LIFE OF THE LAND
76 North King Street, Suite 203
Honolulu, Hawai`i 96817
Phone: 533-3454; E: henry.lifeoftheland@gmail.com

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Allen G. Kam, Esq., AICP,
HIREP EIS Manager, DBEDT
State Energy Office
P.O. Box 2359
Honolulu, HI 96804
hirep@dbedt.hawaii.gov

Anthony J. Como
DOE NEPA Document Manager
Office of Electricity Delivery and Energy Reliability
U.S. Department of Energy
1000 Independence Avenue, SW
Washington, DC 20585
anthony.como@hq.doe.gov

Office of Environmental Quality Control
235 South Beretania Street, Suite 702
Honolulu, HI 96813

re: Hawai'i Interisland Renewable Energy Program (HIREP) Programmatic Environmental Impact Statement Preparation Notice (EISPN)

Aloha,

Life of the Land is Hawai`i's own community action group advocating for the people and the land since 1970. Our mission is to preserve and protect the life of the land by promoting sustainable land use and energy policies and to promote open government through research, education, advocacy, and when necessary, litigation.

I. INTRODUCTION

The inter-island cable will be the longest transmission line in the state, and the installation of 400 MW of wind will be Hawaii's largest single energy project ever brought on-line at one time. The proposal is the second multi-island energy project to be extensively studied, and if built will be the first of its kind in existence in Hawai`i. If successful it will transform Hawai`i. It will merge separate island grids into a unified multi-island grid.

At the same time, as a result of its cost and the size of the renewable systems being planned, it will displace other alternatives that might achieve the same thing, with different technologies, different costs, and with different winners and losers. This is known as opportunity cost (the cost of passing up the next best choice when making a decision).

The system will not be confined just to the water, as land-based connections, including transmission lines and substation upgrades, will need to be built initially on three islands, and spreading to five islands.

The Department of Business, Economic Development, and Tourism ("DBEDT") has created a master list of over 200 steps needed to complete this project.

The Environmental Impact Statement (EIS) is supposed to be done at the earliest practical time. In this case the wind proposal has been raised in utility rate cases and a specific docket devoted to the wind proposal prior to the release of the EIS.

The Hawai`i Public Utilities Commission Regulatory Docket 2009-0162 presented the very first opportunity for the public to get in on the ground floor and to provide meaningful input on whether the project makes sense or not. Life of the Land's Motion to Intervene in the docket was denied.

Legally speaking, an Environmental Impact Statement (EIS) is supposed to analyzes the various alternatives. The required alternatives section is missing in this Hawai'i Interisland Renewable Energy Program (HIREP) Environmental Impact Statement Preparation Notice (EISPN). This is really odd since the HIREP Website[1] has posted the legal requirements for the EIS.[2] It is odd that the website would have an item showing that the EISPN does not meet the spirit and substance required by the law. Rather than the required "hard look" at alternatives, the EISPN does not even engage in a soft look.

II. FEDERAL LAW

The Council on Environmental Quality (CEQ) implements NEPA. CEQ publishes the "Forty Most Asked Questions" regarding NEPA.[3]

> "1a. Range of Alternatives. What is meant by "range of alternatives" as referred to in Sec. 1505.1(e)?
>
> A. The phrase "range of alternatives" refers to the alternatives discussed in environmental documents. It includes all reasonable alternatives, which must be rigorously explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them. Section 1502.14. A decisionmaker must not consider alternatives beyond the range of alternatives discussed in the relevant environmental documents. Moreover, a decisionmaker must, in fact, consider all the alternatives discussed in an EIS. Section 1505.1(e).
>
> 1b. How many alternatives have to be discussed when there is an infinite number of possible alternatives?
>
> A. For some proposals there may exist a very large or even an infinite number of possible reasonable alternatives. For example, a proposal to designate wilderness areas within a National

[1] http://www.hirep-wind.com/
[2] www.hirep-wind.com/documents/40NEPAQuestions.pdf
[3] http://nepa.gov/nepa/regs/40/40p3.htm

Forest could be said to involve an infinite number of alternatives from 0 to 100 percent of the forest. When there are potentially a very large number of alternatives, only a reasonable number of examples, covering the full spectrum of alternatives, must be analyzed and compared in the EIS. An appropriate series of alternatives might include dedicating 0, 10, 30, 50, 70, 90, or 100 percent of the Forest to wilderness. What constitutes a reasonable range of alternatives depends on the nature of the proposal and the facts in each case.

2a. Alternatives Outside the Capability of Applicant or Jurisdiction of Agency. If an EIS is prepared in connection with an application for a permit or other federal approval, must the EIS rigorously analyze and discuss alternatives that are outside the capability of the applicant or can it be limited to reasonable alternatives that can be carried out by the applicant?

A. Section 1502.14 requires the EIS to examine all reasonable alternatives to the proposal. In determining the scope of alternatives to be considered, the emphasis is on what is "reasonable" rather than on whether the proponent or applicant likes or is itself capable of carrying out a particular alternative. Reasonable alternatives include those that are practical or feasible from the technical and economic standpoint and using common sense, rather than simply desirable from the standpoint of the applicant.

2b. Must the EIS analyze alternatives outside the jurisdiction or capability of the agency or beyond what Congress has authorized?

A. An alternative that is outside the legal jurisdiction of the lead agency must still be analyzed in the EIS if it is reasonable. A potential conflict with local or federal law does not necessarily render an alternative unreasonable, although such conflicts must be considered. Section 1506.2(d). Alternatives that are outside the scope of what Congress has approved or funded must still be evaluated in the EIS if they are reasonable, because the EIS may serve as the basis for modifying the Congressional approval or funding in light of NEPA's goals and policies. Section 1500.1(a)."[4]

[4] http://ceq.hss.doe.gov/nepa/regs/40/1-10.HTM#1

U.S. Ninth Circuit Court of Appeals re Alternatives Analysis (2009)

"The Center for Biological Diversity, the Western Land Exchange Project, and the Sierra Club (collectively, "Appellants") bring suit against Asarco LLC ("Asarco"), a mining company, and the Department of Interior and the Bureau of Land Management (collectively, "BLM"). Appellants contend that the BLM's approval of a land exchange violates the National Environmental Policy Act ("NEPA")

As part of the process of approving the land exchange, the BLM prepared a Final Environmental Impact Statement ("FEIS") pursuant to NEPA. In the FEIS, the BLM assumed that Asarco would carry out mining operations on the land in the same manner whether or not the land exchange occurred. Because of this assumption, the FEIS contains no comparative analysis of the environmental consequences for the different alternatives proposed. The BLM made the same assumption in its Record of Decision ("ROD") approving the land exchange. The ROD, like the FEIS, contains no analysis of how the environmental consequences-and the implications for the public interest-would differ depending on whether the proposed land exchange occurs.

Because the BLM has conducted no comparative analysis, we hold that it has not "taken a 'hard look' at the environmental consequences of its proposed action" in violation of NEPA, Blue Mountains Biodiversity Project v. Blackwood, 161 F.3d 1208, 1211 (9th Cir.1998), and that its approval of the proposed land exchange was "arbitrary and capricious" in violation of FLPMA. Webb v. Lujan, 960 F.2d 89, 91 (9th Cir.1992). We reverse the decision of the district court approving the actions of the BLM."[5]

NEPA Task Force (2002-04) Council on Environmental Quality[6] *CEQ Review of NEPA December 20, 2002*[7]

> **TO AVOID APPEALS**
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> CEQ regulation requires agencies to adopt procedures to ensure that alternatives considered by the decisionmaker are encompassed by the range of alternatives discussed in the relevant environmental documents. [Section] 1501.1(e). According to CEQ, the phrase "range of alternatives" includes

[5] CENTER FOR BIOLOGICAL DIVERSITY v. UNITED STATES DEPARTMENT OF INTERIOR LLC, No. 07-16423 (2009)
http://caselaw.findlaw.com/us-9th-circuit/1432977.html
[6] http://ceq.hss.doe.gov/ntf/catreport/
[7] http://ceq.hss.doe.gov/ntf/catreport/ceq_ch1.pdf

> "all reasonable alternatives," and these "must be rigorously explored and objectively evaluated, as well as those other alternatives, which are eliminated from detailed study with a brief discussion of the reasons for eliminating them." 46 Fed. Reg. 18026 (March 23, 1981). ...
>
> The consideration of alternatives is "the heart of the environmental impact statement." 40 C.F.R. [section] 1502.14 (1998). It is "absolutely essential to the NEPA process that the decisionmaker be provided with a detailed and careful analysis of the relative environmental merits and demerits of the proposed action and possible alternatives, a requirement that we have characterized as 'the linchpin of the entire impact statement.'" Natural Resources Defense Council v. Callaway, 524 F.2d 79, 92 (2d Cir. 1975). Moreover, "The existence of a viable but unexamined alternative renders an environmental impact statement inadequate." Resources Ltd. v. Robertson, 35 F.3d 1300, 1307 (9th Cir. 1993) (quoting Idaho Conservation League v. Mumma, 956 F.2d 1508, 1519 (9th Cir. 1992)). According to the CEQ: In determining the scope of alternatives to be considered, the emphasis is on what is "reasonable" rather than on whether the proponent or applicant likes or is itself capable of carrying out a particular alternative. An alternative that is outside the legal jurisdiction of the lead agency must still be analyzed in the EIS if it is reasonable. (Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Fed. Reg. 18026, 18027 (March 23, 1981)) These statements by the CEQ and the courts make clear that the inclusion of alternatives in detailed analysis is a central component that can not be lightly handled."

III. STATE LAW

State Law (HRS 343-1): "The legislature finds that the quality of humanity's environment is critical to humanity's well being, that humanity's activities have broad and profound effects upon the interrelations of all components of the environment, and that an environmental review process will integrate the review of environmental concerns with existing planning processes of the State and counties and alert decision makers to significant environmental effects which may result from the implementation of certain actions. The legislature further finds that the process of reviewing environmental effects is desirable because environmental consciousness is enhanced, cooperation and coordination are encouraged, and public participation during the review process benefits all parties involved and society as a whole.

It is the purpose of this chapter to establish a system of environmental review which will ensure that environmental concerns are given appropriate consideration in decision making along with economic and technical considerations."[8]

IV. THE PROPOSAL

Hawaii Clean Energy Initiative (HCEI) (2008)

On January 31, 2008, Governor Lingle signed a Memorandum of Understanding (MOU) with the US Department of Energy for the Hawaii-DOE Clean Energy Initiative. On October 20, 2008 the Governor of Hawai`i, DBEDT, the Division of Consumer Advocacy of the Department of Commerce and Consumer Affairs and Hawaiian Electric Company signed an Energy Agreement ("EA"). These two documents (MOU, EA) form the core of the HCEI.

The EA is HECO-centric, mentioning the utility directly and indirectly on 400 occasions while ignoring other major energy players in the State including the Kauai Island Utility Coop (KIUC). The EA focused on utility initiated central station wind and biofuels while ignoring distributed generation (DG) such as rooftop solar and wind systems.

