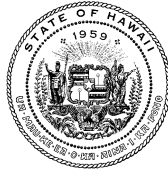


DAVID Y. IGE  
GOVERNOR



CURT T. OTAGURO  
COMPTROLLER  
AUDREY HIDANO  
DEPUTY COMPTROLLER

**STATE OF HAWAII**  
**DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES**  
P.O. BOX 119, HONOLULU, HAWAII 96810-0119

WRITTEN TESTIMONY  
OF  
CURT T. OTAGURO, COMPTROLLER  
DEPARTMENT OF ACCOUNTING AND GENERAL SERVICES  
TO THE HOUSE COMMITTEE ON FINANCE

FRIDAY, FEBRUARY 21, 2020, 1:30 P.M.  
CONFERENCE ROOM 308, STATE CAPITOL

H.B. 1846, HD2

RELATING TO ENERGY EFFICIENCY

Chair Luke, Vice Chair Cullen, and Members of the Committee, thank you for the opportunity to submit testimony on H.B. 1846, HD2.

The Department of Accounting and General Services (DAGS) supports the intent of the bill to increase the energy efficiency of State buildings. The DAGS offers the following comments for the committee's consideration:

- 1) A project that utilizes section 36-41, Hawaii Revised Statutes (HRS) will perform an energy audit as one of its first steps. Therefore, the DAGS recommends to proceed with initiating projects that utilize section 36-4, HRS for buildings that have not been included in that type of project since 2010; and all other buildings shall have an energy audit performed.
  - a. SECTION 1. Revise lines 2-4 on page 2 as follows:
    - (1) Require all state facilities, with the exception of smaller facilities, ~~to~~ undergo an energy audit by January 1, 2022 to begin utilization of section 36-

41, if they have not since 2010; and all others to perform an energy audit and implementation of its feasible recommendations.

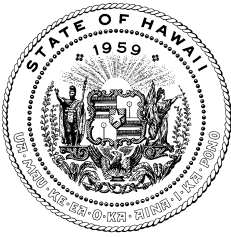
b. SECTION 2. Revise lines 5-16 on page 3 as follows:

(a) All state facilities that have not utilized section 36-41 since 2010 shall begin the process of utilizing section 36-41 by January 1, 2022; and other State facilities shall complete an energy audit and implement the feasible recommended efficiency measures by January 1, 2020. shall address the results of the energy audit conducted pursuant to Act —, Session Laws of Hawaii 2020, through the implementation of efficiency measures or enter into performance contracts for efficiency measures as follows:

(1) Beginning on January 1, 2022, for all state facilities that have not utilized section 36-41 since 2010; and

(2) Beginning on January 1, 2024, for all other state facilities; provided that the simple payback period does not exceed the performance period of the contract.

Thank you for the opportunity to submit testimony on this matter.



# HAWAII STATE ENERGY OFFICE STATE OF HAWAII

235 South Beretania Street, 5<sup>TH</sup> Floor, Honolulu, HI 96813 | [energy.hawaii.gov](http://energy.hawaii.gov)

DAVID Y. IGE  
GOVERNOR

SCOTT J. GLENN  
CHIEF ENERGY OFFICER

(808) 587-3807

## Testimony of **SCOTT J. GLENN, Chief Energy Officer**

### before the **HOUSE COMMITTEE ON FINANCE**

Friday, February 21, 2020  
1:30 PM  
State Capitol, Conference Room 308

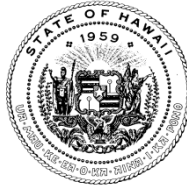
### In SUPPORT of **HB 1846, HD2** **RELATING TO ENERGY EFFICIENCY.**

Chair Luke, Vice Chair Cullen, and Members of the Committee, the Hawaii State Energy Office (HSEO) supports HB 1846, HD2, which requires an energy audit for all state facilities 10,000 square feet and larger, by January 1, 2022. The HSEO is to have access to all utility bills and energy usage data for all state-owned facilities, and have the data in a publicly accessible format. Our office defers to the Department of Accounting and General Services and other state agencies, as the auditing process takes time and resources.

Energy efficiency is the most cost-effective way to reduce energy usage and a number of state agencies in Hawaii have been benchmarked, audited, and have participated in or are in the process of participating in energy savings performance contracts. However, there are always additional energy savings opportunities and energy generation opportunities that may be identified via energy audits and other means. This is consistent with the HSEO's mission to promote energy efficiency, renewable energy, and clean transportation, to help Hawaii achieve a resilient clean energy economy.

Regarding the design of new state buildings to maximize energy generation potential; allowing building materials that reduce the carbon footprint where feasible and cost-effective, and having 25% of the parking to be electric vehicle charger ready; HSEO is supportive of these measures and they are in alignment with the State's clean energy and decarbonization goals. Public facilities have an important role in contributing not only to energy efficiency but energy generation as well.

Thank you for the opportunity to testify.



**TESTIMONY BY:**

JADE T. BUTAY  
DIRECTOR

Deputy Directors  
LYNN A.S. ARAKI-REGAN  
DEREK J. CHOW  
ROSS M. HIGASHI  
EDWIN H. SNIFFEN

**STATE OF HAWAII**  
**DEPARTMENT OF TRANSPORTATION**  
869 PUNCHBOWL STREET  
HONOLULU, HAWAII 96813-5097

February 21, 2020  
1:30 p.m.  
State Capitol, Room 308

**H.B. 1846, H.D. 2**  
**RELATING TO ENERGY EFFICIENCY**

House Committee on Finance

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The Department of Transportation (DOT) **supports** the intent of this bill. The DOT continues to transform our transportation infrastructure and facilities to advance the state's sustainability and energy efficiency goals by being electric vehicle charger ready at its parking lots and entering into energy savings performance contracts at airports, highways and harbors divisions which is estimated to save the DOT \$776 million over the life of these contracts. This also includes a concrete mix injected with waste carbon dioxide which DOT views as a sustainable transportation initiative along with other innovative energy saving technologies the future may bring.

