can be developed from commercial products for installation between a wind farm and the utility grid. The purpose of the device, called the Electronic Shock Absorber, is to help the electric utility ride through short duration power fluctuations (frequency, voltage, etc.) from the wind farm caused by the variable nature of wind.
- Intermittent Generation Assessment Protocol (IGAP)
To improve existing planning and evaluation tools, HECO is working with a consultant on the IGAP study to address the technical and cost impacts of relatively high levels of intermittent renewable energy generation on small, isolated electric utility systems.

The study will develop improved modeling to quantify the impacts of high levels of intermittent generation, establish appropriate power quality standards, and identify specific measures that can be taken by intermittent generation operators and utility operators to mitigate power quality fluctuations.

- Grid Quality Assessment
Through its membership with the Utility Wind Interest Group (UWIG), HECO plans to participate in a project to develop assessment tools related to grid quality. The purpose of this project is to determine and characterize the voltage fluctuations caused by wind farms on distribution feeder lines.
- In-line Hydro and Pumped Storage Hydro Assessment
Under a partnership with HECO, HELCO, DBEDT, County of Hawaii, and the State Department of Agriculture, a study is being funded by DBEDT and HECO to identify the potential for in-line hydroelectric and pumped storage hydroelectric (i.e., use of wind during off-peak hours to pump water to a higher elevation and generating power through in-line hydro units during on-peak hours) in existing County, State, and private water systems.
- Bulk Energy Storage to Relieve Transmission Congestion on the Big Island
Under a partnership with HELCO, DBEDT, and Sentech, a study is being funded by the U.S. Department of Energy to investigate new forms of energy storage that could alleviate the issue of overloading transmission lines when transporting renewable electricity to end uses, fostering the increased use of distributed energy and renewable energy systems
- Distributed Energy Resources Management as a Microgrid
HECO and DBEDT have received funding under a U.S. Department of Energy competitive grant program to evaluate the combination of hybrid, controllable distributed energy resources (DER) systems that will encourage development of renewable and distributed resources.

Assess Renewable Energy Technologies in IRP

HECO utilities conduct long-range planning to meet the energy needs of its customers. As part of its Integrated Resource Planning (IRP) process, HECO utilities evaluate both supply-side and demand-side resource options. Included in the IRP process is a comprehensive assessment of renewable energy resources and technologies that are feasible in the near-term (within the 5-year action plan period) and long term (over the 20-year IRP horizon). The evaluation of near-term technologies yields the most up-to-date information on potential renewable projects in Hawaii.

(2) ACCELERATE THE DEVELOPMENT OF EMERGING RENEWABLE ENERGY TECHNOLOGIES

As part of the HECO utilities' strategy to increase the renewable portfolio in the long-term, the companies are pursuing a broad range of initiatives to facilitate and accelerate the development of emerging renewable energy technologies in Hawaii.

Investment Opportunities

HECO's parent company, Hawaiian Electric Industries (HEI), provides venture capital funding to local companies engaged in emerging technology development to help accelerate technology deployment in Hawaii. HEI is involved with two companies developing renewable energy technology.

Hoku Scientific

In June 2002, HEI provided venture capital funding to Hoku Scientific, Inc., a Hawaii-based fuel cell R&D company that is developing proprietary fuel cell membrane technology. HEI's investment, which was part of a \$1+ million round of funding, is viewed as critical to the further development of Hoku Scientific and its technology.

Worldwide Energy Group

HEI provided venture capital funding to Worldwide Energy Group, Inc., a Hawaii-based company developing a technology that converts sugarcane bagasse or other biomass resources into ethanol. Ethanol is a potential alternative fuel produced from locally available renewable sources that can be used to generate electricity.

Research, development, and demonstration (RD&D)

RD&D projects and projects that enhance public education about renewable energy are also underway. HECO utilities' membership with the Electric Power Research Institute (EPRI), the research arm of the electric utility industry, keeps HECO utilities abreast of technology advances and is a core component of its RD&D thrust. In addition, HECO utilities will continue to seek partnerships with Federal, State, and County governments, the University of Hawaii, and other entities to increase its renewable energy portfolio.

