



**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 FINANCE**  
Thursday, February 20, 2014  
1:30 p.m.  
State Capitol, Conference Room 308  
in consideration of  
**HB 2618, HD 2**  
**RELATING TO ENERGY STORAGE.**

Chair Luke, Vice Chairs Johanson and Nishimoto, and Members of the Committee.

The Department of Business, Economic Development and Tourism (DBEDT) respectfully offers comments on HB 2618, HD 2, which establishes an investment tax credit and utilization tax credit for individuals or corporations that install grid-connected energy storage properties.

DBEDT appreciates the importance of adding energy storage capacity to Hawaii's electrical grid; however, we are concerned that this measure may be inconsistent with the State's established energy policy directives of balancing technical, economic, environmental, and cultural considerations, and allowing for market-driven solutions.

In addition, we are concerned that the financial and human resources required to administer the duties mandated by this bill are not included in our current budget, and the precise economic impact analysis requested would be impossible for the following reasons:

1. Some required data do not exist, e.g., the net flow of money in and out of state, the number of jobs maintained, and the average pay of the jobs;
2. It is questionable whether the Department of Taxation has the ability to release individual tax payer information, which would make it impossible to know who was claiming the credit;

3. While the required information could possibly be gathered through a survey, the survey questionnaires would have to be directed to the utilities and other energy-related companies since we would not have access to tax credit claimant information;
4. The survey recipient companies would not necessarily be compelled to respond since it is not required when filing for the tax credit.

Notwithstanding the aforementioned concerns, should the committee decide to proceed with this measure, we estimate that the survey and certification duties would cost approximately \$225,000 on an annual basis (2x .5 full time equivalents plus \$100,000 for the survey, if possible) and \$250,000 for the initial economic impact study. Moreover, we caution that the additional funding requirement should not replace or adversely impact priorities indicated in our Executive Budget.

Finally, we defer to the Department of Taxation on the fiscal implications of this bill.

Thank you for the opportunity to offer these comments.

NEIL ABERCROMBIE  
GOVERNOR

SHAN TSUTSUI  
LT. GOVERNOR



STATE OF HAWAII  
**DEPARTMENT OF TAXATION**  
P.O. BOX 259  
HONOLULU, HAWAII 96809  
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FREDERICK D. PABLO  
DIRECTOR OF TAXATION

JOSHUA WISCH  
DEPUTY DIRECTOR

To: The Honorable Sylvia Luke, Chair  
and Members of the House Committee on Finance

Date: Thursday, February 20, 2014  
Time: 1:30 P.M.  
Place: Conference Room 308, State Capitol

From: Frederick D. Pablo, Director  
Department of Taxation

Re: H.B. No. 2618, H.D. 2, Relating to Energy Storage

The Department of Taxation (Department) appreciates the intent of H.B. 2618, H.D. 2, to support the renewable energy industry and provides the following comments for the Committee's consideration.

H.B. 2618 creates an income tax credit for grid-connected energy storage properties. The credit is nonrefundable but can be converted to a refundable credit at the taxpayer's election to accept a 30% discount on the amount of the credit. The tax credit can be claimed as an investment credit equal to an unspecified percentage of the basis or as a utilization credit equal to the product of the capacity of the property and the number of days for which the credit applies multiplied by an unspecified number of cents. This measure has a defective effective date of July 1, 2112.

The credit applies to grid-connected energy storage properties which are installed and placed in service during a taxable year beginning after December 31, 2014 and before December 31, 2025. Both the investment and utilizations credit calculations are separated into two paragraphs for grid-connected storage property first placed in service on or before December 31, 2020 and after December 31, 2020 but on or before December 31, 2025.

The Department offers the following technical comments for your consideration.

First, the grid-connected energy storage property as described in this measure already qualifies as an accessory under the Renewable Energy Technologies Income Tax Credit (RETITC) provided under section 235-12.5, Hawaii Revised Statutes (HRS), if installed with the energy producing portion of the system. The Department will defer to the Department of

Economic Development, Business, and Tourism (DBEDT), as to whether an additional tax credit should be provided to store electricity.

