

TESTIMONY OF HERMINA MORITA  
CHAIR, PUBLIC UTILITIES COMMISSION  
DEPARTMENT OF BUDGET AND FINANCE  
STATE OF HAWAII  
TO THE  
HOUSE COMMITTEE ON  
CONSUMER PROTECTION & COMMERCE

FEBRUARY 24, 2014  
2:10 p.m.

**MEASURE:** H.B. No. 2619, H.D. 1  
**TITLE:** Relating to Energy Storage

Chair McKelvey and Members of the Committee:

**DESCRIPTION:**

H.B. No. 2619, H.D. 1 would direct the Public Utilities Commission ("Commission") to establish energy storage portfolio standards for Hawaii that will "maximize cost-effective energy storage programs and technologies." The Commission would be required to analyze currently available and commercially viable types of energy storage for use in the State and compare the costs of those technologies to other non-storage solutions. The Commission may also establish incentives and penalties, and it is to evaluate and may revise the standards every five years. Finally, the measure would direct the Commission to report its finding and revisions to the Legislature prior to the convening of the 2020 Legislative Session and every five years thereafter.

**POSITION:**

The Commission has concerns regarding this measure and would like to offer the following comments for the Committee's consideration.

**COMMENTS:**

The Commission appreciates the Legislature's recognition of the already significant role of energy storage technologies<sup>1</sup> in transforming Hawaii's energy sector. However, there

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<sup>1</sup>A list and map of notable energy storage projects, including those operating in Hawaii, is maintained by the U.S. Department of Energy and Sandia National

appears to be a belief that energy storage is a panacea that will address the frustrations felt by consumers and solar project developers who want to interconnect to the electrical grid.

The Commission is concerned that the establishment of a portfolio standard would focus the State's attention on satisfying a pre-established quota for a specific set of technologies and may hinder utilization of alternative technologies and programs that could achieve the stated goals of this bill more cost-effectively. These alternatives to energy storage could include demand response programs, modifications to existing generation units, investments in new "flexible" generating units, utilizing advanced technologies at renewable energy plants, and load management programs, just to name a few options.

Future planning and investment in each grid should focus on the best portfolio of technologies to meet the State's clean energy goals. In recent orders, the Commission has required Maui Electric Company, Ltd. and Hawaii Electric Light Company, Inc. to file plans that consider a range of options, including energy storage, to improve their power systems and integrate renewable energy. Energy storage technologies – when appropriately priced and effectively deployed – can improve system efficiency, increase use of renewable energy, contribute to electrical system reliability, and improve affordability of electricity for all. While the Commission believes energy storage is likely to have a growing role on each grid, it is important to note that energy storage is just one of many means to Hawaii's clean energy goals, rather than a goal in itself.

Thank you for the opportunity to testify on this measure.

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Laboratories and can be found at the following website:  
<http://www.energystorageexchange.org/projects>.



**DEPARTMENT OF BUSINESS,  
ECONOMIC DEVELOPMENT & TOURISM**

NEIL ABERCROMBIE  
GOVERNOR

RICHARD C. LIM  
DIRECTOR

MARY ALICE EVANS

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Statement of  
**Richard C. Lim**  
**Director**  
Department of Business, Economic Development, and Tourism  
before the  
**HOUSE COMMITTEE ON CONSUMER PROTECTION AND COMMERCE**

Monday, February 24, 2014

2:10 p.m.

State Capitol, Conference Room 325

in consideration of

in consideration of

**HB 2619, HD 1**

**RELATING TO ENERGY STORAGE.**

Chair McKelvey, Vice Chair Kawakami, and Members of the Committee.

The Department of Business, Economic Development and Tourism (DBEDT) offers comments on HB 2619, HD 1, which requires the Public Utilities Commission (PUC) to establish energy storage portfolio standards that will maximize cost-effective energy storage programs.

