



HAWAII STATE ENERGY OFFICE STATE OF HAWAII

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Testimony of
SCOTT J. GLENN, Chief Energy Officer

before the
HOUSE COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION

Thursday, March 17, 2022
9:00 AM
State Capitol, Conference Room 325 & Videoconference

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

Chair Lowen, Vice Chair Marten, and Members of the Committee, the Hawaii State Energy Office (HSEO) offers comments on SB 2283, SD2, which requires the Hawaii Natural Energy Institute (HNEI) to conduct a study to examine the State's ability to advance hydrogen production from local renewable energy resources and develop the Hawaii Hydrogen Strategic Plan utilizing the results of its study, which shall be reviewed and updated every four years, and to report to the Legislature.

HSEO appreciates that the bill was revised to specify that the long-term hydrogen plan should align with other long-term energy planning in the State and directs HNEI to consult with relevant entities, including HSEO.

HSEO agrees that hydrogen has the potential to be an increasingly important component of Hawaii's energy system and that it is appropriate for HNEI "to conduct a study to examine the State's ability to advance hydrogen production from local renewable energy resources." The hydrogen study is an initial step in creating a hydrogen deployment strategy as part of HSEO's overall energy planning mandate to decarbonize the economy. In 2019, Act 122 established the Hawaii state energy office "with a clear mission... to assist both the public and private sectors in achieving the State's energy goals" and "achieving a clean energy economy," and mandated Hawaii's 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 Hawaii 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 of hydrogen production, storage, distribution, and use in Hawai’i, and potential competition from imported green hydrogen, and continued collaboration to incorporate the results of the study with the creation of a Hydrogen Strategic Plan and integration with HSEO’s overall planning for the decarbonization of Hawaii’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.



UNIVERSITY OF HAWAII SYSTEM

Legislative Testimony

Testimony Presented Before the
House Committee on Energy & Environmental Protection
Thursday, March 17, 2022 at 9:00 a.m.

By

Richard Rocheleau, Director
Hawai'i Natural Energy Institute

And

Michael Bruno, PhD
Provost

University of Hawai'i at Mānoa

SB 2283 SD2 – RELATING TO THE HAWAII HYDROGEN STRATEGIC PLAN

Chair Lowen, Vice Chair Marten, and members of the committee:

SB 2283 SD2 requires the Hawai'i Natural Energy Institute (HNEI) to conduct a study to examine the State's ability to advance hydrogen production from local renewable energy resources and develop the Hawai'i Hydrogen Strategic Plan utilizing the results of its study. The bill requires a preliminary report prior to the 2023 legislative session with a full report prior to the 2024 legislative session and an update every 4 years after beginning in 2028.

HNEI supports SB 2283 SD2.

In developing the hydrogen strategy HNEI will endeavor to make it consistent with and supportive of other broader state planning efforts.

HNEI has sufficient barrel tax funding to perform the work currently requested.

Thank you for the opportunity to provide this testimony on SB 2283 SD2.



**Hawaiian
Electric**

**TESTIMONY BEFORE THE HOUSE COMMITTEE ON
ENERGY & ENVIRONMENTAL PROTECTION**

SB 2283 SD2

Relating to the Hawaii Hydrogen Strategic Plan

Thursday, March 17, 2022

9:00 AM

State Capitol, Conference Room 325 & Videoconference

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

Chair Lowen, Vice Chair Marten, and Members of the Committee:

My name is Darren Ishimura and I am testifying on behalf of Hawaiian Electric Company, Inc. (“Hawaiian Electric”) in support of SB 2283 SD2.

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.

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. As such, Hawaiian Electric strongly supports the development of a comprehensive Hydrogen Strategic Plan for Hawai’i that aligns with long-term energy plans and considers land and land-use impacts, utilization of green hydrogen to achieve decarbonization and renewable energy goals, and the potential for hydrogen to provide resilience benefits.

Accordingly, Hawaiian Electric supports SB 2283 SD2. Thank you for the opportunity to testify.