Second, the Department suggests that one method of computing the credit be chosen. Two methods of calculation will cause unnecessary confusion for taxpayers and difficulty for the Department in administering the credit and auditing the tax credit claims.

Third, the Department suggests that subsection (e), which requires DBEDT certification, be clarified in terms of the timing and procedure for the certification process. Taxpayers often have taxable years which do not coincide with the calendar year; therefore, the Department suggests that taxpayers be required start the certification a minimum 90 days or more prior to their needing the certification.

Finally, the Department is unable to comply with the requirement that twenty days prior to the start of each regular session, the Department report on data from the preceding taxable year. Taxpayers do not file their tax returns until after the close of the taxpayer's taxable year. As a result, the Department generally does not receive all the tax returns for a taxable year until approximately 15 months **after** the close of the taxable year. Thereafter, Department statistical staff must then manually aggregate tax credit data from tax returns that are not electronically process by the computer system.

The Department also notes that some of the information requested is not captured by our computer system; for example, the Department does not have specific data on the number or types of properties, but merely aggregate data on the credit amounts claimed by taxpayers. The Department is also unable to comply with the requirement to perform an economic benefit analysis attributable to the tax credit, as the Department does not perform dynamic economic analysis using tax data; instead, the Department defers to DBEDT regarding its ability to comply with the provision.

Thank you for the opportunity to provide comments.



# TAXBILLSERVICE

126 Queen Street, Suite 304

TAX FOUNDATION OF HAWAII

Honolulu, Hawaii 96813 Tel. 536-4587

SUBJECT: INCOME, Grid-connected energy storage tax credit

BILL NUMBER: HB 2618, HD-2

INTRODUCED BY: House Committee on Consumer Protection and Commerce

**BRIEF SUMMARY:** Adds a new section to HRS chapter 235 to allow an individual or corporate net income taxpayer to claim an income tax credit for each grid-connected energy storage property that is installed and placed in service during a taxable year after December 31, 2014 and shall not be available for tax years beginning after December 31, 2025. The tax credit may be claimed in either, but not both, of the following forms:

**Investment credit:** An investment credit equal to: (1) for a grid-connected energy storage property first placed in service on or before December 31, 2020, not more than \_\_\_\_% of the basis; or (2) for a grid-connected energy storage property first placed in service after December 31, 2020, and on or before December 31, 2025, not more than \_\_\_\_% of the basis; or:

**Utilization credit:** A utilization credit equal to: (1) for a grid-connected energy storage property first placed in service on or before December 31, 2020, \_\_\_\_ cents per kilowatt-hour of energy storage capacity; or (2) for a grid-connected energy storage property first placed in service after December 31, 2020, and on or before December 31, 2025, \_\_\_\_ cents per kilowatt-hour of energy storage capacity. Permits the utilization credit to be claimed during each of the first ten taxable years that the grid-connected energy storage property is in service; provided that this annual utilization credit shall not exceed the product of the energy storage capacity measured in kilowatt-hours, multiplied by 365, multiplied by the applicable number of cents per kilowatt-hour.

Multiple owners of a grid-connected energy storage property shall be entitled to a single tax credit, and the tax credit shall be apportioned between the owners in proportion to their contribution to the basis of the grid-connected energy storage property. In the case of a partnership, S corporation, estate, or trust, the tax credit allowable shall be for every eligible grid-connected energy storage property that is installed and placed in service in the state by the entity. The basis upon which the tax credit is computed shall be determined at the entity level. Distribution and share of credit shall be determined pursuant to section 235-110.7(a).

Defines “basis,” “energy storage capacity,” “first placed in service” and “grid-connected energy storage property” for purposes of the measure.

