DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

KA ʻOIHANA HOʻOMOHALA PĀʻOIHANA, ʻIMI WAIWAI A HOʻOMĀKAʻIKAʻI

JOSH GREEN, M.D.
GOVERNOR

SYLVIA LUKE
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Statement of
JAMES KUNANE TOKIOKA
Director
Department of Business, Economic Development, and Tourism
before the
SENATE COMMITTEE ON ENERGY AND INTERGOVERNMENTAL AFFAIRS

Tuesday, February 17, 2026
3:05 PM
State Capitol, Conference Room 224

In Support of
SENATE BILL NO. 3081
RELATING TO A PROGRAM TO CHARACTERIZE THE POTENTIAL OF UNDERGROUND ENERGY RESOURCES STATEWIDE.

Chair Wakai, Vice Chair Chang and members of the Committee, the Department of Business, Economic Development and Tourism (DBEDT) supports SB 3081 as a priority DBEDT and Administration measure to accelerate Hawaiʻi's energy transition. SB 3081 aligns with DBEDT's Economy for Resilience framework, which prioritizes firm renewable energy, economic diversification, infrastructure readiness, and long-term cost stability for Hawaiʻi residents and businesses. Characterizing underground geothermal and carbon sequestration resources is a foundational investment that strengthens energy security, reduces imported fuel dependency, and supports sustainable economic growth across multiple sectors including agriculture, advanced manufacturing, and the blue economy. If appropriately funded, SB 3081 would help the state reach its energy self-sufficiency targets and increase affordability by enabling DBEDT to administer a statewide Geothermal Resources Characterization Program through HSEO and supported by the Hawaiʻi Groundwater and Geothermal Resources Center at the University of Hawaiʻi.

Conducting research via slim-hole test wells is a high priority of Hawai‘i's updated energy strategy because of the potential to clearly identify where geothermal resources might exist, with a focus on Maui, Hawai‘i, and O‘ahu. The ultimate goal is to stimulate private sector investment in producing safe, reliable, and affordable firm renewable energy that can make Hawai‘i energy self-sufficient and reduce electricity costs and carbon emissions. This exploration would inform DBEDT, the Public Utilities Commission, and other policymakers about how far geothermal can take Hawai‘i towards meeting its 100% renewable portfolio targets on Maui, Hawai‘i and O‘ahu. From an economic development standpoint, this initiative reduces exploration risk, improves market transparency, and creates conditions necessary for private capital deployment in firm renewable energy infrastructure. By lowering uncertainty through state-sponsored characterization, Hawai‘i can reduce risk premiums embedded in future power purchase agreements, thereby lowering long-term electricity costs and improving business competitiveness statewide.

The measure will also inform where underground water resources can be found and the longer-term potential for subsurface carbon sequestration. Further provisions provide accountability and transparency through HSEO’s preparation and submission of a progress report to the Legislature with research outcomes and any proposed legislation emanating from the research findings. The data generated through this program also supports broader resilience objectives. Improved understanding of subsurface water temperatures and geological conditions may inform agricultural irrigation planning, food security initiatives, and future industrial applications that rely on reliable energy and water access. This integrated resource mapping strengthens Hawai‘i’s long-term land use and infrastructure planning.

To effectively and responsibly conduct this statewide resource characterization effort, DBEDT supports the appropriation of no less than $6,000,000 from the Energy Security Special Fund, as provided in the measure. This investment is strategic in nature and designed to catalyze significantly larger private sector investment while preserving fiscal discipline by reducing long-term procurement and ratepayer risk.

This measure is informed by HSEO's analysis of market gaps in firm renewable resources and long duration storage, especially geothermal and pumped hydro. Hawai‘i is fortunate to have subsurface heat from geothermal energy remaining from Earth's formation that is stored in rocks and fluids. Through deep wells, the heat can be brought to the surface as steam to drive turbines that generate electricity. However, it is not economically feasible to procure geothermal development through the competitive bidding process without first providing evidence of geothermal potential in specific locations. Without such evidence, developers must drill multiple, costly exploration wells with the risk that they may not discover a reliable geothermal resource, if they decide to participate at all. The uncertainty is passed on to ratepayers via a risk premium added to the developer's bid. This measure would mitigate the risk premium and increase production royalties to Hawai‘i through State-sponsored slim-hole research that first identifies locations where hot water is sufficient for electric power generation. Hawai‘i's renewable portfolio standard requires not only variable renewable resources such as solar and wind, but also firm, dispatchable renewable energy to stabilize the grid and avoid continued reliance on imported fossil fuels. Geothermal represents one of the few scalable, in-state firm renewable options available. Advancing characterization now ensures Hawai‘i maintains optionality in its future energy mix.

In addition to the economic development and energy self-sufficiency benefits of geothermal, geothermal offers the least land-intensive renewable energy resource option in Hawai‘i and the Center for Strategic and International Studies credits modern

geothermal power plants as having 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.

Concurrently, HSEO will engage energy stakeholders at the community level during 2026 and beyond to gain insight on how and where geothermal development can appropriately take place in ways that meaningfully benefit the affected communities. DBEDT recognizes that community engagement, cultural consultation, and environmental review under Chapter 343, HRS, are essential components of responsible development. SB 3081 appropriately requires environmental assessment or environmental impact review prior to development activities and mandates annual reporting to the Legislature, ensuring transparency and legislative oversight.

Given the importance of firm renewable energy in achieving Hawai‘i’s decarbonization, affordability, and energy independence goals, government-supported resource characterization is a prudent first step in advancing the State’s Economy for Resilience strategy. With appropriate funding, SB 3081 provides the data-driven foundation necessary to unlock private investment, strengthen grid reliability, and position Hawai‘i for long-term economic stability.

Thank you for the opportunity to testify.

HAWAII STATE ENERGY OFFICE
STATE OF HAWAII

JOSH GREEN, M.D.
GOVERNOR

SYLVIA LUKE
LT. GOVERNOR

MARK B. GLICK
CHIEF ENERGY OFFICER

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Testimony of
MARK B. GLICK, Chief Energy Officer

before the
SENATE COMMITTEE ON ENERGY AND INTERGOVERNMENTAL AFFAIRS

Tuesday, February 17, 2026
3:05 PM
State Capitol, Conference Room 224 and Videoconference

In Support of
SENATE BILL NO. 3081

RELATING TO A PROGRAM TO CHARACTERIZE THE POTENTIAL OF UNDERGROUND ENERGY RESOURCES STATEWIDE.

Chair Wakai, Vice Chair Chang and Members of the Committee, the Hawai‘i State Energy Office (HSEO) supports Senate Bill No. 3081 as a priority Administration measure to accelerate Hawai‘i’s energy transition. If appropriately funded, SB 3081 would enable the HSEO to administer a statewide Geothermal Resources Characterization Program supported by the Hawai‘i Groundwater and Geothermal Resources Center at the University of Hawai‘i.

Conducting research via slim-hole test wells is a high priority of Hawai‘i's updated energy strategy because of the potential to clearly identify where geothermal resources might exist, with a focus on Maui, Hawai‘i, and O‘ahu. The ultimate goal is to stimulate private sector investment in producing safe, reliable, and affordable firm renewable energy that can make Hawai‘i energy self-sufficient and reduce electricity costs and carbon emissions. HSEO’s updated energy strategy indicates that better understanding of the location of geothermal potential greatly improves the potential to meet the 100% renewable portfolio targets on Maui, Hawai‘i, and possibly even O‘ahu.

The measure will also inform where underground water resources can be found and the longer-term potential for subsurface carbon sequestration. Further provisions

provide accountability and transparency through HSEO’s preparation and submission of a progress report to the Legislature with research outcomes and any proposed legislation emanating from the research findings.

To effectively and broadly conduct this research, HSEO requests no less than $6,000,000 to carry out this program.

This measure is informed by HSEO’s analysis of market gaps in firm renewable resources and long duration storage, especially geothermal and pumped hydro. Hawai‘i is fortunate to have subsurface heat from geothermal energy remaining from Earth’s formation that is stored in rocks and fluids. Through deep wells, the heat can be brought to the surface as steam to drive turbines that generate electricity. However, it is not economically feasible to procure geothermal development through the competitive bidding process without first providing evidence of geothermal potential in specific locations. Without such evidence, developers must drill multiple, costly exploration wells with the risk that they may not discover a reliable geothermal resource, if they decide to participate at all. The uncertainty is passed on to ratepayers via a risk premium added to the developer’s bid. This measure would mitigate the risk premium and increase production royalties to Hawai‘i through State-sponsored slim-hole research that first identifies locations where hot water is sufficient for electric power generation.

In addition to the economic development and energy self-sufficiency benefits of geothermal, the Center for Strategic and International Studies credits modern geothermal power plants as having 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.

Concurrently, HSEO will engage energy stakeholders at the community level during 2026 and beyond to gain insight on how and where geothermal development can appropriately take place in ways that meaningfully benefit the affected communities.

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. With the apporpiate level of funding, SB 3081 would provide that needed support.

Thank you for the opportunity to testify.

SB-3081
Submitted on: 2/15/2026 7:55:39 PM
Testimony for EIG on 2/17/2026 3:05:00 PM

Submitted By	Organization	Testifier Position	Testify
Kanoeuluwehianuhea Case	Testifying for Na Wai Ho'ola Nui La'au Lapa'au, Truth for the People	Oppose	In Person

Comments:

Position: Bill Number SB3081 RELATING TO A PROGRAM TO CHARACTERIZE THE POTENTIAL OF UNDERGROUND ENERGY RESOURCES STATEWIDE.