The highly effective renewable portfolio standard (RPS) has been the primary statutory driver for increased penetration of renewable energy in the electrical power sector in Hawaii. DBEDT has also established energy policy directives to meet and exceed RPS by means of a diverse portfolio of renewable resources and an integrated and modernized electrical grid network, while balancing technical, economic, environmental, and cultural considerations.

As essential means to go beyond our RPS targets, DBEDT supports grid analysis and exploring innovative measures, such as energy storage, to remove barriers to renewable penetration. But, DBEDT cautions against setting statutory standards on the means to achieve and exceed RPS. Instead, DBEDT recommends that cost-effective, technical solutions be chosen on the basis of what best meets and exceeds Hawaii's aggressive clean energy mandates. Should this measure be adopted, we defer to the PUC in its analysis of "currently available," "commercially viable" and cost-effective forms of energy storage that are feasible in the State.

Thank you for the opportunity to offer these comments.



NEIL ABERCROMBIE  
GOVERNOR

SHAN S. TSUTSUI  
LT. GOVERNOR

STATE OF HAWAII  
OFFICE OF THE DIRECTOR  
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JO ANN M. UCHIDA TAKEUCHI  
DEPUTY DIRECTOR

TO THE HOUSE COMMITTEE ON CONSUMER PROTECTION & COMMERCE

THE TWENTY-SEVENTH LEGISLATURE  
REGULAR SESSION OF 2014

MONDAY, FEBRUARY 24, 2014  
2:10 P.M.

TESTIMONY OF JEFFREY T. ONO, EXECUTIVE DIRECTOR, DIVISION OF  
CONSUMER ADVOCACY, DEPARTMENT OF COMMERCE AND CONSUMER  
AFFAIRS, TO THE HONORABLE ANGUS L. K. MCKELVEY, CHAIR,  
AND MEMBERS OF THE COMMITTEE

HOUSE BILL NO. 2619, HD1 - RELATING TO ENERGY STORAGE

DESCRIPTION:

This measure proposes to require the Public Utilities Commission ("Commission") to establish and periodically revise energy storage portfolio standards and report to the Legislature.

POSITION:

The Division of Consumer Advocacy supports the intent of this measure but offers comments.

COMMENTS:

There is continued and growing interest in renewable energy projects at both utility scale and customer sited distributed generation levels, but due to various reasons,

including technical issues, the ability to interconnect these projects is impaired. The Consumer Advocate shares the Legislature's concerns with resolving the current impediments to increasing the integration of more renewable energy generating units, whether those units are of an intermittent or firm dispatchable nature.

One of the potential solutions is energy storage technology. It should be made clear, however, that energy storage technology is not the only solution and will not always be the most cost effective solution to the issue. For instance, to accommodate additional renewable energy from an intermittent energy source such as a wind farm or photovoltaic farm, upgrades to transmission facilities and/or changes to system unit dispatch guidelines could supplant the need for energy storage. Another possible solution may include analyzing how demand response might be able to address certain issues associated with intermittent renewable energy resources in lieu of more costly energy storage solutions.

If energy storage requirements are established, this may encourage less than optimal decisions and solutions. For example, if the utility companies are required to maintain a certain amount of energy storage capacity, this may divert resources towards energy storage equipment and infrastructure and away from other desirable resources, such as firm sources of renewable energy generation, such as geothermal, biomass, waste-to-energy. Firm, dispatchable sources of renewable energy generally do not require energy storage; thus, in order to maximize the benefits of energy storage, if required, decisions may be made to favor intermittent sources instead of firm sources of renewable energy. Additionally, assuming that requiring energy storage standards is meant to address issues with distributed generation at the residential and small business level, this solution will place additional cost burdens on non-participating customers that should be evaluated.

