SB 2932

Measure Title:	RELATING TO ENERGY STORAGE.
Report Title:	Energy Storage Portfolio Standards; Public Utilities Commission
Description:	Establishes energy storage portfolio standards that will facilitate increased use of renewable energy and reductions of fossil fuel consumption in Hawaii, while maintaining reliable and affordable electric service. Requires the public utilities commission to evaluate the energy storage portfolio standards every five years.

TESTIMONY OF HERMINA MORITA
CHAIR, PUBLIC UTILITIES COMMISSION
DEPARTMENT OF BUDGET AND FINANCE
STATE OF HAWAII
TO THE
SENATE COMMITTEES ON
ENERGY & ENVIRONMENT
AND
COMMERCE & CONSUMER PROTECTION

February 4, 2014
2:45 p.m.

MEASURE: S.B. No. 2932
TITLE: Relating to Energy Storage

Chair Gabbard, Chair Baker, and Members of the Committees:

DESCRIPTION:

This measure proposes to direct the Public Utilities Commission ("Commission") to open a proceeding on or before September 1, 2014 to establish energy storage portfolio standards "that will facilitate increased use of renewable energy and reductions in fossil fuel consumption in the State, while maintaining reliable and affordable electric service to customers," and which will be "designed to achieve the State's statutory clean energy goals and increase or maintain electric system reliability and affordability." Energy storage is described in the measure as either "centralized or distributed" resources that can perform one or a number of technical functions of energy storage systems.

The Commission is to also establish interim goals and to adjust the standards "to maximize the effectiveness of the energy storage programs that are in the best interests of electric customers and to preserve the electric utilities' flexibility to utilize firm renewable energy as it becomes available." S.B. No. 2932 also states the Commission "shall" establish penalties for utilities that fail to comply with the standards, and that the Commission "may" establish incentives for "performance in achieving or exceeding" the standards.

The Commission is to evaluate and possibly revise the standards every five years with legislative reporting required every five years beginning in 2017.

POSITION:

The Commission has concerns about 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 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.

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[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.

DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

NEIL ABERCROMBIE
GOVERNOR

RICHARD C. LIM
DIRECTOR

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Statement of
Richard C. Lim
Director
Department of Business, Economic Development, and Tourism
before the
SENATE COMMITTEE ON ENERGY AND ENVIRONMENT
and
SENATE COMMITTEE ON COMMERCE AND CONSUMER PROTECTION
Tuesday, February 4, 2014
2:45 p.m.
State Capitol, Conference Room 225

in consideration of
SB 2932
RELATING TO ENERGY STORAGE.

Chairs Gabbard and Baker; Vice Chairs Ruderman and Taniguchi; and Members of the Committees.

The Department of Business, Economic Development and Tourism (DBEDT) respectfully offers comments on SB 2932, which requires the Public Utilities Commission (PUC) to open a proceeding to establish energy storage portfolio standards.

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 SENATE COMMITTEES ON
ENERGY AND ENVIRONMENT AND COMMERCE AND CONSUMER PROTECTION

THE TWENTY-SEVENTH LEGISLATURE
REGULAR SESSION OF 2014

TUESDAY, FEBRUARY 4, 2014
2:45 P.M.

TESTIMONY OF JEFFREY T. ONO, EXECUTIVE DIRECTOR, DIVISION OF CONSUMER ADVOCACY, DEPARTMENT OF COMMERCE AND CONSUMER AFFAIRS, TO THE HONORABLE MIKE GABBARD AND THE HONORABLE ROSALYN H. BAKER, CHAIRS, AND MEMBERS OF THE COMMITTEES

SENATE BILL NO. 2932 - RELATING TO ENERGY STORAGE

DESCRIPTION:

This measure establishes energy storage portfolio standards that will facilitate increased use of renewable energy and reductions of fossil fuel consumption in Hawaii, while maintaining reliable and affordable electric service. It also proposes to require the Public Utilities Commission ("Commission") to evaluate the energy storage portfolio standards every five years.

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 will likely divert resources towards energy storage equipment and infrastructure and away from other desirable resources, such as firm sources of renewable energy generation, including geothermal, biomass, and 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.

Instead, the Consumer Advocate recommends that the Legislature continue 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. In addition, the Consumer Advocate suggests 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 solutions to determine whether energy storage requirements might be warranted.

Thank you for this opportunity to testify.

REACH

RENEWABLE ENERGY ACTION COALITION OF HAWAII

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Testimony of ERIK KVAM
President of Renewable Energy Action Coalition of Hawaii
e-mail: Kvam@REACHawaii.org

In SUPPORT of SB 2932 RELATING TO ENERGY STORAGE

Before the
SENATE COMMITTEE ON ENERGY AND ENVIRONMENT and
SENATE COMMITTEE ON COMMERCE AND CONSUMER PROTECTION

February 4, 2014 2:45 p.m.

Good afternoon, Chair Gabbard, Chair Baker, Vice-Chair Ruderman, Vice-Chair Taniguchi 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 SB 2932.