RD&D projects, listed by technology, are described below.

Hydrogen and Fuel Cells

- Hawaii Fuel Cell Test Facility
HECO has partnered with HNEI, U.S. Department of Defense (DOD), and UTC Fuel Cells to build and operate a hydrogen fuel cell test facility in Hawaii. The Hawaii Fuel Cell Test Facility, operational since April 2003, is housed in approximately 4,000 square feet of warehouse space at HECO's Ward Avenue

facility and is used to evaluate the performance and reliability of production-sized, single-celled, fuel cell stack designs, materials, and fuels.

- Hydrogen Power Park Study
HECO and HELCO are partnering with the DBEDT, HNEI, Sentech, Sunline, Stuart Energy, and UTC Fuel Cells in a project to introduce and demonstrate hydrogen-based infrastructure in Hawaii.
- NELHA Gateway Project
HELCO is partnering with the Natural Energy Laboratory of Hawaii Authority (NELHA), DBEDT, HNEI, and Sentech in a project to construct distributed energy systems at the Gateway Center located at the entrance to NELHA's Hawaii Ocean Science and Technology (HOST) Park. This project aims to demonstrate renewable distributed energy resources and technology.

Solar Energy

- PV/Hydrogen Project at Ford Island
A partnership between HECO, HNEI, Office of Naval Research (ONR), and Navy Region Hawaii was formed to develop a photovoltaic energy park (PVEP) on Navy land to generate electricity from the sun and conduct research and development related to renewable energy, hydrogen, and fuel cells. Congressional authorization and appropriation for federal funding for a utility-scale photovoltaic system and associated research and development are in place.
- Solar Roof Assessment Study
HECO provided seed funds for a research effort by the University of Hawaii School of Architecture to develop a method for assessing the potential for solar power on roofs of existing buildings on the island of Oahu.
- Kona Base Yard Grid-Connect Photovoltaic System
To demonstrate a net energy metered photovoltaic system that would be similar to what a small commercial or residential customer might consider, HELCO has installed a 5.4 kW photovoltaic system along with battery back up and an educational display at its Kona base yard.
- Solar Thermal/Cooling Pilot Project
HELCO is partnering with Pacific Energy Services, Solel, and the Waikoloa Beach Marriott (An Outrigger Resort) on a project to demonstrate a solar thermal pilot system. The pilot system, operational since April 2003, utilizes a solar panel to produce domestic hot water to help meet hotel hot water needs.
- Maui Building-Integrated Photovoltaics
HECO provided a solar roof to the County of Maui's Lahaina Civic Center in November 2003. The roof serves the dual purpose of covering a walkway and providing the solar power for an electronic sign as well as parking lot lighting.
- U.S. Department of Defense Bus Stop Photovoltaic Lighting Demonstration
To promote and demonstrate off-grid photovoltaic technology, HECO is working with the Army to install photovoltaic area lighting systems at existing bus stops and other facilities on military property (Schofield Barracks).

- HELCO Photovoltaic Area Lighting Projects
To promote the use of off-grid photovoltaic applications, HELCO has partnered with various entities to install photovoltaic area lighting systems:
 - HELCO, the County of Hawaii, and the U.S. Department of Energy Million Solar Roofs (MSR) program teamed up to design and install a solar lighted educational kiosk and solar lighting for the Hilo bay front public restrooms.
 - Two solar-powered lights provide dusk-to-dawn security and improve the safety of the parking lot at the Catholic Charities Community and Immigrant Services transitional shelter Ka Hale `O Kawaihae.
 - A partnership between HELCO and the County of Hawaii was formed to provide improved lighting for two County parks located in Puna (Ahalanui Beach Park and Pohoiki Beach Park).