However, the DOT finds this bill challenging without clarification on State historic preservation facilities and the scope of the energy efficiency audit this bill intends which may require an exemption, adequate time and resources.

Thank you for the opportunity to provide testimony.



STATE OF HAWAII  
DEPARTMENT OF EDUCATION  
P.O. BOX 2360  
HONOLULU, HAWAII 96804

**Date:** 02/21/2020  
**Time:** 01:30 PM  
**Location:** 308  
**Committee:** House Finance

**Department:** Education

**Person Testifying:** Dr. Christina M. Kishimoto, Superintendent of Education

**Title of Bill:** HB 1846, HD2 RELATING TO ENERGY EFFICIENCY.

**Purpose of Bill:** Requires an energy audit for all state facilities with an area over 10,000 square feet, except facilities at the Aloha Stadium, by 1/1/2022, and dates for energy efficiency implementation. Beginning 7/1/2020, allow for new state building construction to utilize post-industrial carbon dioxide mineralized concrete, or other materials that reduce the carbon footprint of the project where feasible and cost-effective, have twenty-five per cent of its accompanying parking lot be electric vehicle charger ready. Authorizes the Hawaii state energy office to access utility bills and energy usage data for state-owned buildings and make the data publicly available. Takes effect on 7/1/2050. (HD2)

**Department's Position:**

The Department of Education (Department) supports HB 1846, HD2 for new building construction.

The Department has 4,425 buildings, which equate to approximately 20.7 million square feet of older structures. On average, these buildings are nearly 50 years old. Energy audits would take nine months to complete at the cost of approximately \$600,000.

The costs of the energy audits as well as designs for net-zero capable structures require significant funding that is only available for new construction. As such, the Department appreciates the legislature's requiring that new building designs maximize energy generation potential in place of a net-zero requirement. This provides the Department with additional flexibility in building design and potentially reduces the associated costs.

Thank you for the opportunity to testify on HB 1846, HD2.

The Hawai'i State Department of Education is committed to delivering on our promises to students, providing an equitable, excellent, and innovative learning environment in every school

to engage and elevate our communities. This is achieved through targeted work around three impact strategies: school design, student voice, and teacher collaboration. Detailed information is available at [www.hawaiipublicschools.org](http://www.hawaiipublicschools.org).



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183 Pinana St., Kailua, HI 96734 • 808-262-1285 • [info@350Hawaii.org](mailto:info@350Hawaii.org)

To: The House Committee on Finance  
From: Brodie Lockard, Founder, 350Hawaii.org  
Date: Friday, February 21, 2020, 1:30 pm

**In strong support of HB 1846 HD2, with comments**

Dear Chair Luke, and members:

350Hawaii.org's 6,000 members strongly support HB 1846 HD2, with comments.

We are disappointed to see the excellent net-zero capable requirement removed from the original version of this bill. Simply maximizing "energy generation potential where feasible and cost-effective" greatly weakens the bill's effectiveness and misses an enormous opportunity to reduce Hawaii's greenhouse gas emissions.

The bill retains great merit but would be so much more powerful with the original language. New buildings offer many opportunities to save energy and move Hawaii closer to our goal of zero emissions.

Concrete's essential ingredient, cement, has a huge carbon footprint. Making cement requires superheating limestone, and releases massive amounts of carbon dioxide. Cement is responsible for 7% of global man-made greenhouse gas emissions, making it the world's second largest industrial source of CO<sub>2</sub>. But new types of concrete can reduce the need for cement, and even trap CO<sub>2</sub> emissions forever at the same time.

[<https://money.cnn.com/2018/06/12/technology/concrete-carboncure/index.html>]

Using this type of concrete actually makes a new building decrease emissions.

Requiring new buildings' parking lots to be electric vehicle (EV) ready promotes EV adoption by providing additional places for EV owners to charge.

They can also be net zero, using no additional energy when taking into account their design, construction materials and methods, and all of their energy use, savings and production.

New buildings can provide space for rooftop photovoltaic systems, and every new building in Hawaii should be equipped with PV. Please add this requirement in this bill.

HB 1846 sets examples by using all of these energy-savings methods in new state buildings. Please support it.

Brodie Lockard  
Founder, 350Hawaii.org



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

HOUSE COMMITTEE ON FINANCE  
Friday, February 21, 2020 — 1:30 p.m. — Room 308

## **Ulupono Initiative Supports HB 1846 HD 2, Relating to Energy Efficiency**

Dear Chair Luke and Members of the Committee:

My name is Amy Hennessey, and I am the Senior Vice President of Communications & External Affairs at Ulupono Initiative. We are a Hawai'i-based impact investment firm that strives to improve our community's quality of life by creating more locally produced food; increasing affordable clean renewable energy and transportation options; and better managing waste and fresh water resources.

**Ulupono supports HB 1846 HD 2**, which requires an energy audit for all state facilities with an area over 10,000 square feet, except facilities at the Aloha Stadium, by 1/1/2022, and dates for energy efficiency implementation. Beginning 7/1/2020, this bill will allow for new state building construction to utilize post-industrial carbon dioxide mineralized concrete, or other materials that reduce the carbon footprint of the project where feasible and cost-effective, have 25% of its accompanying parking lot be electric vehicle charger ready. This bill authorizes the Hawai'i State Energy Office to access utility bills and energy usage data for state-owned buildings and make the data publicly available.

Ulupono supports energy efficiency measures to lower consumption across the State. As Hawai'i's energy issues become increasingly complex and challenging, we appreciate this committee's efforts to look at policies that reduce the State's overall energy demand, which in return should save the State, and taxpayers, money. Meeting the State's 100% renewable goal by 2045 will require everyone's commitment and it is important for the State government to lead the way.

Furthermore, electric vehicles (EVs) are an important avenue to address Hawai'i's pressing climate issues and align with the State's energy and environmental goals. EVs currently offer an effective option to advance clean renewable ground transportation and provide immediate benefits to Hawai'i.