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Representative Nicole Lowen, Chair
Representative Lisa Marten, Vice Chair
Committee on Energy & Environmental Protection

RE: SB 2283 SD2 - Relating to the Hawaii Hydrogen Strategic Plan – In Support
March 17, 2022; 9:00 A.M.

Aloha Chair Lowen, Vice Chair Marten and members of the committee:

Servco is in support of SB 2283 SD2, which requires the Hawaii Natural Energy Institute to conduct a study to examine the State's ability to advance hydrogen production from local renewable energy resources and develop the Hawaii Hydrogen Strategic Plan utilizing the results of its study, which shall be reviewed and updated every four years.

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 an economic impact 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

SB-2283-SD-2

Submitted on: 3/15/2022 7:17:01 PM

Testimony for EEP on 3/17/2022 9:00:00 AM

| Submitted By | Organization | Testifier Position | Testify |
|--------------|----------------------------|--------------------|-------------------|
| Ted Bohlen | Climate Protectors Hawai'i | Oppose | Remotely Via Zoom |

Comments:

To: The Honorable Nicole Lowen, Chair, the Honorable Lisa Marten, Vice Chair, and Members of the House Committee on Energy and Environmental Protection

From: Climate Protectors Hawai'i (by Ted Bohlen)

Re: Hearing: SB2283 SD2 **RELATING TO THE HAWAII HYDROGEN STRATEGIC PLAN.**

Hearing: Thursday, March 17, 2022, 9:00 a.m., Rm. 211 and by videoconference

Aloha Chair Lowen, Vice Chair Marten, and Members of the Committee on Energy and Environmental Protection!

The Climate Protectors Hawai'i is a group focused on reversing the climate crisis and encouraging Hawai'i to lead the world towards a safe and sustainable climate and future. The Climate Protectors Hawai'i **SUPPORTS the bill's intent**, but respectfully **OPPOSES the bill unless it excludes hydrogen that is produced from fossil fuels or wood.**

The bill's intent is to have the Hawai'i Natural Energy Institute conduct a study of 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 results of the study shall be used to inform energy planning, which may include a Hawai'i Hydrogen Strategic Plan, decarbonization efforts, and other ongoing work being undertaken by the Hawai'i State Energy Office.

Comments and proposed amendment:

Studying hydrogen is not a bad idea, and the Climate Protectors Hawai'i do not oppose the bill. Such study should be undertaken with a healthy skepticism, however. Almost all hydrogen is currently produced from climate-killing methane, a potent greenhouse gas, or coal, and therefore is quite harmful for the climate when the extraction and production parts of the lifecycle are considered, as they properly should be. The Hawai'i Supreme Court has clarified that qualifying for the State definition of Renewable Energy and greenhouse gas neutrality does not satisfy the statutory need for Greenhouse Gas Analysis in the form of GHG Life Cycle Analysis.

The Climate Protectors Hawai'i propose an amendment to Section 1 of Bill SB2283 as follows:

Section 1. "The study shall consider: ... and (9) A Greenhouse Gas Life Cycle Analysis shall be performed for the production of hydrogen utilizing each renewable energy resource being considered."

Even if hydrogen is produced from clean renewable power that does not exacerbate climate warming, it does not appear to be viable for ground transportation, as the following recent Clean Technica article about a study by Dr. Patrick Plötz of the Fraunhofer Institute for Systems and Innovation Research in Germany makes clear. Dr. Plötz concludes:

"The use case for hydrogen is in industry — making [steel](#) and cement and fertilizers, for example. Researching ways to make that happen is well worth the investment in time and money, as those industries pump enormous amounts of carbon dioxide into the atmosphere every year. By all means, let's find ways to make those industries carbon neutral or even zero carbon."

Here is the article:

"Hydrogen For Cars & Trucks Is An Idea Whose Time Has Come — And Gone

The window for hydrogen-powered motor vehicles is closing fast, says a new report from Fraunhofer ISI.



