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

February 4, 2014
8:30 a.m.

MEASURE: H.B. No. 2619
TITLE: Relating to Energy Storage

Chair Lee and Members of the Committee:

DESCRIPTION:

H.B. No. 2619 proposes to direct the Public Utilities Commission ("Commission") to establish energy storage portfolio standards for Hawaii with a requirement of 600 megawatt hours of electric power storage statewide to be achieved by 2035. This measure would also direct the Commission to establish interim goals and to adjust the standards. The Commission may also establish incentives and penalties, and it may evaluate and possibly 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[1] in transforming Hawaii's energy sector. However, there

[1]A list and map of notable energy storage projects, including those operating in Hawaii, maintained by the U.S. Department of Energy and Sandia National Laboratories can be found at the following website: http://www.energystorageexchange.org/projects.

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 technology 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 to improve their power systems and integrate renewable energy, including energy storage. 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.

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

NEIL ABERCROMBIE
GOVERNOR

RICHARD C. LIM
DIRECTOR

MARY ALICE EVANS
DEPUTY DIRECTOR

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

Tuesday, February 4, 2014
8:30 a.m.
State Capitol, Conference Room 325

in consideration of
HB 2619
RELATING TO ENERGY STORAGE.

Chair Lee, Vice Chair Thielen, and Members of the Committee.

The Department of Business, Economic Development and Tourism (DBEDT) offers comments on HB 2619 which requires the Public Utilities Commission (PUC) to establish energy storage portfolio standards designed to achieve 600 megawatt hours of electric power storage statewide by 2035.

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.

Thank you for the opportunity to offer these comments.

NEIL ABERCROMBIE
GOVERNOR

SHAN S. TSUTSUI
LT. GOVERNOR

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KEALI`I S. LOPEZ
DIRECTOR

JO ANN M. UCHIDA TAKEUCHI
DEPUTY DIRECTOR

TO THE HOUSE COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION

THE TWENTY-SEVENTH LEGISLATURE
REGULAR SESSION OF 2014

TUESDAY, FEBRUARY 4, 2014
8:30 A.M.

TESTIMONY OF JEFFREY T. ONO, EXECUTIVE DIRECTOR, DIVISION OF CONSUMER ADVOCACY, DEPARTMENT OF COMMERCE AND CONSUMER AFFAIRS, TO THE HONORABLE CHRIS LEE, CHAIR, AND MEMBERS OF THE COMMITTEE

HOUSE BILL NO. 2619 - RELATING TO ENERGY STORAGE

DESCRIPTION:

This measure proposes to require the Public Utilities Commission ("Commission") to establish energy storage portfolio standards and requires that the Commission report its findings.

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.

Testimony before the
House Committee on Energy and Environmental Protection

H.B. 2619 – Relating to Energy Storage

Tuesday, February 4, 2014
8:30 am, Conference Room 325

By Darren Ishimura
Acting Manager, Grid Technologies
Hawaiian Electric Company

Chair Lee, Vice-Chair Thielen, 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 to maximize 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 ("Commission"). This examination, through proceeding or other regulatory process, should not prevent or delay the Commission from reviewing or acting on electric utility requests to approve energy storage projects or programs before or during the course of this proceeding or regulatory process. The goals, schedule, and rules of an energy storage portfolio standard must be established in the best interest of electric utility customers.

Accordingly, the Hawaiian Electric Companies recommend that this bill be revised in accordance with the aforementioned points.

Thank you for the opportunity to testify.

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

MALAMA I KA HONUA
Cherish the Earth

HOUSE COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION

February 4, 2014, 8:30 A.M.
(Testimony is 2 pages long)

TESTIMONY IN SUPPORT OF HB 2619

Aloha Chair Lee 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. This measure requires specific amounts of storage technology to come onto our electrical 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 then 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.

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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.

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REACH
RENEWABLE ENERGY ACTION COALITION OF HAWAII
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Tel: (808) 371-1475
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Testimony of ERIK KVAM
President of Renewable Energy Action Coalition of Hawaii
e-mail: Kvam@REACHawaii.org

In SUPPORT of HB 2619 RELATING TO ENERGY STORAGE

Before the
HOUSE COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION

February 4, 2014 8:30 a.m.

Good morning, Chair Lee, Vice-Chair Thielen and members of the Committees.

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

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

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 undispatchable 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 – 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 to testify.

Statement of
Shawn Bailey
Regulatory and Market Analysis Manager
Sempra US Gas and Power
before the

HOUSE COMMITTEE ON
ENERGY AND ENVIRONMENTAL PROTECTION

4, day, February, 2014
8:30 a.m.
State Capitol, Conference Room 325 In consideration of

BILL RELATING TO
Chair Representative Lee , Vice Chair Thielen, and Members of the Committee on ENERGY AND ENVIRONMENTAL PROTECTION

Sempra USG **Supports** HB2619 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.

Sunrun Inc. | 1.855.4SUNRUN | sunrunhome.com

HOUSE COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION

Tuesday, February 4, 2014

TESTIMONY IN SUPPORT OF HB 2619 RELATING TO ENERGY STORAGE
Sarah Bertram, Director, Public Policy, Sunrun

Chair Lee, Vice Chair Thielen, and Members of the Committee:

Thank you for the opportunity to provide testimony in support of HB 2619.

