HAWAII STATE ENERGY OFFICE
STATE OF HAWAII

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Testimony of
MARK B. GLICK, Chief Energy Officer

before the
SENATE COMMITTEES ON
ENERGY, ECONOMIC DEVELOPMENT, AND TOURISM,
AGRICULTURE AND ENVIRONMENT,
AND
WATER AND LAND

Wednesday, February 14, 2024
1:45 PM
State Capitol, Conference Room 229 and Videoconference

In Support of
SB 2499

RELATING TO A PROGRAM TO CHARACTERIZE CARBON SEQUESTRATION POTENTIAL AND UNDERGROUND WATER RESOURCES STATEWIDE.

Chairs DeCoite, Gabbard, and Inouye, Vice Chairs Wakai, Richards and Elefante, and members of the Committees, I am writing in support of SB 2499 which provides resources to conduct slim-hole resource characterization to assist identification of geothermal energy throughout Hawai‘i.

In 2023, the Hawai’i State Energy Office (HSEO) analyzed market gaps in firm renewable resources and long duration storage, especially geothermal and pumped hydro, and developed policies and pursued funding opportunities to fill those gaps. Geothermal energy is heat that was generated during the planet’s formation stored in rocks and fluids and brought as steam to the earth’s surface using deep wells. The steam drives turbines to generate electricity.

The Center for Strategic and International Studies notes that like solar and wind energy, modern geothermal power plants have insignificant greenhouse gas (GHG) emissions with life-cycle emissions six to twenty times lower than natural gas and four times lower than solar photovoltaic (PV) energy due to the materials used to construct the plants.

Accordingly, it is HSEO's energy strategy to prioritize slim-hole test wells to understand where geothermal resources might exist on Maui, Hawaii, and Oahu. The ultimate goal is to stimulate private sector investment to ensure safe, reliable and affordable firm renewable energy throughout Hawai'i.

Concurrently, HSEO will engage energy stakeholders at the community level during 2024 and beyond to gain insight on how and where geothermal development can appropriately take place in ways that meaningfully benefit the affected communities.

Several obstacles have limited Hawai'i from fully developing its geothermal potential. Geothermal exploration is commercially risky and expensive. Developers have to drill multiple exploration wells before finding a reliable geothermal resource, and sometimes they do not find one at all. Private investors usually cannot mitigate and manage this risk independently.

Given the importance of geothermal in helping Hawai'i meet its firm renewable needs, government support to identify areas of geothermal potential is an appropriate first step towards incentivizing private sector investment and development of state-of-the-art geothermal resources. SB 2499 provides that needed support.

Thank you for the opportunity to testify.

Email: communications@ulupono.com

SENATE COMMITTEES ON ENERGY, ECONOMIC DEVELOPMENT & TOURISM,
AGRICULTURE & ENVIRONMENT, AND WATER & LAND
Wednesday, February 14, 2024 — 1:45 p.m.

Ulupono Initiative strongly supports SB 2499, Relating to a Program to Characterize Carbon Sequestration Potential and Underground Water Resources Statewide.

Dear Chair DeCoite, Chair Gabbard, Chair Inouye, and Members of the Committees:

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 choices, and better management of freshwater resources.

Ulupono strongly supports SB 2499, which requires the Hawai'i State Energy Office (HSEO) to implement a Slim-hole Resource Characterization Program that identifies the location and characteristics of underground water and carbon sequestration resources across the state under the direction of the Hawai'i Groundwater and Geothermal Resources Center at the University of Hawai'i; requires the HSEO to prepare an environmental assessment or, if required, an environmental impact statement for the program; and, requires the HSEO to engage with the counties and nearby communities to understand community needs, priorities, and concerns relating to the program before and during the environmental assessment and the program.

Hawai'i needs all viable forms of renewable energy to meet the 100% renewable portfolio standard by 2045. Furthermore, the Hawai'i State Energy Office in its recently published Hawai'i Pathways to Decarbonization Report identifies, among other things, the significant need for additional renewable energy generation to meet broader economy-wide decarbonization goals.[1] Wind and solar alone are not enough. Firm sources, such as geothermal, will also be necessary.

Hawai'i also faces many competing demands for available land. Geothermal projects use the least amount of land per megawatt of renewable power produced. As reported by Hawai'i Public Radio in 2019, "[r]esearch recently presented by graduate student Ted Brennis with the

[1] Hawai'i Pathways to Decarbonization Act 238, Session Laws of Hawai'i 2022, Report to the 2024 Hawai'i State Legislature December 2023. https://energy.hawaii.gov/wp-content/uploads/2024/01/Act-238_HSEO_Decarbonization_Report.pdf

Hawai'i Groundwater and Geothermal Resources Center indicates that where resources are available, geothermal is competitive with wind and solar on both cost and land use."[2]

Most residents seem to believe the Big Island is the only place in which geothermal energy can be commercially produced, and yet that assumption has never been thoroughly researched and confirmed. Ulupono supports the work of the Hawai'i Technology Development Corporation to further the discovery and development of geothermal resources.