The Consumer Advocate recommends that this committee consider, in lieu of the proposed statute, creating a resolution requiring the Commission to analyze the currently available commercially viable forms of energy storage that might be feasible in Hawaii and to evaluate the cost effectiveness of those forms as compared to other non-storage solutions to determine whether energy storage requirements might be warranted. Furthermore, the Consumer Advocate recommends that it is reasonable to rely upon the statutory language in the renewable energy portfolio standards to encourage interested stakeholders to investigate and deploy the various options and solutions that can safely, reliably and cost-effectively deliver ever increasing levels of clean energy to customers.

Thank you for this opportunity to testify.

House Bill No. 2619, HD1  
House Committee on Consumer Protection & Commerce  
Monday, February 24, 2014, 2:10 p.m.  
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HOUSE COMMITTEE ON CONSUMER PROTECTION & COMMERCE  
Monday, February 24, 2014 – 2:10 p.m. – Room 325

**Ulupono Initiative Strongly Supports HB 2619 HD 1, Relating to Energy Storage**

Dear Chair McKelvey, Vice Chair Kawakami, and Members of the Committee:

My name is Murray Clay and I am managing partner of the Ulupono Initiative, a Hawai'i-based impact investment firm that strives to improve the quality of life for the people of Hawai'i by working toward solutions that create more locally grown food, increase renewable energy, and reduce/recycle waste. Ulupono invests in projects that have the potential to create large-scale, innovative change.

**Ulupono strongly supports HB 2619 HD 1**, which establishes an energy storage portfolio standard for grid-connected renewable energy projects. In recent years Hawai'i has seen significant growth in renewable energy adoption moving the State towards its renewable energy goals. However, over the last year in particular, interconnection of renewable energy systems has become increasingly problematic. The growth rate in new residential solar PV systems, for example, has begun to decline this year. The interconnection of utility-scale renewable energy systems is stretching over years. If the existing interconnection problems continue, renewable energy growth will stagnate in Hawai'i. A modern, flexible grid is necessary to maximize renewable energy penetration.

Energy storage is one of the primary means by which to increase grid flexibility and resilience. Circuits that are currently completely closed to additional renewable energy could effectively be opened up with sufficient storage in place. Furthermore, energy storage has the ability to decrease the curtailment of existing renewable energy – energy that is currently being wasted. An energy storage portfolio standard as proposed by this bill could be supportive of the State's clean energy goals by pushing energy storage technology into mainstream use in Hawai'i, opening the door to further renewable energy use and a reduction in expensive oil use. For these reasons we support HB 2619 HD 1.

We strongly believe that this bill has the potential to open the door for significant renewable energy growth in Hawai'i.

Thank you for this opportunity to testify.

Respectfully,

Murray Clay  
Managing Partner

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**Testimony of ERIK KVAM**  
**President of Renewable Energy Action Coalition of Hawaii**  
**e-mail: [Kvam@REACHhawaii.org](mailto:Kvam@REACHhawaii.org)**

**In SUPPORT of HB 2619, HD 1 RELATING TO ENERGY STORAGE**

**Before the  
HOUSE COMMITTEE ON CONSUMER PROTECTION & COMMERCE**

**February 24, 2014 2:10 p.m.**

Aloha, Chair McKelvey, Vice-Chair Kawakami and members of the Committee.

My name is Erik Kvam. I am the President of Renewable Energy Action Coalition of Hawaii (REACH), a trade association that envisions is a Hawaiian economy powered 100% by renewable energy sources indigenous to Hawaii.

REACH is in **SUPPORT** of HB 2619 HD1.

Without large amounts of energy storage, the large amounts of intermittent solar and wind generation that have been and will be added to the Hawaiian island grids will be undispachable and unusable when imported fuels stop flowing to Hawaii.

Right now, Hawaii's electric utilities do not seem to be planning for 100% renewable energy – requiring large amounts of dispatchable renewable generation -- to ensure their future prosperity and business success when imported fuels stop flowing to Hawaii.