Hydroelectric Resources

- County of Hawaii In-line Hydroelectric Demonstration Project
HELCO has committed funding to cost-share with the County of Hawaii Department of Water Supply for an in-line hydroelectric generator project.
- Lanai In-line Hydroelectric Study
MECO is working with Castle & Cooke Resorts to initiate a feasibility study to examine whether an in-line hydroelectric system can be installed in the existing distribution water pipelines from central Lanai to its Manele Bay Resort.

Ocean Resources

- Navy Wave Energy Demonstration
Under a DOD Small Business Innovation Research (SBIR) grant, the Navy is partnering with Ocean Power Technologies (OPT) to assess the technical and economic feasibility of ocean wave energy. An at-sea demonstration of a 20-kW buoy wave energy system will be conducted at Kaneohe Marine Base. HECO provided engineering support regarding interconnecting to the electric grid and also serves as a Navy technical advisor.
- EPRI Offshore Wave Energy Project
HECO and DBEDT are participating in a multi-phase, multi-state collaborative project headed by EPRI to demonstrate the feasibility of wave power. The project will yield a conceptual design, including performance and cost estimates, for an offshore wave power device at a target location in each of six states (Hawaii, Maine, Massachusetts, California, Oregon, and Washington). Environmental and permitting issues will also be assessed.
- Honolulu Board of Water Supply (BWS) Deep Ocean Water Application Facility Study
The BWS is evaluating the feasibility of developing a deep ocean water facility to produce potable water, generate power via OTEC, and provide chilled water for

air conditioning and other applications. HECO is serving on the study's advisory group.

Public Education

- Sun Power for Schools Program
HECO, HELCO, and MECO are entering the 8th year of their Sun Power for Schools program with the State of Hawaii Department of Education. Through the Sun Power for Schools program, HECO utilities will continue to install photovoltaic systems at Hawaii public schools using voluntary customer contributions and by providing in-kind utility contributions, including engineering, project management, administration, advertising, and marketing. To date, nineteen (19) public schools have received photovoltaic systems (nine on Oahu, four on the Big Island, and six in Maui County).

HECO and the State of Hawaii Department of Education developed educational materials through a grant from the U.S Department of Energy's Million Solar Roofs program. The material was provided to public high school teachers. HECO, HELCO and MECO also conducted workshops for public high school and middle school teachers and participated in their Solar Sprint program where students evaluate their solar cars in field tests.

- Bishop Museum Energy Pavilion
Increasing public education and awareness of renewable energy technology is an important step towards establishing a sustainable market for renewable energy. HECO provided funding for a grid-connected photovoltaic system and renewable energy exhibit located at Bishop Museum. The photovoltaic energy system and exhibit, called *Hale Ikehu*, is operational and open to the public. Visitors are able to observe a working photovoltaic system and learn about solar energy and other renewable energy technologies. During the first seven months, over 600 individuals directly participated in the Hale Ikehu educational programs and over 110,000 visitors to Bishop Museum had the opportunity to view the renewable energy displays and educational materials.
- HECO Renewable Energy Website
More information about the HECO Utilities' renewable energy programs and initiatives can be found on HECO's website at www.heco.com under 'Renewable Energy'.

HECO Utilities are also involved in other activities that encourage the use of renewable energy in Hawaii.

Expand solar water heating and heat pump DSM programs

City and County of Honolulu Solar Roofs, Low-Income Solar Loan Program

To increase participation in HECO's Residential Efficient Water Heating Program ("REWH"), HECO entered into a partnership with the City and County of Honolulu to offer loans for the installation of solar water heating systems to low to moderate-income customers. Working with the Rehabilitation Loan Branch of the Department of Community Services has enabled HECO to offer these low-interest loans with a minimal amount of additional cost to the program.

The interest rate from the loan repayment is either 0% or 2% based on the applicant's income. The term of the loan is 7 years and generally gives customers monthly payments equal to or only slightly greater than the energy savings on their electric bill resulting from the installation of the solar system.