Credits in excess of a taxpayer’s income tax liability may be applied to subsequent income tax liability until exhausted. Requires all claims for the credit to be filed on or before the end of the twelfth month following the close of the taxable year. The director of taxation may adopt rules pursuant to HRS chapter 91 and prepare the necessary forms to claim the credit and may require proof of the claim for the credit.

For any grid-connected energy storage property, a taxpayer may elect to reduce the eligible credit amount by 30% and, if this reduced amount exceeds the amount of income tax payment due from the taxpayer, the excess of the credit amount over payments due shall be refunded to the taxpayer; provided that no refund on account of the tax credit allowed by this section shall be made for amounts less than \$1. Allows an association of owners under HRS chapters 421I, 421J, 514A, or 514B to claim the credit allowed under this section in its own name for grid-connected energy storage property placed in service and located on common areas. No credit under this section shall be allowed to any federal, state, or local government or any political subdivision, agency, or instrumentality thereof.

Directs the department of taxation, in collaboration with the department of business, economic development, and tourism (DBEDT) to submit a report to the legislature on: (1) the number of grid-connected energy storage properties that have qualified for a tax credit during the preceding calendar year; (2) the total cost of the tax credit to the state during the taxable year; and (3) the estimated economic benefit that may be attributable to the grid-connected energy storage tax credit.

EFFECTIVE DATE: July 1, 2112

STAFF COMMENTS: The proposed measure would establish income tax credits to encourage the use of grid-connected energy storage technologies and systems. This measure would establish an investment credit of \_\_\_% of the basis or a utilization credit equal to \_\_\_ cents per kilowatt hours for such systems. However, such systems may already be eligible for the renewable energy technologies credit under HRS section 235-12.5; indeed, the IRS recently recognized, in PLR (Private Letter Ruling) 201308005, that such energy storage systems can be considered an integral part of a renewable energy system because it helps the underlying photovoltaic or wind system stabilize its output and thereby lessen its impact on the grid.

While the measure also proposes to define what types of storage property qualify for the proposed credit, consideration might be given to adopting the federal definitions of alternate energy devices which qualify for preferential treatment rather than attempting to make up rules and definitions that would be unique to Hawaii. At least administrators could look to the federal standards for these devices for guidance.

Instead of providing tax incentives via tax credits for the purchase of existing technology, lawmakers may want to take advantage of Hawaii's natural environment which lends itself to all sorts of possibilities to explore and develop more efficient means of harnessing the natural resources that pervade the Islands, from wind to sun to geothermal to hydrogen from Hawaii's vast resources, all of which could be further developed with the assistance and cooperation of government in Hawaii.

Digested 2/19/14



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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 HB2618 HD 2 RELATING TO ENERGY STORAGE**

**Before the  
HOUSE COMMITTEE ON FINANCE**

**February 20, 2014 1:30 p.m.**

Aloha, Chair Luke, Vice-Chairs Nishimoto and Johanson 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 whose vision is a Hawaiian energy economy based 100% on renewable sources indigenous to Hawaii.

REACH **SUPPORTS THE INTENT** of HB 2618 HD 2, and believes that it should be amended to apply the tax credit to all energy storage property, not just “grid-connected” energy storage property having a capacity of one MW or one MWh.

Hawaii’s renewable energy technologies tax credit applies only to intermittent solar and wind generation. It does not apply to energy storage or any forms of dispatchable renewable generation.

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.



**REACH SUPPORTS THE INTENT** of HB 2618 HD 2 – creating an energy storage tax credit that complements the existing renewable energy technologies tax credit -- to encourage development of the dispatchable renewable generation that Hawaii needs when imported fuels stop flowing to Hawaii.

**REACH SUPPORTS AMENDMENTS** to HB 2618 HD 2 that would apply the tax credit to all energy storage property, not just “grid-connected” energy storage property having a capacity of one MW or one MWh.