In fact, the International Code Council (ICC), recently voted to include EV-ready measures in the International Building Code. The City and County of Honolulu is also in final consideration of a measure to require EV-ready in new commercial construction. The State

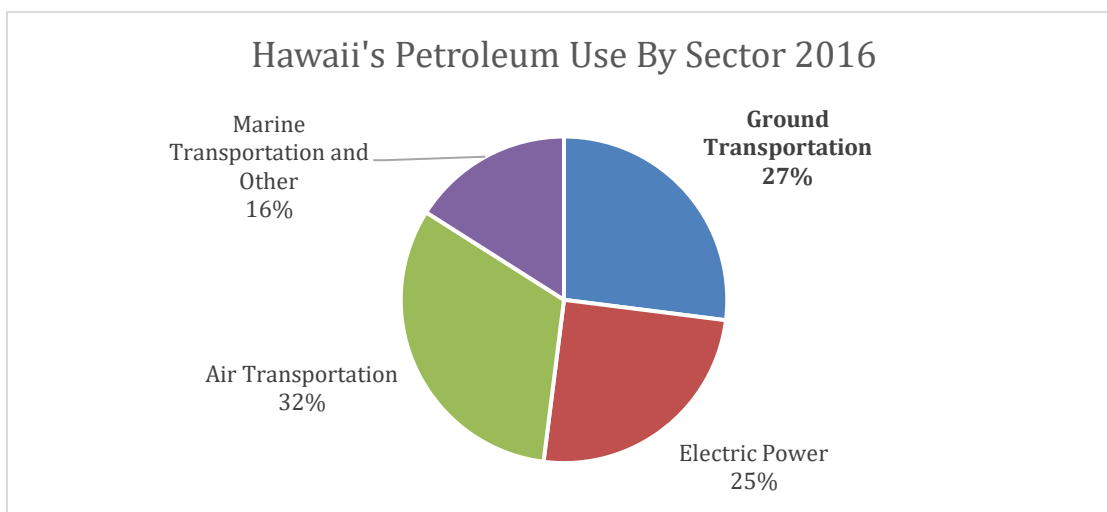
*Investing in a Sustainable Hawai'i*



of Hawai'i should continue to lead by example and further show the world that Hawai'i is serious about the sustainability and resiliency of our community by encouraging EVs and EV infrastructure as this bill proposes.

### **EVs Provide Immediate Energy and Environmental Impact**

Ground transportation alone utilizes more than a quarter of the state's imported petroleum. Electrifying ground transportation will reduce our demand for imported fossil fuels, keeping millions of dollars in the state and cutting harmful pollution.



*Source: Hawaii State Energy Office – Hawaii Energy Facts & Figures*

Converting from petroleum-based vehicles to EVs immediately reduces GHG emissions, helping combat climate change and its impacts on our islands. EVs produce zero-emissions at the tailpipe, and even when full lifecycle emissions (from manufacturing through disposal) are considered, EV emissions are approximately 50 percent lower than internal combustion engine (ICE) vehicles.

EVs can also support the integration of more renewables on the electric grid with smart charging technology and rate structures. Thus, proliferating EVs throughout Hawai'i can help accelerate progress towards the State's 100 percent RPS goal, as well as contribute to the State's Paris Agreement commitments and carbon neutral goal.

### **Hawai'i Should Be Doing More**

EVs are the future, but they currently only represent less than one percent of all passenger vehicles in the state. Hawai'i must encourage this still nascent market and be prepared with the necessary infrastructure.

Public EV charging stations are a vital component of the EV system. They provide access to charging for drivers who may not be able to charge at home, such as residents who live in

multi-unit dwellings, and alleviate range anxiety for all EV drivers, a top-cited barrier to purchasing EVs. Similar to the benefits that community solar offers to renters and apartment residents, public chargers open up the opportunity and feasibility of owning an EV to more people, increasing equity and access.

Requiring qualifying facilities to be “EV ready” is smart and essential future proofing. Installing EV infrastructure post-construction costs three times more than at the time of new construction, and it represents approximately less than one percent of total new construction project cost. Given that building construction has a ~30-year life, this bill is a fiscally prudent way for the State to prepare for 2049 and beyond, when EVs are expected to be abundant and charging will be critical.

Other states and cities recognize the importance of EV infrastructure and already have policies that require public and private parking facilities to be built to support EV charging. Below are examples of leading state and city EV-ready requirements:

- California – 8 percent of parking stalls at nonresidential properties
- Vancouver – 100 percent of parking stalls at multi-unit residential and 10 percent of stalls at commercial properties
- New York City – 20 percent of parking stalls at parking facilities (open lots and garages)
- Atlanta – 20 percent of parking stalls at new commercial and multifamily properties
- San Francisco – 20 percent of new residential, commercial and municipal properties

This bill is an important measure for the State to lead the private market here in Hawai‘i, while continuing to show the world that Hawai‘i is a clean energy leader.

Thank you for this opportunity to testify.

Respectfully,

Amy Hennessey, APR  
Senior Vice President, Communications & External Affairs



# Hawai'i Energy

YOUR CONSERVATION & EFFICIENCY PROGRAM

1132 Bishop Street, Suite 1800 • Honolulu, Hawai'i 96813 • HawaiiEnergy.com • P: (808) 839-8880 • F: (808) 441-6068

Before the House Committee on Finance  
Friday, February 21, 1:30 PM, Conference Room 308  
HB 1846 HD2: Relating to Energy Efficiency

Chair Luke, Vice Chair Cullen, and members of the committee:

The Hawai'i Energy program supports HB 1846 HD2 and offers the following comments.

Hawai'i Energy works to empower island families and businesses on behalf of the Hawai'i Public Utilities Commission (PUC) to make smart energy choices to reduce energy consumption, save money, and pursue a 100% clean energy future. Energy efficiency is the cheapest option to help us achieve our 100% clean energy goal by eliminating waste and being more efficient.