The loan program was introduced in April 2003 and as of December 2003 resulted in 35 approved loans.

Maui Solar Roofs Initiative

In September 2002, MECO formed a partnership with the County of Maui to increase the use of renewable energy in Maui County by increasing the number of solar water heating systems installed in residences. The County provided a grant in the amount of \$250,000 to MECO to establish a revolving fund, administered by MECO, offering zero-interest loans to qualified homeowners. The loan would help finance the up front costs of installing a solar water heater on their home.

The fund is rebuilt as the approved applicants repay their loans. During the first year, 116 applications were approved of which 40% of the applicants were below the median income. Based on the program's success after its first year, MECO received an additional \$100,000 grant from the County's Office of Economic Development. The program was modified to reserve at least 50% of the funds for applicants with household income below the median with priority going to low-income applicants.

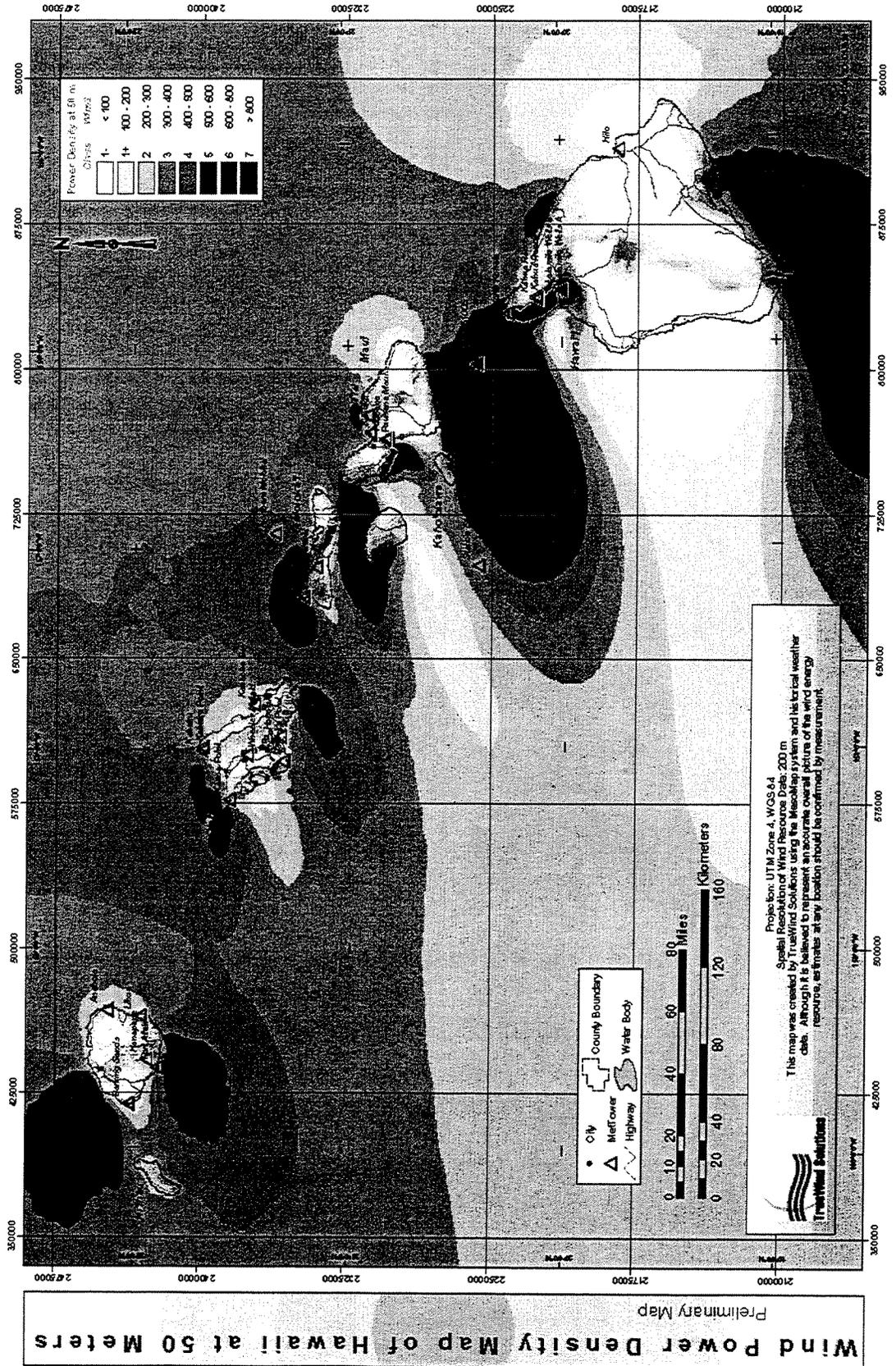
MECO is in discussion with Maui County's Department of Housing and Human Concerns, Housing and Urban Development ("HUD") Section 8 administration, to expand the reach into the low-income rental market.