Aloha Senate Committee on Energy and Intergovernmental Affairs,

Senator Glenn Wakai, Chair
Senator Stanley Chang, Vice Chair

My name is Kanoeuluwehianuhea Case, Co-founder of Na Wai Ho'ola Nui La'au Lapa'au Foundation in collaboration with Keaukaha Action Network and Truth For the People grassroots initiative standing in protection of Aloha ʻĀina to protect our "Natural resources" otherwise known to Kanaka as our Na Akua, elemental beings from invasive developments such as geothermal in the name of "Renewable Energy". 'O Mauna A Wakea no ku'u Mauna, ʻO Waimea Moku ʻO Keawe mai au.

I respectfully submit this testimony in STRONG OPPOSITION to SB3081, a bill RELATING TO A PROGRAM TO CHARACTERIZE THE POTENTIAL OF UNDERGROUND ENERGY RESOURCES STATEWIDE and would authorize geological subsurface characterization activities through the Geothermal Resources Characterization Program under the direction of the University of Hawaiʻi Groundwater and Geothermal Resources Center, and appropriates funds for that purpose. There in which undermining the cultural, environmental, and public health concerns deeply felt by many Native Hawaiians and community members under the guise of research.

As a Lineal Descendant of our Hawai'i, I submit this testimony in strong opposition to any bill or measure authorizing industrialized geothermal exploration and development that would result in drilling into Kūpuna Pele within and throughout Moku o Keawe and equally in opposition to DHHL statewide Geothermal Exploration and Development initiative on public trust lands and Department of Hawaiian Home Lands (DHHL) Crown trust lands on any of our Moku of Hawai'i Nui Akea.

These Bills represent a fundamental shift toward institutionalizing geothermal exploration under the guise of research while simultaneously weakening environmental protections and public oversight by minimizing the affects of slim bore holes for research purposes. Of particular concern is the University of Hawai‘i Groundwater and Geothermal Resources Center which has been actively advancing legislative proposals that would override or shortcut existing environmental review requirements, including those involving seismic monitoring related to groundwater and geothermal exploration on Department of Hawaiian Home Lands (DHHL) and public trust lands.

Geothermal is not merely an “energy resource.” It is Kūpuna Pele. For Kanaka or by definition in legislative matters Native Hawaiians, geothermal activity is the physical manifestation of a living ancestral presence, inseparable from our genealogies, ceremonies, and spiritual obligations to ‘āina. To authorize industrialized geothermal development is to authorize drilling into the body of Kūpuna Pele herself. This act constitutes desecration of a sacred elder and severs an enduring cultural relationship that predates the State of Hawai‘i. No economic valuation can replace this relationship, and no regulatory framework can render such desecration acceptable.

Because of this cultural reality, industrialized geothermal development and drilling into Kūpuna Pele are fundamentally incompatible with the State’s constitutional and statutory duties. Article XI, Section 7 of the Hawai‘i State Constitution establishes that natural resources are held in public trust for the benefit of present and future generations. The public trust doctrine imposes an affirmative obligation upon the State to protect these resources and to prevent their impairment. Authorizing industrial drilling into geothermal systems prioritizes commercial extraction for monetary gain over protection and violates this constitutional mandate. There is no balance with invasive desecration of our already limited resources, and Akua PELE is not a resource to be tampered with.

These obligations are further reinforced by the Hawai‘i Admissions Act of 1959, which transferred former Crown and Government Lands to the State to be held in trust for specific public purposes. Those lands — often referred to as ceded lands — are subject to fiduciary duties that require their management for the benefit of the public and Native Hawaiians. Industrialized geothermal development and drilling into Kūpuna Pele on these lands constitutes a misuse of trust assets and a breach of the State’s fiduciary responsibilities under both federal and state law.

The history of geothermal development in Hawai‘i, particularly in Wao Kele o Puna, illustrates this constitutional failure. In the late 1980s and 1990s, Native Hawaiian practitioners and community members engaged in sustained protests to protect Wao Kele o Puna from industrialized geothermal development and drilling into Kūpuna Pele. Despite clear evidence of cultural, ecological, and spiritual significance, the State advanced geothermal drilling in the area, resulting in arrests of protectors, prolonged litigation, and irreversible disruption of a living forest ecosystem. These actions demonstrated the State’s prioritization of industrial extraction over its public trust duty to protect trust resources and Native Hawaiian traditional practices.

Rather than serving as a cautionary example, current geothermal proposals repeat the same pattern of constitutional disregard. The State now seeks to expand industrialized geothermal exploration under a statewide initiative, including on DHHL lands and former Crown and

Government Lands, once again elevating energy policy and projected revenue generation in the name of Public Health as if it will contribute to the betterment of our People over its constitutional and fiduciary obligations to actually safe guard our people from harmful affects culturally, mentally, spiritually and physically. This initiative would further entrench the practice of drilling into Kūpuna Pele as a matter of public policy. This is not a localized land-use issue; it is a systemic threat to the trust corpus across all islands.

Industrialized geothermal development and drilling into Kūpuna Pele further endanger interconnected trust resources, including groundwater, air quality, and geologic stability. These risks are especially acute on the Moku o Keawe, where volcanic and aquifer systems are inseparable from subsistence practices, burial grounds, and ceremonial sites. The State cannot lawfully authorize degradation of these resources under Article XI, Section 7 of the Hawai‘i State Constitution or under the fiduciary standards imposed by the Admissions Act of 1959 in the name of speculative energy benefit.

Geothermal exploration is not a neutral scientific activity. It involves intrusive testing, drilling, and seismic monitoring that directly affect subsurface water systems, geologic stability, and culturally significant landscapes. Framing these activities as “characterization” does not change their physical impact or their legal implications.

WE DO NOT CONSENT TO ANY GEOTHERMAL DEVELOPMENT IN HAWAI'I.

The proposal of industrialized geothermal exploration, development and drilling into Kūpuna Pele on trust lands without consent reflects a failure to honor both the cultural foundations of these lands and the legal obligations established to protect them. Lineal Descendants and DHHL Beneficiaries are not merely stakeholders; we are Lineal Descendants of our Hawai’i, trust beneficiaries whose rights must guide, not follow, legislative action.

Accordingly, I urge this Committee to reject this measure because it:

1. Authorizes geothermal exploration under the guise of research while weakening environmental review;

2. Undermines protections for groundwater, seismic stability, and culturally significant lands;

3. Threatens DHHL and public trust lands with intrusive exploration activities; and

4. Prioritizes energy policy over environmental law and trust obligations.

Energy planning must not come at the expense of environmental integrity, public trust responsibilities, or Native Hawaiian rights.

Energy policy must not override culture. Revenue must not override constitutional and fiduciary law. Industrialized development must not override ancestral relationship.

For these reasons, I respectfully request that this Committee uphold their fiduciary obligations and Public Trust duty and decline any measure requesting funding and authorizing industrialized geothermal exploration or development that would result in drilling into Kūpuna Pele on ANY lands in our Hawai'i held in public trust, former Crown and Government, and DHHL lands.

Mahalo for the opportunity to submit this testimony.

Kanoeuluwehianuhea Case

Moku O Keawe

Founder of Na Wai Ho'ola Nui La'au Lapa'au Foundation
Co-Collaborator of Truth for the People

SB-3081
Submitted on: 2/15/2026 10:50:04 PM
Testimony for EIG on 2/17/2026 3:05:00 PM

Submitted By	Organization	Testifier Position	Testify
Terri Napeahi	Testifying for Truth for the people & Keaukaha Action Network	Oppose	In Person

Comments:

We Strongly Oppose this measure!

Donald Thomas and Protégé Nicole Lautze of UH/HGGRC finally found a State Agency willing to continue money laundering Tax payers money. DHHL is not ignorant to the long history Geothermal has had in opposition on Moku 'o Keawe! The State is ignoring historical record of Geothermal initiatives and its failures. The people of Moku 'o Keawe will always distrust the initiatives of Geothermal‘ because it is not renewable and clean. We have attended the first readings of Geothermal bills in the House the last two weeks and are appalled at the language you have all tried to skirt around in the bills produced by SoE, HGGRC, DHHL, UH, Nicole Lowen & DBEDT.The laws you all have tried to skirt around by eliminating the Environmental Review Process, is hewa and a sure play of pilau! Environmental Reviews on DHHL will be NEPA and NHPA Section 106 Consultation. We "Native Hawaiians" are the only ethnic group involved in this process, which will discuss impacts of TCP. Judicial challenges have happened in the past and the opportunity is always available at present!

It is so obvious that the tactics being played by State Agencies, private corporations, Legislators and University is pure corruption.

Donald Thomas helped the State, Fed and County lose $80 million dollars of Tax payers in the 80's. Donald Thomas has done thermal subsurface testing in various areas through out the State in the early eighties. Protoge' Nicole Lautze is doing the same, by doing ground Water testing, and plan to tap into the sacred waters of Maunakea. That is not going to go well with the people of our Moku. The maps of potential drill sites on DHHL Lands, are areas of Cultural significant, that will be scrutinized by our organizations every step of the way. The areas are a hit or miss, and does not have the same permits for drilling Water. Humu'ula or Maunakea is far away from the source. You will lose money again.
Do not make the same mistake all over again. The greed for money (royalties) will be the down Fall of this "Beast."