By

[Steve Hanley](#)

Published

1 day ago

- [151 Comments](#)

Dr. Patrick Plötz of the Fraunhofer Institute for Systems and Innovation Research in Germany has published a new study at [Nature Electronics](#) (paywall) in which he says fuel cell cars and trucks have little chance of becoming commercially viable and that the urgency of the climate crisis demands decision makers focus on battery-electric vehicles instead. The gist of the study is available on [Charged EVs](#).

It's not that hydrogen will not play a role in reducing carbon emissions, he writes. "Hydrogen will play a vital role in industry, shipping and synthetic aviation fuels. But for road transport, we cannot wait for hydrogen technology to catch up, and our focus now should be on battery-electric vehicles in both passenger and freight transport. The window of opportunity to establish a relevant market share for hydrogen cars is as good as closed."

At the beginning of 2021, there were about 25,000 hydrogen fuel cell powered cars on the road, two FCEV models available — the Toyota Mirai and Hyundai Nexo — and about 540 hydrogen filling stations around the world. "In contrast, by the beginning of 2022, there are likely to be about 15 million battery-electric and plug-in hybrid vehicles on the road across the world. Almost all manufacturers now sell such vehicles, with more than 350 models available globally."

Recent technological developments have eliminated the main arguments in favor of FCEVs, namely longer range and shorter refueling times. "When battery-electric vehicles had limited ranges of under 150 km, and charging took a few hours, there was an important and large market segment for fuel cell vehicles — long distance travel. But battery electric vehicles now offer about 400 kilometers of real world range and the newest generation use 800 V batteries, which can be charged for a range of 200 kilometers in about 15 minutes."

Even in the trucking sector, batteries have left fuel cells behind. Plötz says there are currently some 30,000 battery-electric trucks in operation, mostly in China. More than 150 medium and heavy duty battery-electric truck models have been announced. "Fuel cell electric trucks, on the other hand, have only been operated in test trials (from two manufacturers) to date and are not yet commercially available."

"The current challenge for battery electric vehicles is long haul logistic operation (with an average of 100,000 km per year) and transport of very heavy goods (which implies high energy consumption per kilometer)," Plötz writes. "This is the use case often discussed for hydrogen trucks. Several truck manufacturers, as well as fuel cell and infrastructure providers, have joined forces and announced a target of 100,000 fuel cell trucks on European roads by 2030."

"But this seems very unlikely when contrasted with announcements from the companies about the earliest start date for the production of commercial series fuel cell electric trucks being in 2027. By that time, the second generation battery electric vehicles will already be commercially available and in operation."

Plötz admits long haul trucking of more than 500 kilometers per day "poses a challenge" for battery-electric trucks, but European regulations require truck drivers to stop for a 45-minute break after every 4.5 hours of driving. "Within 4.5 hours, a heavy truck could travel up to around 400 km, and thus practical [battery] ranges of about 450 km would suffice if high-power fast charging for battery-electric trucks was widely available."

He notes that specifications for the new megawatt charging system (MCS) standard, which could enable charging levels as high as 3.75 MW, are expected to be announced by the end of 2022, and a final standard is expected in 2023. According to [Green Car Reports](#), the MCS could swing the advantage back to electric trucks, but it is not yet clear whether it will be less expensive than

hydrogen. The total cost of ownership will ultimately be the determining factor in whether fuel cells or batteries dominate in trucking.

“Policymakers and industry need to decide quickly whether the fuel cell electric truck niche is large enough to sustain further hydrogen technology development, or whether it is time to cut their losses and to focus efforts elsewhere,” the study concludes.

The Hydrogen Dream

Oil and gas companies continue to greenwash their public communications with articles about the wonders of hydrogen. When it gets used to power a fuel cell (Toyota even has an internal combustion engine that burns hydrogen), the waste products are nothing more than water vapor and heat. What could possibly be “greener” than that?

The problem, as [anyone who reads CleanTechnica knows all too well](#), is that most hydrogen available today is derived from climate-killing methane (incorrectly known as “natural gas”) or coal. While it is possible to make it by splitting water into its component atoms, that takes a lot of electrical energy. Hydrogen advocates blithely say we can simply use excess renewable energy to do it, but that assumes wind and solar farms will be able to supply all the world’s needs with plenty left over to run electrolyzers. We are nowhere near close to that point today and won’t be for a decade or more.

