



UNIVERSITY OF HAWAII SYSTEM

Legislative Testimony

Testimony Presented Before the
House Committee on Finance
Tuesday, April 5, 2022 at 2:30 p.m.

By
Richard Rocheleau, Director
Hawai'i Natural Energy Institute
And
Michael Bruno, PhD
Provost
University of Hawai'i at Mānoa

SB 2283 SD2 HD1 – RELATING TO THE HAWAII HYDROGEN STRATEGIC PLAN

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

SB 2283 SD2 HD1 requires the Hawai'i Natural Energy Institute (HNEI) to conduct a study to examine the potential for the production and use of renewable hydrogen in the State and the potential role of renewable hydrogen in achieving a local, affordable, reliable and decarbonized energy system and economy.

This bill directs that the Hawai'i Natural Energy Institute shall, as appropriate, consult with the Department of Business, Economic Development, and Tourism; Hawai'i State Energy Office; Public Utilities Commission; or any other applicable state or county agency; and shall further consult with electric and gas utilities and other industry stakeholders.

HNEI strongly **supports the intent** of this bill. The study results, when used for informing other integrated planning efforts as summarized in Section 1(11 b) *“The results of the study shall be used to inform energy planning, which may include a Hawaii hydrogen strategic plan, decarbonization efforts, and other ongoing work being undertaken by the Hawaii state energy office”* will provide critical information needed to fully evaluate the potential for hydrogen to contribute to an affordable, reliable, decarbonized energy system and economy for Hawai'i.

However, HNEI is concerned that some aspects of the requested study cannot be adequately addressed as a stand-alone study but rather needs to be included in the more complete integrated energy analysis efforts and respectfully offers the following comments.

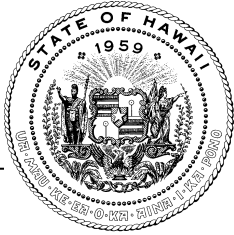
Section 1 (5) asks HNEI to consider *“Costs, benefits, and impacts compared to other fuel sources”*. We believe that the costs, benefits and impacts compared to other fuel sources can only be developed in the context of the specific uses of the hydrogen in an

integrated energy system. We respectfully suggest that this line be deleted or amended to ask HNEI to consider “the expected range of costs from different production methods and to identify potential benefits and impacts for consideration in ongoing integrated energy analysis efforts”

Similarly, Section 1 (8) asks HNEI to consider “Use cases in which hydrogen would provide the most benefit, including considering power supply and transportation sectors” The benefits of various possible use cases cannot be determined absent information on the use of competing technologies. We respectfully suggest that this line be deleted or amended to ask HNEI to consider “a range of potential use cases including both power supply and transportation for consideration in ongoing and future integrated energy analysis efforts”

Section 1 (c) states that “renewable hydrogen” means hydrogen produced entirely from renewable sources that have lifecycle emissions of no more than fifty grams of carbon dioxide per kilowatt hour. While agreeing fully with the need to minimize GHG emissions we believe that this definition is too restrictive to allow a full assessment of the renewable options that may be available to decarbonize the State’s energy system and recommend this section be amended to “renewable hydrogen” means hydrogen produced entirely from renewable sources as defined in HRS 269-91. ~~that have lifecycle emissions of no more than fifty grams of carbon dioxide per kilowatt hour.~~

Thank you for the opportunity to submit testimony on SB 2283 SD2 HD1.



HAWAII STATE ENERGY OFFICE STATE OF HAWAII

DAVID Y. IGE
GOVERNOR

SCOTT J. GLENN
CHIEF ENERGY OFFICER

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Testimony of
SCOTT J. GLENN, Chief Energy Officer

before the
HOUSE COMMITTEE ON FINANCE

Tuesday, April 5, 2022
2:30 PM
State Capitol, Conference Room 308 & Videoconference

COMMENTS
SB 2283, SD2, HD1
RELATING TO THE HAWAII HYDROGEN STRATEGIC PLAN.