Don‘t do it! Don't pass this measure!

Sincerely

Terri Napeahi

Truth for the People!
tnapeahi@yahoo.com

SB-3081
Submitted on: 2/15/2026 11:44:08 PM
Testimony for EIG on 2/17/2026 3:05:00 PM

Submitted By	Organization	Testifier Position	Testify
Terri Napeahi	Testifying for Truth for the People	Oppose	In Person

Comments:

To Honorable Legislators of EIG.

My name is Terri Napeahi of Truth for the people.

I strongly oppose this measure! Do not support this measure! Geothermal initiatives in the past lost $80 million dollars. You will lose this money again.
Donald Thomas Geochemist did thermal subsurface Studies in the 80‘s, and received millions and have had nothing to show. This is not our first Rodeo! Nicole Lautze protege‘ is doing the same only calling it Characterization Studies, with probability maps! Meaning "not guarantee or maybe. Don't waste the money from tax payers again!

Don‘t do it! Don't pass this measure!

mahalo,

Truth for the people,

Don‘t do it,
Terri Napeahi
"Lau Lima i ka Hapai Pohaku"

Email: communications@ulupono.com

SENATE COMMITTEE ON ENERGY AND INTERGOVERNMENTAL AFFAIRS
Tuesday, February 17, 2026 — 3:05 p.m.

Ulupono Initiative supports SB 3081, Relating to a Program to Characterize the Potential of Underground Energy Resources Statewide.

Dear Chair Wakai and Members of the Committee:

My name is Micah Munekata and I am the Vice President 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 supports SB 3081, which establishes the Underground Energy Resources Characterization Program to identify the location and characteristics of underground energy resources through the use of slim-hole bores and requires a related environmental assessment or environmental impact statement.

Hawai'i needs all viable forms of renewable energy to meet the 100% renewable portfolio standard by 2045. New data underscores the widespread support among residents for this transition. Between October 2023 and January 2024, Ulupono Initiative partnered with Anthology Research to conduct a statewide public opinion survey on energy in Hawai'i involving 1,985 surveys across all four counties. With a margin of error +/- 2.21%, this is arguably the most extensive and comprehensive study on the topic to date. The findings are compelling.

A staggering 91% of respondents expressed their support for the expansion of renewable energy resources throughout the islands. Moreover, the importance of developing Hawai'i's own energy resources was emphasized across all counties by the residents. This resounding endorsement from the community validates the strong support for continued investment and advancement in renewable energy solutions to meet our collective energy goals.

This bill is a forward-looking initiative that prioritizes scientific research and environmental stewardship. By identifying geothermal and carbon sequestration resources, this measure supports Hawai'i's broader goals of achieving energy resilience and combating climate change. Resource characterization through slim-hole bores offers a minimally invasive method for gathering critical data, ensuring that these activities are conducted responsibly and with

minimal environmental disruption. This approach reflects a commitment to balancing energy development with environmental protection.

As the State advances resource exploration activities, Ulupono believes robust, early and ongoing community engagement must be a foundational element of this work. This engagement must take place in parallel with any exploration activities, as it is also important to understand the scope and potential resources to have a deeper conversation about what is at stake. Meaningful engagement—particularly with Native Hawaiian communities, cultural practitioners, and residents of nearby areas—is essential to ensuring these efforts are grounded in place-based knowledge, cultural awareness, and community priorities. Proactive outreach that clearly explains the purpose of the exploration, listens to concerns, and incorporates local perspectives helps build trust and increases the likelihood that any resulting resource development delivers real, lasting benefits to the people of Hawai‘i rather than unintended impacts. Our support is contingent upon ensuring that exploration efforts stay aligned with community priorities as well as Hawai‘i’s broader renewable energy and sustainability goals for the long-term benefit of its residents.

Thank you for the opportunity to testify.

Respectfully,

Micah Munekata
Vice President, Government Affairs

SB-3081
Submitted on: 2/14/2026 1:07:23 PM
Testimony for EIG on 2/17/2026 3:05:00 PM

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

Comments:

As I support geothermal resource development and carbon sequestration, the Hawaii Groundwater and Geothermal Resources Center (HGGRC) should execute the geothermal resource characterization. Through this University of Hawaii research unit, the State of Hawaii'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 (Notably, Puna Geothermal Venture is the only other geothermal-focused organization in Hawaii that has a suitable drill rig). The State can further benefit from HGGRC and UH's research, expertise, and resources.

Sara Steiner
13-430 Pohoiki Road
P.O. Box 1081
Pahoa, Hawaii 96778
808-936-9546
pahoatoday@gmail.com

February 10, 2026

RE: **VEHEMENTLY OPPOSE SB3081** RELATING TO CHARACTERIZING POTENTIAL OF UNDERGROUND ENERGY RESOURCES

Dear COMMITTEE ON ENERGY AND INTERGOVERNMENTAL AFFAIRS:

I agree, Hawaii does need to find the location of POTABLE WATER around the islands, because how many years has it been since any water wells have been drilled to service the Kohala – Kona side? Those people are constantly on water restriction because the Water Agency(s) do not keep replacements for their pumps. This is no way to live and certainly no way to promote Agriculture.

From there we move to why I disagree with this bill:

1. Geothermal is not clean energy, it spews deadly Hydrogen Sulfide and multiple other toxins (mercury, lead, radon, cadmium, etc) into the air because they do not operate "closed loop systems", there is no way to prevent corrosion and the pipes, seals and flanges are continually rotting and need to be replaced. So far, the Health Department has only enacted rules to protect the pollutors and not the residents leading to dozens of lawsuits in the last 40 years. Somehow you in the Legislature just aren't being told the truth by the geothermal pushers.

2. No Drilling Slim Boreholes Without Environmental Assessments. Drilling into the ground causes earthquakes which can travel along faults for many miles and trigger bigger quakes. Drilling into the ground uses Chemicals which are toxic to humans, water life and animal life. Thinking you don't need an EA to poke around and disturb the underground environment is NOT PONO. You don't just drill wherever you want and then get the EA after the fact in case you find something interesting…

3. Where is any Robust Community Engagement? So far, for the last 40 years, the State has done all it possibly can to Discredit The Community Living Around Geothermal in Puna. In 2001, Annie Szvetecz from the University of Montana did her thesis on "Geothermal energy in Hawai'i: an analysis of promotion and regulation available at:
https://scholarworks.umt.edu/cgi/viewcontent.cgi?article=9293&context=etd
Ms. Szvetecz notes that the true history of geothermal energy was glossed over and the people were given an alternative prospective that was all positive, no environmental impacts, no health impacts and a "safe indigenous source of energy".

Then we have Kara Neal's 2024 University of Hawaii Thesis: Renewing Community Trust: Fostering Pilina and Embracing Cultural Knowledge for Renewable Energy Planning. I can't find it anywhere online. You know why I think that is? Because she notes that there is No Trust in Hawaii Government over geothermal so far and the public needs to be involved. That means the Public Who Already Has Lived Next To A Geothermal Plant – not the pushing to locals about "feel good using the heat of the earth to make clean, green, cheap power" while not noticing that geothermal plants on the Mainland and other areas are Source Monitored – Hydrogen Sulfide, Seismicity and Subsidence…

Then you have the Public Outreach by Waika Consulting. They started coming around the Big Island with their feel-good indigenous stories of New Zealand geothermal. They don't talk about Hydrogen Sulfide, Earthquake, Subsidence, Emergency Response, Entire Power Plants Must Be Kept At the Ready because Geothermal gets knocked offline by power pole issues, lightening strikes, hurricanes and lava flows – where it takes days, to months to years where other power plants have to make up PGV's lack. Ask HELCO how many times PGV made their quota? Never to Maybe One Time in the last 30 years!! LOL, that is not a great power producer that is a highly variable toxic nightmare!!!

4. I agree that the State needs to prioritize its general funds. Subsidizing energy exploration is not a good way to use Hawaii's limited resources. Let the rich energy companies who want to build and sell expensive stinky geothermal power to the state PAY to explore for it! How much you wanna bet they won't? My colleague Larry Wood has broken down all the special perks and laws and schemes that fueled the 2 major pushes for geothermal in the United States and I will attach it to this testimony because you need to read it and understand that geothermal is a losing proposition and wouldn't exist except for government handouts because it isn't viable, firm or reliable and you have to continually drill more and more and more as you use the heat from the earth.

5. In closing, I Do Not Trust The Hawaii State Energy Office And You Shouldn't Either!!! **Director Mark Glick told Stantec this in his remarks for Puna Geothermal Venture's Final Environmental Impact Statement in 2023 "while he recognizes the historical complaints of the residents surrounding PGV, the Final EIS should only include information from "experts".** And Lo And Behold, PGV's Final EIS did not include responsible opposing views, negative impacts or reports, including from geologist Larry Wood (1968MIT) and University of Miami (formerly UH) Professor Falk Amelung who stated clearly that PGV needs to turn over their proprietary seismic records and also there is Subsidence at the PGV Fissure line since PGV got back on the property in 2020 and even more once the plant started operating in 2022. I'll attach Professor Amelung's Declaration from my EIS lawsuit that is currently languishing in the ICA because the County of Hawaii and PGV did not want it expedited.

DO NOT PASS THIS BILL – DO NOT PASS ANY GEOTHERMAL BILLS – THEY ARE NOT GOOD FOR HAWAII AND I WILL CONTEST THEM IN COURT!!!