The limitation to “grid-connected” energy storage property having a capacity of one MW or one MWh means that the credit could not be used by any self-generators, such as residential and commercial PV system owners, who install energy storage systems behind-the-meter for their own dispatchable power needs, or who install energy storage systems to provide dispatchable energy for their own off-the-grid or microgrid operations. The limitation forecloses the possibility of increasing Hawaii’s energy resilience through investment by self-generators, whether grid-connected or off-the-grid, in energy storage systems.

The limitation also means that the tax credit could not be used by any prospective owners of grid-connected energy storage systems less than one MW or one MWh who want to sell energy storage services to the electric utility. The limitation forecloses the possibility of increasing Hawaii’s energy resilience through investment in small-scale (< 1 MWh) distributed energy storage systems could be more cost-effective than investment in large-scale (> 1 MWh) systems.

REACH recommends that HB 2618 HD 2 be amended to apply to all energy storage property, regardless of whether it is “grid-connected,” and regardless of its capacity measured in MW or MWh, to encourage wide-scale development of the dispatchable renewable generation that Hawaii needs when imported fuels stop flowing to Hawaii

Thank you for allowing me to testify.

# PRINCETON ENERGY GROUP

*Innovation in Renewable Energy*

STEVE TABER  
*Chairman and CEO*

## PRINCETON ENERGY GROUP'S TESTIMONY IN SUPPORT OF HB 2618, HD2

HOUSE COMMITTEE ON FINANCE  
Monday, February 20, 2014 at 1:30p.m.  
Conference Room 308

Good afternoon Chair Luke, Vice Chairs Nishimoto and Johanson, and members of the Committee:

Princeton Energy Group ("Princeton") supports HB2618, HD2 and respectfully requests that the Committee pass it out.

We are currently engaged in the Ikehu Molokai Project. The island of Molokai suffers from very high electric rates, a grid that is unstable electrically, and a large carbon footprint. The Ikehu Molokai project aims to solve these problems by converting the island's electric system to 100% renewable energy. This effort will require a mix of technologies and multiple phases, and it will be the work of several years. Nevertheless, we are committed to the success of the project. No modern electric grid of this significance has been converted from 100% carbon-based fuels to 100% renewable energy, so the Ikehu Molokai project will serve as an example of high levels of renewable energy penetration, while keeping rates affordable and the grid stable. As such, Molokai and Hawaii will serve as an example to other islands and to utilities and policy-makers all over the world.

In order to achieve a high penetration of renewable energy on Molokai's weak grid, it is necessary to install a large amount of energy storage. This is fundamentally different from the storage installations on larger grids, such as Oahu and Maui. On the larger grids, renewable energy projects must sometimes install relatively small amounts of storage to mitigate short-term fluctuations in output and prevent transient voltage spikes. This is sometimes called a "Smoothing" application of storage. The cost of such Smoothing storage is typically a small fraction of the overall cost of the renewable generation.

In contrast, on small grids such as Molokai's, it is necessary to install a large amount of storage to shift production from the hours when it is generated into the hours when the need is greatest. As such, it is very valuable, in that it converts low-value energy generated when it

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isn't needed to high-value energy available when the need is greatest. However, it is very expensive; on the Ikehu Molokai project, for example, the cost of adding this storage will more than double the overall cost of the project.

To illustrate this contrast, below is a simplified analysis of 10 MW renewable projects, one on a large island grid and the other on a small island grid. (The latter is representative of Molokai.) The large island project has a small storage capability, intended for smoothing; the small island project has a large storage capability for shifting the generation into the high-need evening hours. Note that the large island project has a healthy return on investment of 11.23%, even at a PPA price of \$120/MWh. The small island project has a sub-market return of 5.62%, even with a higher PPA price of \$200/MWh.