USDA Rural Utilities Service's Grant to Fund MECO's Solar for Molokai Project

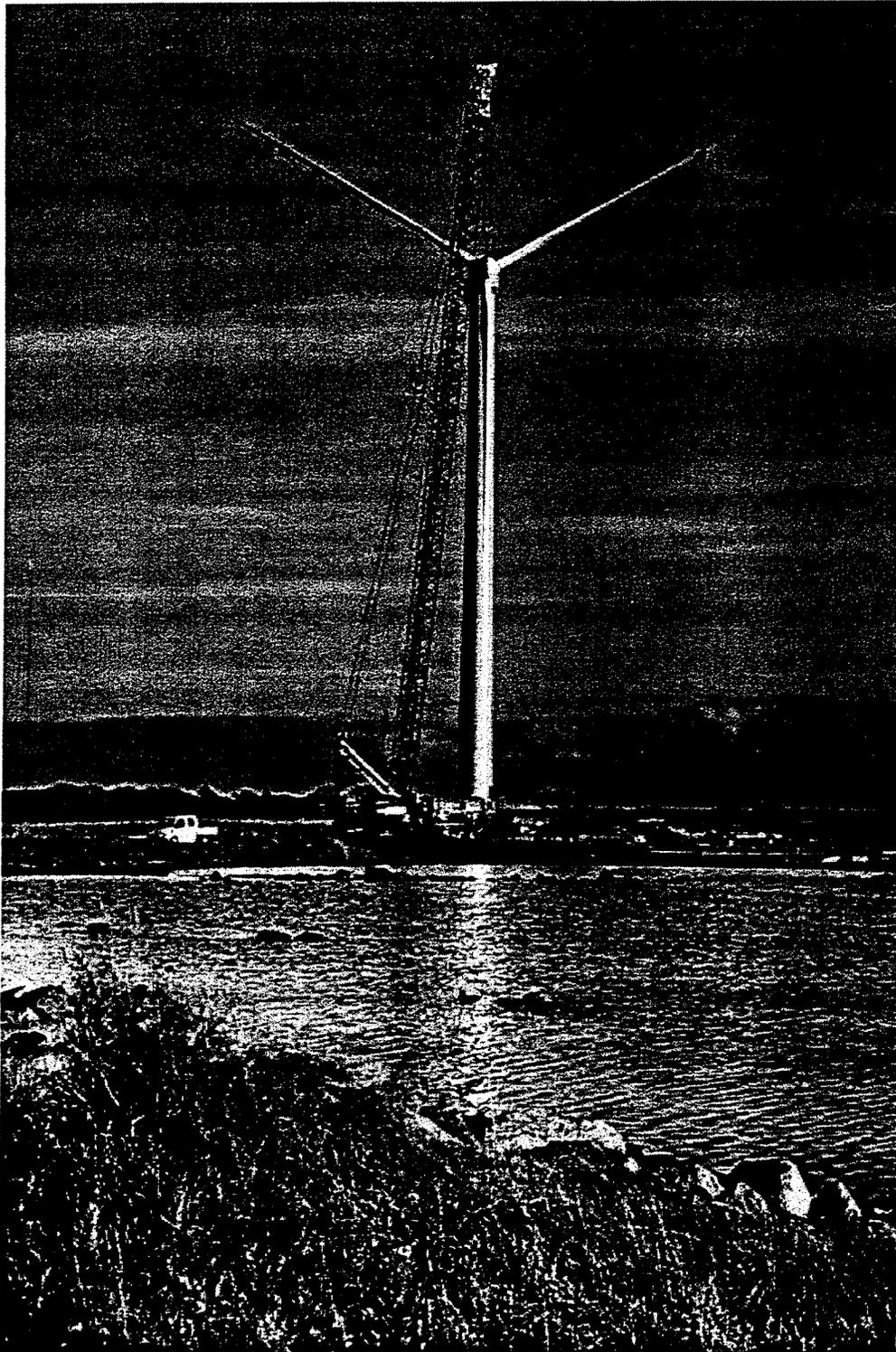
To further help make solar water heating more affordable for those who might not otherwise be able to invest in it, MECO has been selected to receive over \$1.1 million in USDA funds for the installation of renewable energy solar water heating systems on the island of Molokai. MECO will provide about \$400,000 in rebates, as well as project administration and outreach. Approved applicants will be required to attend classes to learn about basic solar system maintenance to ensure maximum performance over the life of the system and other energy saving techniques.