Sincerely,

Sara Steiner

Renewing Community Trust: Fostering Pilina and Embracing Cultural Knowledge for Renewable Energy Planning

Kara Neal

Committee: Ashok Das, Antoinette Konia Freitas, Priyam Das

Department of Urban and Regional Planning

University of Hawai‘i at Mānoa

Master's Capstone Paper

Fall 2024

Acknowledgements

I would like to extend my heartfelt gratitude to my advisor, professors, colleagues, and coworkers for their invaluable guidance and encouragement throughout this journey. I am deeply appreciative of my previous mentors, whose insights and support have shaped my academic and professional growth. Special thanks to the individuals who participated in my research study and generously shared their time and perspectives, making this work possible. Lastly, I am profoundly grateful to all those who offered their unwavering support, motivation, and reassurance, helping me successfully complete this project.

Abstract

The research presented aims to bridge the gap between government and private planning priorities and the deeply rooted values of Native Hawaiian communities. With Hawai‘i aiming to transition entirely to renewable energy by 2045 in alignment with environmental goals, critical issues emerge, Hawaiian communities that have had negative impacts of renewable energy development in the past. Rather than fostering positive change, these initiatives often exacerbate shortcomings in planning approaches, including inequities and trust deficits. This study emphasizes the importance of recognizing and honoring Native Hawaiian ancestral wisdom, which has sustained the islands' ecosystems for generations. Engaging local communities in the planning process– before, during, and after implementation– is vital for fostering trust and ensuring that initiatives align with community needs. Utilizing a qualitative approach inspired by Pacific Island methodologies, including Kūlana Noi‘i and Vanua, this research illustrates how a holistic planning framework that prioritizes community engagement and relationship building could be realized by drawing on relevant progressive practices, the study exhibits pathways for strengthening community bonds and embracing culturally informed planning practices, ultimately advocating for a more equitable approach in future planning and for renewable energy infrastructure.

Table of Contents

List of Abbreviations

CBA	Community Benefits Agreement
CERAP	Community Energy Resilience Action Plan
CIA	Cultural Impact Assessment
CSR	Corporate Social Responsibility
DHHL	Department of Hawaiian Homelands
DLNR	Department of Land and Natural Resources
DOE	Department of Education
DOH	Department of Health
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
HELCO	Hawai‘i Electric Light Company
HNEI	Hawai‘i Natural Energy Institute
H2S	Hydrogen Sulfide
IRB	Institutional Review Board
MCEH	Moloka‘i Clean Energy Hui
OHA	Office of Hawaiian Affairs
PGV	Puna Geothermal Venture
PUC	Public Utilities Commission

Glossary[1]

Term	Definition
ʻĀina	Land, earth
Mana	Supernatural power
Manaʻo	Thought, belief, idea
Makai	Seaward
Makaʻāinana	Commoner, citizen
Mauka	Inland
Pono	Goodness, uprightness, morality, moral qualities, correct or proper procedure, excellence, well-being, prosperity, welfare, benefit, behalf, equity, sake, true condition or nature, duty; moral, fitting, proper, righteous, right, upright, just, virtuous, fair, beneficial, successful

[1] Hawaiian Dictionary

Introduction

There is a pressing need for a change in the planning process in Hawai‘i by placing Native Hawaiians and community knowledge at the forefront, especially in infrastructure development. With the growing challenges posed by climate change, rising poverty, increased development, and the displacement of local residents, it is important to involve those deeply connected to the land and equipped with traditional knowledge to safeguard both the environment and the people (Matunga, 2013; DOE, 2017). For community-focused planning to be effective, community members must be engaged in discussions before, during, and after project implementation. This engagement should not be a procedural formality to check off a box, but instead, it should be an ongoing process that fosters accountability and transparency among all stakeholders (Matunga, 2013; DOE, 2017; Kent, 1981). This master's capstone paper highlights the problems and gaps in current planning practices and the need to shift away from top-down approach through advocating for a more inclusive and transparent process that places Hawaiians and the broader community at the heart of decision making and encouraging ongoing, meaningful dialogue. In this paper, a renewable energy project is used as a case to demonstrate the paper’s argument. Renewable energy is a suitable vehicle for the paper’s objectives because Hawai‘i aims to be 100% renewable energy by 2045, and that means there will be more private developers and extensive infrastructure in areas across the islands. To avoid projects that generate inequity or are deemed unjust for not serving the people and ‘āina, changes are needed to bring Native Hawaiians and local communities to the center of planning and policy discussions.

This paper examines colonial planning practices, path dependency, and the process of indigenizing planning in the literature review. Then the paper outlines the research questions, data, and methodology, followed by an in-depth analysis of the Puna Geothermal Venture, including its history, current state, and key issues. The paper concludes with recommendations for stakeholders on how they

can better support the Puna community, foster relationships, and rebuild trust with those most affected by the project.

Literature Review

Planning as a Colonial Artifact

Planning has historically functioned as a tool of colonial domination, reinforcing systems of control that marginalize Indigenous peoples and entrench inequitable power dynamics. In colonial contexts, planning practices were deeply entwined with the dispossession of Indigenous lands and the imposition of settler worldviews (Porter, 2010; Sandercok, 2007). As Sandercock (2007) notes, the spatial technologies of colonial power— such as mapping, surveying, and private property laws– were used to reorder urban and regional spaces, often to the detriment of Indigenous populations. These practices not only displaced Indigenous communities but also sought to erase their cultural and spatial relationships to the land. The dominance of settler land-based interests and their codification in planning frameworks served to legitimize non-Indigenous control over Indigenous territories, further embedding colonial values within institutional structures (Sandercock, 2007; Porter, 2010).

In Hawai‘i, Native Hawaiians once had their own management system of the ‘āina[2] known as the ahupua‘a system, where the families cultivated the land in the ahupua‘a they resided in (Trask, 1991). The ahupua‘a system runs mauka[3] to makai[4] as Hawaiian traditional knowledge understands the importance that a balanced system is to be nurtured from the mountains to the sea and should not be disrupted (Trask, 1991). The ahupua‘a system fostered community interdependence, serving as a core economic unit that ensured mutual benefit. This was not land ownership; this was a collective responsibility. Hawaiians were and continue to acknowledge that the land and the people are not separate but are connected, and as the land provides, the people must, in return, take care of the land. In

[2] ‘Āina: Land, earth (Hawaiian Dictionary)
[3] Mauka: Inland (Hawaiian Dictionary)
[4] Makai: Seaward (Hawaiian Dictionary)

their knowledge, the Hawaiian ancestors constructed their homes, irrigation networks, temples, and cultivation complexes (McGregor, 2007). The disruption of the thriving ʻāina, interdependent system, and Hawaiian people began in 1778 when James Cook stumbled upon the islands and introduced a foreign concept that was not compatible with coexisting with the Hawaiians. The foreign concepts included the Western political system, capitalism, individualism, and Christianity (Trask, 1991). Then, just within 100 years of Cook's arrival, the Great Māhele was enacted. The Great Māhele of 1848 was an attempt to protect the Hawaiian Kingdom and people amid growing foreign influence. However, it also introduced a transformative shift in the Hawaiian relationship with ʻāina. Under the Māhele, land transitioned into a legally defined commodity, aligning with Western property systems. While this was intended to secure land rights for Native Hawaiians, the implementation posed significant challenges such as many makaʻāinana[5] lacked the resources, understanding, or access to navigate the new legal frameworks, resulting in a loss of ancestral lands (Preza, 2010).

The disruption of Hawaiian land management is emblematic of broader patterns of colonial planning, which have brought inequities across Indigenous communities worldwide. The concept of path dependency sheds light on how these colonial legacies persist within planning institutions (Parsons et al., 2019). Path dependency refers to how historical decisions and institutional practices shape and constrain future actions, creating patterns that are difficult to break. These patterns are reinforced by power dynamics, political compromises, and value systems that uphold past decisions. Institutions tend to repeat established practices because they reflect the priorities of those in power, often sidelining alternative approaches, such as those rooted in Indigenous knowledge. This persistence is not accidental but as a result of intentional efforts to maintain systems that benefit specific groups, often at the expense of others (Parsons et al., 2019).

[5] Makaʻāinana: Commoner, citizen (Hawaiian Dictionary)

Colonial planning systems were designed to prioritize settler interests, establishing legal and spatial frameworks that excluded Indigenous communities. Over time, these systems became deeply embedded, limiting opportunities for change. However, breaking path dependency requires active efforts to challenge these deeply-rooted systems whether through critical moments of disruption– such as social movements or political shifts– or gradual changes, such as the incorporation of diverse perspectives and values into the planning processes. Simplifying planning practices and making them more inclusive can pave the way for more equitable approaches (Parsons et al., 2019).

Planning is an artifact of colonialism, and Indigenous peoples continue to struggle against systems that undermine their rights and traditional knowledge (Porter, 2010). Nevertheless, there is a growing recognition of the importance of integrating Indigenous perspectives into ecological management. More recently, the ahupua‘a system, with its holistic approach, is increasingly acknowledged in planning initiatives across Hawai‘i, reflecting a broader understanding that ecological systems thrive when communities are seen as integral to their environments (Porter, 2010; HSEO, 2022; Deluze et al., 2023). Like other Indigenous cultures, Hawaiians do not perceive the environment as separate from themselves; instead, they see it as interconnected. As long as some continue to view the environment as an "it" rather than recognizing its personhood, the land will be treated merely as a resource to be managed rather than a vital relationship that sustains both the ‘āina and the people for generations to come (Kimmerer, 2013). Prioritizing Hawaiian epistemologies and research methods is essential to empower communities to participate actively in their development.