	Smoothing/large island	Generation shifting (small island)		
generation capacity (KW)	10,000	10,000		
generation capital cost (\$)	20,000,000	20,000,000		
storage cost (\$)	1,000,000	41,000,000		
total capital cost (\$)	21,000,000	61,000,000		
energy generated (MWh/yr)	20,148	20,148		
<b>energy delivered (MWh/yr)</b>		<b>Daytime</b>	<b>nighttime</b>	<b>total</b>
Gross	20,148	5,037	15,111	20,148
less storage losses	(504)	0	(3,022)	(3,022)
net energy delivered	19,644	5,037	12,089	17,126
revenue (\$/MWh)	120	200	200	
revenue (\$)	2,357,316	1,007,400	2,417,760	3,425,160
<b>unleveraged return on investment</b>	<b>11.23%</b>			<b>5.62%</b>

Therefore, some form of financial incentive is vitally important to the success of the Ikehu Molokai project.

The economic impact of the tax credit bill to enable energy storage investments in Hawaii will be strongly positive. In the numerical illustration above, we assume a small island generation-shifting energy storage to cost \$41 million. The tax credit will amount to 20%, or approximately \$8 million. On a small island, such as Molokai, the renewable energy project with this type of energy storage can lead to reduction in electricity rates for the residents of 5 to 8 cents per kWh. Over the 20 year life of the energy storage equipment, this will result in savings to the residents of at least \$20 million. In addition, over the same period, the renewable energy/energy storage project will create at least 200 person-years of jobs on the island, representing at least \$10,000,000 in direct economic activity and about 3 times that much, or \$30,000,000, in indirect economic activity. Furthermore, in the case of Molokai, the reduced electricity costs will make water more affordable for homesteaders and Molokai businesses more cost-efficient, which will also stimulate economic activity.

Therefore, we respectfully request that this measure be passed out.

Thank you for the opportunity to testify.



Sincerely,

**Princeton Energy Group**

Steve Taber  
Chairman & CEO

Princeton Energy Group is a company of renewable energy veterans deploying renewable energy projects and technologies around the world. The mission of the Princeton Energy Group is to expand the reach of renewable energy and energy efficiency in the marketplace through innovation in technology, business models, and financing techniques. We bring to every task exceptionally qualified individuals, skilled in finding unique resource and business solutions to difficult problems. The founders of Princeton have been at the forefront of the renewable energy industry since its early days in the 1970s in California. In addition to our for-profit activities through Princeton Energy Group, we have held influential positions in state and federal government and have served in the non-profit sector.

18 February 2014

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

Before the House Committee On **FINANCE**

February 20, 2014

1:30 PM

State Capitol, Conference Room 308

In consideration of  
**HB2618 HD2 RELATING TO ENERGY STORAGE**

Chair Luke, Vice Chairs Nishimoto, Johanson and members of the Committee on Finance,

Sempra USG **Supports** HB2618 HD2 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. The incorporation of tax credit provisions will enhance the cost effectiveness of storage installations.



**Testimony before the  
House Committee on Finance**

**H.B. 2618 HD2 – Relating to Energy Storage**

**Thursday, February 20, 2014  
1:30 pm, Conference Room 308  
Agenda #3**

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

**Written Testimony Only**

Chair Luke, Vice Chairs Nishimoto and Johanson, 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").

The Hawaiian Electric Companies support HB 2618 HD2 as this tax credit can reduce energy storage project costs, and thus benefit all customers. The Hawaiian Electric Companies envision that the portfolio of energy storage systems that support the electric grid of the future will likely consist of utility-owned storage systems and non-utility storage systems. Tax credits applied to utility-owned storage would allow us to reduce the amount of cost recovery needed from our customers, just as credits applied to non-utility owned storage should enable the owners of those systems to supply lower cost storage services to the utility. Hence all electric utility customers can benefit from this tax credit.

Thank you 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 FINANCE

HB 2618 HD2, RELATING TO ENERGY STORAGE

February 20, 2014

Chair Luke, Vice-Chairs Nishimoto and Johanson 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 2618 HD2 is to establish an income tax credit for each grid-connected energy storage property that is installed and placed in service in the State during the taxable year beginning December 31, 2014; provided that this tax credit shall not be available for taxable years beginning after December 31, 2025. The tax credit may be claimed as either an investment credit or utilization credit.