Community partners include the Department of Hawaiian Home Lands, Maui Economic Opportunity, Department of Housing and Human Concerns, Molokai Community Services Council, Office of Hawaiian Affairs, and Ke Aupuni Lokahi, which oversees the island's Enterprise Community efforts. The Energy, Resources and Technology Division of DBEDT will assist in conducting the educational classes.

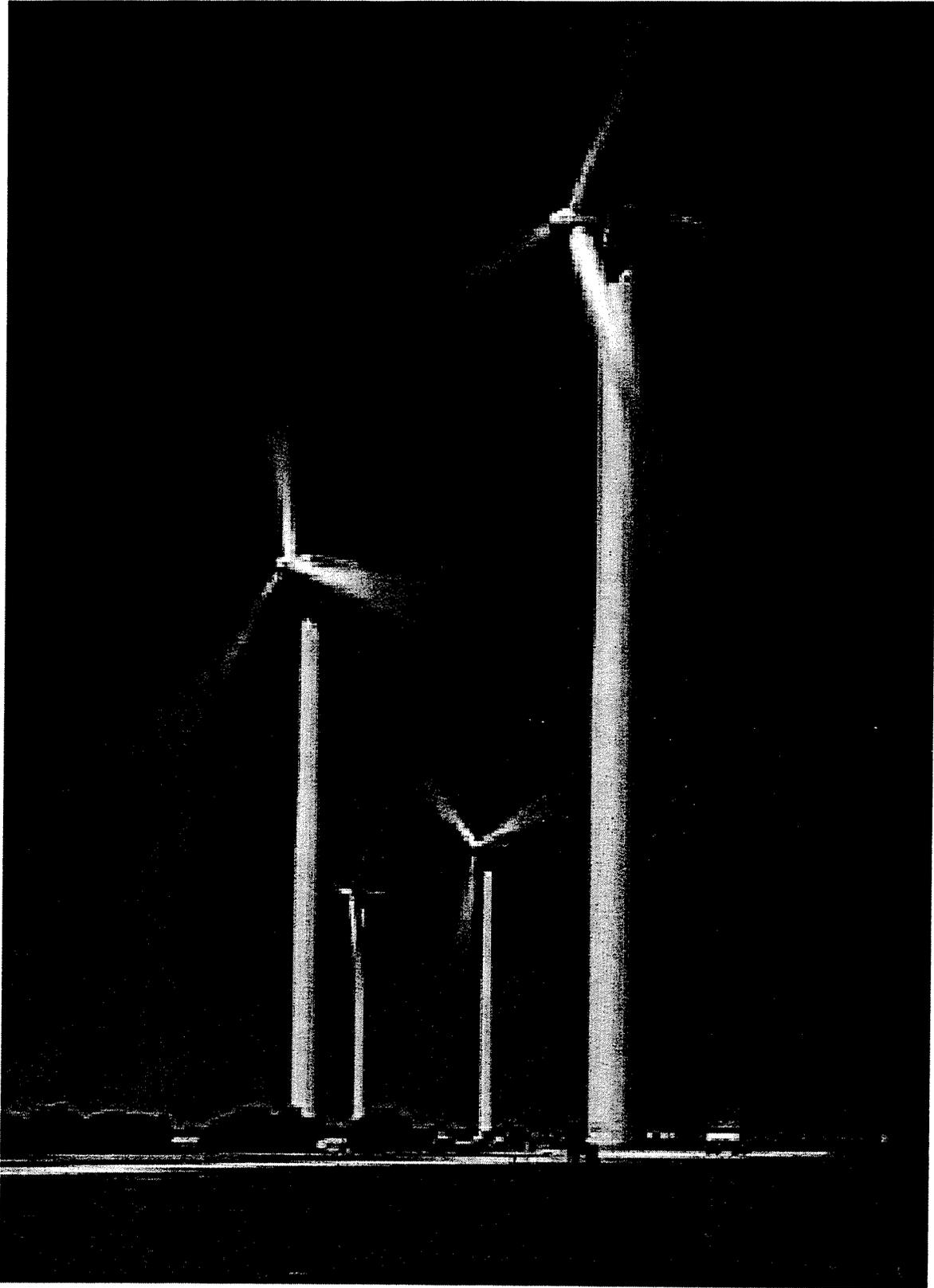
Attachment
 State High Resolution Wind Map



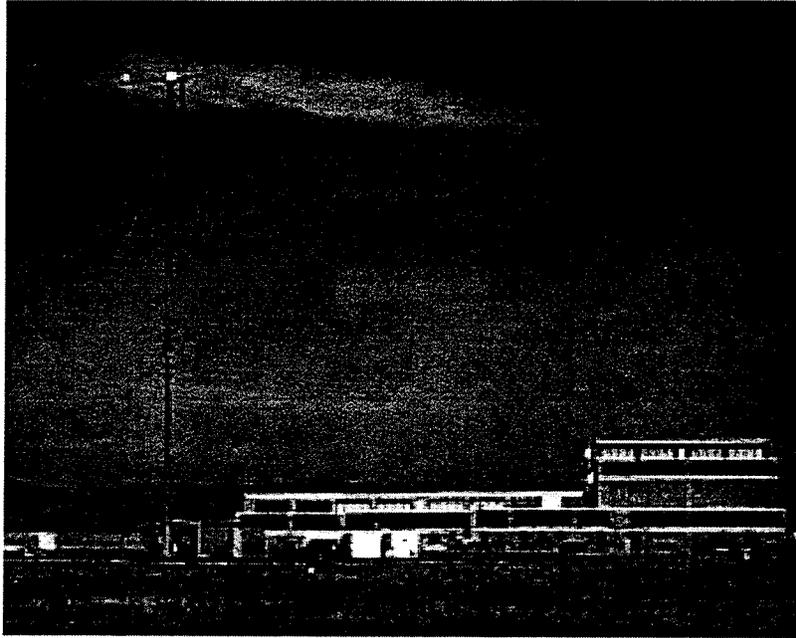
Photographs of Large and Small Wind Turbines



Vestas 660 kW Wind Turbine



GE 1.5 MW Wind Turbine



Bergy 10 kW Wind Turbine



Fuhrlander 30 kW Wind Turbine