HCEI Energy Agreement (2008)

The Energy Agreement (EA) advocated overturning Hawaii Public Utilities Commission (PUC) decisions ("All parties will support reconsideration of the Commission's ban on utility-owned DG where it is proven that utility ownership and dispatch clearly benefits grid reliability and ratepayers' interests, and the equipment is competitively procured"); amending EPA's Regional Haze Rules regarding new utility emissions in areas with volcanic haze ("Controlling visibility impairing emissions from Company units would be

[8] Hawaii Revised Statutes (HRS) **§343-1 Findings and purpose.** http://www.capitol.hawaii.gov/hrscurrent/Vol06_Ch0321-0344/HRS0343/HRS_0343-0001.htm

fruitless"); amending EPA's New Source Review (NSR) rules ("Allow electrical generation units to switch to green fuels (biofuels) without triggering New Source Review") and amending federal law ("The parties will support continued federal tax support for biofuels and will seek their extension to cover the full range of biofuel products including crude palm oil (CPO)").[9]

Public Utilities Commission proceeding re Big Wind (2009)

"Hawaiian Electric Company, Inc. ... requests approval ... to recover the expenses for these "Big Wind Implementation Studies" through a surcharge mechanism."[10]

HECO: "The studies and analyses for which cost recovery is requested in this Application are ... (1) the Oahu Wind Integration and Transmission Studies ("OWITS"); and (2) the Transmission/Cable Routing and Permitting Studies ("TCRPS")".[11]

HECO (October 26, 2009) "Within this Application, the Company is seeking the recovery of costs associated with Stage I estimated at $6,258,000 for the Oahu Wind Integration and Transmission Study ("OWITS") and Transmission / Cable Routing & Permitting Studies ("TCRPS"). The Company will request approval for cost recovery for Stage 2 and Stage 3 studies in separate applications. The status and details of the OWITS and TCRPS were provided at the Overview Session presentation on September 22, 2009. The Overview Session presentation slides are submitted in Attachment I of this IR response.

Attachment 1 is being submitted under protective order, as portions of the Overview Session presentation includes certain information related to the security of the Company's facilities, that if disclosed publicly could increase the risk to the Company's facilities. The presentation also contains cost competitive information, that if disclosed publicly would be harmful to future competitive bid requests. And the presentation contains preliminary route/map information not intended for public consumption, that if disclosed publicly could mislead the public, create unnecessary public confusion, and undue public concern."[12]

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[9] http://hawaii.gov/dbedt/info/energy/agreement/signed2008oct20.pdf
[10] HECO Application, dated July 17, 2009, Docket 2009-0162, p1
[11] HECO Application, dated July 17, 2009, Docket 2009-0162, p3
[12] HECO-RIR-1 re CA-IR-1. HECO Responses to Information Requests (RIR), HECO Application for Approval of Big Wind Implementation Studies Cost Through the Renewable Energy Infrastructure Program Surcharge, PUC Docket No 2009-0162.

HECO noted that: "Public awareness is a key element to the behavioral change necessary to engender energy saving actions and for the public to understand big picture energy conservation, security, and economic and environmental benefits of such actions. Mass market advertising is needed to build and sustain such awareness. For these reasons, the Company should be provided the tools, including adequate funds for advertising, to help achieve those standards and goals. The fact that the Company is also subject to potential penalties for not meeting these requirements was noted simply to emphasize the required nature of these utility obligations."[13]

"OWITS and TCRPS represent concurrent system and infrastructure studies necessary to guide the integration of up to 400 MW of wind from neighbor islands into the Oahu electrical system."[14] TCRPS Consultant Costs 1,692,000 including Due Diligence Studies 484,000; OWITS Consultant Costs $4,555,000.

What is meant by "due diligence"?

During the Evidentiary Hearing in PUC Docket 2007-0346 (Imperium-HECO biofuel contract) both Life of the Land and Commissioner Kondo extensively questioned the utility on what "due diligence" meant.

Would the use of the term "due diligence" in this proceeding conform to PUC decisions? How exactly was the money spent in these "due diligence studies?"

"HECO Response: a. The Big Wind project is comprised of three distinct components: 1) the Hawaiian Electric on-island infrastructure necessary to interconnect the inter-island cable system to the Oahu grid; 2) the wind facilities on Lanai and/or Molokai; and 3) the inter-island cable system that includes the converter stations on Oahu, Molokai and/or Lanai. The Company will own and operate all of its transmission infrastructure on Oahu. The wind facilities on Lanai and/or Molokai will be owned and operated by the respective developers. And, as stated on page 13 of the application, the Energy Agreement contemplates an undersea cable system owned by the State and Hawaiian Electric contracted to operate and maintain it.[15]

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[13] CA-RIR-1. HECO Response to Consumer Advocate. Docket No. 2008-0083 - HECO 2009 Test Year Rate Case, dated July 28, 2009.
[14] HECO-RIR-1 re CA-IR-6. HECO Responses to Information Requests (RIR), HECO Application for Approval of Big Wind Implementation Studies Cost Through the Renewable Energy Infrastructure Program Surcharge, PUC Docket No 2009-0162.
[15] HECO-RIR-1 re CA-IR-7. HECO Responses to Information Requests (RIR), HECO Application for Approval of Big Wind Implementation Studies Cost Through the Renewable Energy Infrastructure Program Surcharge, PUC Docket No 2009-0162.

The HECO assertion that "[i]n order to achieve these aggressive new RPS goals, Hawaiian Electric must take advantage of wind power."[16]

The HECO Application is self-serving and less than credible. Isn't this a rush to judgment without adequately analyzing reasonable alternatives?

Wind power can be part of the solution, but at a time when we need to look at all possibilities, and be cognizant that we are facing a statewide economic slowdown, limiting the possibilities to one option that requires costly rate-payer financed integration studies, and intensive utility oversight, is short-sighted, unreasonable, and not in the public interest.

HECO (November 30, 2009): "Hawaiian Electric filed its Application with the Commission initiating this proceeding on July 17, 2009. On September 2, 2009, the Commission filed its Order Denying Motions to Intervene and Participate which denied Life of the Land's motion to intervene, and denied Hawaii Holding, LLC, and Castle and Cooke Resorts, LLC motions to participate in the instant proceeding. On September 22, 2009, the Company conducted a three hour informational Overview Session presentation on many aspects of the Big Wind Studies ...to the Commission and the Division of Consumer Advocacy, Department of Commerce and Consumer Affairs ("Consumer Advocate")."[17]

Who from the PUC attended? What questions did they ask? Please produce notes from the meeting.

HECO: "This Application does not request that the Commission approve any commitments to actually implement the proposed Big Wind Projects and related electrical infrastructure improvements - the Application asks that the Commission approve the cost recovery mechanism for the expenses necessary to identify what it will take to implement the projects."[18]

Questions by Consumer Advocate: "Within the stage 1 studies, please indicate whether HECO sees any "off-ramps," where if one or more particular studies suggest that certain aspects are infeasible, the studies performed and the costs incurred will be cut short or curtailed. If so, please identify each of the

[16] HECO Application, dated July 17, 2009, Docket 2009-0162, p10
[17] HECO's Reply Statement, dated November 30, 2009, PUC Docket 2009-0162, pp5-6
[18] HECO's Reply Statement, dated November 30, 2009, PUC Docket 2009-0162, pp2-3

applicable "off ramps" and the potential savings associated with each point." "HECO Response: a. Hawaiian Electric is actively managing the direction of the studies and utilizing the expertise provided by members of the Technical Review Committee ("TRC") to guide study scope and review the results. The current study efforts (Stage I) have been well vetted and at this point are deemed necessary. ...b. ...The current study efforts have been well vetted through the Technical Review Committee and are deemed necessary and appropriate."[19]

Are there project off-ramps or is this EISPN part of a done deal?

The 30-member TRC includes nine representatives from HECO; six from the U.S. Department of Energy which is a partner in the project; three representing the State of Hawai`i which is also a partner in the project; and two from the UH Hawaii Natural Energy Institute which is coordinating the initial cable routing studies. The other ten people are wind integration, smart grid, and transmission experts who support central station wind projects.

Please define independent.

Please list all questions raised by this group.

Please provide all agendas, minutes, and supporting material.

Please provide detailed information re

(1) How many of the 30 people are connected to this project outside of the TRC;

(2) How many of the 30 people are connected to, contracted with, or were hired by HECO in ways outside of this project;

[19] HECO Response to CA-lR-10, dated October 26, 2009 re Question by Consumer Advocate

(3) How many of the 30 people are connected to, contracted with, or were hired by DBEDT in ways outside of this project.

How were members of the TRC engaged?

Did the utility seek to include people meeting certain requirements?

What was the scope of the TRC?

Who attended each meeting?

Please provide copies of each written statements made by each member of the TRC.

Who made presentations to the TRC?

HECO Response: “In the case of sole-sourced contracted services, for a number of the studies, services were procured from consultants that the Company uses on a regular basis and has existing Consultant Services Master Agreements ("CSMA") in place.”[20]

HECO: “A 400 MW off-island wind project can produce approximately 1,051 GWh of energy annually assuming a 30% capacity factor (actual energy/name plate capacity potential)." Wind resources on the islands of Molokai and Lanai are estimated to be far greater but from an economic standpoint, a reduced energy based capacity value is used, as some level of curtailment may be expected.[21]

“The fundamental question to be answered by Stage 1 of the Big Wind Implementation Studies, "should we" proceed with the Big Wind Projects does not lend itself to being answered in the abstract. Rather, the answer to this "should we" question depends heavily on more specific answers to the foundational question of "how could we" accomplish such an outcome.

HECO: “The Big Wind Implementation Studies define the due diligence being conducted to inform proposed groundbreaking changes in Hawaiian Electric's

[20] HECO Response to CA-lR-13 re Question by Consumer Advocate
[21] HECO Reply Statement of Position in Docket 2009-0162 pp14-15

operations, as the utility moves forward in step with state and national clean energy policy."[22]

Isn't switching from "should we" to "how could we" putting the cart before the horse?

Shouldn't we first ask whether it is wise to build the project before asking how the project can be built?

How can "due diligence" inform?

Hawai'i Interisland Renewable Energy Program (HIREP)

"This Hawai'i Interisland Renewable Energy Program (HIREP) Wind Programmatic Environmental Impact Statement (HIREP Wind EIS) evaluates the environmental impacts associated with a proposed wind energy generation, transmission, and delivery program. …Department of Business, Economic Development and Tourism (DBEDT) …is participating in the preparation of the HIREP Wind EIS as a joint lead agency, ensuring that the evaluations and presentations contained in the HIREP Wind EIS will comply with the requirements of the State's environmental review process set forth by Chapter 343 of the Hawai'i Revised Statutes (HRS), also known as the Hawai'i Environmental Protection Act (HEPA) as well as in compliance with the National Environmental Policy Act (NEPA)"[23]

HECO: "The Interisland Wind Project aims to transmit 400 megawatts of electricity from wind projects planned by First Wind and Castle and Cooke on Molokai and Lanai respectively to Oahu via an undersea cable. In 2009, Hawaiian Electric worked with the State on system integration studies, and coordinated environmental impact studies, community outreach, and public information projects."[24]

Renewable Energy World (October 2010): "Clean Energy There for the Taking …The big push in Hawaii is to build wind farms totaling 400 megawatts on the sparsely populated islands of Molokai and Lanai, then ship the energy via

[22] HECO Reply Statement of Position in Docket 2009-0162 pp22-23
[23] Hawai'i Interisland Renewable Energy Program: Wind, page 1-1
[24] HECO 2009 Corporate Sustainability Report http://www.heco.com/vcmcontent/StaticFiles/pdf/Sustainable2009ARfLR.pdf

undersea cable to Oahu, where most of the people live, said Dave Corbus, NREL laboratory program manager for electricity systems."[25]

V. IMPACTS

"On the project islands of Maui County, most of the local harbors are small and not designed for large-scale construction traffic. As a result, the harbors are currently restricted to receiving limited loads and may not be used for turbine component offloading or servicing of larger construction vessels. Improvements to the facilities would be required to implement construction of a commercial-scale wind energy project. Facility improvements would be required for improved access, receiving and distributing large-scale construction materials and equipment, and berthing and servicing of construction vessels."[26]