Thank you for the opportunity to testify.

Respectfully,

Micah Munekata
Director of Government Affairs

[2] https://www.hawaiipublicradio.org/local-news/2019-07-25/unexplored-geothermal-potential-may-offer-solution-to-renewables-reliability-problem. Report cited can be found at https://www.higp.hawaii.edu/hggrc/wp-content/uploads/2019/07/Brennis-Ted-2019.07.23-Thesis-Presentation.pdf

www.sustainableeneryhawaii.org

February 12, 2024

SUPPORT FOR SB2499 – RELATING TO A PROGRAM TO CHARACTERIZE CARBON SEQUESTRATION POTENTIAL AND UNDERGROUND WATER RESOURCES STATEWIDE.

Aloha Chairs DeCoite, Gabbard, and Inouye, Vice Chairs Wakai, Richards, and Elefante, and members of the Committees,

Sustainable Energy Hawai'i (SEH) supports SB2499.

SB2499 *"Requires the Hawai'i State Energy Office to implement a Slim-hole Resource Characterization Program that identifies the location and characteristics of underground water and carbon sequestration resources across the State under the direction of the Hawai'i Groundwater and Geothermal Resources Center at the University of Hawai'i. Requires the Office to prepare an environmental assessment or, if required, an environmental impact statement for the program. Requires the Office to engage with the counties and nearby communities to understand community needs, priorities, and concerns relating to the program before and during the environmental assessment and the program."*

Hawai'i has unique resources that, properly utilized, will contribute to the State's energy independence and economic resilience, and enable social equity. Importantly, these can allow our State to contribute significantly to critical climate action. SB2499 will help fund efforts to help us properly utilize these resources.

We have groundwater and heat resources and the geology to enable the storage of legacy carbon. These opportunities are well-known to our institutions, including the Hawai'i Groundwater and Geothermal Resources Center. Their researchers have conducted studies on the deep groundwater and heat resources in Hawai'i. Research is also progressing on the potential to store carbon in basalt found on our islands, particularly Hawai'i Island.

Our ability to properly capture and store legacy carbon in basalt offers not only the opportunity to help reduce planet-warming emissions but also has the potential to generate economic benefit[1] - there are significant incentives for the capture and storage of carbon dioxide.

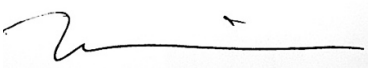
However, this process is challenging, requiring significant energy, the right technology, and community acceptance. There are also critical considerations - carbon capture must not hamper our efforts to deliver affordable, clean electricity for our people, must not delay our goal to decarbonize electricity, and must not prolong our dependence on fossil fuel imports.

[1] https://climate.mit.edu/ask-mit/how-much-captured-co2-worth

More must be done to fully understand the various environmental, cultural, and economic considerations before we can realize the benefits of our groundwater and basaltic carbon capture opportunities. SB2499 will enable this understanding by investing in the efforts of the Hawai‘i Groundwater and Geothermal Resources Center.

Please support SB2499.

Thank you for the opportunity to testify,



Noel Morin
Chair, Board of Directors
Sustainable Energy Hawai‘i
noel@sustainableenergyhawaii.org

Sustainable Energy Hawai‘i is a 501(c)3 non-profit dedicated to improving the quality of life for Hawai‘i residents. Our mission is to enable an economic, social, and environmental revival in Hawai‘i through a just transition to sustainable, locally sourced renewable energy and, to that end, the creation of a thriving clean hydrogen economy.

SB-2499
Submitted on: 2/12/2024 2:50:05 PM
Testimony for EET on 2/14/2024 1:45:00 PM

Submitted By	Organization	Testifier Position	Testify
Ted Bohlen	Testifying for Climate Protectors Hawaii	Support	Written Testimony Only

Comments:

Climate Protectors Hawaii supports UH research into resources. That doesn't necessarily mean development of these resources is appropriate, but it is prudent to know what ressources there are in Hawaii.

Please pass this bill!

Mahalo!

Climate Protectors Hawaii (by Ted Bohlen)

SB-2499
Submitted on: 2/11/2024 7:36:19 AM
Testimony for EET on 2/14/2024 1:45:00 PM

Submitted By	Organization	Testifier Position	Testify
Richard Ha	Individual	Support	Written Testimony Only

Comments:

Aloha Senators

i am a very very strong supporter of HGGRC and Geothermal for stable electricity prices forever.