Chair Luke, Vice Chair Yamashita, and Members of the Committee, the Hawai'i State Energy Office (HSEO) offers comments on SB 2283, SD2, HD1, which requires the Hawai'i Natural Energy Institute (HNEI) to conduct a study to examine the potential for the production and use of renewable hydrogen in the State and the potential role of renewable hydrogen in achieving a local, affordable, reliable, and decarbonized energy system and economy, and to report to the Legislature.

HSEO appreciates that the bill was revised to specify that the results of the study shall be used to inform energy planning, including work being done by HSEO.

HSEO notes that the establishment of a screening criteria based on "lifecycle emissions" (page 3, line 1) does require quantification as a first step. Therefore, HSEO suggests that, in this initial study, carbon emissions be quantified for the relevant renewable resources included in [Section 269-91](#), Hawai'i Revised Statutes. Rather than developing and applying the screening criteria outside of the study, HSEO recommends including the information as part of the study, to better inform policy-makers and the public. Therefore, HSEO recommends that the definition of "renewable hydrogen" starting on page 2, line 19, be revised to read:

(c) For the purposes of this section,
"renewable hydrogen" means hydrogen produced
entirely from renewable sources ~~that have
lifecycle emissions of no more than fifty
grams of carbon dioxide per kilowatt hour.~~

This change allows for consistency in definitions, and adds a new and important facet to understanding the effectiveness of Hawai'i's various energy resources in reducing Hawai'i's greenhouse gas emissions that may be useful in establishing new terms and potential limits for hydrogen to qualify as "green." HSEO also notes that a threshold of "50 grams of carbon per kWh" may not include some systems on Hawai'i's grids, such as crystalline silicon photovoltaics manufactured prior to achieving the improved emissions profiles of current technologies.¹

HSEO agrees that hydrogen has the potential to be an increasingly important component of Hawai'i's energy system and that it is appropriate for HNEI to conduct the study, with input from a variety of experts. HSEO notes that in section 2, beginning on page 3, line 3, HNEI is directed to work with "applicable state or county agency" and "industry stakeholders." HSEO recommends adding "national laboratories and federal agencies" since significant greenhouse gas lifecycle assessment, harmonization work, and quantification tools have been developed and published by national laboratories.

The study of "renewable hydrogen" will be an important and useful part of HSEO's overall energy planning mandate to decarbonize the economy. In 2019, Act 122 established the HSEO "with a clear mission... to assist both the public and private sectors in achieving the State's energy goals" and "achieving a clean energy

¹ According to communication with staff of the National Renewable Energy Laboratory (NREL) regarding NREL's [Life Cycle Assessment Harmonization](#), the [Life Cycle Greenhouse Gas Emissions from Electricity Generation: Update](#), "crystalline silicon (c-Si) PV has median life cycle GHG as reported in our analysis that is HIGHER than 50. I imagine that is a result that would not be expected and might cause consternation amongst stakeholders. C-Si PV has improved over time, and the harmonization study was not designed to estimate a current life cycle GHG emission for today's modules, rather it was designed to review extant literature and average all values, e.g., anywhere in the world, published estimates since ~1990, and would thus be more representative of all installed generation technologies of a category... One solution might be to adjust the threshold from 50 to 75." Personal communication, February, 2022.

economy,” and mandated the Chief Energy Officer to “Identify market gaps and innovation opportunities, collaborate with stakeholders, and facilitate public-private partnerships [...] that will support the State's energy and decarbonization goals.” The Hawai'i State Planning Act, HRS Section 226-55(a), also affirms HSEO's overall energy planning mandate: “The state agency head [i.e., the Chief Energy Officer] primarily responsible for a given functional area shall prepare and periodically update the functional plan for the area.” HSEO looks forward to collaborating with HNEI on the study and integration with HSEO's overall planning for the decarbonization of Hawai'i's economy.

HSEO defers to the appropriate agencies for comment on the fiscal, administrative, and regulatory impacts of this proposal.

HSEO's comments are guided by its mission to promote energy efficiency, renewable energy, and clean transportation to help achieve a resilient, clean energy, decarbonized economy.

Thank you for the opportunity to testify.