EISPN: "**Road Improvements.**
Lāna'i. The sole principal arterial road is Route 440, Kaumālapa'u Highway, which runs from Kaumālapa'u Harbor to the intersection with Mānele Road in Lāna'i City, continuing on Mānele Road to Hulopo'e Beach Park. There are some secondary roads; most are ungraded dirt roads requiring a four-wheel drive. The areas under consideration for wind generation and associated facilities on the western part of the island are connected by Polihua Road.
Moloka'i. There are several principal arterial roads:
• Route 450, Kamehameha V Highway: from Kaunakakai to Hālawa Valley
• Route 460, Maunaloa Highway: from Maunaloa Village to Kaunakakai
• Route 465: Airport Loop off of Maunaloa Highway;
• Route 470, Kala'e Highway: Intersection with Maunaloa Highway to Kalaupapa Lookout;
• Route 480, Pu'upe'elua Avenue: Intersection with Maunaloa Highway to intersection with Farrington Avenue.
There are secondary roads and, similar to Lāna'i, unpaved roads are common. Generally speaking, there is road access to the areas under consideration for wind generation and associated facilities are found along the northern half of the island between Maunaloa and Kualapu'u, and along the southern half of the island east of Kaunakakai."[27]

EISPN: **"Potential Impacts.** The roads and roadway networks that could potentially provide access to all of the areas under consideration for the proposed wind program do not presently exist. There would be a need to improve existing available roads, which are limited, and to construct new

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[25] Island Breezes, Sun Perfect for Renewables By Bill Scanlon, NREL http://www.renewableenergyworld.com/rea/news/article/2010/10/island-breezes-sun-perfect-for-renewables
[26] **EISPN 2.2.1 Overview of Land-Based Wind Energy Infrastructure p2-4**
[27] EISPN 3-30 – 3-31.

roadway segments. These improvements and new construction undertakings would be expected to result in a range of impacts that would need to be addressed in the HIREP Wind EIS."[28]

Urbanization

Expanding harbors on Moloka`i and Lana`i will allow more and bigger ships to arrive and use the harbors after the wind projects are complete. It will be easier to store and launch private yachts. Improving the road and highway systems on Moloka`i and Lana`i will allow greater levels of transportation on the islands. This in turn will allow greater urbanization to occur. This secondary impact is obvious but not mentioned at all.

Please expand on the potential urbanization that can occur as a direct result of the Moloka`i and Lana`i harbor and road improvements that will occur as a result of this project.

Invasives

The threat of alien species occurs when areas are opened up. For example, when contractors building geothermal for the Puna Geothermal Ventures entered the Puna Rainforest, alien species were brought in which have invaded the forest. When telescopes were built on Mauna Kea, alien species that could only survive at altitude became invaders. It is assumed in both cases that alien species could cling onto equipment and boots and be brought into the area. There is no mention of this issue in the EISPN.

Water

The EISPN states "WATER RESOURCES …Potential Impacts …The HIREP Wind EIS will evaluate how to address, mitigate, and provide BMPs on …erosion or downstream sedimentation …groundwater supply or quality."[29]

[28] EISPN 3.7.3, pp33-34

"The wind farm site could include the following facilities: ...a temporary concrete batch plant ...The foundations for the turbines would consist of large reinforced concrete mats of up to 60 feet in diameter, typically extending 8 to 10 feet below grade."[30] "Depending upon local availability and weather conditions, concrete typically needs to be poured within 90 minutes of being mixed with water. To accommodate this time constraint, it is anticipated that a temporary concrete batch plant would be constructed within the wind farm site to supply this material."[31]

These sections do not address water use. Each foundation would have a diameter of 30 feet (10 yards) and an average depth of 9 feet (3 yards). Thus the volume for each foundation would be (pi)(r squared)(d) = 3x10x10x3=900 cubic yards of concrete. The "water-to-concrete" (w/c) ratio would determine the amount of water needed. In addition water would probably be used for dust control. On an island with limited water supply, such as Lana`i, this analysis should be included in the Draft EIS.

Economics

EISPN: “Potential direct socioeconomic effects of the proposed facilities would include: (1) construction employment and business activity; (2) state revenues in the form of excise taxes, lease revenues, and property taxes; (3) substantial fuel cost savings to HECO, which potentially translate into ratepayer savings; (4) ongoing employment of facility operation and maintenance staff (which would be relatively limited); and (5) ongoing expenditures for materials and outside services.”[32]

There are other obvious economic impacts.

Money is exported from the economy to buy foreign equipment such as wind towers.

Unlike oil, a greater percentage of the costs occur up front, resulting in a higher present value analysis that straight line accounting will result in.

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[29] p3-7
[30] p2-3
[31] p2-4
[32] EISPN 3.13.3 Potential Impacts

In analyzing this project, as well as comparing this alternative to other alternatives, it is important to know the total present value cost of the project and what percentage of that total cost is immediately exported, as well as what percentage is given to workers who are imported just for this project and then go back home.

In addition to the money allocation, it is important to know that of all the man-hours or people-years of employment, what percentage go to jobs elsewhere, to jobs temporarily in the state due to temporary visitors, jobs for those on O`ahu, and jobs for those who currently live on the affected islands of Lana`i and Moloka`i.

The idea that there is 'substantial fuel cost savings to HECO, which potentially translate into ratepayer savings" needs to be elaborated on.

Is the savings just for the utility or is it really for ratepayers?

How much of the "state revenues in the form of excise taxes, lease revenues, and property taxes" will be offset by tax breaks, grants and other rebates?

Are the "ongoing expenditures for materials and outside services" for local or imported stuff?

DBEDT stated in 2009 that: "Work has also begun on the overall economic cost/benefit of such a cable system. Together with HECO, the State Energy Office has had numerous discussions with developers and investors in similar grid system projects, including undersea cables, around the world covering business and financial parameters of such projects. In the next several months, groups of developers and investors will be invited to Hawaii to provide

more detailed information, including business and financial models, on how these projects were done elsewhere."[33]

Regarding completed and on-going cost/benefit analysis, please provide a full list of all people and organizations contacted, talked to, information gained, business and financial models generated, data developed, meetings held, and forums attended.

VI. ALTERNATIVES

Pacific Business News: "The cost of the project could total roughly $3 billion, according to Ted Peck, the state's energy administrator. …'We know that there are community concerns, and it's critical that they are addressed,' said Peck. 'The environmental impact statement is going to do a robust analysis of alternatives, and we are looking at everything to get us to a clean-energy future and get us off this drug called oil that is so dangerous to our communities.'"[34]

What does robust mean?

HECO: "Hawaii has an abundance of natural, renewable energy resources from wind, solar, ocean/wave, geothermal and bio-based fuels (MSW, algae, ethanol) as well as opportunities to develop hydrogen options in the future."[35]

HECO: "The Energy Agreement also discusses and documents a number of initiatives and renewable energy projects that will assist in achieving these requirements. These programs and projects include, but are not limited to, the on-going competitive request for proposal for 100 MW of non-firm renewable energy on Oahu, small, medium mid large wind projects on all islands, which could total nearly 500 MW, waste-to-energy projects in the range of 30 MW, ocean thermal projects (potentially up to 100 MW), the increased use of biofuels where appropriate, proposed solar, biomass, wave and geothermal projects in the range of 40 MW and development of both a Photovoltaic ("PV") Host program and a feed-in tariff ("FIT") program."[36]

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[33] Statement of Theodore E. Liu, Director, Department of Business, Economic Development and Tourism and Energy Resources Coordinator, State of Hawaii Before the Committee on Appropriations United States Senate, Monday, August 24, 2009, Hawaii State Capitol, p10 http://hawaii.gov/dbedt/info/energy/publications/tel-statement-08-24-09.pdf

[34] Wind's impact has felt more like a breeze by **Sophie Cocke**, Pacific Business News, September 20, 2010. http://www.bizjournals.com/pacific/stories/2010/09/20/story2.html

[35] HECO's Reply Statement, dated November 30, 2009, PUC Docket 2009-0162, p13

[36] DOD-RIR-6, HECO Response to the Department of Defense, Docket No. 2008-0083 - HECO 2009 Test Year Rate Case, dated July 28, 2009.

(A) Biofuels

Isn't the use of biofuels part of state policy?

Could biofuels provide an alternative for this project?

The Energy Agreement proposes energy projects from 2008-2030. Could the order of the projects be changed, and if so, would immediate development of biofuels and delayed implementation of Big Wind make more sense? Should this be included in the EISPN? If not, please elaborate why not.

"Hawaiian Electric will encourage and explore the development of the following project proposals known today, with the goal of bringing the maximum number of projects and renewable MW on-line as quickly as possible subject to Commission approval, contract negotiations, and grid integration feasibility. ...CIP CT-1 (110 MW) Biofuel Simple Cycle Gas Turbine; Airport DG (8 MW) Biofuel; DG at substations to Biofuel (30 MW); CIP CT-2(100MW) Biofuel"[37]

Honolulu Advertiser (2010): "The U.S. Department of Agriculture and the Navy are hoping to jumpstart the growth of crops and algae in Hawai'i that can be used for military fuel as part of an aggressive drive by the Pentagon to reduce its dependence on foreign oil and increase renewable energy sources. ...USDA ..."A viable agricultural sector in Hawai'i can enhance Hawai'i's energy security, and energy projects like those anticipated by the Navy's needs can help rural economies.

If you talk to the biofuel developers, they want to know, 'Hey, am I going to have a market? If I produce this stuff, who is going to buy it?' "said Ted Peck, Hawai'i's energy administrator. "What the Navy is going to do, and the (entire) military is going to do, same as the utility is going to do — they are going to create a market for local crops that are going to help drive that. ...

HECO Executive Vice President Robbie Alm said the formal request for proposals is the next stage in the company's commitment to create a market for locally grown biofuels. This first call for proposals will test the market and determine what HECO's next actions will be, officials said.

[37] Energy Agreement pp7,8

Peck said part of the plan may include the Navy leasing some of its land to growers. Among that land may be the 7,500-acre Naval Munitions Command Lualualei on the Wai'anae Coast, he said. ...Peck, the state's energy administrator, said there are about eight companies either doing or planning to do algae work in Hawai'i. ..."I can tell you, from our perspective, this (biofuel development) is worth our time and attention because it can be transformative for Hawai'i's agriculture industry and for Hawaii's energy independence," Peck said."[38]

"This Bioenergy Master Plan report was developed in accordance with Act 253, Session Laws of Hawaii (SLH) 2007, which called for a bioenergy master plan to "set the course for the coordination and implementation of policies and procedures to develop a bioenergy industry in Hawaii." The State Department of Business, Economic Development and Tourism (DBEDT), tasked with preparation of the plan, contracted with the University of Hawaii's Hawaii Natural Energy Institute (HNEI) in mid-2008 to achieve the specifications of the legislation.