HREA **supports** this measure with 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 do not have any recommendations at this time for “filling in the blanks,” i.e., how many cents/kWh.
  - b) The measure offers two options for payment: investment tax credit (the credit would be taken upon installation) and utilization tax credit (the credit would be paid out over a 10 year period). If there is concern about fiscal impact, the utilization tax credit might be preferred as the annual fiscal impacts would be spread out over 10 years.
- 2) Recommendations: We recommend the committee pass this measure out.

Mahalo for this opportunity to testify.



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

Before the House Committee On **FINANCE**  
February 20, 2014  
1:30 PM  
State Capitol, Conference Room 308

In consideration of  
**HB2618 HD2 RELATING TO ENERGY STORAGE**

Chair Luke, Vice Chairs Nishimoto, Johanson and members of the Committee on Finance,

**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.





HOUSE COMMITTEE ON FINANCE  
Thursday, February 20, 2014 – 1:30 p.m. – Room 308

**Ulupono Initiative Strongly Supports HB 2618 HD 2 with amendments, Relating to Energy Storage**

Dear Chair Luke, Vice Chair Nishimoto, Vice Chair Johanson, 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 2618 HD 2 with amendments**, which establishes an energy storage tax credit 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. A modest tax credit, as proposed by this bill, could be sufficient to push currently expensive storage technology into mainstream use in Hawai'i, thus opening the door to further renewable energy use and a reduction in expensive oil use. For these reasons we support HB 2618 HD 2.

However, we would recommend the following figures be added into the blank amounts:

- On page 2, line 15: “20%” for the first period through 2020
- On page 2, line 19: “15%” for the second period through 2025
- On page 3, line 1: “7” cents for the first period through 2020
- On page 3, line 5: “5.5” cents for the second period through 2025

We feel these recommended figures would adequately balance incentivizing investment in energy storage but not overly burden the State's finances.



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

Email: [communications@ulupono.com](mailto:communications@ulupono.com)

TESTIMONY IN SUPPORT OF HB 2618, HD2  
HOUSE COMMITTEE ON FINANCE  
Monday, February 20, 2014 at 1:30p.m.  
Conference Room 308

To: Chair Luke, Vice Chairs Nishimoto and Johanson, and members of the Committee:

I support HB2618, HD2 and respectfully request that the Committee pass it.

I am a long-term land owner in Molokai. My husband and I bought land in Molokai, after falling in love with the natural beauty of the island, and hoping to retire there. I am also Director of Project Finance for the Princeton Energy Group, which is developing the proposed renewable energy project with energy storage technology (Ikehu Molokai). Princeton Energy Group has been developing innovative and challenging renewable energy projects since the 1990s.

Because of my day to day work, I stayed very interested in the development of the "Big Wind" project on Molokai. When Molokai Ranch decided not to lease its land to this project in February 2013, I went to Molokai almost immediately thereafter, to hear from as many residents as possible, what could be done on the island which would utilize the abundant renewable energy resources on the island, for the island's benefit. I also met with Molokai Ranch, the Maui Electric Company (Meco) and inspected possible project sites. It emerged that there is strong support on the island for solar power to power Molokai, and provided we can put in significant energy storage, Meco will be supportive.

Upon hearing my report, I was delighted that my CEO (Steve Taber) felt that taking on this challenging project in Molokai is in line with Princeton Energy Group's corporate mission and expertise, and that he will be willing to put in a lot of effort himself, to make the project happen. Steve and his Co-founder have indeed taken on many challenging projects, such as the first renewable energy project in Crete (an island grid) in Greece, in Turkey and in Mexico.