REACH **SUPPORTS** HB 2619 HD 1 – requiring the utilities to procure targeted amounts of energy storage according to energy storage portfolio standards specified by the Public Utilities Commission – to get the utilities' attention and get them pointed in



the direction of planning for 100% renewable energy, supported by large amounts of dispatchable renewable generation.

Thank you for allowing me this opportunity to testify.

**Testimony before the  
House Committee on Consumer Protection & Commerce**

**H.B. 2619 HD1 – Relating to Energy Storage**

**Monday, February 24, 2014  
2:10 PM, Conference Room 325**

**By Darren Ishimura  
Acting Manager, Grid Technologies  
Hawaiian Electric Company**

Chair McKelvey, Vice-Chair Kawakami, and Members of the Committee:

My name is Darren Ishimura, Acting Manager of Grid Technologies at Hawaiian Electric. I am testifying on behalf of Hawaiian Electric and its subsidiary utilities, Maui Electric and Hawai'i Electric Light (collectively the "Hawaiian Electric Companies").

Hawaiian Electric supports the intent of H.B. 2619 HD1 to utilize cost-effective energy storage programs and technologies for the benefit of all electric utility customers. However, the Hawaiian Electric Companies believe the establishment of energy storage portfolio standards, if any, should be examined by the State of Hawaii Public Utilities Commission. In addition, Energy Storage Portfolio Standards, if any, should provide for deployment of energy storage in combination with variable renewable resources that result in lowest-cost solutions for achievement of Renewable Portfolio Standards and good value for our customers.

We underscore the importance of the statement in the bill's preamble that these analyses and/or establishment of energy storage portfolio standards "...is not intended to delay or prevent the public utilities commission's approval of appropriate energy storage projects or other alternate means to deliver safe, reliable, and cost-effective clean energy to consumers." We have ongoing initiatives to develop, test, and procure energy storage systems for our Companies and any delays to those efforts should be avoided.

Thank you for the opportunity to testify on this measure.

Statement of  
**Shawn Bailey, Regulatory and Market Analysis Manager**  
**Sempra US Gas and Power**

Before the House Committee On **Consumer Protection and Commerce**

February 24, 2014

2:10 PM

State Capitol, Conference Room 325

In consideration of  
**HB2619 HD1 RELATING TO ENERGY STORAGE**

Chair McKelvey, Vice Chair Kawakami, Members of the Committee on Consumer Protection and Commerce,

Sempra USG **Supports** HB2619 HD1 Relating to Energy Storage.

Sempra USGP's fleet includes over 2000 MW of wind, solar and natural gas fueled generation. Sempra USGP's Auwahi wind project on Maui includes 21MW of wind generation in combination with 11MW and 4.4MWh of battery storage capacity.

There are a number of factors that make the Hawaii's consideration of energy storage particularly timely. First, storage is uniquely capable of dealing with generation variability associated with the current significant intermittent renewable penetration in the state, and the increasing renewable procurement goals. For example, since storage acts as both generation capacity and load, it can help accommodate periods of over-generation and generation variability by the renewable fleet. In addition, increasing distributed generation on the system, including rooftop solar, makes maintaining the balance between demand and supply more challenging, and can result in less efficient operation for some of the flexible thermal generators on the system.

Other states with similar renewable goals are moving aggressively to procure storage as a means to maximize the benefit of prior and future renewable procurement, and address the need for more flexible generation. California Public Utility Commission has established a 50MW storage procurement mandate to meet local reliability needs in the Los Angeles area in the near term, and a mandate to reach 1325MW of storage procurement by the three investor-owned utilities by 2020. In addition, New York has committed \$23mm in funding for storage development, and the Canadian province of Ontario also plans to procure 50MW of storage capacity as an initial goal.

Sempra USGP supports a near term storage procurement goal to address current needs, and ongoing efforts by HECO and the Public Utilities Commission to establish a storage procurement plan to reach future incremental storage targets, as a prudent course of action..