Hydrogen is also much more expensive than renewable energy, so the economic advantage it enjoys as a fuel will be far less than it is for battery-electric vehicles, although [Bloomberg](#) does suggest that “green” hydrogen could be cheaper than “blue” hydrogen by 2030. That still is no guarantee it will be cheaper than electrons from renewable energy sources, at least when calculating the cost of [powering a motor vehicle from Point A to Point B](#). The dream of hydrogen-powered motor vehicles is dead. Time to move on.

The use case for hydrogen is in industry — making [steel](#) and cement and fertilizers, for example. Researching ways to make that happen is well worth the investment in time and money, as those industries pump enormous amounts of carbon dioxide into the atmosphere every year. By all means, let’s find ways to make those industries carbon neutral or even zero carbon.

The planet could use a rest from all the crud that gets pumped into the environment every hour of every day with the excuse that people need jobs and jobs depend on fossil fuels. They don’t. In the long term, they will depend on abundant, zero emissions energy, or else all the workers will be dead, along with virtually all human beings on Earth — a point the free market economists and capitalism advocates conveniently fail to include in their calculations.

It’s like saying humans need to breathe in oxygen to survive — which is true — while neglecting to point out they also need to exhale — which is equally true. An economy that is not sustainable is a lie told for private profit. Pursuing that lie will be the death of us all."

Please amend the bill as requested and as otherwise appropriate in light of the concerns expressed by Dr. Patrick Plötz.

Mahalo!

Climate Protectors Hawai'i (by Ted Bohlen)



Email: communications@ulupono.com

HOUSE COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION
Thursday, March 17, 2022 — 9:00 a.m.

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

Dear Chair Lowen 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, which requires the Hawai'i Natural Energy Institute (HNEI) to conduct a study to examine the State's ability to advance hydrogen production from local renewable energy resources and develop the Hawai'i Hydrogen Strategic Plan utilizing the results of its study, which shall be reviewed and updated every four years.

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



**Testimony to
The Committee on Energy & Environmental Protection**

**Thursday, March 17, 2022
9:00 AM
VIA Video Conference
Conference Room 325, Hawaii State Capitol**

SB 2283 SD2

Chair Lowen, Vice Chair Marten, and members of the committee,

Hawaii Gas **supports** **SB 2283 SD1**, 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.



DATE: March 17, 2022

TO: Representative Nicole Lowen
Chair, Committee on Energy and Environmental Protection

FROM: Tiffany Yajima

RE: **S.B. 2283, S.D.2 – Relating to the Hawaii Hydrogen Strategic Plan**
Hearing Date: Thursday, March 17, 2022 at 9:00 a.m.
Conference Room: 325

Dear Chair Lowen and Members of the Committee on Energy and Environmental Protection:

On behalf of the Alliance for Automotive Innovation (“Auto Innovators”) we submit these comments in **support** of S.B. 2283, SD2. This measure requires the Hawaii Natural Energy Institute to examine the State's ability to produce hydrogen from local renewable energy resources and develop 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 are supportive of 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.

SB-2283-SD-2

Submitted on: 3/14/2022 5:47:22 PM

Testimony for EEP on 3/17/2022 9:00:00 AM

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

Comments:

This is an important study to determine if hydrogen production will be a feasible investment in our future.

SB-2283-SD-2

Submitted on: 3/15/2022 3:34:08 PM

Testimony for EEP on 3/17/2022 9:00:00 AM

| Submitted By | Organization | Testifier Position | Testify |
|---------------------|---------------------|---------------------------|---------------------------|
| Andrea Quinn | Individual | Support | Written Testimony Only |

Comments:

Dear Honorable Committee Members:

Please support SB2283.

Thank you for the opportunity to present my testimony.

Andrea Quinn

Kihei, Maui