TESTIMONY BEFORE THE HOUSE COMMITTEE ON FINANCE

SB 2283 SD2 HD1

Relating to the Hawaii Hydrogen Strategic Plan

Tuesday, April 5, 2022

2:30 PM

State Capitol, Conference Room 308 & Videoconference

Darren Ishimura, P.E.
Director, Grid Technologies
Hawaiian Electric Company, Inc.

Chair Luke, Vice Chair Yamashita, and Members of the Committee:

My name is Darren Ishimura and I am testifying on behalf of Hawaiian Electric Company, Inc. (“Hawaiian Electric”) to support the intent of SB 2283 SD2 HD1, offer comments, and suggest amendments.

Hawaiian Electric strongly supports a study of hydrogen for Hawai'i that aligns with long-term energy plans and considers land and land-use impacts, utilization of hydrogen sourced from renewable resources to achieve decarbonization and renewable energy goals¹, and the potential for hydrogen to provide resilience benefits. One action under Hawaiian Electric's Climate Change Action Plan is to pursue cost-effective, low-emission or zero-emission fuels, such as green hydrogen, and other emerging technologies.

Hawaiian Electric supports the cost-competitive production of hydrogen from renewable resources. However, inclusion of a definition in the bill is premature and “renewable hydrogen,” as defined in HD1, may be too restrictive when assessing hydrogen production from resources available in Hawai'i. Hawaiian Electric recommends that the definition of “renewable hydrogen” be removed from the bill (delete lines 19-20 on page 2 and

¹ Hawaiian Electric has committed to reduce carbon emissions from power generation in 2030 by as much as 70% below 2005 levels and have net zero carbon emissions by 2045. In concert with these commitments, Hawaiian Electric continues to modernize its grids and integrate more renewable energy to achieve the State's 100% renewable energy goal by 2045 while providing safe, reliable, and resilient power to its customers.

lines 1-2 on page 3), and instead, language be inserted to perform an analysis to define “renewable hydrogen” as part of the hydrogen study. Hawaiian Electric suggests adding a new item in Section 1(a) as follows:

“(11) Analysis of appropriate renewable resources available in Hawai’i, and other locations outside Hawai’i, to produce hydrogen, including development of a definition of “renewable hydrogen” (also referred to as “green” hydrogen).”

Accordingly, Hawaiian Electric supports the intent of SB 2283 SD2 HD1 with the aforementioned recommended amendments. Thank you for the opportunity to testify.



Email: communications@ulupono.com

HOUSE COMMITTEE ON FINANCE
Tuesday, April 5, 2022 — 2:30 p.m.

Ulupono Initiative supports SB 2283 SD 2 HD 1, Relating to the Hawai'i Hydrogen Strategic Plan

Dear Chair Luke and Members of the Committee:

My name is Micah Munekata, and I am the Director of Government Affairs at Ulupono Initiative. We are a Hawai'i-focused impact investment firm that strives to improve the quality of life throughout the islands by helping our communities become more resilient and self-sufficient through locally produced food; renewable energy and clean transportation; and better management of freshwater and waste.

Ulupono supports SB 2283 SD 2 HD 1, which requires the Hawai'i Natural Energy Institute to conduct a study to examine the potential for the production and use of renewable hydrogen in the State and the potential role of renewable hydrogen in achieving a local, affordable, reliable, and decarbonized energy system and economy.

Ulupono supports the approach of this bill to perform a study and develop a strategic plan on the technical and economic feasibility of hydrogen production from renewable energy resources. The study will help to guide the development of the Hawai'i Hydrogen Strategic Plan to provide a road map of how hydrogen can play a role in our state meeting its renewable energy goals. Establishing the study and strategic plan are important first steps in determining hydrogen's role in meeting the State's 2045 100% renewable portfolio standard goal.

As Hawai'i's energy issues become increasingly complex and challenging, we appreciate this committee's efforts to look at policies that support the continued implementation of renewable energy resources throughout the islands.

Thank you for this opportunity to testify.