″The market economy has spread like wildfire, with uneven results for human well-being and devastation for the natural world. However, it is just a story we have told ourselves, and we are free to tell another to reclaim the old one. One of these stories sustains the living systems on which we depend.

One of these stories opens the way to living in gratitude and amazement at the richness and generosity of the world." - Robin Kimmerer, Braiding Sweetgrass (2013)

Environmental Planning and Energy Development

Contemporary planning continues to deal with ongoing inequities, particularly in the context of environmental and renewable energy initiatives. While renewable energy projects aim to address climate change and promote sustainability, they also present significant challenges related to equity and environmental justice. For example, geothermal energy development can lead to noise pollution, land subsidence, and water contamination if not properly managed (Sayed et al., 2021). Effective planning is required to mitigate those impacts and balance environmental benefits with social costs.

The transition to renewable energy systems offers immense potential to reduce greenhouse gas emissions, mitigate climate change, and curb dependence on fossil fuels. This transition also provides an opportunity to address historical injustices in energy access and environmental degradation (Gayen et al., 2024; Kim, et al., 2023). Historically marginalized communities, including Indigenous populations, low-income households, and communities of color, have borne the disproportionate burdens of fossil fuel extraction, energy generation, and other large infrastructure developments. These impacts include not only environmental degradation but also displacement, health hazards, and limited access to affordable energy (Kim et al., 2023).

As climate change intensifies and exacerbates environmental vulnerabilities– such as rising sea levels, extreme weather events, and natural resource scarcity– the need for equitable planning becomes even more urgent. Equitable planning goes beyond mitigating and adapting to climate change; it also seeks to address and correct the historical inequities embedded in both energy and planning systems (Fletcher, 2019; Kim et al., 2023).

Indigenizing the Planning System

At the core of Indigenous perspectives lies a profound connection to the land, reinforcing the critical relationship between communities and their ancestral territories. Reestablishing and preserving these connections is essential for Indigeneity and effective planning practices (Matunga, 2013). Successful Indigenous planning includes equitable participation and social cohesion in political decision-making (Matunga, 2013). Although no one owns 'planning,' it has historically been a tool for marginalization. Denying Indigenous communities the right to participate in their planning processes perpetuates cycles of institutional dehumanization (Matunga, 2017). Therefore for Hawai‘i, integrating Native Hawaiians and their knowledge into planning is essential. Recognizing Native Hawaiians as custodians of their traditional sciences can pave the way toward restorative justice and social equity. For Native Hawaiians, restorative environmental justice involves reclaiming and revitalizing land and culture (Mackenzie et al., 2007). This focus on self-determination is rooted in belief systems that connect spirituality, history, and livelihood to the natural environment (Mackenzie et al., 2007). As Walsgrove (2022) emphasizes, proper recognition of Indigenous rights is essential for responsibility and repair, especially as we confront the climate crisis. Without acknowledging historical injustices, we cannot reconcile the urgent need for decarbonization with the imperative of justice. Restorative justice invites challenging conversations that can facilitate healing and growth. Lessons from Indigenous groups can inform contemporary energy solutions, as demonstrated by community-based initiatives emerging on Moloka‘i (Walsgrove, 2022). It is crucial to place Native Hawaiian communities at the center of this restorative dialogue. This engagement is not only about inclusion; it requires listening to perspectives that challenge existing norms and confronting uncomfortable truths, including the historical theft of sovereignty from the Hawaiians.

Addressing these issues is not just an ethical obligation but vital for nurturing good citizenship and reciprocity. As we strive for justice, let it be justice for all aspects of creation (Kimmerer, 2013). Centering Hawaiian voices, knowledge, and perspectives in community planning is essential in empowering Hawaiian planning, building relationships and trust with all those involved, and promoting a more just and equitable future where we can thrive in harmony with the land and one another (Matunga, 2013; HSEO, 2023). Especially with climate change amplifying unpredictable weather patterns and rising sea levels (Fletcher, 2019).

Research Questions

The research aimed to answer one main question "How can critically analyzing infrastructure development efforts, such as the Puna Geothermal Venture (PGV), guide us to improve contemporary planning approaches in Hawai‘i, in ways that empower Native Hawaiian communities and rebuild their trust in the state?" To explore this, the study was guided by three sub-questions:

- How can contemporary infrastructure planning initiatives, such as energy projects, achieve development initiatives without harming local/native communities?
- How can planners work with communities to achieve planning outcomes that are not just sustainable but also empowering for Native Hawaiian communities respectful of their traditions and beliefs?
- How can historical injustices and dispossession experienced by Native Hawaiian communities be addressed and remedied through contemporary renewable energy planning and development processes?

Data and Methods

This research draws from Pacific research methodology, Vanua and Kūlana Noi‘i. Vanua encapsulates the profound interconnectedness between individuals, their land, environment, cultures,

relationships, spiritual realms, beliefs, knowledge systems, values, and divine entities (Nabobo-Baba, 2008). Vanua is a holistic approach that reveres community needs and integrates Indigenous protocols, values, philosophies, and knowledge systems (Nabobo-Baba, 2008). Even though Vanua is a methodology based on Fijian worldviews, it still encapsulates many of the values Hawaiians recognize, as this methodology prioritizes establishing and nurturing relationships—before, during, and after the research endeavor. In addition, this research utilized Kūlana Noiʻi, created by multiple stakeholders within Hawaiʻi, as this methodology is focused on building relationships through: respect, reciprocity, self-awareness and capacity, communication, maintaining a long-term focus, community engagement and co-review, knowledge stewardship, and accountability (IDEAS, 2018). Western/ contemporary methodologies were still used ensuring a structured approach to data collection, analysis, and interpretation that aligns with established academic standards for objectivity and reliability.

The research was approved by the University of Hawaiʻi Institutional Review Board (IRB) in July 2024, attached in *Appendix A*. Due to preferring Pacific methodologies over traditional Western approaches, the approval process was more difficult as it took four attempts.. This delay is important to appreciate since this showed Pacific methodologies are often less “formal” than Western ones, necessitating additional explanation and clarification to ensure ethical practices when working with communities and other stakeholders.

Pacific methodologies played a key role in guiding two talk story sessions and informal conversations with individuals who reached out or were recommended for inclusion in the study. In contrast, Western methodologies steered the more structured aspects of the research, including formal interviews and the analysis of archival documents. Notably, the informal talks and talk story sessions proved to be the most valuable for gathering diverse insights, as the space would be more relaxed with no time constraints, fostering more open conversations. While formal interviews contributed valuable

information, the setting sometimes inhibited the flow of information, possibly due to the presence of audio recording, time restrictions, and fear of oversharing information. The consent forms for the formal interviews and the talk story sessions are attached in *Appendix B*.

Puna Geothermal Venture (PGV) of Hawa‘i Island

Pele's essence, fierce yet free,

Shapes the land and invites us to see.

Crafts a world where hearts entwine.

Puna sings of creation's design,

A timeless dance in a sacred space.

Where the goddess reigns with steadfast grace.

In every breath, her stories unfold,

Yet today, some doubt her power, bold.

Though values shift and connections fray,

Pele's spirit shines in our everyday.

Together, we rise for the land we adore,

Fighting for trust and relationships that restore.

In unity, we protect what's sacred and bright,

In harmony, we thrive, embracing what's right.

(A poem written to enlighten the space for the following case study)

Puna and Hawaiian culture and spirituality

Hawai‘i Island, the vibrant heart of the Hawaiian archipelago, is the home of five volcanoes, including the iconic Kīlauea, whose fiery spirit still roams the lands of Puna today (Matsuoka et al., 1996; Armitage, et al. 1944). Puna, a region steeped in cultural significance, holds a cherished place in the hearts of Native Hawaiians. Puna is home to the Hawaiian Goddess, Pelehonuamea (Pele). Ahupua‘a Keahialaka is where Pele first arrived on Hawai‘i Island and made Puna her home. She is still alive today, as shown by her steam and eruptions. The steam is believed to be Pele's mana[6] and the form where she manifests herself (McGregor, 2007; Armitage, et al. 1944). Pele is in all parts of Puna, as no part of Puna is free of volcanic activity (Matsuoka et al., 1996). The Kīlauea volcano, where Puna lies, is one of the most active volcanoes in the world. Early scientists discovered this as the Kīlauea Middle East Rift Geothermal Rift Subzone. The once harmonious area for foraging and honoring the goddess Pele shifted to Westerners, who identified another source of Hawaiians as a commodity.