Statement of  
**Geoff Brown**  
**Director, Business Development**  
**BEACON POWER, LLC**

Before the House Committee On **Consumer Protection and Commerce**  
February 24, 2014  
2:10 PM  
State Capitol, Conference Room 325

In consideration of  
**HB2619 HD1 RELATING TO ENERGY STORAGE**

Chair McKelvey, Vice Chair Kawakami, Members of the Committee on Consumer Protection and Commerce,

**Comments:**

Thank you for the opportunity to present the views of Beacon Power before the Hawaii Legislature. Beacon Power is a US based energy storage company that utilizes its proprietary carbon fiber composite flywheels to store and then recycle electrical energy on the transmission grid to help enable grid operators more accurately balance electricity supply and demand. Beacon Power has deployed its fast-responding and accurate storage devices in New York, New England and Pennsylvania. Our flywheel energy storage systems are particularly helpful to grid operators that are integrating high levels of variable generation renewable resources into their systems.

The strategic visions articulated by both the Governor and the CEO of Hawaiian Electric, designate renewable energy as one of the fundamental pillars of the Hawaii energy supply. As such, Hawaii will integrate very high levels of solar and wind power generation into the electricity system, likely at a higher percentage basis than any other state in the US. This integration will undoubtedly put Hawaii on the path to a more sustainable long term energy plan, one that enables it to attain its energy independence and achieve bold economic objectives, while also living up to its very high standards of environmental stewardship. However, this plan will require supporting infrastructure to ensure that Hawaii can achieve its objectives.

Although the fuel for renewable energy is free, there are direct and indirect capital costs needed to ensure its effective and efficient integration in the electric grid eco-system. The renewable energy generation output is variable; constantly changing based on wind patterns and cloud cover. In addition, renewable energy generation resources sometimes need to be sited remotely with the power being transmitted to locations where it will be consumed. For the host utility, this implies additional investment is needed for modernization of the transmission and distribution (T&D) systems for each new MW of



renewable energy added to the system. Specifically, balancing real-time supply and demand becomes a significant challenge, but there are many technologies, including energy storage and demand response, that utilities can use to address these issues. As a rule of thumb, we believe that for an additional cost of 1 to 2 c/kWh, supporting infrastructure can be installed to ensure renewable energy is seamlessly integrated into the grid.

As renewables are being added to the system across the US, the mainland utilities are addressing the same basic system integration issue as Hawaii. Importantly, FERC addressed the frequency regulation market required for the balancing of generation and load on the transmission systems of its jurisdictional independent system operators and regional transmission organizations in Orders 755 & 784. In these orders, FERC directed that the jurisdictional ISOs and RTOs create market rules to compensate participants in its ancillary services market for their provision of frequency regulation in a manner that reflects the regulation services actually provided by the market participant. This compensation structure encourages the integration of faster-responding and more accurate grid balancing tools, thus allowing the transmission system operators to be able to more accurately address the system balancing needs, including any variability introduced by the integration of high levels of renewable energy into their supply base.

The energy storage and demand side management systems are evolving at a rapid rate. Utility professionals and experts at the PUC must dedicate significant time and effort to stay on top of new technology capability and cost. Because this field is so dynamic, Beacon advocates empowering the subject matter experts at the utility companies and the PUC to take appropriate action to incorporate the best available technologies into their grid as needed. Single point in time energy storage legislation runs a far greater risk of distorting the market than enabling the utilities to make the best technology choice. It would be difficult or impractical to design legislation that could keep pace with the rate of change of the emerging technologies, or for that matter, the constantly changing dynamics on Hawaii's electric system. Legislative solutions also run the risk of delaying infrastructure program implementation, and given the rate of installation of renewable energy in Hawaii, the State needs a bias toward speed of execution of the necessary supporting infrastructure.