Hawai'i Energy applauds the emphasis on improving energy efficiency in State facilities. The State of Hawai'i has had a successful Energy Savings Performance Contract (ESPC) program that drove a significant level of energy savings projects between 2009 and 2015. The State of Hawai'i has benefitted substantially from ESPCs. Hawai'i Energy estimates that since 1996, Hawai'i government agencies have saved, on average, more than 5 million kilowatt hours a year, equating to over \$24 million in savings, with the majority of this coming through ESPCs. ESPC procurements have significantly dropped since 2015, due to a number of potential factors, including previously completed projects, use of standard procurement mechanisms, and state agencies not having the expertise and resources to develop, procure, and manage the construction, among others. With advances in technologies that increase efficiency coupled with the number of buildings that are still largely inefficient, opportunity remains for further improvement.

Tackling energy use by all state facilities will take time, manpower, and in some instances funding. Hawai'i Energy supports the modifications in HD2 exempting facilities under 10,000 square feet. Hawai'i Energy also supports the timeline laid out in HD2 for audits and implementation as being realistic, especially if the State ESCO process is utilized.

Thank you for the opportunity to provide comments on and our **support** of HB1846 HD2.

Brian Kealoha  
Executive Director  
Hawai'i Energy

**HB-1846-HD-2**

Submitted on: 2/19/2020 8:43:49 PM

Testimony for FIN on 2/21/2020 1:30:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Climate Protector	Climate Protectors Coalition	Support	No

Comments:

**NOTICE OF HEARING**

DATE: Friday, February 21, 2020

TIME: 1:30 PM.

Conference Room 308

State Capitol

PLACE:

415 South Beretania Street

Aloha Chair Luke, Vice Chair Cullen and members of the Committee on Finance.

The Climate Protectors Coalition strongly supports HB 1846 HD2!

We are a new group inspired by the Mauna Kea Protectors but focused on reversing the climate crisis. As a tropical island State, Hawaii will be among the first places harmed by the global climate crisis, with more intense storms, loss of protective coral reefs, and rising sea levels. We must do all we can to reduce our carbon footprint and become at least carbon neutral as soon as possible.

We need to capture the substantial potential energy savings by requiring greater efficiency in State buildings as set forth in this bill. Please pass this bill. Mahalo!



## ELEMENTAL EXCELERATOR

### Written Statement of Elemental Excelerator before the House Committee on Finance

#### In consideration of [HB 1846 HD 2](#) RELATING TO ENERGY EFFICIENCY

February 21, 2020

#### Aloha Chair Luke, Vice-Chair Cullen, and Members of the House Committee on Finance:

Elemental Excelerator respectfully **submits support** for HB 1846 HD 2, which:

1. Requires an energy audit for all state facilities with an area over 10,000 square feet, except facilities at the Aloha Stadium, by 1/1/2022, and dates for energy efficiency implementation.
2. Beginning 7/1/2020, allow for new state building construction to utilize post-industrial carbon dioxide mineralized concrete, or other materials that reduce the carbon footprint of the project where feasible and cost-effective, have twenty-five per cent of its accompanying parking lot be electric vehicle charger ready.
3. Authorizes the Hawaii state energy office to access utility bills and energy usage data for state-owned buildings and make the data publicly available.

Elemental Excelerator is a Honolulu-based non-profit organization that supports climate positive startup companies that are helping solve Hawai'i's most urgent environmental problems. Each year, we select 15-20 companies annually that best fit our mission and fund each company up to \$1 million. To date, we have awarded \$36 million to 99 companies resulting in over fifty demonstration projects in Hawai'i & the Asia Pacific.

About twenty percent of Elemental Excelerator's portfolio companies focus on resilience in the real estate sector. We support the key points listed above, and aim to provide some additional information about the requirement *"to allow for the building to be a net zero capable structure, use post-industrial carbon dioxide mineralized concrete where cost-effective"*.

This provision aligns with the Hawaii Department of Transportation (HDOT) deployment in May 2019 of post-industrial carbon dioxide mineralized concrete as a sustainable transportation initiative.<sup>1</sup> The initial test involved a pour of 150 cubic yards of carbon-injected concrete next to an equivalent pour of standard concrete mix on an access road for the Kapolei Interchange Phase 2 on Oahu Island. The carbon-injected material has turned out to be stronger and more workable, with no increase in cost over traditional concrete.<sup>2</sup> It also aligns with Honolulu City Council Resolution 18-283, which was unanimously adopted in April 2019. The resolution *"requests the city administration to consider using carbon dioxide mineralization concrete for all future infrastructure projects utilizing concrete"*<sup>3</sup> In July 2019, the United States Conference of Mayors adopted the "Honolulu Resolution" urging 400 cities to introduce legislation that prioritizes utilizing post-industrial carbon dioxide mineralized concrete for use in city-building and infrastructure projects to their city councils.<sup>4</sup> It also aligns with existing policies like Act 15

and Act 32, which structures the Greenhouse Gas Sequestration Task Force<sup>5</sup> and sets a target for a zero-emissions clean economy by 2045.<sup>6</sup>

These policies demonstrate a growing commitment in Hawai'i and across the nation to repurpose and sequester CO<sub>2</sub>, known as CO<sub>2</sub> utilization or CO<sub>2</sub>U, and signal Hawai'i's leadership in growing its economy while prioritizing sustainable new technologies.

**We strongly support HB 1846 HD 2 and the requirement for new state building construction to use post-industrial carbon dioxide mineralized concrete for the following reasons:**

1. **It can be implemented quickly and is economically responsible:** The 2016 *Global Roadmap for Implementing CO<sub>2</sub> Utilization* (GCI) study has identified several companies in the market that use post-industrial carbon dioxide [CO<sub>2</sub>] mineralized concrete in partnership with existing concrete producers. This process can reduce operational costs and create up to \$26 billion in new production efficiencies.<sup>7</sup>
2. **It reduces greenhouse gas emissions:** Concrete is the most widely used construction material in the world because of its low cost, strength, and durability. However, 7% of CO<sub>2</sub> emissions come from cement production. In 2017, Hawai'i imported around 300,000 tons of cement from Taiwan. The importing of concrete leads to additional costs in shipping, which also leads to a larger CO<sub>2</sub> footprint. With CO<sub>2</sub> mineralization, concrete development can reduce up to 700 megatons of annual global CO<sub>2</sub> emissions.<sup>8</sup>
3. **It is a competitive and innovative technology:** The GCI study found that the emerging carbon utilization industry is expected to become a \$1 trillion industry by the year 2030.<sup>9</sup>

Mahalo for the opportunity to provide testimony.