G*eothermal energy production: the quest and the fallouts*

In the 1970s, scientists identified the Kīlauea Middle East Rift Geothermal Rift Subzone, sparking interest in exploring geothermal resources. In response to the potential of geothermal energy, the Hawai‘i State Legislature enacted several supportive laws throughout the 1980s. These included tax incentives for geothermal energy sellers and the designation of geothermal subzones, facilitating the development process (McGregor, 1996). The success of the HGP-A facility attracted private developers, notably True Geothermal Energy Company and Ormat Energy Systems (today known as Ormat Technologies, Inc.). The True Geothermal Energy Company, the largest landowner in Wyoming, partnered with Campbell Estate to drill in Wao Kele o Puna. This quickly led to protests because of the cultural and environmental significance of the Wao Kele o Puna Forest and Pele herself. In March of

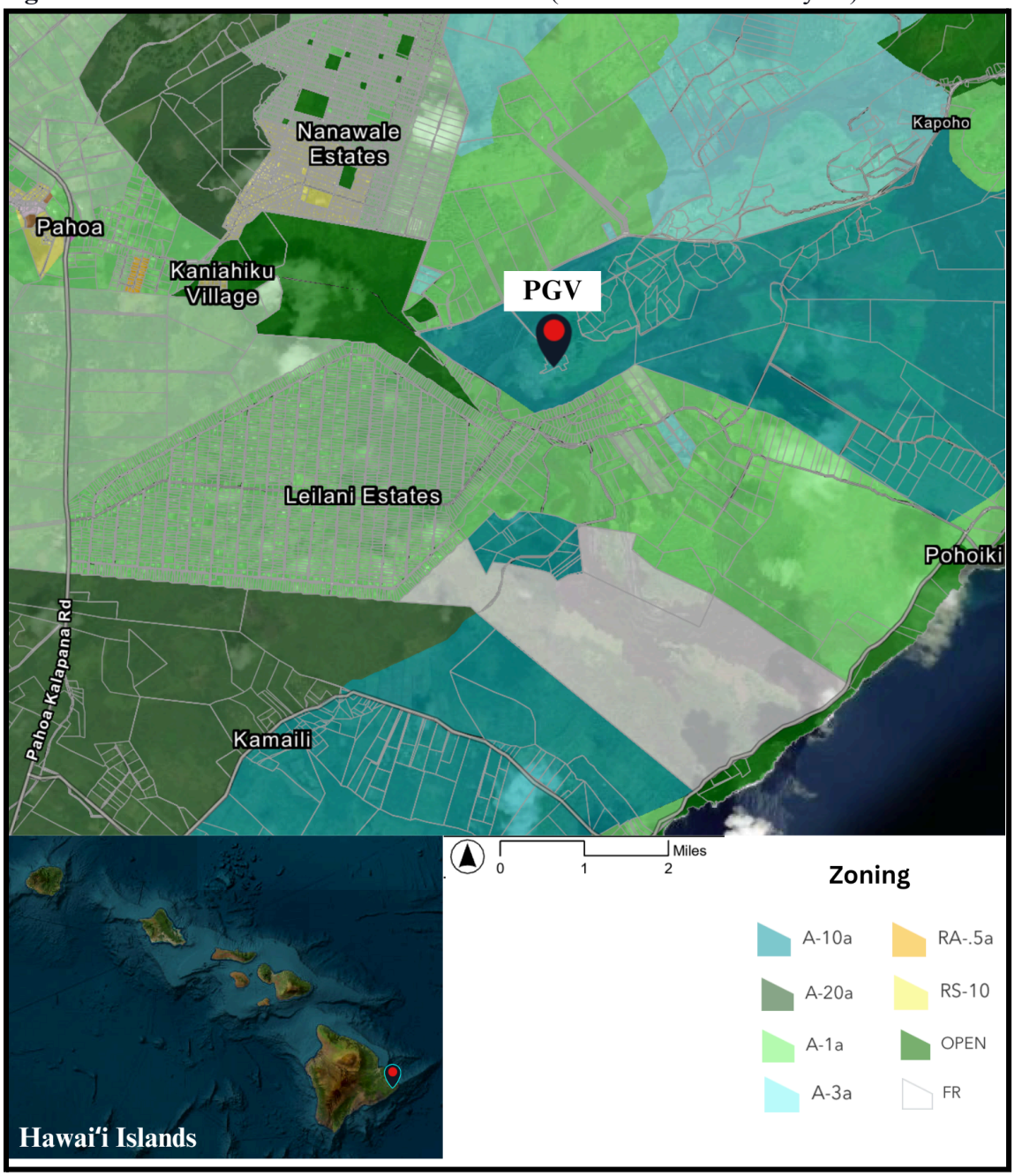
[6] Mana: Supernatural power (Hawaiian Dictionary)

1990, over 1,000 activists marched against the project, resulting in over 100 arrests. By 1994, the project had failed and been abandoned (McGregor, 1996). During this time, in 1989, Ormat Technologies, Inc. retrieved the necessary permits for geothermal. The permits included the basics necessary for Environmental Protection Agency (EPA), Department of Land and Natural Resources (DLNR), Department of Health (DOH), County, and State such as Plan of Operation, Geothermal Well Permits, Underground Injection Control, and Non-Covered Source Permit, Groundwater Well Permits, and Building and Grading Permits. However, there was no requirement for an Environmental Impact Statement (EIS) or Cultural Impact Assessment (CIA) for development of the Puna Geothermal Venture (PGV). As PGV assured the Planning Commission that the plant would "operate without environmental impact" (Ormat 1990), yet this was in direct contrast to concerns raised by community groups and neighbors. Despite unresolved issues, the County issued the Geothermal Resource Permit, which set the stage for the significant mistrust that persists between local residents, PGV, the County, and the State. The lack of adequate pre-operations studies on noise, air quality, and water impacts has been a critical point of contention. While some studies were conducted after operations began, these have been criticized for their insufficiency and failure to address the true scale of environmental and health impacts.

By 1993, Ormat Technologies, Inc. began to drill on acres owned by Kapoho Land Development adjacent to the former HGP-A plant, creating the controversial PGV shown in *Figure 1* (McGregor, 1996). From 1993 until this day, the development of PGV has been marked by a series of environmental and community impacts such as excess release of hydrogen sulfide on multiple occasions, excessive noise impacts, and lack of reporting from PGV leading to lawsuits, that have significantly harmed the relationship between PGV operators, local residents, and government authorities (Environment Hawai‘i, 1992; Hawai‘i Tribune, 2016). The community's fears were

heightened not only because of the lack of studies but also because of the past penalties from PGV such as the high levels of hydrogen sulfide (H2S) leaks that began in the 1990s. These violations, along with subsequent penalties, have left a legacy of distrust that persists today.

Figure 1: Location of PGV on Hawai‘i Island (Hawai‘i State GIS Layers)



Geothermal Relocation and Community Benefits Fund

In 1996 a Geothermal Relocation Fund was created to purchase property from homeowners living near PGV, addressing concerns related to noise, health risks, and other adverse impacts. In 2008, the program expanded with the creation of the Community Benefits Fund, aimed at improving infrastructure and services in Lower Puna (Stantec Consulting Services Inc, 2023). Both initiatives were designed to address community concerns. The funding for both the Geothermal Relocation Fund and the Community Benefits Fund comes from geothermal royalty revenues paid by PGV. By law, PGV is to give 30% to the County of Hawai‘i, 20% to the Office of Hawaiian Affairs (OHA), and 50% to the Department of Land and Natural Resources (DLNR). In the Fiscal Year of 2023, the total geothermal royalties received an amount of $2,536,465.66 divided as follows: State of Hawai‘i $1,268,232.83 (50%); County of Hawai‘i $760,939.70 (30%); Office of Hawaiian Affairs $507,593.13 (20%) (DLNR, 2023).

The County of Hawai‘i has allocated its share to fund the proposed water quality study, upgrade the Pāhoa community center and pool, fund the security cameras for Pāhoa Town, scholarship funding, purchase of passenger buses for the region, and others (Stantec Consulting Services Inc., 2023). These efforts aim to address community needs and improve the quality of life for residents impacted by geothermal operations. Despite these efforts, the funding has proved insufficient to fully meet the community’s voiced concerns and priorities. Critical needs, such as health and additional environmental studies related to the geothermal facility, affordable energy solutions, and other infrastructure improvements, remain unaddressed. The County consults with community members to prioritize the use of its portion of the funds, it receives only 30% of the total royalties, limiting its capacity to address all the community’s needs.

Recent developments and current practices

Puna's population has been steadily increasing, largely due to its relative affordability compared to other areas of Hawai‘i. Many people have moved to the region for affordable housing and rural living. This has contributed to the housing crisis, making it increasingly difficult for Native Hawaiians and longtime residents to secure housing on their own lands (Dobbyn, 2023). Traditionally, Puna has been home to a significant proportion of Native Hawaiians, many of whom reside along the coastline. However, as the region grows, the demographic makeup has shifted (Esri). While the Native Hawaiian population still maintains a strong presence in the area, there has been an increase in the number of white residents, outpacing the growth of Pacific Islanders in some parts of the district. In addition to these demographic changes, Puna faces ongoing socio-economic challenges. A substantial portion of the population lives at or below the poverty line, which is reflected in lower income levels throughout the area. This economic hardship is also evident in educational attainment, with many residents facing limited access to higher education and specialized job opportunities. As a result, cycles of poverty persist, making it more difficult for individuals to overcome economic barriers and improve their standard of living. An analysis was conducted through Esri to understand the population and demographics closer to the PGV facility which is shown in *Figure 2* and *Figure 3*. These analyses exhibit the population growth and the fact that 32% of the population are at poverty level, with 22% of the population making under $15,000 per year.