There are 5 volcanoes on Hawai'i Island. We will be located over the "hot spot" for 1-2 million years. The heat underneath us will rise as steam that can spin turbines to generate electricity. That steam is free. We need to characterize the resource so we can assess the risks. Kilauea and Mauna Loa are active and high risk. Maunakea, last erupted 4,000 years ago. Hualalai and Kohala erupted even longer back in time. The Hawai'i Groundwater and Geothermal Resource Center (HGGRC) is the worlds expert in our special volcanology.

Aloha

Richard Ha

SB-2499
Submitted on: 2/9/2024 12:30:07 PM
Testimony for EET on 2/14/2024 1:45:00 PM

Submitted By	Organization	Testifier Position	Testify
Jacqueline S. Ambrose	Individual	Support	Written Testimony Only

Comments:

Aloha,

RELATING TO A PROGRAM TO CHARACTERIZE CARBON SEQUESTRATION POTENTIAL AND UNDERGROUND WATER RESOURCES STATEWIDE.

Requires the Hawaii State Energy Office to implement a Slim-hole Resource Characterization Program that identifies the ocation and characteristics of underground water and carbon sequestration resources across the State under the direction of the Hawaii Groundwater and Geothermal Resources Center at the University of Hawaii. Requires the Office to prepare an environmental assessment or, if required, an environmental impact statement for the program.

Requires the Office to engage with the counties and nearby communities to understand community needs, priorities, and concerns relating to the program before and during the environmental assessment and the program. Requires reports to the Legislature. Declares that the general fund expenditure ceiling is exceeded. Make appropriations.

SB-2499
Submitted on: 2/11/2024 1:54:22 PM
Testimony for EET on 2/14/2024 1:45:00 PM

Submitted By	Organization	Testifier Position	Testify
Alice Kim	Individual	Support	Written Testimony Only

Comments:

As the State of Hawaii should encourage groundwater exploration and carbon sequestration, I strongly support SB 2499.

As Hawaii is the only U.S. state without an official geological survey, the University of Hawaii (UH) contributed a bulk of what we know about Hawai‘i’s geology. As a UH research unit, the Hawaii Groundwater and Geothermal Resources Center (HGGRC) is well equipped for groundwater research. Through HGGRC, the state’s most prominent earth scientists are researching Hawaii’s groundwater resources. HGGRC obtained land access for research from dozens of landowners across the state. For research equipment, HGGRC has access to $1 million worth of geophysical equipment and a $3 million drill rig.

HGGRC is now exploring carbon sequestration with Hawaii’s basaltic rocks, which make up almost all of Hawaii’s land mass. As the first organization in Hawaii to conduct this research, HGGRC is collaborating with research institutions outside of Hawaii. One of the institutions, Lawrence Berkeley National Laboratory, has already developed considerable expertise in this type of carbon sequestration.

This project will involve geotechnical and hydrological research, engineering, and application and may bring the state to net zero or negative carbon emissions. The project will improve the understanding of Hawaii’s groundwater resources and will promote the state’s sustainability goals.

HGGRC has also provided students and new professionals hands-on research experiences and education. Over the years, HGGRC sponsored employment of dozens of employees, and HGGRC scientists provided academic advising for undergraduate and graduate students.

Please invest in developing knowledge of water--our most precious resource--and carbon dioxide storage and mineralization in Hawaiian basalt. We must also invest in highly skilled, educated professionals and infrastructure for Hawaii’s future livelihood and sustainability. Please support SB 2499.

SB-2499
Submitted on: 2/9/2024 10:34:27 PM
Testimony for EET on 2/14/2024 1:45:00 PM

Submitted By	Organization	Testifier Position	Testify
Stanley Osserman	Individual	Support	Written Testimony Only

Comments:

Prudent assessment of potential geothermal resources across the State of Hawaii is critical. This bill is vital in that role!

SB-2499
Submitted on: 2/10/2024 9:41:47 AM
Testimony for EET on 2/14/2024 1:45:00 PM

Submitted By	Organization	Testifier Position	Testify
Selah levine	Individual	Oppose	Written Testimony Only

Comments:

I oppose the funding for this bill. The water has not been tested in the communities surrounding PGV since 2015. Because we have porous volcanic rock in lower Puna, which has expanded and changed drastically in the vicinity of PGV since the 2018 eruption, both above and below ground, it is possible that contamination of our water has already occurred. If any funding is to be appropriated, it should first be to test the water in the community that has had more than 30 years of possible contamination before any other water sources are to be identified.

SB-2499
Submitted on: 2/12/2024 11:12:27 AM
Testimony for EET on 2/14/2024 1:45:00 PM

Submitted By	Organization	Testifier Position	Testify
Regina Gregory	Individual	Oppose	Written Testimony Only

Comments:

underground carbon sequestration is a bad idea