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** SB 2932 – 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.

TESTIMONY OF WARREN BOLLMEIER ON BEHALF OF THE HAWAII RENEWABLE ENERGY ALLIANCE BEFORE THE SENATE COMMITTEE ON ENERGY AND ENVIONMENTAL PROTECTION

SB 2932, RELATING TO ENERGY STORAGE

February 4, 2014

Chair Gabbard, Vice-Chair Ruderman 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 SB 2932 is to maximize cost-effective energy storage programs and technologies by establishing an energy storage portfolio standard.

HREA **supports** this measure and offers the following comments and recommendations:

1) Comments. This measure supports our clean energy goals as we will need storage to facilitate the integration of renewables and energy efficiency on our island grids. With respect to the provisions of this measure:

   a) We believe the goal of 600 MWHs of storage is too pedestrian. In addition to distributed energy storage, we will need a significant amount of utility-scale storage, such as pumped hydro, 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, at which time, we can sharpen our pencils.

2) Recommendations: We recommend the committee pass this measure out.

Mahalo for this opportunity to testify.

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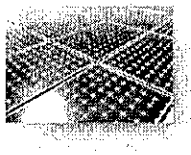
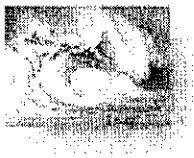
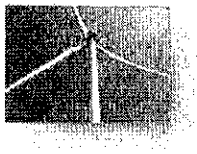
SB2932
Submitted on: 2/3/2014
Testimony for ENE/CPN on Feb 4, 2014 14:45PM in Conference Room 225

Submitted By	Organization	Testifier Position	Present at Hearing
Leslie Cole-Brooks	Hawaii Solar Energy Association	Support	No

blue planet FOUNDATION

SENATE COMMITTEE ON ENERGY AND ENVIRONMENT
SENATE COMMITTEE ON COMMERCE AND CONSUMER PROTECTION
February 4, 2014, 2:45 P.M.
Room 225
(Testimony is 2 pages long)

TESTIMONY IN STRONG SUPPORT OF SB 2932

Chairs Gabbard and Baker and members of the committees:

The Blue Planet Foundation strongly supports SB 2932, 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.

[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 SB 2932.

Thank you for the opportunity to testify.

2/4/2014	**Senate Committee on Energy and Environment** **Senate Committee on Commerce and Consumer Protection**	**ENE/CPN**
2:45 p.m.	**TESTIMONY IN SUPPORT**	**SB 2932**

Chair Gabbard, Chair Baker, Vice Chair Ruderman, Vice Chair Taniguchi, and Members of the Committees:

Hawaii PV Coalition is pleased to submit testimony in support of SB 2932, 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 SB 2932 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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SIERRA CLUB OF HAWAI'I
MĀLAMA I KA HONUA. *Cherish the Earth.*

MALAMA I KA HONUA
Cherish the Earth

SENATE COMMITTEE ON ENERGY & ENVIRONMENT
SENATE COMMITTEE ON COMMERCE AND CONSUMER PROTECTION

February 4, 2014, 2:45 P.M.
(Testimony is 2 pages long)

TESTIMONY IN SUPPORT OF SB 2932

Aloha Chair Gabbard, Chair Baker, and Members of the Committees:

The Sierra Club of Hawai'i, with over 12,000 dues paying members and supporters statewide, respectfully supports SB 2932. 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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Statement of
Shawn Bailey
Regulatory and Market Analysis Manager
Sempra US Gas and Power

before the
SENATE COMMITTEES ON
ENERGY AND ENVIRONMENT
COMMERCE AND CONSUMER PROTECTION

4, February, 2014
2:45 p.m.
State Capitol, Conference Room 225

In consideration of SB2932 Relating to Energy Storage

Chair Gabbard, Chair Baker, Vice Chair Ruderman, Vice Chair Taniguchi, and Members of the Committee on Energy and Environment, and Commerce and Consumer Protection,

Sempra USG Supports SB2932 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, and the incorporation of tax credit provisions that enhance the cost effectiveness of storage installations.

Thank you for the opportunity to testify.

Sunrun Inc. | 1.855.4SUNRUN | sunrunhome.com

SENATE COMMITTEES ON ENERGY & ENVIRONMENT AND COMMERCE & CONSUMER PROTECTION

Tuesday, February 4, 2014

TESTIMONY IN SUPPORT OF HB 2932 RELATING TO ENERGY STORAGE
Sarah Bertram, Director, Public Policy, Sunrun

Chairs Gabbard and Baker, and Members of the Committee:

Thank you for the opportunity to provide testimony in support of SB 2932.

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.

SB 2932 recognizes that energy storage will play an important role in Hawaii's clean energy transformation. SB 2932 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 SB 2932 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

SB2932
Submitted on: 1/30/2014
Testimony for ENE/CPN on Feb 4, 2014 14:45PM in Conference Room 225

Submitted By	Organization	Testifier Position	Present at Hearing
Javier Mendez-Alvarez	Individual	Support	No