In developing Ikehu Molokai, a key challenge is the cost of energy storage. In order to be able to shift the day time generation from solar photovoltaic panels into night time use on Molokai, we will need a very large amount of energy storage capacity. We are looking at various energy storage technologies, ranging from pumped storage hydro, advanced flow batteries, solar thermal with molten salt storage, etc. They are capital intensive and expensive. However, advanced energy storage technologies are rapidly becoming fully operational, as witnessed at the first North American energy storage conference in San Jose (California) in September 2013. As utilities integrate more renewable energy resources, which are intermittent by nature, energy storage is becoming essential. The State of Hawaii can do its part, by enabling projects such as Ikehu Molokai, to integrate energy storage in renewable energy generation at a utility scale. Incentivizing energy storage will lead to significantly higher levels of renewable energy penetration in the State of Hawaii, as well as to a stable and reliable grid.



I respectfully request that this measure be passed out.

Thank you for the opportunity to testify.

Sincerely,

Kumiko Yoshinari, PhD, CFA

18 February 2014

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



FEBRUARY 20, 2014  
1:30 p.m.

**MEASURE:** H.B. No. 2618, H.D. 2  
**TITLE:** Relating to Energy Storage

Chair Luke and Members of the Committee:

**DESCRIPTION:**

H.B. No. 2618, H.D. 2 would establish an income tax credit for tax payers who install and place into service after December 31, 2014 and before December 31, 2025 a “grid-connected energy storage property” with a capacity of at least one megawatt-hour or one megawatt. The amounts for both the investment and utilization tax credit options are currently unspecified.

**POSITION:**

The Commission would like to offer the following comments for the Committee’s consideration.

**COMMENTS:**

Energy storage has a role in Hawaii's strategy to achieve its clean energy policy goals through the development of a diverse and cost-effective portfolio of renewable resource and energy efficiency options, but it should be recognized that energy storage is not a panacea.

A variety of technologies have been found to be cost-effective in Hawaii, when used in the right application, to meet objectives including improved reliability and power quality, greater utilization of renewable energy, and management of demand.

The Commission cautions the Legislature in selecting one approach to incentivize over others. Each kind of technology or program has the potential to address a different combination of objectives and concerns under different conditions or in different locations. Artificially lowering the apparent cost of one technology has the potential to introduce market distortions, whereas a desired approach is to establish a competitive market structure where possible.

Finally, the Commission notes that, given this measure's one megawatt-hour/one megawatt capacity size requirement to qualify for the credit, there are currently a number of utility-scale energy storage systems operating in Hawaii that have been successfully financed and installed without the support of a state tax credit. Thus, the Commission believes that this measure may not be necessary to further encourage energy storage in the State.

Thank you for the opportunity to testify on this measure.



**HOUSE COMMITTEE ON FINANCE**

February 20, 2014, 1:30 P.M.

Room 308

**(Testimony is 4 pages long)**

**LATE**

**TESTIMONY IN STRONG SUPPORT OF HB 2618 HD2, SUGGESTED AMENDMENT**

Aloha Chair Luke and Finance Committee members:

The Blue Planet Foundation strongly supports HB 2618 HD2, to facilitate and encourage the use of renewable energy by incentivizing the use of grid-connected energy storage technologies and systems through a tax credit (that is limited in scope and duration) for grid-connected energy storage. The proposed investment tax credit or utilization tax credit are intended to promote the use of grid-connected energy storage to address the varying needs of our island electric grids with technologies most applicable to those needs. Energy storage tax incentives are the appropriate and needed tool to enable continued momentum toward Hawaii's independence from fossil fuels.

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.

Blue Planet believes HB 2618 HD2 is a timely and appropriate policy for the reasons described below. However, we also suggest that HB 2618 HD2 should be amended to delete the requirement that only storage devices of one megawatt-hour and larger qualify for the tax credit. Energy storage devices of all sizes can have the potential to provide value to strengthening our electricity grid and reducing variability of renewable energy resources. By limiting the eligible storage devices with HB 2618 HD2, the bill would essentially be making an engineering decision. Decisions about what size energy storage devices can best support the energy grid (or whether many smaller devices might work together to have a larger impact) should be made on the basis of technical analyses, rather than through the policy incentive embodied in HB 2618 HD2.