Sincerely,



Aki Marceau  
Managing Director- Policy & Community

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<sup>1</sup> [HDOT Tests Sustainable Concrete Mix Designed to Reduce Carbon Footprint of Road Construction](#), May 2019

<sup>2</sup> [Hawaii's DOT tests sustainable concrete](#), May 2019

<sup>3</sup> Honolulu City Council Resolution 18-283

<sup>4</sup> 2019 United States Conference of Mayors, [Honolulu Resolution](#)

<sup>5</sup> Hawai'i [Act 015 GM 1115](#)

<sup>6</sup> Hawai'i [Act 32 GM 1132](#)

<sup>7</sup> CarbonCure. (n.d.). Retrieved from <https://www.carboncure.com/>

<sup>8</sup> Who's who in North American cement imports (October 2018). Retrieved from <https://cementdistribution.com/wp-content/uploads/2018/11/Who-is-who-in-North-American-cement-imports.pdf>

<sup>9</sup> Global Roadmap for Implementing CO<sub>2</sub> Utilization (November 2016), p.5. Retrieved from <http://www.globalco2initiative.org/wp-content/uploads/2018/09/GlobalRoadmapCO2.pdf>

Written Statement of Mitsubishi Corporation before the Hawai'i State House of  
Representatives Committee on Finance  
Friday, February 21st, 2020  
In Consideration of Resolution HB 1846  
RELATING TO ENERGY EFFICIENCY

Dear Chair Luke and members of the Committee on Finance:

Mitsubishi Corporation(MC) respectfully submits this statement in **strong support** of HB 1846 which requires a series of actions to be taken to increase the energy efficiency of state facilities and buildings, consider energy costs and requirements in design, and to reduce the embodied carbon footprint of public buildings through the use of **carbon dioxide mineralized concrete**.


MC is a global integrated business enterprise that develops and operates business together with its offices and subsidiaries in approximately 90 countries and regions worldwide, as well as a global network of around 1,400 group companies. MC has 10 Business Groups that operate across virtually every industry (Natural Gas, Industrial Materials, Petroleum & Chemicals, Mineral Resources, Industrial Infrastructure, Automotive & Mobility, Food Industry, Consumer Industry, Power Solution and Urban Development).

MC has a strong vision to contribute to achieve international objectives, such as the UN Sustainable Development Goals and the 2°C target laid out in the Paris Agreement. As MC recognizes that Carbon Capture Utilization and Storage will play a major role in achieving the goals of the Paris Agreement, MC has been working closely with innovative clean technology companies, associations and governments around the globe.

MC strongly supports the HB 1846 and the requirement of carbon dioxide mineralized concrete, as we believe this is one of the few available and innovative technologies that could be immediately implemented to reduce the CO2 footprint and help provide solutions to the global agenda, climate change.

Mahalo for your consideration,

Sincerely,



Masao Koyama  
Low Carbon Task Force  
Mitsubishi Corporation

## Written Statement of CarbonCure Technologies before the Hawai'i State House of Representatives Committee on Finance

Thursday, February 20<sup>th</sup>, 2020

In Consideration of Resolution HB 1846  
RELATING TO ENERGY EFFICIENCY

Dear Chair Luke and members of the Committee on Finance:

CarbonCure Technologies respectfully submits this statement in strong support of HB 1846 which requires a series of actions to be taken to increase the energy efficiency of state facilities and buildings, consider energy costs and requirements in design, and to reduce the embodied carbon footprint of public buildings through the use of carbon dioxide mineralized concrete.

CarbonCure is a clean technology company that has had the honor to be a recent cohort company of the Elemental Excelsior (EEX) program based in Honolulu. Our investors include Breakthrough Energy Ventures, a \$1 billion clean energy venture fund comprising 20 global business leaders. We are the world leader in CO<sub>2</sub> mineralization technologies and were recently named the North American Cleantech Company of the Year by Cleantech Group<sup>1</sup>.

Beginning in 2019 with our concrete producer partners Island Ready Mix Concrete and Hawai'i Concrete and Cement Company, we have produced post-industrial carbon dioxide mineralized concrete that meets performance criteria. This form of concrete is readily available to support future state facility construction projects at a competitive cost. For example, the Hawaii Department of Transportation successfully demonstrated the use of CO<sub>2</sub> mineralized concrete on the Kapolei Interchange in May 2019 and has introduced language into its concrete specifications to standardize the use of CO<sub>2</sub> mineralized concrete on HDOT developments.

Resolution HB 1846 supports the ambitious climate goals set by the State of Hawai'i while enhancing the local market for clean technologies. We submit our strong support for this resolution for the following reasons:

- 1. It fosters innovation in clean technologies and positions Hawai'i to lead in the future economy:** Carbon utilization technologies such as carbon dioxide mineralized concrete are expected to become a \$1T industry by the year 2030. Similarly, electric vehicles are expected to account for more than 30% of global passenger vehicles by 2040<sup>2</sup>. This resolution positions the State of Hawai'i to capitalize on emerging technology trends and proactively design and plan for this future reality. Successful innovation is

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<sup>1</sup> [Cleantech Group](#)

<sup>2</sup> [BloombergNEF Electric Vehicle Outlook](#)



only realized in partnership with strong leadership from elected officials and the public sector. By sending a clear market signal, this resolution will catalyze investment into the State to support implementation and improvement of the technologies that will shape our economy in the years to come.