Importantly, Act 253 Part III states: "The primary objective of the bioenergy master plan shall [be to] develop a Hawaii renewable biofuels program to manage the State's transition to energy self-sufficiency based in part on biofuels for power generation and transportation." Thus, the objectives of the legislation - bioenergy industry and bioenergy program development - were overarching considerations in the examination of the specified issues and outcomes. These issues and outcomes were therefore studied in the context of the primary value chain components necessary for a successful bioenergy industry – feedstock production and logistics, conversion, distribution, and end use. Further, the recommendations that comprise the Roadmap are presented to be carried out programmatically, by and through a Hawaii Renewable Biofuels Program."[39]

Bioenergy Master Plan: "Additionally, unlike the variable generation of wind and sun, the energy stored in biofuels is available on demand. When used in combination with renewable resources such as wind energy, the ability of biofuels to be available on demand can stabilize Hawaii's utility grids to enable greater use of these variable resources. The increased use of the state's biomass resources for the production of fuels for transportation and electricity will diversify Hawaii's energy supplies and increase energy and economic security and sustainability. Thus, with a bioenergy industry based on locally sourced biomass of sufficient size to displace a significant amount of imported

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[38] Hawaii crops, algae may get funded for military biofuel by William Cole Honolulu Advertiser, April 3, 2010. http://the.honoluluadvertiser.com/article/2010/Apr/03/ln/hawaii4030337.html

[39] Hawai`i Bioenergy Master Plan Executive Summary, page i http://www.hnei.hawaii.edu/bmpp/documents/stakeholders/masterplan/20091215/Vol_I_Hawaii_Bioenergy_Master_Plan.pdf

petroleum, Hawaii could enjoy greater economic stability and retention of dollars spent on imported fuels. The development of a sustainable bioenergy industry can yield long-term benefits for Hawaii's environment, while creating jobs and strengthening the state's energy security."[40]

Bioenergy Master Plan: "House Concurrent Resolution 195 (SLH 2006) required the Hawaii Energy Policy Forum (HEPF) to report to the 2007 State Legislature with recommendations "encouraging Hawaii's landowners, investors, county governments, and regulated electric utilities to pursue development and conversion of fuel crops for electricity generation." In its recommendations to the Legislature, HEPF called for the development of a Bioenergy Master Plan."[41]

Bioenergy Master Plan: "Act 253, SLH 2007, Plan Requirements: Act 253 provides for development of a plan "that will set the course for the coordination and implementation of policies and procedures to develop a bioenergy industry in Hawaii." Specifically, the Act requires the Department of Business, Economic Development and Tourism (DBEDT) to prepare the plan "in consultation with representatives of the relevant stakeholders", and to provide an interim and a final report on the development of the plan. The guidelines for the plan are provided in the Act as follows: The "objective" establishes that the intent of the Act is for development of a plan that will address programmatic support for the state's transition to energy self-sufficiency as a longer term goal. "The primary objective of the bioenergy master plan shall [be to] develop a Hawaii renewable biofuels program to manage the State's transition to energy self-sufficiency based in part on biofuels for power generation and transportation."[42]

Energy Agreement: "Significant activity is taking place both in Hawaii and around the world to produce biofuels, which can be substituted for liquid fossil fuels. The use of sustainable, renewable biofuels in existing firm power units (utility and non-utility) will provide substantial levels of renewable energy, reduce greenhouse gas emissions, avoid the need to construct expensive replacement generation, and allow for the integration of intermittent resources such as wind and solar energy. The demand created by the use of biofuels in Hawaiian Electric's units will provide a strong basis for investment in the local biofuel industry, which, in turn, will bolster Hawaii's agriculture sector and increase our energy independence and security, and retain dollars in the State."[43]

Energy Agreement: "The State, via its State Biofuels Master Plan, will identify and implement financial incentives and land use and employment policies to

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[40] Hawai`i Bioenergy Master Plan pp3-4

[41] Hawai`i Bioenergy Master Plan p5
[42] Hawai`i Bioenergy Master Plan p7
[43] p14

encourage the development of a local biocrop and biofuel production industry. The Hawaiian Electric utilities will consider and pursue options to actively incent or partner in local biofuel development projects either as a regulated utility or as an unregulated affiliate. The State agrees to support the utilities' involvement in these projects subject to a showing of avoidance of conflicts of interest, and, if done as a regulated utility, reasonable ratepayer benefits."[44]

HECO Website (December 2010): "In approving Hawaiian Electric's new Campbell Industrial Park Generating Station, the Public Utilities Commission confirmed an agreement reached between the State Consumer Advocate and Hawaiian Electric, to fuel this new 110-megawatt peaking plant with 100-percent, renewable biofuel. As on Maui, if a dependable supply of locally grown feedstocks is available, it will have preference. In providing a preference to local feedstocks, the Hawaiian Electric companies hope to create a market that will encourage a local agriculture industry to develop. The goal is to protect open space and agriculture, create jobs, and keep more of Hawaii's spending on energy at home – in addition to reducing our use of imported fossil fuel."[45]

HECO: Hawaiian Electric seeks local biofuels for long-term contracts (April 1, 2010)

> "Hawaiian Electric Company today began a formal quest for a long-term supply of biofuels made from feedstocks produced and processed within the state of Hawaii. These local biofuel supplies may be proposed for use at Hawaiian Electric companies' generation sites on Oahu, Maui, Molokai, Lanai and Hawaii Island.
>
> The proposals may use land or water-based crops, waste animal fat or yellow grease feedstocks originating in Hawaii that may be converted to liquid biofuel. Each growing, production and processing method for supplying biofuels to Hawaiian Electric companies must meet all environmental standards and other requirements under federal, state and county laws.
>
> Proposals will also be carefully evaluated as to how well they meet environmental guidelines for the sustainable use of biofuels developed by Hawaiian Electric Company in partnership with the Natural Resources Defense Council.

[44] p15

[45] http://www.heco.com/portal/site/heco/menuitem.508576f78baa14340b4c0610c510b1ca/?vgnextoid=28dc202fe559b110VgnVCM1000005c011bacRCRD&vgnextfmt=default&cpsextcurrchannel=1

> Responders to the request for proposals (RFP) are encouraged to "think broadly about the larger benefits of their approach to the people of Hawaii, the local economy and the local environment." Proposals may note possible benefits such as the number and types of jobs created, both directly and indirectly over the life of the project, expenditures to be made in the local economy, and any environmental services the project may provide."[46]

Kyle Datta: "Locally produced biofuels could meet the State's Renewable Fuels Standard targets of 10% ethanol by 2015, supply 70% transportation needs by 2025, and enable our utilities to exceed the Renewable Portfolio Standard by providing biomass to power. …Do we have enough arable land in Hawaii to meet our fuel needs without impacting the diversified agriculture already in place? Certainly do. Using advanced technologies, we would need 50,000 acres in high yielding fiber crops producing ~130 million gallons of ethanol, 100,000 acres in high yield forestry crops producing ~140 million gallons of ethanol, and 10,000 acres of algae ponds producing ~ 95 million gallons of biodiesel (or jet fuel). We are currently using near 48,000 acres in the state to produce traditional sugar cane on Maui and Kaui. Of the 675,000 acres of prime agricultural land, only 200,000 acres are currently being utilized (including the current sugar production). We have even more acres of potential forest lands. Algae ponds do not require prime agricultural and forest lands, and are more economic when placed near CO2 sources such as power plants. If production systems and bio-refineries are co-located on the large tracts of still available land, then concerns regarding transportation logistics on our already congested highways are largely addressed."[47]

(B) O`ahu Ocean Wave Energy

Isn't the use of ocean energy part of state policy?

Could ocean energy provide an alternative for this project?

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[46] http://www.heco.com/portal/site/heco/menuitem.508576f78baa14340b4c0610c510b1ca/?vgnextoid=504d2e26fa9b7210VgnVCM1000005c011bacRCRD&vgnextfmt=default&cpsextcurrchannel=1

[47] FUEL, FOOD, AND FIBER: THE POTENTIAL PROMISE OF SUSTAINABLE BIOFUELS IN HAWAII by Kyle Datta (March 30, 2009) This article was written for the UH-based Hawaii Energy Policy Forum as part of an effort to encourage discussion of energy issues. Datta, CEO of Hawaii-based energy consulting and renewable development firm New Energy Partners, was managing director of Rocky Mountain Institute's Consulting Practice. He co-authored Winning the Oil Endgame and Small is Profitable. http://www.hawaiienergypolicyforum.blogspot.com/

The Energy Agreement proposes energy projects from 2008-2030. Could the order of the projects be changed, and if so, would immediate development of ocean energy and delayed implementation of Big Wind make more sense? Should this be included in the EISPN? If not, please elaborate why not.

The use of only wave energy in conjunction with batteries (storage) could achieve energy self-sufficiency for all non-transportation needs: i.e., heat, light, electricity.

DBEDT's Feasibility of Developing Wave Power as a Renewable Energy Resource for Hawaii (1992): Waves Power (buoys) could generate all (100%) of the state's electrical needs.

In response to House Resolution 8-2001, DBEDT conducted a study on wave energy.[48] This report updated an earlier report written for DBEDT in 1992 by George Hagerman, of SEASUN Power Systems, entitled "Wave Energy Resource Assessment for the State of Hawaii."

The Electric Power Research Institute (EPRI) is a national utility think tank. Its members represent over 90% of the electricity generated by shareholder-owned utilities in the United States. In 2004 EPRI examined wave power, and more specifically, looked in detail at Hawai`i's potential wave power. EPRI found that wave energy off Molokai could produce 200 times Molokai's needs, whereas waves off O`ahu could produce just 100% of O`ahu's total electrical demand. Each island could meet its electricity needs through wave energy. Wave energy is more predictable than wind energy. Small ocean swells of just 6 inches can be captured and converted to electricity.

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[48] Feasibility of Developing Wave Power as a Renewable Energy Resource for Hawaii. This report is the DBEDT's response to House Resolution No. 8 (HR 8) - "Requesting the Department of Business, Economic Development, and Tourism (DBEDT) to Study the Feasibility of Developing Wave Power as a Renewable Energy Resource for Hawaii," was adopted by the House of Representatives of the Twenty-First Legislature of the State of Hawaii, Regular Session of 2001.

EPRI Offshore Wave Power in the US: Environmental Issues (2004): “Like any electrical generating facility, a wave power plant will affect the environment in which it is installed and operates. ... We conclude that, given proper care in site planning and early dialogue with local stakeholders, offshore wave power promises to be one of the most environmentally benign electrical generation technologies. We recommend that early demonstration and commercial offshore wave power plants include rigorous monitoring of the environmental effects of plants and similarly rigorous monitoring of a nearby undeveloped site in its natural state.”[49]

E2I/EPRI Offshore Wave Energy Plant Site Assessment - State of Hawaii (2004) ''Oahu. ... Very good energy resources along its northeast coast from Kahuku to Makapuu Points. ... Honolulu is the best port harbor and port infrastructure in the Islands to support device fabrication and assembly. ... A unique opportunity for a wave energy pilot facility exists off the northeast coast of Oahu, just west of the humpback whale marine sanctuary boundary. The unique opportunity is the existence of Makai Ocean Engineering's fully instrumented pier and offices.''[50]

Dr. Tom Denniss, an Australian scientist and mathematician marveled at blowholes as he was growing up. He sought to build a blowhole in which air would be forced in and out of a hole.

The Blow-Hole (Oscillating Water Column) Wave Energy System consists of a compartment with water at the bottom and air on top. When a wave arrives, the water level rises and air is forced out of the blowhole. When the wave recedes, the air is sucked back into the blowhole. A two-way air turbine spins in the same direction as the air goes in and out, generating electricity. Having the spinning device rotating in the same direction regardless of which way the wind is moving significantly increases the efficiency of the generator. There is only one moving part in Oscillating Water Column systems, and unlike most other wave energy systems, it is above the water level. The physical structure rises about 30 feet above sea level. The blowhole energy systems can produce net power (after accounting for the power to run the system) with an eight inch

[49] Principal Investigator: George Hagerman. Contributors: Roger Bedard (EPRI) December 21, 2004. www.epri.com/oceanenergy/attachments/wave/reports/007_Wave_Envr_Issues_Rpt
[50] See also EPRI, Survey and Characterization of Potential Offshore Wave Energy Sites in Hawaii. Principal Investigator: George Hagerman. Contributors: Roger Bedard and Mirko Previsic. June 15, 2004. http://www.epri.com/oceanenergy/attachments/wave/reports/003_Hawaii_Site_Repo

ocean swell. The system was developed by Oceanlinx (formerly Energetech), an Australian firm, and was a Top 10 Finalist for Scientific Innovations of 2006 by the International Academy of Sciences. Oceanlinx will build a small system off Maui and the company is looking to expand throughout Hawai`i.

The total power of waves breaking on the world's coastlines is estimated at 2 to 3 million megawatts. In favorable locations, wave energy density can average 65 megawatts per mile of coastline. Wave power projects generally utilize the up-and-down motion of a device floating in the ocean encountering ocean swells to generate electricity.

DBEDT is considering an inter-island electric cable but has been closed minded about including a wave hub along the route.