Figure 2: Pāhoa-Kalapana Demographics (Esri)

esri
THE SCIENCE OF WHERE

Demographic and Income Profile

Pahoa-Kalapana
Area: 267.91 square miles

Prepared by Esri

Summary	Census 2010	Census 2020	2024	2029
Population	11,060	10,494	10,852	11,188
Households	4,367	4,167	4,438	4,698
Families	2,521	2,417	2,535	2,680
Average Household Size	2.53	2.50	2.43	2.37
Owner Occupied Housing Units	3,055	2,978	3,263	3,569
Renter Occupied Housing Units	1,312	1,189	1,175	1,129
Median Age	42.5	47.5	48.0	48.8

Trends: 2024-2029 Annual Rate	Area	State	National
Population	0.61%	0.16%	0.38%
Households	1.15%	0.36%	0.64%
Families	1.12%	0.32%	0.56%
Owner HHs	1.81%	0.86%	0.97%
Median Household Income	4.32%	2.10%	2.95%

	2024		2029	
Households by Income	Number	Percent	Number	Percent
<$15,000	1,005	22.6%	924	19.7%
$15,000 - $24,999	421	9.5%	327	7.0%
$25,000 - $34,999	519	11.7%	531	11.3%
$35,000 - $49,999	461	10.4%	427	9.1%
$50,000 - $74,999	766	17.3%	831	17.7%
$75,000 - $99,999	400	9.0%	398	8.5%
$100,000 - $149,999	455	10.3%	575	12.2%
$150,000 - $199,999	170	3.8%	292	6.2%
$200,000+	241	5.4%	393	8.4%

Figure 3: Communities at risk population within a three mile radius of PGV

From 1993 until 2018, PGV continued its drilling operations, despite the ongoing demands for additional studies, health and environment concerns, and lawsuits. In 2018, the Kīlauea volcanic eruption halted PGV from drilling as the lava reached the main access road to the plant, disrupting the facility and displacing nearby communities. In 2022, PGV resumed operations and is currently in the process of increasing power generation capacity from 38 megawatts (MW) to 46 MW, with future plans to expand to 60 MW (Stantec Consulting Services Inc., 2023). Despite these operational improvements, the ongoing effects of PGV on the surrounding community– particularly the disruption caused by the 2018 eruption and the challenges faced by residents– underscore the continuing tensions between the plant's operations and the local population needs.

Efforts from Ormat Technologies and County for impacted community

PGV has created a community outreach plan (last updated in 2020), public access to air quality and noise monitoring on their website, and conducts quarterly meetings to update the community and address concerns (Ormat Technologies, Inc.). In 2013, a health study was conducted to clarify the impacts of the hydrogen sulfide (H2S) released, the noise, and other effects that could harm communities' health for being near a geothermal company. However, the health assessment has been deemed biased and unclear regarding its impact (Adler, 2013; Kim, 2024). Additionally, a water study is underway to understand better the impact of drilling and facilities on groundwater quality (Kim, 2024). This shows that Ormat Technologies Inc. and County representatives are currently trying to address community health and environmental concerns, but is it enough? How can there be trust when studies are completed after permits and environmental assessments have been approved? How can there be trust when the private company conducts a health study 10 years after operating and then a water study 20 years after operating? Moreover, there is the cultural issue of the beliefs of some of the desecration of Pele and that the practice of drilling for geothermal energy is not the answer for renewable energy. So how can a private company and County show the community that they are with the community and want to build relationships and trust and move forward together? I investigated these questions through my primary research conducted in the Puna District during August to September, 2024.

Learning from the community and other stakeholders

In this section I discuss the findings from my primary research. I conducted three interviews, two talk story sessions, and informal talks. The purpose of all the interviews and talks was to better understand why there is mistrust, the goals of renewable energy and geothermal, and whether it is possible to move forward together for a cohesive and relationship-based future.

Overview of interviews, talk story sessions, and informal talks

For the three interviews, depending on the interviewee, the time would range from 30 minutes to one hour. All interviews were in person at the interviewees place of work, audio-recorded, and went over prepared questions. The interviews with the State and County confirmed questions and clarity on geothermal and the future of renewable energy. Planning for renewable energy is shifting to a community-based initiative, like Molokaʻi and others across the islands. There are programs to support communities, like the Hawaiʻi State Energy Office (HSEO) Wayfinders program, to educate and empower local and underserved communities in renewable energy. Additionally, the Public Utilities Commission (PUC) has created an Equity Docket open for public comment in moving forward for equitable and community-based planning to avoid bad planning practices for renewable energy infrastructure. The County of Hawaiʻi has not begun any community planning for future renewable energy projects but recognizes that the community has to be at the center of the discussions to meet the County and State goals and to better plan for the community to avoid it being built in someone's backyard. So, after the three interviews, it seemed that there are significant initiatives to move forward for equitable planning for renewable energy for the State and that the County is aware of the community being in the discussions. However, initiatives are based on solar, wind, hydropower, and other ways to receive renewable energy. There is nothing on how to address those who have already been impacted by renewable energy infrastructure and how to address those issues equitably. Remarkably, the State and County of Hawaiʻi understand the change, but what about the ones who have already been impacted?

After completing the three interviews, I went on to the two talk story sessions held one month apart. I advertised the meetings through social media (Facebook, Instagram, LinkedIn), email, and word of mouth. Despite the emails I received and expressed interest, I had fewer participants expected to

show up for each meeting. Ten people were at the first meeting and eight at the second. Even though it was not a large crowd, it gave more opportunity to those who showed up to share their knowledge, experience, and mana‘o[7] on renewable energy, PGV, and community planning. Later on, the community addressed that the possible reasons for the few participants were: people are tired of repeating the same thing, skeptical of the goals of the session and who I am representing, and that it is not easy to have PGV, County, and Energy stakeholders in the same room with the community without it being more controlled. The talk story materials involved are in *Appendix C*.

The talk story sessions were both held at Uncle Roberts in Kalapana, HI (13 miles from PGV), an open space widely known for farmers markets, live music, local food, and of highly respected Native Hawaiian descendent families. Both talk story sessions were opened by introducing myself and explaining the purpose of the research study, and then attendees introduced themselves to open up the conversations. For both sessions, the age group was around mid-thirties and up, most of whom were residents of Lower Puna District; others were from Mountain View, ‘Āinaloa, and Hilo. The race/ethnicity was not recorded of the attendees, so I cannot state assumptions on their ethnicity.

Most of the stories shared were ones that are in the newspapers and social media of the health and safety concerns, the blowouts, the blocking of the roads during the 2018 volcanic eruption for the community to get out, the concern of fracking and further drilling, and the desecration of Pele. Many voiced “No future with geothermal” and “ No more PGV.” One Uncle shared that he was not concerned about geothermal energy but more about the fact that this volcano is too young to extract energy from. The 2018 eruption shows how close it got to the facility, and the concern of what happens when the facility blows from the lava brings even more concern to the surrounding community. Each session had about an hour and a half of sharing why there is mistrust and opposition to geothermal energy for Hawai‘i.

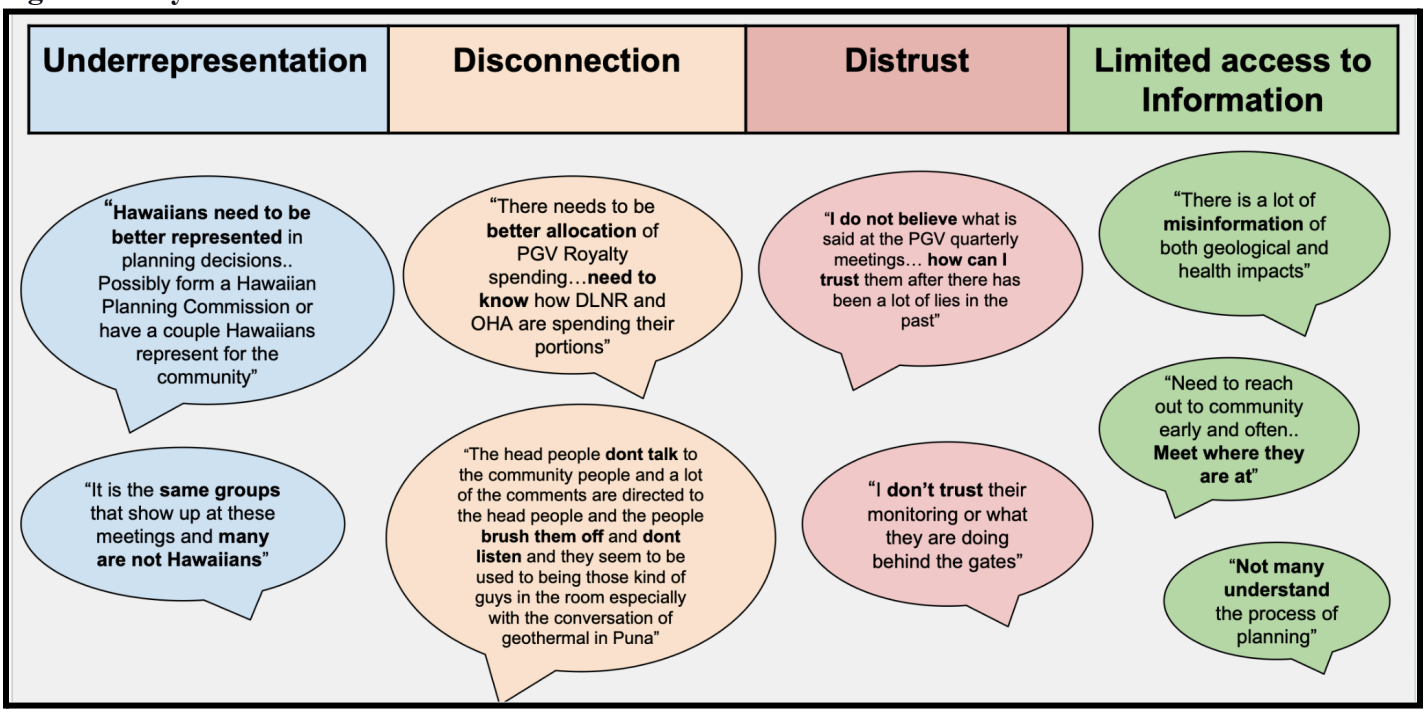
[7] Mana‘o: thought, belief, idea (Hawaiian Dictionary)

The following section dives more into what was found from the interviews, talk story sessions, and informal talks.