Despite the fact the system problems are arguably being created or exacerbated by the introduction of independently developed renewable power projects or customer-owned renewable energy, most utilities are concluding the problem is best solved via centralized solutions. A utility controlled centralized response enables the utilities to account for the spatial diversity benefits of having renewables geographically spread across the islands. This also enables utilities to optimize solutions through project hybridization and combination projects including transmission upgrades, demand response and energy storage. This overall system optimization should result in the lowest total cost and best response to system problems leading to highest reliability.

Placing control and ownership of the implementation of the renewable energy supporting infrastructure with the utility and PUC will help address the issue of cost. The utility is in



the best position to determine how much and what type of energy storage is needed to reliably and safely meet Hawaii's renewable energy goals. The PUC and consumer advocate will be there to make sure the investments are prudent and balance the interests of all the stakeholders. The question of who should pay for this supporting infrastructure is often a hotly debated topic. Yet in the case of Hawaii, renewable energy implementation has clear and compelling strategic and societal benefits for the State which means the cost should probably be borne all the beneficiaries. The utility billing process has always been an effective and fair way to allocate those costs by adding a charge to customers' bills in proportion to their kWh of usage. It would be difficult to craft legislation that could as fairly allocate those costs.

Thank you again for allowing us to present our views. We very strongly recommend that Hawaii use all the emerging technologies, including energy storage, to help integrate renewable energy into its asset base. Whether the decision is to use the existing regulatory and utility system or implement new legislation, ultimately the program should have a bias for action to ensure renewables achieve their objectives while maintaining a reliable electrical system for the State.

**kawakami3-Benigno**

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**From:** mailinglist@capitol.hawaii.gov  
**Sent:** Wednesday, February 19, 2014 3:42 PM  
**To:** CPCtestimony  
**Cc:** mendezj@hawaii.edu  
**Subject:** \*Submitted testimony for HB2619 on Feb 24, 2014 14:10PM\*

**HB2619**

Submitted on: 2/19/2014

Testimony for CPC on Feb 24, 2014 14:10PM in Conference Room 325

| <b>Submitted By</b>   | <b>Organization</b> | <b>Testifier Position</b> | <b>Present at Hearing</b> |
|-----------------------|---------------------|---------------------------|---------------------------|
| Javier Mendez-Alvarez | Individual          | Support                   | No                        |

Comments:

Please note that testimony submitted less than 24 hours prior to the hearing, improperly identified, or directed to the incorrect office, may not be posted online or distributed to the committee prior to the convening of the public hearing.

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**LATE**

**HOUSE COMMITTEE ON CONSUMER PROTECTION & COMMERCE**

February 24, 2014, 2:10 P.M.

Room 325

**(Testimony is 3 pages long)**

**TESTIMONY IN STRONG SUPPORT OF HB 2619 HD 1, SUGGESTED AMENDMENTS**

Chair McKelvey, Vice Chair Kawakami and members of the Consumer Protection & Commerce Committee:

The Blue Planet Foundation strongly supports HB 2619 HD 1, setting an energy storage portfolio standard to maximize cost-effective energy storage programs and technologies. Similar to the establishment of a renewable energy portfolio standard and an energy-efficiency portfolio standard, an energy storage portfolio standard sets a target of energy storage to be achieved in incremental stages. Energy storage programs and technologies will make a significant and cost-effective contribution to weaning Hawaii from expensive fossil fuels and achieving Hawaii's clean energy goals.

**While Blue Planet requests that this committee advance this measure, we strongly recommend that the HD1 be amended to include key elements from the original measure. Those key elements are 1) directly establishing an energy portfolio standard of six hundred (600) megawatt hours of electric power storage statewide by 2035 and 2) providing public utilities commission with the authority and discretion to establish interim goals for electric power storage to be achieved by 2020, 2025, and 2030 and may also adjust the 2035 standards by rule or order to maximize cost-effective energy storage programs and technologies.**

**Energy storage portfolio standards are realistic targets with existing technology.**

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Blue Planet supports energy storage portfolio standard that sets a target of energy storage because it ensures the maximization of the use of indigenous renewable energy in the long run and in turn, strengthens Hawaii's economy. Energy storage portfolio standard supplements



Hawaii's renewable energy portfolio standard initiatives that have already, in the short term, considerably reduced fossil fuel dependence. Currently, a variety of energy storage strategies are available with existing technology: battery technologies, hydrogen and other alternative fuels, and pumped hydroelectric storage. With increased energy storage, the existing grid will be transformed into a "smarter", more efficient and more reliable grid that accommodates expected increasing proportions of renewable generation resources.