2. **It takes an economically responsible approach to addressing greenhouse gas emissions:** Improving the energy efficiency of existing buildings is widely acknowledged to be one of the fastest and most cost-effective strategies for decarbonization<sup>3,4</sup>. Reducing the energy consumption of public buildings will achieve emissions reductions while reducing the cost of utility bills. The use of carbon dioxide mineralized concrete can reduce operational costs and unlock new production efficiencies for concrete producers, providing a market-ready solution to drive down emissions in this hard to decarbonize industrial sector.
3. **It promotes transparency:** By requiring continual energy audits and reporting of energy consumption, this resolution will place data in the hands of elected officials to better inform decision-making on behalf of all Hawaiians.
4. **It will achieve emissions reductions and demonstrates the State's commitment to the Paris Climate Accord:** In June 2017, Governor David Ige signed SB 559<sup>5</sup>, reaffirming commitment to the principles of the Paris Accord and aligning climate mitigation efforts with achieving the goals of the Accord. This resolution outlines a suite of actions that will reduce both operational emissions and embodied carbon emissions. Concrete is the most widely used construction material in the world. However, 7% of emissions come from cement production<sup>6</sup>. In 2017, Hawai'i imported around 300,000 tons of cement from Taiwan<sup>7</sup>. The importing of cement leads to additional costs in shipping, which then leads to a larger footprint. With mineralization, concrete development can reduce up to 700 MT of annual global emissions.

Mahalo for the opportunity to testify on this resolution.

Sincerely,

**Robert Niven**

CEO and Founder

CarbonCure Technologies, an Elemental Excelerator cohort company

rniven@carboncure.com

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<sup>3</sup> [Natural Resources Defense Council](#)

<sup>4</sup> [International Energy Agency](#)

<sup>5</sup> [SB 559](#)

<sup>6</sup> [Global Roadmap for Implementing CO<sub>2</sub> Utilization](#)

<sup>7</sup> [North American Cement Imports](#)

**HB-1846-HD-2**

Submitted on: 2/19/2020 7:40:17 PM

Testimony for FIN on 2/21/2020 1:30:00 PM

<b>Submitted By</b>	<b>Organization</b>	<b>Testifier Position</b>	<b>Present at Hearing</b>
Andrea Quinn	Individual	Support	No

Comments:

**HB-1846-HD-2**

Submitted on: 2/20/2020 4:11:32 AM

Testimony for FIN on 2/21/2020 1:30:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Nanea Lo	Individual	Support	No

Comments:

Dear Chair Luke, and members:

As one of 350Hawaii.org's 6,000 members, I strongly support HB 1846 HD2, with comments.

We are disappointed to see the excellent net-zero capable requirement removed from the original version of this bill. Simply maximizing "energy generation potential where feasible and cost-effective" greatly weakens the bill's effectiveness and misses an enormous opportunity to reduce Hawaii's greenhouse gas emissions.

The bill retains great merit but would be so much more powerful with the original language. New buildings offer many opportunities to save energy and move Hawaii closer to our goal of zero emissions.

Concrete's essential ingredient, cement, has a huge carbon footprint. Making cement requires superheating limestone, and releases massive amounts of carbon dioxide. Cement is responsible for 7% of global man-made greenhouse gas emissions, making it the world's second largest industrial source of CO2. But new types of concrete can reduce the need for cement, and even trap CO2 emissions forever at the same time. [\[https://money.cnn.com/2018/06/12/technology/concrete-carboncure/index.html\]](https://money.cnn.com/2018/06/12/technology/concrete-carboncure/index.html)

Using this type of concrete actually makes a new building decrease emissions.

Requiring new buildings' parking lots to be electric vehicle (EV) ready promotes EV adoption by providing additional places for EV owners to charge.

They can also be net zero, using no additional energy when taking into account their design, construction materials and methods, and all of their energy use, savings and production.

New buildings can provide space for rooftop photovoltaic systems, and every new building in Hawaii should be equipped with PV. Please add this requirement in this bill.

HB 1846 sets examples by using all of these energy-savings methods in new state buildings. Please support it.

me ke aloha 'Ä• ina,

Nanea Lo

**HB-1846-HD-2**

Submitted on: 2/20/2020 6:24:16 AM

Testimony for FIN on 2/21/2020 1:30:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Caroline Kunitake	Individual	Support	No

## Comments:

Dear Chair Luke, and Members of the House Committee on Finance,

As one of [350Hawaii.org](http://350Hawaii.org)'s 6,000 members, I strongly support HB 1846 HD2, with comments.

We are disappointed to see the excellent net-zero capable requirement removed from the original version of this bill. Simply maximizing "energy generation potential where feasible and cost-effective" greatly weakens the bill's effectiveness and misses an enormous opportunity to reduce Hawaii's greenhouse gas emissions.

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New buildings can provide space for rooftop photovoltaic systems, and every new building in Hawaii should be equipped with PV. Please add this requirement in this bill.

HB 1846 sets examples by using all of these energy-savings methods in new state buildings. Please support it.

Mahalo,

Caroline Kunitake

**HB-1846-HD-2**

Submitted on: 2/20/2020 1:17:56 PM

Testimony for FIN on 2/21/2020 1:30:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Randy Ching	Individual	Support	No

## Comments:

Aloha Chair Luke, Vice Chair Cullen, and members of the committee:

I strongly support HB 1846 HD2, with comments.

We are disappointed to see the excellent net-zero capable requirement removed from the original version of this bill. Simply maximizing "energy generation potential where feasible and cost-effective" greatly weakens the bill's effectiveness and misses an enormous opportunity to reduce Hawaii's greenhouse gas emissions.

The bill retains great merit but would be so much more powerful with the original language. New buildings offer many opportunities to save energy and move Hawaii closer to our goal of zero emissions.

Concrete's essential ingredient, cement, has a huge carbon footprint. Making cement requires superheating limestone, and releases massive amounts of carbon dioxide. Cement is responsible for 7% of global man-made greenhouse gas emissions, making it the world's second largest industrial source of CO2. But new types of concrete can reduce the need for cement, and even trap CO2 emissions forever at the same time. [\[https://money.cnn.com/2018/06/12/technology/concrete-carboncure/index.html\]](https://money.cnn.com/2018/06/12/technology/concrete-carboncure/index.html)

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New buildings can provide space for rooftop photovoltaic systems, and every new building in Hawaii should be equipped with PV. Please add this requirement in this bill.