Respectfully,

Micah Munekata
Director of Government Affairs

Investing in a Sustainable Hawai'i



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Representative Sylvia Luke, Chair
Representative Kyle Yamashita, Vice Chair
Committee on Finance

**RE: SB 2283 SD2 HD1 - Relating to the Hawaii Hydrogen Strategic Plan – In Support
April 5, 2022; 2:30 P.M.**

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

Servco is in support of SB 2283 SD2 HD1, which requires the Hawaii Natural Energy Institute to conduct a study to examine the potential for the production and use of renewable hydrogen in the State and the potential role of renewable hydrogen in achieving a local, affordable, reliable, and decarbonized energy system and economy.

The demand for energy is growing and the benefits of producing hydrogen locally can play a key role in realizing a sustainable energy economy. Hydrogen is part of the portfolio of clean energy technologies to reduce Hawaii's dependency on imported fossil fuels. Servco has invested millions of dollars into hydrogen production facilities and will continue to invest as we believe in its future. We are pleased that the study includes the potential for locally produced renewable hydrogen as an export commodity. The long-term export potential of hydrogen across the globe is not only a revenue generating opportunity but also yields environmental benefits.

Thank you for the opportunity to provide comments in support.

Peter Dames
Executive Vice President

April 5, 2022

From: Hawaii Hydrogen Alliance

Re: SB2283 SD2 HD1

Relating to The Hawaii Hydrogen Strategic Plan



To the House Committee on Finance (FIN):

Chair Rep. Luke, Vice-Chair Rep Yamashita, and Members of the Committee,

The State of Hawai'i does not have a holistic strategy to reduce energy and transportation emissions to zero. The current renewable portfolio standard lacks accountability and inherently favors lowest-cost resources – intermittent renewable electricity. The result is lower resiliency across the islands, longer delays for project approval, and an unrealistic and myopic vision of an 'all-electric' grid.

This bill would examine the ability for hydrogen to serve as a low-cost, resilient, zero-emissions energy resource for both the electricity and transportation sectors here. It would also look at the potential for Hawai'i to export green hydrogen to places like Asia and North America.

Including stakeholder participation (specifically, NGO's) is an important part of this strategy, and we support this bill. Hawaii Natural Energy Institute has produced thoughtful documents related to hydrogen development in Hawai'i, and so they seem a good fit to take on this research-and-reporting based endeavor.

The Hawaii Hydrogen Alliance (Maui, Hawaii) is focused on increasing awareness for 'green hydrogen' production and use in Hawaii and across the Pacific. HHA represents companies and other stakeholders involved in the green hydrogen industry.

We look forward to participating in the discussion regarding the Hawai'i Hydrogen Strategic Plan.

Mahalo,

Chuck Collins

Board Member

admin@hawaiihydrogenalliance.com



**Testimony to
The Committee on Finance**

Tuesday, April 5, 2022

2:30 PM

Conference Room 308 & Via Video Conference, Hawaii State Capitol

SB 2283 SD2 HD1

Chair Luke, Vice Chair Yamashita, and members of the committee,

Hawaii Gas **supports** **SB 2283 SD2 HD1**, relating to the Hawaii Hydrogen Strategic Plan.

Hydrogen has established itself on the forefront of promising zero-emissions fuel sources. In the gas industry specifically, global research and development is yielding significant progress in understanding hydrogen's compatibility with gas grids and establishing it as a clean and reliable fuel source for typical household and commercial uses.

As we move towards our 2045 decarbonization goals, Hawaii Gas believes that our collective focus on innovation to accelerate multiple paths forward to achieve our state's goals is essential to meet our deadlines. The national infrastructure bill reflects this approach, allocating billions of dollars in funding **for clean energy demonstrations and research** focused on next generation technologies needed to achieve the nation's goal of net-zero by 2050, including funding for national hydrogen hubs and allocating resources for a national hydrogen plan.

We ask the committee to pass the bill.

Thank you for the opportunity to testify.



SanHi

GOVERNMENT STRATEGIES

A LIMITED LIABILITY LAW PARTNERSHIP

DATE: April 1, 2022

TO: Representative Sylvia Luke
Chair, Committee on Finance

FROM: Tiffany Yajima

RE: **S.B. 2283, S.D.2, H.D.1 – Relating to the Hawaii Hydrogen Strategic Plan**
Hearing Date: Tuesday, April 05, 2022 at 2:30 p.m.
Conference Room: 308

Dear Chair Luke and Members of the Committee on Finance:

On behalf of the Alliance for Automotive Innovation (“Auto Innovators”) we submit these comments supporting the intent of S.B. 2283, SD2, HD1. The intent of this measure is to require the Hawaii Natural Energy Institute to examine the State's ability to produce hydrogen from local renewable energy resources and use the results of the study to inform energy planning. This measure also includes the possibility of developing a strategic plan to advance this fuel for Hawaii.