Wave Energy Systems should not be confused with waves crashing down along reefs and the coastline. Rather, they get their energy from the wave action of water rising and falling in the open ocean. The waves are generally far more predictable than wind, or even sun which can be blocked by clouds. Thus they are one of the most baseload-ish of the variable (intermittent) energy systems. The system I have chosen for Hawaii is the Oceanlinx Oscillating Water Column. The system can generate net energy off a 6 inch ocean swell.

A full scale system was built and tested off Australia. The technology has only one moving part, located above the water line, uses no oils or toxic fluids, and the only thing driving the turbine is air. The International Academy of Science chose the Oceanlinx system as one of the Top 10 Most Outstanding Technologies of 2006. In general, the Oceanlinx system has the lowest cost per energy output of any wave energy system. A small Oceanlinx system will be deployed off Maui.

Environmental Impacts

EPRI: There have been some great studies on the potential environmental impacts of ocean energy wave systems.[51]

“July 16, 2009 -- LITTLEPORT, Cambridgeshire, England -- JDR Cable Systems Ltd., a provider of custom designed and manufactured subsea power cables, umbilical systems and specialized marine cables, has been awarded a contract by the South West RDA [Regional Development Agency] for the supply of subsea power cables for the UK's ground-breaking Wave Hub project.

Wave Hub is a major marine renewables infrastructure project that will create an electrical 'socket' on the seabed in approximately 50 meters of water some 10 miles off the coast of Cornwall in South West England, and connected to the National Grid via a subsea cable. Wave Hub will have an initial maximum capacity of 20MW (enough electricity to power approximately 7,000 homes) but has been designed with the potential to scale up to 50MW in the future.

The scope of contract awarded to JDR includes 25km of 33kV three-phase power cables which will provide the essential link between the Wave Hub and the onshore control room. The Wave Energy Convertors are connected back to the Wave Hub by four additional 300m three-phase power cables and dry mate connector sets. All cables include fiber optics and will be subject to rigorous integration testing. JDR will also supply the 'Wave Hub' assembly consisting of subsea terminations and a complete subsea protection structure. The package of equipment will be delivered in the second quarter of 2010 from JDR's new deepwater quayside facility at Hartlepool Dock. The first wave energy devices are expected to be deployed in 2011.

"The Wave Hub project draws on JDR's wealth of experience in the design and manufacture of subsea cable and umbilical systems to produce a solution that will meet the demanding requirements of this innovative application," states Patrick Phelan, managing director of JDR Cable Systems Ltd. "Our new quayside facility at Hartlepool dock is ideally sized for the manufacture and load-out of this 1500 tonne cable system, and we look forward to supporting the installation process with our team of qualified offshore service technicians."

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[51] (1) Offshore Wave Power in the US: Environmental Issues (2004) George Hagerman (Virginia Tech University); Electric Power Research Institute (EPRI), Electricity Innovation Institute (E2I), Global Energy Partners LLC. www.lifeofthelandhawaii.org/doc2/EPRI%20_Wave_Environmental_Issues.pdf
(2) Expected marine environmental impacts from harvesting tidal and wave energy Projektarbete Olympiaskolan (March 2006)
www.helsingborg.se/upload/Fsk%20skola%20vuxutb/Olympiaskolan/yarnoldprojektarbetevariant3.pdf

The 100,000 sq. ft. facility is the only site in the UK designed specifically to manufacture subsea power cables for the growing offshore renewable energy market and the increasingly complex oil and gas sector."[52]

(C) Oahu – Hub - Molokai/Lanai Interisland Cables

This alternative is a combination of the HECO Preferred Plan and the Oahu wave alternative. In this scenario the cables the various islands go to unused wave hubs or "electrical 'socket' on the seabed." The hubs, essentially underwater power strips, allow for future ocean energy systems to be attached. By installing the bubs now the costs and regulatory approvals for future ocean energy projects is significantly reduced.

(D) Oahu Maui Interisland Cable

The resistance to new Wind farms such as Kaheawa, Maui is significantly less than the resistance on Moloka`i and Lana`i. There are additional wind sites on Maui which would tax the Maui grid but which would present few problems for the O`ahu grid, thus the transmission line should be built from O`ahu to Maui. This would also enable transfer of geothermal electricity from the southwest flank of Haleakala. Stimulus funds are being used by the owner of Puna Geothermal Ventures to explore geothermal opportunities on Maui.

Are Maui geothermal energy exploration ventures reasonable?

Is geothermal a continuous baseload energy?

What is the range of capacity factors for wind and for geothermal?

[52] http://www.interconnectionworld.com/index/display/article-display/366346/articles/connector-specifier/industry-news/2009/07/jdr-cable-systems-to-design-manufacture-subsea-power-cables-for-uk-wave-hub-project.html

(E) Oahu Distributed Generation

Isn't the use of photovoltaic energy part of state policy?

Could photovoltaic energy provide an alternative for this project?

The Energy Agreement proposes energy projects from 2008-2030. Could the order of the projects be changed, and if so, would immediate development of photovoltaic energy and delayed implementation of Big Wind make more sense? Should this be included in the EISPN? If not, please elaborate why not.

The Hawai`i Public Utilities Commission adopted Net Energy Metering where customers can install photovoltaic systems, giving energy to the grid during the day and removing electricity at night, paying only for the net electricity used. Recently the Hawai`i Public Utilities Commission went one step further by adopting Feed-In Tariffs. In this scheme, customers can sell electricity to the grid and be paid for it, in excess of their consumption.

In Net Energy Metering there would never be payments by the utility to the customer. In Feed-In Tariffs there are payments by the utility to the customer. The PUC calculated the cost of an average system for each of solar, concentrated solar, wind and hydro in each of three size categories. The object of the differentiation is to ensure that for a given technology and a given system size, the average customer can make a profit. If the payment is too low, no one will sign up. If the payment is too high there will be a rush to install and the average utility ratepayer will overpay those who install such systems.

Hawaii's implementation of Feed-In Tariffs left a lot to be desired. The payments were low and few signed up.

Suppose however that one wanted to see the cost of Feed-In Tariffs versus the cost of the cable. According to the EISPN "A 400 MW off-island wind project can produce approximately 1,051 GWh of energy annually assuming a 30% capacity factor (actual energy/name plate capacity potential)."

1000 GWh equals 1 billion kWhs. If anyone who installs on-site generation qualifying for a Feed-In Tariff were to receive a 20 cent per kilowatt hour surplus, it would cost $200M. If the subsidy were in place for three years for solar and wind, and five years for concentrated solar, the subsidy would be less that the cost of the cable, and yet significant enough to drive large amounts of small distributed power systems.

The reason for a higher subsidy for concentrated solar power (CSP) is that CSP can produce electricity 2 hours after the sun has set, that is, during peak demand. The use of wind and solar offsets the need for oil and coal imports. CSP offsets the need for costly peaking generators.

Alternatively, if one included all of the costs of Big Wind (two windfarms, undersea cable, O`ahu transmission upgrades), the total cost of $3B could be used instead to fund distributed generation throughout the State.

Energy Agreement: "Solar opportunities for Hawaii include solar water heating (SWH), photovoltaics (PV), and concentrated solar power (CSP)."[53]

Energy Agreement: "Hawaiian Electric will review utility property such as Kahe Valley for use as a PV and/or CSP site by March 31, 2009"[54]

[53] p11
[54] p13

A Catalog of Potential Sites for Renewable Energy in Hawaii (December 2006): "Because of its large load, the penetration of intermittent generating sources is less of a problem than on other islands. …the potential is high for certain projects on land that is already commercially developed or under development, such as solar applications installed on rooftops of government, commercial, or industrial facilities."[55]

Honolulu Advertiser: "Hawaiian Electric told the state Public Utilities Commission earlier this month that it wants to suspend adding new photovoltaic systems to the grid because the growing number of renewable-energy systems poses a threat to the reliability and stability of its transmission system. …The proposals have stunned the state's photovoltaic installation firms and also cast doubt on the state's efforts to get 40 percent of its electricity from renewable sources by 2030."[56]

(F) Ocean Thermal Energy Conversion

HECO believes that 100MW of OTEC by 2020 is reasonable, and included it in their Energy Agreement. By increasing the 100MW of firm baseload renewable energy to 1000MW, the need for all fossil fuel power plants in the State would be eliminated.

"Hawaiian Electric will encourage and explore the development of the following project proposals known today, with the goal of bringing the maximum number of projects and renewable MW on-line as quickly as possible subject to Commission approval, contract negotiations, and grid integration feasibility. …Sea Solar (25 MW to 100MW) Ocean Thermal • Lockheed Martin (10 MW) Ocean Thermal" Appendix: Sea Solar OTEC 25 MW (2015) 100 MW (2020), Lockheed Martin OTEC 10 MW (2015)[57]

"One might ask: is OTEC renewable energy? The simple answer is that as long as the sun shines and, if and only if, deep-ocean cold water is provided by the thermohaline circulation the ocean thermal resource is renewable. A pertinent question, however, is: what is the worldwide power resource that could be extracted with OTEC plants without affecting the thermohaline ocean circulation? Our estimate is that the maximum steady-state OTEC electrical

[55] Produced for the State of Hawaii Department of Land and Natural Resources and the Department of Business, Economic Development, and Tourism by Global Energy Concepts, LLC in response to Act 95, Session Laws of Hawaii 2004 https://www.eere-pmc.energy.gov/states/Hawaii_Docs/cpsre07.pdf

[56] Moratorium sought on solar installation: HECO seeks move on Neighbor Isles to study effects on power grids By Greg Wiles, Honolulu Advertiser (February 22 2010)

[57] Energy Agreement, p7

power is about 5 TW (e.g., 50,000x 100 MW OTEC plants!) This is about twice the amount projected for worldwide consumption by 2025."[58]

"The Hawai'i National Marine Renewable Energy Center (HINMREC) was established to facilitate commercialization of Wave Energy Conversion (WEC) devices and to accelerate development and testing of Ocean Thermal Energy Conversion (OTEC) technologies. HINMREC supports design of OTEC pre-commercial plants and plans to provide WEC developers access to grid connected berths under a variety of ocean conditions. HINMREC is primarily funded by the Energy Efficiency & Renewable Energy Office of the US Department of Energy (DOE), through a five-year (2009-2014) contract awarded to the Hawai'i Natural Energy Institute (HNEI) at the University of Hawai'i."[59]

"Objective: Establish and maintain a testing site for commercial wave power systems. Expand existing facilities to incorporate a wave-hub providing berthing for as many as four wave energy conversion devices in the 300 to 500 KW range. Presently: Ocean Power Technologies (OPT) has been testing a single 40 kWe buoy in 30 m depth water in Kaneohe Marine Corps Base Hawai'i (KMCBH) on the windward (northeast) coast of the island of O'ahu. The up and down motion of the buoy is used to drive a generator which is connected to shore via an undersea cable. OPT has been collecting data since the first unit was deployed in June 2004 and has completed an extensive EA. This congressionally funded project, managed by Naval Facilities Engineering Command (NAVFAC), is intended to demonstrate the feasibility of wave power for naval facilities worldwide."[60]

"Lockheed Martin Taps Ocean for Power Under U.S. Navy Contract MS2 receives additional funds to advance Ocean Thermal Energy Conversion technology. The U.S. Naval Facilities Engineering Command (NAVFAC) awarded Lockheed Martin Mission Systems & Sensors (MS2) a $4.4 million contract modification to advance the design for an Ocean Thermal Energy Conversion (OTEC) pilot plant off the coast of Hawaii.

Under the NAVFAC contract, a Lockheed Martin-led industry team continues to develop critical system components and designs for an OTEC pilot plant, which leverages the temperature difference between warmer water at the ocean's surface and colder water below to produce clean power. Unlike other intermittent energy sources, OTEC offers a sustainable baseload power source, available day and night regardless of weather conditions.