Sunrun is a leading residential solar company with a national reach. Sunrun has been serving customers in Hawaii since 2010 by partnering with local solar installers. To date, Sunrun has invested more than $140M to support approximately 4,000 homeowners across the islands in adopting rooftop solar.

HB 2619 recognizes that energy storage will play an important role in Hawaii's clean energy transformation. HB 2619 builds on an existing policy framework – the portfolio standard – that is already driving an energy shift towards renewable power and energy efficiency.

The utility grid needs to transform to serve modern-day needs. Hawaii's electricity grid was designed to support a century-old business model that moves power from dirty power plants to consumers. That model no longer supports consumer needs. The utility grid now needs to optimize the use of electricity, including clean electricity that is generated on Hawaii's rooftops using solar panels. Renewables are playing a major role in the modernizing of Hawaii's grid today. Energy storage will play a critical role in this transformation going forward.

Energy storage is poised to follow a similar trajectory that rooftop solar has experienced Hawaii; in the four years that Sunrun has been investing in rooftop solar in Hawaii, installed costs have declined by 25%. Similarly, through scale, energy storage costs should decline and allow the technology to become more mainstream.

Sunrun supports the vision and policy approach of HB 2619 to ensure that Hawaii's electric grid will serve the needs of its customers for decades to come.

Thank you for the opportunity to provide this testimony.

Sincerely,
Sarah Bertram

HB2619
Submitted on: 2/3/2014
Testimony for EEP on Feb 4, 2014 08:30AM in Conference Room 325

Submitted By	Organization	Testifier Position	Present at Hearing
Ulrich Bonne	Individual	Support	No

Comments: Although I am in support of HB 2619 to establish a "energy storage portfolio standard designed to achieve 600 MWh of electric energy storage state-wide by 2035," the 600 MWh by 2035 is "too little, too late." This is because at 10 kWh per average home with a 4-kW PV (consuming 500 kWh/month), the 600 MWh of storage is enough for only 60,000 average households, regardless whether on-site or somewhere on the grid. If we were to only expand PV generators at 30% per year, we would hit the 600 MWh in 4 years on the Big Island alone, based on the 5355 PV systems to date, according to WHT issue of Jan. 23, 2014, p. 5A. My testimony to SB 2565 submitted on Feb.3, 2014 goes into the details of why 2 to 2.5 kWh of storage for an average 4-kW PV is sufficient to allow all present ratepayers to install PVs, not only without overloading the grid, but (actually and incredibly) largely off-loading it. Respectfully submitted by Ulrich Bonne (ulrichbonne@msn.com), Kailua-Kona, HI 96740

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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blue LATE



HOUSE COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION
February 4, 2013, 8:30 A.M.
Room 325
(Testimony is 2 pages long)

TESTIMONY IN STRONG SUPPORT OF HB 2619

Chair Lee and members of the Energy & Environmental Protection Committee:

The Blue Planet Foundation strongly supports HB 2619, 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.

Energy storage—whether it be batteries, ultra-capacitors, or some other technology—will be an integral part of our island electricity systems. These technologies are evolving rapidly and in the technology development and deployment stage where tax credits could make a critical difference in adoption rates.

Energy storage technologies reduce Hawaii's reliance on fossil-fuel generation resources, provide essential grid ancillary services, and accommodate expected increasing proportions of variable renewable generation resources. This renewable energy transformation will help to stabilize and strengthen Hawaii's economy by reducing dependence on imported fuels and will help protect Hawaii's environment by greatly reducing greenhouse gas emissions.

A 2013 study[1] conducted by Hawaiian Electric Companies on battery storage on the MECO system demonstrates showed 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. By reducing curtailment, the amount of renewable energy sold increases, enabling greater use of lower cost, clean energy to display dirty, expensive fossil energy.

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[1] Hawaiian Electric Companies 2013 Integrated Resource Planning ("IRP") Report and Action Plan

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This bill proposes energy storage portfolio standards that shall be designed to achieve 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 costly and infeasible storage projects. The proposed amendment to §269 also provides the 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.

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.

Energy storage also increases the resiliency of Hawaii'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.

Hawaii's economy needs power that's as dependable as the sunrise. To make full use of all of Hawaii'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 Hawaii'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.

Thank you for the opportunity to testify.

LATE

2/4/2014	**House Committee on Energy and Environmental Protection**	**EEP**
8:30 a.m.	**TESTIMONY IN SUPPORT**	**HB 2619**

Chair Lee, Vice Chair Thielen, and Members of the Committee:

Hawaii PV Coalition is pleased to submit testimony in support of HB 2619, which establishes energy storage portfolio standards.

In order for Hawaii to take full advantage of its renewable energy resources, and for Hawaii to meet its ambitious clean energy goals, Hawaii will need to develop greater energy storage capacity in its electric system. One way to develop this energy storage capacity is to set portfolio standards just as Hawaii has set portfolio standards for renewable energy itself.

Hawaii PV Coalition supports HB 2619 because it will facilitate the adoption and use of energy storage, which will allow Hawaii to more fully take advantage of solar energy and other renewable energy resources.

Sincerely,

Mark Duda
President, Hawaii PV Coalition

The Hawaii PV Coalition was formed in 2005 to support the greater use and more rapid diffusion of solar electric applications across the state. Working with business owners, homeowners and local and national stakeholders in the PV industry, the Coalition has been active during the state legislative sessions supporting pro-PV and renewable energy bills and helping inform elected representatives about the benefits of Hawaii-based solar electric applications.

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