HB1846 sets examples by using all of these energy-savings methods in new state buildings. Please pass HB1846 HD2. Mahalo for the opportunity to testify.

Randy Ching



**HB-1846-HD-2**

Submitted on: 2/20/2020 2:36:21 PM

Testimony for FIN on 2/21/2020 1:30:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Janet Pappas	Individual	Support	No

Comments:

Dear Chair Luke and FIN committee members,

I strongly support HD1846 HD2 to audit all large State buildings for energy efficiency, making necessary upgrades to the structures as detailed in the bill (adding EV charging capabilities, using the newest energy-saving materials, etc.). This is one of the best uses for State monies for mitigating the effects of climate change. This bill sets an excellent example for our citizenry, reminding homeowners that they can do the same for their residences, saving money and helping the planet simultaneously.

Please support HD1846 HD2.

Sincerely,

Jan Pappas

Aiea, Hawaii

**HB-1846-HD-2**

Submitted on: 2/20/2020 2:37:02 PM

Testimony for FIN on 2/21/2020 1:30:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Dale Jensen	Individual	Support	No

Comments:

Dear Chair Luke and Members:

While I support this bill in principle, I am disappointed to see the excellent net-zero capable requirement removed from the original version of this bill. Simply maximizing "energy generation potential where feasible and cost-effective" greatly weakens the bill's effectiveness and misses an enormous opportunity to reduce Hawaii's greenhouse gas emissions.

The bill retains great merit but would be so much more powerful with the original language. New buildings offer many opportunities to save energy and move Hawaii closer to our goal of zero emissions. We have to start including carbon emissions in the economic feasibility equation. How do you put a price on our children and grandchildren's future?

Sincerely,

Dale Jensen, Prof. Engineer.

**HB-1846-HD-2**

Submitted on: 2/20/2020 2:56:06 PM

Testimony for FIN on 2/21/2020 1:30:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Lynn Aaberg	Individual	Support	No

Comments:

Aloha, Chair Luke and Members,

I am writing in support of HB 1846 with the caveat that I am disappointed that the original language of the net-zero capabilities being removed. The bill is weakened with the wording "maximizing energy generation potential where feasible and cost-effective." We do not have time (literally do not have the time!) to be weak on our approach to climate change.

I strongly support that new construction be done in an energy efficient way. As I taught my seventh grade chemistry students, manufacturing cement creates huge amount of carbon dioxide, the major source of global warming. Requirements for cement and other materials that reduce the carbon footprint is excellent.

It is important that EV charging stations are included...very necessary to continue to encourage the purchase of EV's. The EV stations can be net zero when designed for our sunny Hawai'i climate.

New buildings also provide ample space for PV's. Please also include this!

Mahalo,

Lynn Aaberg

**HB-1846-HD-2**

Submitted on: 2/20/2020 3:40:40 PM

Testimony for FIN on 2/21/2020 1:30:00 PM

<b>Submitted By</b>	<b>Organization</b>	<b>Testifier Position</b>	<b>Present at Hearing</b>
Laura Gray	Individual	Support	Yes

Comments:

We must pass all of the bills to curb climate change before it is too late.

**HB-1846-HD-2**

Submitted on: 2/20/2020 4:15:27 PM

Testimony for FIN on 2/21/2020 1:30:00 PM

<b>Submitted By</b>	<b>Organization</b>	<b>Testifier Position</b>	<b>Present at Hearing</b>
David Dinner	Individual	Support	No

Comments:

**LATE**

**HB-1846-HD-2**

Submitted on: 2/20/2020 7:57:30 PM

Testimony for FIN on 2/21/2020 1:30:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Daniel Boren	Individual	Support	No

Comments:

Dear Chair Luke, and members:

As one of [350Hawaii.org](http://350Hawaii.org)'s 6,000 members, I strongly support HB 1846 HD2, with comments.

We are disappointed to see the excellent net-zero capable requirement removed from the original version of this bill. Simply maximizing "energy generation potential where feasible and cost-effective" greatly weakens the bill's effectiveness and misses an enormous opportunity to reduce Hawaii's greenhouse gas emissions.

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New buildings can provide space for rooftop photovoltaic systems, and every new building in Hawaii should be equipped with PV. Please add this requirement in this bill.

HB 1846 sets examples by using all of these energy-savings methods in new state buildings. Please support it.

Danny Boren

**LATE**

**HB-1846-HD-2**

Submitted on: 2/20/2020 9:57:13 PM

Testimony for FIN on 2/21/2020 1:30:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
Audrey Enseki-Tom	Individual	Support	No

Comments:

Please support HB1846 HD2.



**LATE**

**HB-1846-HD-2**

Submitted on: 2/20/2020 10:25:38 PM

Testimony for FIN on 2/21/2020 1:30:00 PM

Submitted By	Organization	Testifier Position	Present at Hearing
tlaloc tokuda	Individual	Support	No

Comments:

To: The House Committee on Finance

From: **YOUR NAME**

Date: Friday, February 21, 2020, 1:30 pm

**In strong support of HB 1846 HD2, with comments**

Dear Chair Luke, and members:

As one of 350Hawaii.org's 6,000 members, I strongly support HB 1846 HD2, with comments.

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HB 1846 sets examples by using all of these energy-savings methods in new state buildings. Please support it.

Tlaloc TOkuda

Kailua Kona, 96740 HI

**HB-1846-HD-2**

Submitted on: 2/21/2020 6:16:06 AM

Testimony for FIN on 2/21/2020 1:30:00 PM

**LATE**

Submitted By	Organization	Testifier Position	Present at Hearing
Michele Nihipali	Individual	Support	No

Comments:

To: The House Committee on Finance

From: **Michele Nihipali**

Date: Friday, February 21, 2020, 1:30 pm

**In strong support of HB 1846 HD2, with comments**

Dear Chair Luke, and members:

As one of 350Hawaii.org's 6,000 members, I strongly support HB 1846 HD2, with comments.