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[58] Gerard Nihous, Department of Ocean and Resources Engineering
http://hinmrec.hnei.hawaii.edu/ongoing-projects/otec-thermal-resource/
[59] http://hinmrec.hnei.hawaii.edu/about/mission/
[60] Dr. Luis Vega, HINMREC http://hinmrec.hnei.hawaii.edu/nmrec-test-sites/wave-energy-project-at-mcbh/

Hawaii, like most tropical islands, is heavily dependent on imported oil for their electricity, resulting in costs five times the average mainland prices. In addition, the island is home to many military bases. OTEC can help meet the military's goal of generating 25 percent of electricity used at its facilities from renewable energy by 2025 and reduce the island's dependency on fossil fuels.

Lockheed Martin's experience with OTEC technology dates back to the 1970s when the company built "Mini-OTEC." This early prototype remains the world's only floating OTEC system to generate power in excess of what is required for self-sustainment. MS2 applies its decades of experience designing and deploying maritime systems for defense markets to ocean power, helping to produce clean energy generation.

This contract modification is an addition to a NAVFAC contract for $8.1 million issued in 2009, resulting in a contract value of $12.5 million. The Department of Energy awarded Lockheed Martin contracts in 2008 and 2010 to advance OTEC technology."[61]

(G) Negawatts (Energy Efficiency)

Rather than focusing immediately on the possibility of wind, aggressively pursue energy efficiency. Energy Efficiency has the lowest costs, the highest benefits, the least regulatory hurdles, the fastest payback and the most community acceptance. The Energy Agreement calls for doing it anyway, why not have it go first?

Isn't the use of energy efficiency part of state policy?

Could energy efficiency provide an alternative for this project?

The Energy Agreement proposes energy projects from 2008-2030. Could the order of the projects be changed, and if so, would immediate development of energy efficiency systems and delayed implementation of Big Wind make more sense? Should this be included in the EISPN? If not, please elaborate why not.

[61] http://www.lockheedmartin.com/ms2/features/OTEC_112210.html

Energy Agreement: "It is the goal of all parties to ensure that Hawaii achieves the maximum possible levels of energy efficiency as it represents the most effective use of resources possible, including conservation by not using resources at all." (p21) "The parties agree that the maximum possible use must be made of energy efficiency, demand response and renewable energy. The utilities shall apply this loading order in the CESP process in determining the utilities' resource plans to supply the total system load." (p29).

Hawaii Clean Energy Initiative Electricity and Transportation Wedge Analysis: Scenarios to illuminate policy needs and inform technical working groups (June 11, 2008). Scenario 8 is for 70% renewable and efficiency in 2030. In Scenario 8, energy efficiency plays a greater role than wind.

"Energy Efficiency: Under HCEI high efficiency assumptions, demand side management measures would decrease statewide electricity demand by 495 MW (30% of 2030 BAU demand). Electric Generation: Under this scenario, electric generation is dominated by wind (424 MW). Note: These figures represent average electricity delivered, i.e., they have been adjusted for capacity factors."

(H) The Preferred Alternative

EISPN: "The State of Hawai'i has recognized that a new paradigm in energy sources and management is needed to ensure future economic and environmental health of all the islands. ...the State embarked on an ambitious program to transition to a sustainable, clean, flexible, and economically vibrant energy future. The vision of the HCEI is 'to serve as a global model for creating a sustainable, flexible, and economically vibrant path to a carbon-free energy future.'"[62]

The terms "clean," "flexible," and "vibrant" never appear again in the document and are not defined. Virtually all life is carbon-based. Virtually all plant and animal food is carbon-based energy. Many energy industry and infrastructure components are carbon based. This includes all biofuels, which along with wind, form the cornerstone of the HCEI Agreement.

[62] EISPN Section 1.2.2, page 1-2

EISPN: “The HCEI is focused on meeting two objectives: (1) reducing energy use through efficiency; and (2) developing indigenous, renewable energy sources.”[63]

Hawai`i Revised Statutes (HRS) Chapter 226: Hawai`i State Planning Act states: “§226-18 Objectives and policies for facility systems--energy. (a) Planning for the State's facility systems with regard to energy shall be directed toward the achievement of the following objectives, giving due consideration to all: (1) Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people; (2) Increased energy self-sufficiency where the ratio of indigenous to imported energy use is increased; (3) Greater energy security and diversification in the face of threats to Hawaii's energy supplies and systems; and (4) Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use.”[64]

Is it true that the HCEI goals are not part of state law (HRS)?

How does achieving the HCEI objectives rank compared to the objectives found in HRS 226?

EISPN: “Renewable energy is energy that comes from resources that are naturally replenished. Examples of renewable energy that are known to be abundant in Hawai‘i and are available for development include: Wind; Geothermal; Solar; Biomass/Biofuel; Ocean Thermal Energy Conversion; and Wave.” …Implementation of wind power, considered the most commercially viable option for large-scale projects at present, would not diminish the potential for implementing solar, geothermal, or other power types in the future as their economic viability matures.[65]

EISPN: “In 2008, a study by DOE (HCEI 2008) for the State attempted to evaluate the status and applicability of known alternative energy sources for O‘ahu and prioritize recommended projects to achieve the HCEI utilization goals. A range of alternative energy resource use scenarios were considered or were already in development for O‘ahu, including efficiency improvements, ocean/wave energy, generation using municipal solid waste, utility-scale solar projects, rooftop solar, wind projects on O‘ahu, and generation using biomass. Wind power from off-island was recognized as a potential source of significant power, but the challenge of transmitting the power to O‘ahu was also recognized.”[66]

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[63] EISPN Section 1.2.2, page 1-3
[64] http://www.capitol.hawaii.gov/hrscurrent/Vol04_Ch0201-0257/HRS0226/HRS_0226-0018.htm
[65] EISPN Section 1.2.3, pages 1-3, 1-4
[66] EISPN Section 2.2.4, page 2-7

(I) <u>Moloka`i-Lana`i Redundant Undersea Cables</u>

As noted in the next section on reliability, building multiple lines following multiple routes maximizes redundancy, allowing transfers of electricity when part of the underwater system fails or when part of the O`ahu island grid fails.

Hasn't the utility argued that our islands are unique?

That what works on the Mainland doesn`t necessarily work in Hawai`i?

That we need more redundancy?

Would laying two cables along one route and one cable along a second route provide the redundancy needed so that one line could be worked on when a second line crashes and power could still be shipped via the third line?

Wouldn't this provide coverage in case of a seabed shift due to an underwater earthquake?

<u>Interisland Wind: Frequently Asked Questions</u>

"Are there similar existing projects anywhere that Hawaii can learn from?
Yes. There are more than 20 undersea transmission cables in operation around the world. There are several similar systems in Europe, the Philippines, Japan, and the mainland U.S. Many are longer and deeper than will be necessary in Hawaii. The technology is well established and there are a number of international companies able to do the work. The National Renewable Energy Laboratory (NREL) has been leading a Technical Review Committee with some of the best expertise across the globe in this area, and they are continuing to give us extremely valuable technical advice. In addition, there are at least nine undersea communications cables connecting the Hawaiian Islands."[67]

[67] http://www.interislandwind.com/FAQ.aspx

Submarine Transmission Links[68]

North America
•TransBay, CA (HVDC, 53 mi, 600 MW, $450 M), Siemens
•Vancouver Island, Canada (DC and AC)
•NJ to Long Island (HVDC, 50 mi, 660 MW)
•CT to Long Island (HVDC, 25 mi, 330 MW), ABB

Rest of the world
•Japan—interisland (50 km HVDC)
•Philippines—interisland (21 km HVDC)
•New Zealand—interisland (40 km, HVDC)
•Australia—Tasmania (290 km, HVDC)
•S. Korea—Cheju Island (100 km, HVDC)

How many undersea transmission cables exist in which none of the connection points (end points, shoreline connectors) interface with a mainland (very large) grid?

In there are any, how is reliability handled? Are there multiple cables, multiple routes, and/or other redundancies?

How many undersea communication cables exist in which none of the connection points (end points, shoreline connectors) interface with a mainland (very large) grid?

In there are any, how is reliability handled? Are there multiple cables, multiple routes, and/or other redundancies?

(J) The No-Action Alternative

The No-Action Alternative stated in the EISPN is not what is traditionally found in an EIS Alternatives Analysis.

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68 http://www.edinenergy.org/pdfs/usvi_submarine_power_transmission_061510.pdf

Traditionally, the No-Action Alternative means you do not do it. It is a No Build Alternative.

EISPN: "Under the no-action alternative, DBEDT would continue administering wind energy development authorizations and approvals in accordance within existing federal, state, and local statutes and requirements. A coordinated overview of potential environmental effects associated with wind energy development would not be developed. Analysis and review of wind energy development applications, including NEPA analyses, HRS 343 analyses, and development of required mitigation measures, would be conducted on a project-by-project basis. As required, individual land use plan amendments, right-of-way grant applications, and other approvals would occur on a project-by-project application basis without the benefit of the overarching, comprehensive analysis provided as envisioned by the HIREP Wind EIS. Under the no-action alternative, it is less likely that the same level of comprehensive and consistent planning, consultation, and mitigation measures would be implemented on a project-specific basis. Follow-on proposed project-specific wind projects would not necessarily be implemented in a consistent manner, potentially making achievement of renewable energy goals addressed by an interisland wind energy program less efficient or feasible."[69]

In this alternative DBEDT appears to say that they will do it anyway, just with less coordinating and consistency between projects. Thus the two alternatives appear to be "build with more coordination" and "build with less coordination."

The "hard look" mandated by federal law is ignored.

It appears that DBEDT believes that this project is guaranteed to be approved as is.

[69] EISPN 2.1.2 No-Action Alternative

(K) Beyond the Box

Traditionally the utility seeks to match supply levels to demand. The utility maintains core baseload units at night and curtails surplus wind during the late night – early morning time period.

This contrasts with the cell phone companies which offer free or very cheap service during off-peak periods.

One approach would be to seek to modify demand rather than supply. The utility could offer very cheap wind energy at times when the wind energy would simply be wasted. The utility has successfully tested using radio controls to turn off selective ratepayer equipment during peak energy demand periods. The opposite of this would be to turn on charging stations, battery storage equipment and related systems during periods of excess supply periods. The utility could also provide a reduced tariff (rates) to customers who switch their consumption to periods when curtailment usually occurs.

HECO was a pioneer in time-of-use rates, but rather than seeking to push customers into specific energy consumption patterns that matched excess renewable energy, the utility instead rewarded those who were able to even out their demand curve. Under this traditional time-of-use rate, customers who demanded energy all the time including at peak periods of demand could get electricity cheaper than those who only used energy during off-peak hours.

The approach of focusing on altering demand instead of curtailing supply is probably too far out of the box for the utility to seriously consider.