A 2013 study<sup>1</sup> conducted by Hawaiian Electric Companies on battery storage on the MECO system demonstrates that a 15 MWh battery storage resource effectively reduced the amount of curtailed renewable energy by almost 2 GWh (i.e., equivalent to 2000 MWh) per year. The study, using data provided by MECO, analyzed various scenarios involving energy storage systems and their effects on wind power generation. The key findings show that energy storage effectively reduces wind curtailment, increases the amount of renewable energy sold and enabled greater use of lower cost, clean energy to displace dirty, expensive fossil energy. In each of the study's scenarios, the payback period for the cost of the energy storage system is estimated to be within 3 to 8.5 years, as a result of millions of dollars saved annually from reducing fossil energy consumption.

The proposed energy storage portfolio standards set targets of six hundred (600) megawatt hours of electric power storage statewide by 2035. These modest targets are likely to be achievable and will prevent the procurement of other costly and infeasible storage projects. Last October, the state of California enacted a relatively more ambitious mandate that requires three of its investor-owned utilities to collectively add 1,325 megawatt hours of energy storage to their grids by 2020, including 200 megawatts by 2014. There is no reason for Hawai'i to procrastinate on setting attainable goals to promote the use of energy storage technologies that are evidently ready for deployment today.

## **Stored energy can serve as an emergency backup to maintain grid reliability.**

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Energy storage also increases the resiliency of Hawai'i's electric grids by providing a form of clean energy backup. Currently, such backup is typically in the form of "spinning reserves," or fossil fuel plants that are kept running even when the energy is not needed. Meanwhile, battery technology is already being used with a number of renewable energy projects in Hawai'i, including wind farms on Maui and solar installations on Kaua'i and the Big Island.

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<sup>1</sup> Hawaiian Electric Companies 2013 Integrated Resource Planning ("IRP") Report and Action Plan

Hawai'i's economy needs power that's as dependable as the sunrise. To make full use of all of Hawai'i's native energy sources we need the ability to store power for times when the sun isn't shining or the wind isn't blowing. While it's not clear what form will be most cost effective—fuel cells, pumped water, flywheels, ultra capacitors, batteries, dilithium crystals—we do know that the technology is evolving rapidly. Consider data storage for computers. In the late 1950s, cutting-edge data storage could store the equivalent of one MP3 file in the space of half a carport. Today, over 12,000 such files fit on a keychain flash drive. We are seeing a similar evolution for power storage, with the cost of battery storage dropping at nearly 8% annually.

Expanding Hawai'i's energy storage capacity will improve the efficiency, flexibility, and reliability of our electric grid, allowing us to wring the most power out of it, while adding large amounts of new renewable energy resources like wind and solar.

Please forward HB 2619 HD1, with amendments.

Thank you for the opportunity to testify.



SIERRA CLUB OF HAWAII'  
MĀLAMA I KA HONUA. *Cherish the Earth.*



MALAMA I KA HONUA  
*Cherish the Earth*

## HOUSE COMMITTEE ON CONSUMER PROTECTION & COMMERCE

February 24, 2014, 2:10 P.M.  
*(Testimony is 2 pages long)*

### TESTIMONY IN SUPPORT OF HB 2619 HD1

Aloha Chair McKelvey and Members of the Committees:

The Sierra Club of Hawai'i, with over 12,000 dues paying members and supporters statewide, respectfully supports HB 2619 HD1. This measure requires the PUC to establish and plan for specific amounts of storage technology to be implemented onto our grid.