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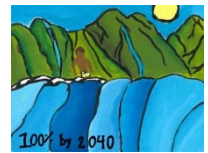
HB 1846 sets examples by using all of these energy-savings methods in new state buildings. Please support it.

Mahalo,

Michele Nihipali

54-074 A Kam Hwy.

Hauula, HI 96717



**LATE**

## HOUSE COMMITTEE ON FINANCE

February 21, 2020, 1:30 P.M.

Room 308

(Testimony is 3 pages long)

### TESTIMONY IN SUPPORT OF HB 1846 HD2

Aloha Chair Luke, Vice Chair Cullen, and members of the Committee:

Blue Planet Foundation **supports HB 1846**, which **requires state agencies to lead by example** when it comes to energy efficiency and benchmarking in facilities, data access, as well as ensuring new state building construction is “future proof” by being net-zero capable and electric vehicle (EV)-ready.

### HB 1846 HELPS STATE FACILITIES LEAD ON EFFICIENCY

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House Bill 1846 can help state agencies achieve deeper energy efficiency savings, and in return lower costs for taxpayers that ultimately pay the state’s energy bills. Energy audits and benchmarking can help identify where the most savings can be achieved. Because energy audits can be costly, the state’s energy savings performance contract program will be essential to successful implementation of HB 1846. Performance contracting—which requires an energy audit at the outset of the process—offers a no-cost option for state agencies to complete the energy audits contemplated in the bill. This also ensures a pathway to implementation because the energy performance contract process would allow the project to be financed and repaid through the energy savings.

### HAWAI‘I NEEDS EV-READY BUILDINGS

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Blue Planet strongly supports the provisions in HB 1846 that require at least 25% of a new state building's accompanying parking lot to be electric vehicle charger ready. This bill will decrease the cost of EV charging infrastructure retrofits for state agencies in the future by ensuring that all conduit and power capacity is installed upon initial construction and will increase the likelihood that state employees would be able to charge their EVs at work. This is an important first step to lowering the overall cost of our transition to electrified transportation and make electric vehicles more accessible to O‘ahu residents.

While Hawai‘i has been making strides on renewable electricity, we are falling short on decarbonizing our ground transportation sector. Greenhouse gas emissions from transportation

are increasing. Last year, we sold 6% more gasoline than the previous year.<sup>1</sup> Over one million gasoline-powered vehicles are on Hawai'i's roads—and from them comes nearly five million metric tons of climate-changing carbon pollution. Although we now have roughly 10,000 EVs on Hawai'i's roads, they still only make up less than 1% of all registered vehicles in the state.<sup>2</sup>

Electric vehicles will play an integral role in Hawai'i's clean energy future. While EVs that use the existing electricity grid to charge still use mostly fossil fuel, they use that fuel more effectively than burning fuel directly in a typical gasoline engine. This is why EVs are much less expensive to “fuel” per mile than their gasoline counterparts. Further, by using stored electrical energy, EVs can take advantage of intermittent solar, wind, and other clean energy resources. Most vehicles sit idle over 22 hours of the day, so they can become de facto energy storage devices if their batteries are plugged into the grid when they are not in use. With smart grid infrastructure in place, EVs become an essential component to electricity load and clean energy resource balancing—in addition to providing clean mobility solutions for Hawaii residents.

House Bill 1846 can help to overcome a key barrier to EV adoption: the lack of adequate EV charging infrastructure. The International Energy Agency has found that “the availability of chargers emerged as one of the key factors for contributing to the market penetration of EVs.”<sup>3</sup> Unlike gasoline car owners, charging behavior for EV owners indicates that over 80% of EV drivers in the United States charge their cars at home.<sup>4</sup> Many Hawai'i residents, however, live in apartments and multi-unit residential buildings,<sup>5</sup> and the vast majority of parking facilities at these residential properties currently lack EV chargers. Moreover, the optimal time to charge an EV is during the day when renewable energy is abundant. Yet, there is a notable lack of charging options at workplaces and at publicly accessible locations.

By ensuring that we are “future-proofing” new state construction projects, this measure is an important step toward increasing EV charging options for those who don't have access to charging at home or at work.

The most challenging aspect of EV charger installation is the common lack of electrical capacity and distributed subpanels to support broad deployment of charging infrastructure. Studies have shown that **installing EV infrastructure at the time of construction can be 91% less expensive than post-construction retrofits**, and per stall installation costs can be reduced through economies of scale.<sup>6</sup>

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<sup>1</sup> *DBEDT Monthly Energy Trends*, December 2019, <http://dbedt.hawaii.gov/economic/energy-trends-2/>.

<sup>2</sup> *Id.*

<sup>3</sup> *Global EV Outlook 2017*, at 29, <https://www.iea.org/reports/global-ev-outlook-2017>.

<sup>4</sup> *Department of Energy*, <https://www.energy.gov/eere/electricvehicles/charging-home>.

<sup>5</sup> The 2017 American Community Survey estimated that more than one third of housing units in Hawai'i are apartments. See *2017 American Community Survey*, searchable at <https://data.census.gov/>.

<sup>6</sup> See <http://evchargingpros.com/wp-content/uploads/2017/04/City-of-SF-PEV-Infrastructure-Cost-Effectiveness-Report-2016.pdf>.

While this bill would not require the installation of the actual EV charging infrastructure, it would require that the power capacity and conduit be set up during construction at new state buildings, which would dramatically reduce retrofit costs at the time of charger installation, creating cost savings downstream.

Cities around North America are adopting EV-ready requirements for commercial and residential new construction. Seattle, San Jose, Atlanta, San Francisco, Denver, and Oakland have adopted requirements for a certain percentage of stalls to be ready for Level 2 charging. Vancouver, British Columbia, now requires that 100% of new parking stalls be built ready for EV chargers. If the state truly wishes to lead by example, Blue Planet Foundation supports **expanding the EV-ready requirement from 25% of new stalls to 100% of new parking stalls.**

Thank you for the opportunity to testify.