(L) Summary

A meaningful EIS which provides a hard look at alternatives would create the following table:

Technology	Type	Cost (kWh)	Capacity Factor (%)	Capital Needed	In-state capital (%)	Jobs Created (people-years)	In-state Jobs Created (%)	Benefits	Impacts
Generation	Biofuels								
	Ocean Wave Energy								
	Ocean Thermal Energy Conversion								
	Distributed Generation								
Cables	O`ahu-Moloka`i-Lana`i Cables & Ocean Hub								
	O`ahu-Moloka`i-Lana`i Cables								
	Enhanced O`ahu-Moloka`i-Lana`i Cables								
	Oahu-Maui Interisland Cable								
Negawatts	Energy Efficiency								
No-Action Alternative									

VII. TECHNICAL ISSUES

Reliability

Campbell Industrial Park Generation Station (2006)

HECO: "The three existing generating stations located in the Campbell Industrial Park area (AES, Kalaeloa, and HPOWER) as well as the interconnecting 138kV transmission system" "the CIP generating complex is served by far fewer transmission lines (two) when compared to HECO's other major generating stations (Kahe and Waiau)." "Figure 1.13. Number of Lines Available to Export Power at Each Generating Station: Kahe 6, Waiau 8, Honolulu 4, CIP 2" ..."The HECO system is currently vulnerable to loss of the entire CIP generation since there are only two transmission paths available to export power from CIP. ...Having only two lines to export power makes the CIP generation the least robust of HECO's major generating nodes. ...If one of the two available CIP connecting lines is out of service and a fault or failure should occur on the remaining line, all CIP generation would become disconnected from the HECO system." "HECO's analyses have determined that the installation of a new AES-CEIP #2 138kV line is the most effective option for increasing CIP generation reliability and preventing overloads on the AES-CEIP and Kalaeloa-Ewa Nui lines."[70]

HECO's East Oahu Transmission Project (2005)

HECO: "There are three Downtown area substations with only two 138kV transmission feeds including the Archer and the Kewalo Substations; the Kamoku Substation has only one 138kV transmission feed. ...The Archer Substation is one of the newer transmission substations on the HECO system, and is fed from the Iwilei and School Street Substations by two underground 138kV transmission lines. These underground lines are relatively new and considered relatively reliable; however, a catastrophic underground duct bank failure could result in loss of power to the Archer Substation for some time depending on the severity of the failure. Installing a third line to the substation would increase the reliability of the substation. ... The Kewalo Substation is also one of the newest transmission substations and is located on Kona Street. Two 138kV underground transmission lines supply power to Kewalo Substation. ...A catastrophic failure to the underground duct bank could result

[70] Campbell Industrial Park Generation Station and Transmission Additions (CIP-1) Final Environmental Impact Statement (FEIS), Prepared for HECO by Planning Solutions (July 21, 2006), pp1-9, 34, 35, 37 http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Oahu/2000s/2006-08-23-OA-FEIS-CIP-GENERATING-STATION-AND-TRANSMISSION.pdf

in loss of power to the Kewalo Substation. A third 138kV transmission line to Kewalo Substation would increase the reliability of the substation."[71]

Electricity and Transportation Wedge Analysis

"Hawaii Clean Energy Initiative Electricity and Transportation Wedge Analysis: Scenarios to illuminate policy needs and inform technical working groups Washington D.C. June 11, 2008. This document is confidential and is intended solely for the use and information of the client Booz Allen Hamilton"[72]

Is this document for use in this proceeding or was it cited even though it is confidential?

Wasn't part of this secret report made public at a Briefing[73]?

"The purpose of the analysis is to show various ways that Hawaii's resources can be deployed to reach the 70% clean energy goal. The analysis illuminates various ways that Hawaii's supply and demand side resources can be used to reach 70% clean energy (Note: this is not an optimization exercise; it does not pick the best scenario based on lowest cost, lowest greenhouse gas emissions, or similar metric). The scenarios include efficiency, electric generation, and transportation, but do not analyze energy delivery needs (grid upgrades, energy storage, etc.). The working groups will be able to use these scenarios to determine which policy changes will be needed to encourage different types of clean energy investment (e.g., solar PV) at sufficient scale"[74]

O`ahu Wind Integration and Transmission Study: Summary Report (November 2010)

> "The scenarios studied in OWITS include 200 MW of wind generation on both Molokai and Lanai with an additional 100 MW of wind and 100 MW of solar generation on Oahu. Small amounts of the Molokai and Lanai wind power will be available to contribute to the small local loads on Molokai and Lanai, but the vast majority of it will be use for the much larger Oahu

[71] HECO's East Oahu Transmission Project 46kV Phased Project Final Environmental Assessment (FEA) Volume 1 of 2 Report to the Public Utilities Commission (January 7, 2005), p2-11 http://oeqc.doh.hawaii.gov/Shared%20Documents/EA_and_EIS_Online_Library/Oahu/2000s/2005-04-23-FEA-EAST-OAHU-TRANSMISSION-46-KV-PHASED-1-OF-2.pdf
[72] Draft June 11, 2008 http://www.hawaiicleanenergyinitiative.org/storage/scenario_draft_bah.pdf
[73] HAWAII CLEAN ENERGY INITIATIVE Briefing for HAWAII STATE ENERGY COUNCIL December 3, 2008 http://hawaii.gov/dbedt/info/energy/planning/eep/eeppresentations/4eHCEI_12-03-08_to_HSEC.pdf
[74] Wedge Analysis, page 2

electrical load. The OWITS scenarios do not include all the solar energy envisioned for Oahu under the HCEI, but rather an amount that could be technically integrated into the study methodology within the budget and timeline of the OWITS project.

In January 2009, the National Renewable Energy Laboratory (NREL) convened and facilitated a Technical Review Committee (TRC) for the OWITS studies. The primary focus of the TRC was to provide technical review of the OWITS work including methods assumptions, and preliminary results. The TRC members were regional, national, and international technical experts with substantial experience in power systems, renewable energy, direct-current (DC) cable systems, island grids, and wind and solar integration. The TRC held five in-person meetings, each two days long, over the project's 18-month period.

The scope of the OWITS work includes the following:

• Identifying the technical requirements and configuration for an undersea inter-island cable to transmit electricity from large wind plants to Oahu;

• Identifying the ancillary services and potential mitigation measures to offset the variable nature of planned wind generation;

• Evaluate potential modifications to the utilities' existing generating units to offset the variable nature of wind energy; and

• Changing some of the utilities operational practices and procedures, including an evaluation of the potential benefits of wind forecasting, that are required to operate the island grids with inter-island wind integration.

The four primary projects included in the OWITS listed below are inter-related and have similar data needs:

1. HECO studies—A series of studies to better understand the operating characteristics and limitations of HECO's generating units, the energy management system (EMS), the interaction between the two, and potential changes/enhancements that can be reasonably assumed for the forward-looking study;

2. Electric Power Systems Inc. (EPS) study—A dynamic stability modeling study of the existing Oahu grid;

3. General Electric (GE)/Hawaii Natural Energy Institute (HNEI)/HECO study—Development and validation of a forward-looking modeling effort for the Oahu electrical grid with consideration of wind and solar integration; and

4. R.W. Beck and Electranix studies—Studies of various inter - island cable options.

In addition, there has been analysis comparing photovoltaic (PV) and wind, as well as a study on financing the cable project.

• Expanded distributed generation and load reduction,

• Biofuel conversion, and

• Up to 400 MW wind power from Molokai/Lanai to Oahu (the "Big Wind" projects)."[75]

The Undersea Cable

In comparing various land-based and water-based alternatives, isn't it important to have an idea of the comparative environmental impacts? Can undersea transmission cables have a major environmental impact? Shouldn't the known impacts be evaluated in the First EIS?

DBEDT/SOEST published the Interisland Cable Ocean Floor Survey Final Report[76]: "Based on the desk-top study and gap analysis, the technical cable requirements, available information on proposed sites for cable landings and converter stations, and it's knowledge of marine geology, benthic biology and oceanography, UHM-SOEST developed a set of initial submarine cable routes and alternatives. ...Using these criteria and the data collected previously, UHM-SOEST developed nine (9) possible routes"[77]

"Routes to Pearl-Honolulu Harbor. For the proposed inter-island power cable to reach the 'Iwilei sub-station in Honolulu they have to cross the wide coral reef along the south O'ahu shore. Five reef crossings have been dredged previously, the three deepest being the entrances to Pearl Harbor, Ke'ehi Lagoon and

[75] OWITS http://www.nrel.gov/wind/systemsintegration/pdfs/2010/owits_summary_report.pdf
[76] http://hawaii.gov/dbedt/info/energy/publications/Ocean%20Floor%20Survey%202009.pdf pp6-7
[77] http://hawaii.gov/dbedt/info/energy/publications/Ocean%20Floor%20Survey%202009.pdf pp6-7

Honolulu Harbor, the two others being at either end of the Honolulu airport runway."[78]

"Pearl Harbor/Honolulu Harbor to Lānaʻi. The UHM-SOEST recommended cable route between Pearl and Honolulu Harbor and Lānaʻi trends SSW from the entrance of the Pearl Harbor dredged channel down the slope, with minor course changes to avoid obstacles identified in the sidescan sonar and bathymetry. The sub-bottom profile shows no significant sonar penetration, indicating a compact/hard substrate. At the base of slope (~400 meters water depth) the route curves to the southeast (to avoid the paleo-reef further south and west) and then east."[79]

"Kāneʻohe to NW Molokaʻi. The recommended cable route from Kāneʻohe to NW Molokaʻi lands at Kāneʻohe Marine Air Station on Oʻahu where a cable could be run along the H3 right-of-way to the Koʻolau substation. Near shore to the east there is a 2 kilometer wide reef terrace. Along part of this route the substrate remains thinly sedimented over reef rock until passing around the submarine canyon head east of Kailua and down off the shelf. Coring the slope recovered 1 meter of silty mud."[80]

"NW Molokai to Lanai. The route from ʻIlio Point retraces the same route that comes from Kāneʻohe, before turning SW to parallel the west Molokaʻi shore where it stays below the relict reef edge in muddy (low backscatter) sediments identified on the sidescan. The mud field ends to the SW and the route passes onto the compact sand with dunes that characterizes the current-swept top of Penguin Bank. Off SW Molokaʻi the route merges with that from Pearl Harbor to Lānaʻi. Almost the whole route is within the Humpback Whale Sanctuary."[81]

"Oʻahu to Molokaʻi /Lānaʻi to Maui. The recommended routes linking Oʻahu-Molokaʻi-Lānaʻi can be extended within the whale sanctuary east to Maui, but there are two areas where particular care will be required. The first is crossing the relict reef in the Kalohi Channel between Molokaʻi and Lānaʻi, particularly its steep east and west edges. Two alternative routes were investigated to cross this, and the recommended route is a variation and combination of them both. It uses the northern of the two small channels originally identified to cross the western reef edge. But the new swath bathymetry and deep-towed sidescan data show that the steep eastern edge can't be traversed exactly where surveyed. Rather, UHM-SOEST proposed a route across the SE nose of the relict reef, where the slope is gentler, to link up with the southern route. The only other passage off the relict reef to the thickly sedimented floor of the Pailolo channel is slightly further south along the axis of a steep-sided, E-W-

[78] Ibid. p10
[79] Ibid. p12
[80] Ibid. p14
[81] Ibid. p16

trending, narrow chute whose floor is only ~50 m wide in the west where it rises up onto the relict reef platform. That platform is current swept and thinly sedimented reef rock, with no sub-bottom reflectors."[82]

"Alternative Routes. If a land-sea cable route from NW Molokaʻi to Lānaʻi is contemplated, then a possible alternate route from south Molokaʻi would be under/across the 2 kilometer wide reef offshore Pala'au or Hale'o'lono and then SSE to Lānaʻi."[83]

"Routes not recommended. The Pearl Harbor to Lānaʻi cable route east across Penguin Bank is not viable because of the steep western edge of Penguin Bank. UHM-SOEST surveyed potential crossing points along the western steep edge, but only found vertical cliffs and boulder-strewn channels that would prevent cable laying. Although somewhat shorter, this route also entails longer stretches in the Humpback Whale Sanctuary. The Kāneʻohe to NW Molokaʻi cable route considered along the Waimanalo-Makapuʻu Shelf is subject to intense fishing and anchoring, crosses the SE Oʻahu portion of the Humback Whale Sanctuary as well as precious coral beds on the slope east of the Makapuʻu Shelf, which has a hard substrate with numerous rock ledges. This route is not recommended."[84]

What are the environmental benefits and risks for each route?