Energy storage is sometimes called "the forgotten fuel". Better storage is essential both for improving the efficiency of the existing electrical grid, and for enabling the adoption of wind, solar, and other renewables. Improving our energy storage systems is a necessary step in building a modern, sustainable power grid.

Clean, renewable energy sources are our future. Fossil fuels like natural gas are a dead end for the people of Hawai'i, the power companies, and for the entire planet.

Renewable energy is now cheaper than any other source of power in most parts of the United States. For example, Excel Energy in Colorado — the largest utility, which serves 2/3 of the population — just rejected a LNG plant because solar is cheaper. The cost of wind is down 50 percent since 2009, and solar panels are down 80 percent since 2008. This trend will only gain momentum. That's why we're seeing places like Spain and Denmark now get more power from wind than any other source.

This isn't speculation. Scientists and engineers have crunched the numbers and shown that it's doable: a 100 percent clean-energy economy. Mark Z. Jacobson and Mark A. Delucchi, professors at Stanford and U.C. Davis, respectively, published an article in *Scientific American* five years ago that showed how the world could be powered by clean energy within decades. Last year, they published an even more detailed plan, in *Energy Journal*, for how the state of New York could switch to 100 percent clean energy by 2050. They've since produced draft plans for California and Washington, as well.

This measure will spark new ideas and storage methods that can move us out of a destructive energy system and into a safe, healthy, and efficient system of renewable energy. There is a precedent for this measure. California recently required an investment of 200 megawatts of energy storage by 2014, and 1.3 gigawatts by the end of 2020. Hawai'i will benefit enormously by investment California is making into this technology, whether in terms of ramping up, learning from other experiences, and efficiencies of scale.

Mahalo for the opportunity to testify.



**Directors**

Jody Allione  
Silver Ridge

Joe Boivin  
Hawaii Gas

Kelly King  
Pacific Biodiesel

Warren S. Bollmeier II  
WSB-Hawaii

TESTIMONY OF WARREN BOLLMEIER ON BEHALF OF THE  
HAWAII RENEWABLE ENERGY ALLIANCE BEFORE THE  
HOUSE COMMITTEE ON CONSUMER PROTECTION AND COMMERCE

HB 2619 HD1, RELATING TO ENERGY STORAGE

February 24, 2014

Chair McKelvey, Vice-Chair Kawakami and members of the Committee, I am Warren Bollmeier, testifying on behalf of the Hawaii Renewable Energy Alliance (“HREA”). HREA is an industry-based, nonprofit corporation in Hawaii established in 1995. Our mission is to support, through education and advocacy, the use of renewables for a sustainable, energy-efficient, environmentally-friendly, economically-sound future for Hawaii. One of our goals is to support appropriate policy changes in state and local government, the Public Utilities Commission and the electric utilities to encourage increased use of renewables in Hawaii.

The purpose of HB 2619 HD1 is to require the Public Utilities Commission to establish and periodically revise energy storage portfolio standards and report to the Legislature. HREA **supports** the **intent** of this measure and offers the following comments and recommendations:

- 1) Comments. This measure supports our clean energy goals, as we will need storage and **other technologies** that can provide **ancillary services** to facilitate the integration of renewables and energy efficiency on our island grids. Specifically:
  - a) We will need a significant amount of storage, both distributed, such as batteries, and utility-scale, such as batteries and **pumped storage**, if we are to reach our clean energy goals.
  - b) We support the role of the Public Utility Commission to open a docket on this portfolio, in conjunction with consideration of other technologies that can provide ancillary services which include:
    - i. Black start service
    - ii. Non-Spinning reserve
    - iii. Regulation and frequency service
    - iv. Spinning reserve
    - v. Voltage support
- 2) Recommendations: We recommend the committee pass this measure out to foster further discussion.

Mahalo for this opportunity to testify.