## Incentives for energy storage will hasten development of a smart grid, increasing reliability and lowering costs to ratepayers

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House Bill 2618 HD2 is intended to support variable energy sources, including wind and solar power, while moderating energy demands during peak hours and facilitating a “smart grid” that is more reliable in order to improve Hawaii’s island electricity grids and achieve the state’s clean energy future. This measure would help improve the efficiency, versatility and reliability of Hawaii’s electric grids, and would offer more affordable energy storage technologies for homes and businesses.

Hawaii’s electricity grid needs energy storage to achieve the state’s aggressive clean energy goals. To take advantage of distributed and diversified energy like solar and wind and other variable sources of power, the grid has to become smarter and have the capacity to store electricity. It will resemble today’s Internet—where distributed servers both send and receive packets of information—and less like yesterday’s commercial television. Such a self-aware, robust smart grid will instantaneously adjust to shifts in wind strength or cloud cover over solar, balancing energy loads on the other side of the wire and drawing on stored energy when needed.

Energy storage is a critically important tool for reliable system operation of a grid with substantial amounts of intermittent renewable generation. Storage can smooth out variable generation, and it can bank excess renewable energy for use during peak demand. Energy Storage helps to maximize the use of indigenous renewable energy and strengthen Hawaii’s economy. It will accommodate expected increasing proportions of variable and/or intermittent renewable generation resources in the near future.

A 2013 study<sup>1</sup> 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 increased and resulted in a corresponding increase in the ability to reduce the cost of electricity and the amount of fossil fuel use.

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



## The time is ripe for implementation of existing energy storage strategies and technology

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Currently, a variety of energy storage strategies are available with existing technology: battery technologies, hydrogen and other alternative fuels, and pumped hydroelectric storage. On Maui, large amounts of wind power are frequently being curtailed in favor of fossil generation. Retiring fossil fuel units and developing innovative energy storage is needed to help eliminate this wasteful practice. Evolving technologies continue to enable more renewable energy. As the prices for renewable sources of energy continue to decrease, energy storage will result in higher capacity factors and less curtailment of renewable resources. This increases availability and optimal use of system operation methods.

With increased energy storage, the existing grid will be transformed into a “smarter”, more efficient, more reliable grid that integrates more renewable energy through the use of various technologies and capabilities and provide more information and options to customers with the overall goal of reducing costs and improving customer service. This clean energy transformation will help to stabilize and strengthen Hawaii's economy by reducing its dependency on imported fuels and will help protect Hawaii's environment by greatly reducing greenhouse gas emissions.

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.

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

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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.

## SUGGESTED AMENDMENTS

Blue Planet respectfully requests that HB 2618 HD1 be amended to delete the requirement that only storage devices of one megawatt-hour and larger qualify for the tax credit. We believe energy storage devices of all sizes can provide value to strengthening our electricity grid and reducing variability of renewable energy resources. Therefore we request that page 5, lines 11 – 12, be amended as follows:

centralized or distributed manner, [~~have a capacity of at least one megawatt-hour,~~] are certified by the department of business,

We further recommend that the energy storage tax credit be amended with credit values as follows:

- (1) An investment credit equal to:
  - (A) For a grid-connected energy storage property first placed in service on or before December 31, 2020, not more than **20 per cent** of the basis; or
  - (B) For a grid-connected energy storage property first placed in service after December 31, 2020, and on or before December 31, 2025, not more than **10 per cent** of the basis; or
- (2) A utilization credit equal to:
  - (A) For a grid-connected energy storage property first placed in service on or before December 31, 2020, **7 cents** per kilowatt-hour of energy storage capacity; or
  - (B) For a grid-connected energy storage property first placed in service after December 31, 2020, and on or before December 31, 2025, **3.5 cents** per kilowatt-hour of energy storage capacity.

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 2618 HD2.

Thank you for the opportunity to testify.