"The International Partnership for Energy Development in Island Nations (EDIN) ...announced three new pilot projects. The U.S. pilot project participant will be the U.S. Virgin Islands (USVI); Iceland's pilot project will be working with Dominica; and New Zealand will work to assess geothermal potential for numerous Pacific Island Nations. Launched in August 2008, EDIN is an international partnership between Iceland, New Zealand and the United States to further the use of energy efficient and renewable energy technologies in island nations and territories."[85]

EDIN's US Virgin Island Energy Workshop was held in Goldon Colorado (February 16-18, 2010). Ben Kroposki, PhD, PE, National Renewable Energy Laboratory (NREL) Group Manager, Distributed Energy Systems Integration, made a presentation on 'Integration of Renewable Energy in Islands & Inter-Island Transmission' (February 17, 2010) "Oahu Wind Integration and Transmission Study (OWITS) Technical Review Committee (TRC) Overview: The primary focus of the TRC will be review and guidance of the grid modeling and transmission expansion studies including methods, assumptions, and preliminary results."[86]

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[82] Ibid. p17
[83]Ibid. p18
[84] Ibid. p20
[85] http://www.nrel.gov/news/press/2009/678.html
[86] http://www.edinenergy.org/pdfs/ce_workshop2010_kroposki.pdf p11

What specific "methods [and] assumptions" did the TRC evaluate?

"Identify possible modifications to the utilities' existing generating units to offset the variable nature of wind energy"[87]

What modifications are needed in existing generation units to accommodate wind?

What are the economic and environmental benefits and costs associated with these modifications?

Will the utility need to increase its use of fossil fuel to maintain additional spinning reserve?

Kroposki: "Inter-Island Cable Study Objectives Overall Project: Develop information that will be publicly shared and used to support decisions. Technology Assessment …Determine economic dispatch priorities of power supply …Estimate costs and benefits"[88]

Will the "economic dispatch priorities" involve prioritizing Big Wind and other intermittent renewable energy resources? Please be specific.

Distributed Generation

DBEDT: "In the Energy Agreement, HECO and the state agreed to move from central-station, oil-based power to a more renewable, distributed- and intermittent powered system while preserving the stability of the grid, minimizing disruption, and keeping the utilities financially sound. The Energy Agreement includes the following points: …Laying an undersea cable linking Oahu and wind farms on Molokai and/or Lanai."[89]

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[87] Ibid. p13
[88] Ibid. p18
[89] PROGRESS REPORT TO THE GOVERNOR AND THE LEGISLATURE OF THE STATE OF HAWAII Pursuant to SECTION 196-41, Hawaii Revised Statutes (HRS) Submitted By State of Hawaii Department of Business, Economic Development and Tourism January 4, 2010, pp3-4 http://hawaii.gov/dbedt/main/about/annual/2010-reports/rps2010.pdf

Offshore Wind

In 2002 HECO noted: “Off-shore Wind Energy on Oahu: …Off-shore wind energy may be an option to expand wind development for Oahu.”[90] Since then HECO has published detailed wind maps for the State.

What are the wind resources for O`ahu including the offshore waters and coastal areas of Kahuku, Kalaeloa and Black Point?

Moloka`i Wind

Are the cost figures found in the DBEDT’s 2003 Moloka`i wind study[91] still relevant? Are they better than nothing?

Uniqueness

DBEDT: "this project is unique in the amount of intermittent renewable energy it seeks to integrate into an existing island electrical grid system."[92]

How will this unique model facing unique issues serve as a model for mainland utilities?

What is the rationale behind stating that unique projects should move forward when the utility wants them and Hawai`i should not be a guinea pig when the utility does not want them?

[90] Wind Energy Development on Oahu, Maui and Molokai, U.S. Department of Energy Wind Working Group Meeting By Arthur Seki, Hawaiian Electric Company, Inc. Honolulu, Hawaii April 8, 2002. http://hawaii.gov/dbedt/ert/wwg/wwg-08-seki.pdf

[91] Utility Scale Wind on Islands: An Economic Feasibility Study of Ilio Point, Hawaii. July/August 2003 REFOCUS www.re-focus.net hawaii.gov/dbedt/ert/wwg/ilio-refocusarticle-2003small.pdf

[92] Statement of Theodore E. Liu, Director, Department of Business, Economic Development and Tourism and Energy Resources Coordinator, State of Hawaii Before the Committee on Appropriations United States Senate, Monday, August 24, 2009, Hawaii State Capitol p8. http://hawaii.gov/dbedt/info/energy/publications/tel-statement-08-24-09.pdf

What if only one Neighbor Island Windfarm is Built?

Interisland Wind: If the Lanai wind farm project does not go forward, would the state nonetheless connect Lanai to the proposed state-wide grid? At this time, landing an undersea cable system on Lanai is tied to the development of the proposed wind project by Castle & Cooke. Without a significant source of renewable energy located on Lanai to feed into the planned undersea cable system, the significant cost of bringing an undersea cable system could not be reasonably justified as a prudent expense.[93]

In this case, would Legislative action on authorizing the cable be a specific law designed to benefit a single company, and therefore a violation of the general law requirement found in the State Constitution?

The Hawai`i State Constitution, Article XI, Section 5: "The legislative power over the lands owned by or under the control of the State and its political subdivisions shall be exercised only by general laws, except in respect to transfers to or for the use of the State, or a political subdivision, or any department or agency thereof."

Attorney General Opinions: "Act 3, L Sp 2007 1st, requiring the Hawaii community development authority to set aside state lands for use by the Kewalo Keiki Fishing Conservancy (KKFC), a private nonprofit section 501(c)(3) organization under the Internal Revenue Code, violated this section; Act 3 could only be interpreted as being a special legislation because it was enacted to benefit the KKFC specifically and was limited to a specific property. Att. Gen. Op. 07-2."

Case Notes: "Where Act 2, L Sp 2007 2d created a class that was "logically and factually limited to a 'class of one' ", that is, it was not reasonably probable that other members could enter the class in the future, the class was illusory; thus, Act 2 was a special law in violation of this section and the circuit court erred when it concluded that Act 2 was constitutional and dismissed plaintiff's claims as moot. 120 H. 181, 202 P.3d 1226. Where, without the legal authority provided by §15 of Act 2, L Sp 2007 2d through an exercise of legislative power, the operating agreement between the superferry and the state department of transportation would have remained void and unenforceable by the circuit

[93] Frequently Asked Questions. http://www.interislandwind.com/FAQ.aspx

court's order as it related to the lands at Kahului Harbor, Act 2 was an exercise of legislative power over state lands. 120 H. 181, 202 P.3d 1226."

VIII. FINANCES

I have often heard from government, industry and consultants that one major issue is who goes first. Does one of the wind farms commit before the cable is assured? Does the State commit first, even though First Wind lacks the land and Castle & Cooke is privately held by one individual who will be in his 90s before the project goes on-line, and what happens to his company and the project after he is gone is unknown.

This is a major risk that does not appear in the EISPN.

First Wind

First Wind recently cancelled an IPO. Federal tax credits may be drying up. There is resistance to the First Wind proposal on Moloka`i. They don't have any land commitments.

Molokai News: "While homesteaders on Hawaiian home lands on Molokai have already expressed reservations with this plan, the state continues to push the project forward ...First Wind, the Massachusetts company seeking to build a wind farm on Molokai, has stated that it will not move forward without community support. Neither the Department of Hawaiian Homelands nor Molokai Ranch has agreed to let First Wind build on their land. The plan calls for the installation of up to 20 turbines on Hawaiian Homestead land in Ho`olehua, followed by as many as 60 turbines on Molokai Ranch land in a second phase."[94]

Boston Globe: "The **First Wind** ...wanted to raise more than $400 million when it first filed paperwork to go public in 2008. Expectations had become more modest — about $300 million — based on price estimates at the start of this week and First Wind still would have raised $216 million if it managed to sell shares for $18 apiece. But it could not. Stock analysts say investors didn't like the **First Wind** offering because the company had piled up a lot of debt and leaked cash. In fact, First Wind owes more than $500 million, loses money on a

[94] Study of undersea energy transmission cable to begin, Molokai News, December 10, 2010 http://themolokainews.com/2010/12/10/study-of-undersea-energy-transmission-cable-to-begin/

steady basis, and reports a negative cash flow. That's a hard sell in a picky market in which 54 IPOs have been postponed or withdrawn this year. Two other initial stock offerings priced Wednesday evening raised less money than they sought and one company cut its price by 44 percent. Another important factor: a declining interest on Wall Street for alternative power generation. Relatively low fossil fuel prices and reduced demand are putting financial pressure on wind and other sources of green power. The possible elimination of federal investment tax credits for renewable energy poses another threat at the end of this year. Alternative energy companies like First Wind, which has built seven utility-scale wind farms in five states, need steady access to lots of capital to grow. For now, the stock market doesn't seem like the place to look for that money."[95]

Wall Street Journal: "The future of U.S. renewable energy grants is in doubt, and ending the program could prove a significant setback for smaller, independent project developers. …Through the third quarter of this year, about $4 billion in tax equity was committed to wind energy projects, according to internal estimates by J.P. Morgan, one of the largest tax equity providers, up from $1.1 billion in 2009. Wind energy projects have traditionally been the largest recipients of tax equity backing. …In one recent example, **First Wind**, an independent wind developer, received a commitment from J.P. Morgan Capital Corp. to fund its 60-megawatt wind project in Penobscot County, Maine."[96]

Castle & Cooke

David Murdoch is 87 years old. He is rumored to be selling assets to cover a heavy mortgage ($100Ms). His only heir was just named in a sex harassment lawsuit. It is unclear whether his proposal will survive his life.

Wikipedia: "David H. Murdock …born April 10, 1923 …In 1985, he took over the nearly bankrupt Hawaiian firm Castle & Cooke, which owned pineapple and banana producer Dole Food Company. As a result of his purchase of Castle & Cooke, Murdock acquired ownership of Lana'i, the sixth largest island in Hawaii. He developed Castle & Cooke's real estate portfolio into residential and commercial properties and turned Dole into the world's largest producer of fruits and vegetables. Acquiring Dole privately in 2003, Murdock successfully completed a $446 million initial public offering in October 2009 …He has been married three times - widowed and twice divorced. He had three children with his first wife, Gabriele, who died of cancer in 1988. Justin Murdock **became**

[95] First Wind IPO sputters suddenly By Steven Syre, Boston Globe, October 29, 2010 http://www.boston.com/business/articles/2010/10/29/first_wind_ipo_sputters_suddenly/

[96] Loss Of US Renewable Energy Grants Looms For Developers By Yuliya Chernova. Dow Jones Venturewire, December 10, 2010 http://online.wsj.com/article_email/BT-CO-20101210-711769-kIyVDAtMUMwTzEtMDIxMDAxWj.html

his sole surviving heir after his son David Murdock Jr. died in an auto accident in 2004. Justin Murdock currently serves as CEO and Executive Chairman of the Board of NovaRX. Justin is also Senior Vice President of Investments for both Castle & Cooke and the Dole Food Company. He serves on the executive boards of both companies, as well as their audit and finance committees."[97]

Forbes: Dole pineapple heir sued for sexual harassment (October 1, 2010) "Justin Murdock, who is heir to Dole pineapple, has been sued by a former employee over sexual harassment and even threatening her life. Carissa Schumacher, who was director of corporate development for more than two years at both Castle and Cooke, a subsidiary of the Dole Food Co."[98]

IX. PUBLIC INVOLVEMENT

Chapter 6 lists the entities that were sent a copy of this document. They are 15 state agencies, 3 federal agencies, and HECO. Excluding were three entities who filed Motions to Intervene or Motions to Participate in PUC Docket 2009-0162 (First Wind, Castle & Cooke, Life of the Land). Also excluded were all community groups, environmental groups and cultural groups who have shown up at public meetings and utility sponsored meetings to address Big Wind and Interisland Electric Transmission Cables.

X. SUMMARY

Please take a hard look at reasonable alternatives and the significant impacts and provide the analysis in the Draft EIS.

Mahalo,

Henry Curtis
Executive Director

[97] http://en.wikipedia.org/wiki/David_H._Murdock
[98] http://billionaires.forbes.com/article/05Le4Uc31R9fn