The Alliance for Automotive Innovation is the singular, authoritative and respected voice of the automotive industry. Focused on creating a safe and transformative path for sustainable industry growth, the Alliance for Automotive Innovation represents the manufacturers producing nearly 99 percent of cars and light trucks sold in the U.S. Members include motor vehicle manufacturers, original equipment suppliers, technology, and other automotive-related companies and trade associations.

Auto Innovators support the state’s pursuit of hydrogen as a feasible alternative fuel for Hawaii and are interested in the development of a strategic plan to implement hydrogen as a transportation fuel. The automotive industry has made and continues to make a significant investment in hydrogen as a feasible fuel for motor vehicles and recognizes the importance of government support for infrastructure projects like hydrogen fueling stations.

Thank you for the opportunity to submit testimony in support of this measure.



Heather Cutter, President
Dave Rolf, Executive Director

Written Testimony by
David H. Rolf, Executive Director, Hawaii Automobile Dealers Association

for the
Committee on Finance
Tuesday, April 5, 2022
Time 2:30 p.m.
State Capitol, via Videoconference
providing testimony **in support of SB2283, SD2, HD1**

RELATING TO THE HAWAII HYDROGEN STRATEGIC PLAN

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

HADA's dealers are in support of SB 2283, SD2, HD1 which proposes that the Hawaii Natural Energy Institute conduct a study to examine the potential for the production and use of renewable hydrogen in the State and the potential role of renewable hydrogen in achieving a local, affordable, reliable and decarbonized energy system and economy.

Hydrogen fuel cell electric cars will play a significant role in Hawaii's renewable energy ground transportation future.

The U.S. government clarified the leading role of hydrogen energy in transportation in the "All-of-the-above Energy Strategy of 2014."

HADA's dealers continue to work with all in the transition to renewable fuels in transportation and thank you for the opportunity to testify in Support of SB 2283, SD2, HD1.

SB-2283-HD-1

Submitted on: 4/1/2022 1:44:41 PM

Testimony for FIN on 4/5/2022 2:30:00 PM

Submitted By	Organization	Testifier Position	Testify
L Basha	Individual	Support	Written Testimony Only

Comments:

A good move forward for our state & our environment.

SB-2283-HD-1

Submitted on: 4/1/2022 4:33:02 PM

Testimony for FIN on 4/5/2022 2:30:00 PM

Submitted By	Organization	Testifier Position	Testify
Douglas Perrine	Individual	Support	Written Testimony Only

Comments:

Renewable hydrogen is a technology that holds great promise for helping Hawaii to achieve its climate protection goals. Hydrogen is a practical solution for many uses for which battery electric is impractical, yet has been largely neglected in Hawaii. It could also be a valuable export commodity if paired with a low-cost no-emissions energy source such as geothermal or solar. We have wasted too much time and should start creating the framework in which renewable hydrogen can be produced and utilized.

SB-2283-HD-1

Submitted on: 4/4/2022 12:39:02 PM

Testimony for FIN on 4/5/2022 2:30:00 PM

Submitted By	Organization	Testifier Position	Testify
Noel Morin	Individual	Support	Written Testimony Only

Comments:

Dear Chair Luke, Vice-Chair Yamashita, and members of the Finance Committee,

I am supportive of the intention of SB2283. Hydrogen will play a role in the decarbonization of our economy. It can also help diversify our economy by creating avenues for energy exports.

It is critical that the hydrogen produced is green and with acceptable lifecycle greenhouse gas emissions. It must not be made using energy from fossil fuels or biomass sourced from trees. Our research also must focus on sectors that are very difficult to electrify, e.g., aviation and marine transport fuels, grid storage, and high-heat processes.

Sincerely,

Noel Morin