Analysis

Based on the conversations from formal and informal conversations, and community talk story sessions, I identified four key themes that align with background research from archived documents, webpages, and planning documents. The four key themes are 1) Underrepresentation, 2) Disconnection, 3) Distrust, and 4) Limited Access to Information. Some quotes from the research under each theme are shown in *Figure 4*.

Figure 4: Key Issues Identified in PGV Research



Underrepresentation

The first talk story session, the community addressed the need for more representation from Hawaiians in planning for decision-making regarding Puna, renewable energy, and PGV. Participants suggested establishing a dedicated Hawaiian commission or appointing representatives from their district to the Planning Department to ensure their voices are heard. This lack of representation has

fueled ongoing concerns and questions about both past and current actions taken by PGV, particularly in how they have engaged with and impacted the community. For many community members, the absence of Hawaiian perspectives in planning has contributed to a growing sense of distrust. They express frustration over decisions that appear to prioritize outside interests over the well-being of local residents, the ʻāina, and cultural values. A stronger presence of Hawaiian voices in planning could provide a vital cultural and traditional lens, ensuring that development aligns with the community's needs and values. The discussions with participants from the talk story sessions and with others, there is a shared desire for systemic changes that prioritize equity, transparency, and cultural respect in planning and development processes.

Disconnection

A recurring theme in my research discussions was the sense of disconnection that has hindered efforts to better support the Puna community. One significant issue is the insufficient funding from the Geothermal Relocation and Community Benefit Fund, which has failed to adequately support both the directly impacted residents and the wider Puna District. During the informal talks, community members emphasized the importance of transparency, particularly regarding how DLNR and the Office of Hawaiian Affairs (OHA) allocate their portions of the Geothermal Royalty funding. This lack of transparency is compounded by the underrepresentation of the local community, including Native Hawaiians, in decision-making processes.

The disconnection between PGV and the broader community has further strained relationships. Although PGV holds quarterly meetings, the same small group of attendees tends to participate, leaving much of the community excluded. There is a pressing need for more inclusive and collaborative discussions that go beyond one-sided meetings and foster genuine engagement between PGV and the community. Recognizing these challenges, I introduced the concept of a Community Benefits

Agreement (CBA) during the second "talk story" session and in other informal discussions as a potential solution to bridge these gaps.

A CBA is a legally binding agreement between a private company and a community that ensures specific, measurable benefits are delivered in return for community support. CBAs are designed to promote inclusiveness, enforceability, transparency, coalition-building, efficiency, and clear outcomes (DOE, 2017). For communities, CBAs offer a powerful tool to negotiate directly with developers, empowering them to secure legally binding commitments tailored to their needs. This direct engagement strengthens the community's ability to hold developers accountable without relying solely on government oversight. Additionally, CBAs can encourage developers to provide more substantial benefits in exchange for community support (Minerbi, 2013; DURP, 2008). CBAs have proven effective in helping communities address both physical and social challenges brought about by development. They provide a framework for mutually beneficial agreements that allow the neighbor communities to obtain tangible benefits while supporting well-planned projects. Moreover, CBAs can establish trust and promote long-term partnerships, transforming typically adversarial relationships into collaborative ones (Minerbi, 2013).

During these discussions, one participant mentioned they were “not opposed” to a CBA, recognizing its potential to reconnect the community with PGV and enhance decision-making processes. Some highlighted the importance of involving Hawaiian Electric Light Company (HELCO) as a key stakeholder to strengthen connections and ensure all relevant parties are engaged. However, most refer to saying there is already one in place, the Community Benefits Package (the combination of the Geothermal Relocation Fund and Community Benefits Fund). These do not count as an agreement with the community, as a CBA is directly between the community and developer and other needed stakeholders, as in this case HELCO. The Community Benefits Package gives funding directly to the

County, then the County has to work with the community with what is best. Identifying gaps in areas like these to improve connections is important in understanding best practices in moving forward.

Distrust

Since 1993, and even prior from other geothermal extraction, distrust has been a large factor in preventing progress among all parties involved. This distrust stems from a history of perceived violations, lack of transparency, and unanswered questions, which have fueled conspiracy theories and skepticism within the community. The limited availability of public information from PGV and relevant authorities has only exacerbated this issue, leaving many residents feeling that they cannot trust what is being said from stakeholders involved. A recurring sentiment expressed during the talk story sessions was the community's deep mistrust of PGV workers and the County. Participants cited historical injustices, such as the failure to address health concerns and the lack of accountability for environmental impacts. These unresolved issues have created a legacy of doubt that continues to hinder any efforts toward reconciliation or collaboration. This has created a challenging dynamic, making it difficult for the community, PGV, and the County to find common ground. Many of those that participated in the talk story sessions claimed there is no moving forward with geothermal, there is no moving forward with PGV, while others in informal and formal talks discussed there needs to be significant efforts to rebuild trust through uncomfortable conversations, accountability, transparency, and inclusive dialogue.

Limited Access to Information

The lack of transparent and accessible information has been a persistent issue, creating barriers for all parties involved to connect and build trust. This lack of transparency affects various aspects of the geothermal project and planning processes, including the availability of critical documents, such as permits, approval records, and operational updates. Without access to these materials, community

members feel excluded from meaningful participation in decisions that directly impact their lives. Participants in the discussions also highlighted the insufficient communication around project developments and the limited public education on energy and planning. For many residents, the technical nature of geothermal energy, combined with the absence of clear, accessible information, makes it difficult to understand the processes or provide informed input. This gap not only disempowers the community but also perpetuates skepticism about the intentions and actions of developers and authorities. Moreover, many brought up that the restricted flow of information undermines the effectiveness of community meetings and other engagement efforts.

Moving forward for Puna

Building on the four key themes of underrepresentation, disconnection, distrust, and limited access to information, I identified specific examples that could serve as valuable guidelines to support all stakeholders involved in these processes. The examples are from Aotearoa, Molokaʻi, Department of Hawaiian Homelands (DHHL), and Hawaiʻi State Energy Office Wayfinders Program.

Underrepresentation

In Aotearoa, geothermal projects require Māori involvement not only to comply with legal frameworks like the Resource Management Act 1991 but also to make sure that the benefits of such developments are equitably shared. The Resource Management Act 1991 mandates that any geothermal project must consider the environmental, social, economic, and cultural sustainability of the area, thereby positioning Māori values as central to resource management. By incorporating Māori perspective, developers and policy makers can create outcomes that are more aligned with the principles of partnership and reciprocity. However, even with these frameworks, challenges arise when Māori values are not authentically integrated into project planning and execution. As Taute (2022) notes, efforts that do not genuinely reflect Māori insights can lead to unsatisfactory outcomes, despite

intentions of inclusivity. This highlights the need for ongoing dialogue and collaborative decision-making rather than one-off consultations. Authentic engagement involves building long-term relationships, ensuring Indigenous voices are heard and respected throughout the development process.

Aotearoa's approach offers a valuable blueprint for addressing underrepresentation by integrating Indigenous knowledge and values into formal planning processes. Aotearoa illustrates how granting Indigenous communities a genuine voice in decision-making can lead to resource development that is equitable, culturally respectful, and environmentally sustainable. While Aotearoa and Hawai‘i differ politically and culturally, the principle of increasing Hawaiian representation in planning decisions remains both achievable and essential. Though this shift will require significant effort, the long-term benefits are undeniable. Empowering Hawaiians and local communities to take a leading role in decision-making can help break the cycle of path dependency, enabling more localized and culturally grounded approaches to planning. By building trust and ensuring representation, infrastructure projects—such as those involving geothermal energy—can move forward in a way that aligns with the values and needs of Hawaiians and their communities.

Disconnection

There are two prime examples to use to build connection with communities and other stakeholders involved before, during, and after the planning process. The first example is the Moloka‘i Community Energy Resilience Action Plan (CERAP). The success of the CERAP stems from the collaborative efforts of the Moloka‘i Clean Energy Hui (MCEH), Sustainable Moloka‘i, and the Hawai‘i Natural Energy Institute (HNEI). The MCEH, established in 2020, brings together a diverse group of community leaders, local businesses, cultural practitioners, and energy users, all committed to building a resilient, clean energy future. Sustainable Moloka‘i has been instrumental in fostering community capacity for innovative, locally-centered planning since 2010. HNEI provides essential

technical expertise, ensuring community preferences and questions guide energy planning (MCEH, 2023).

At the core of the CERAP is the commitment to pono– a concept deeply embedded in Hawaiian culture. Pono in the CERAP derives from community values listed "Fair, equitable, righteous/moral, accurate, correct, necessary, successful, excellent" (MCEH, 2023). The dictionary defines pono as "goodness, uprightness, morality, moral qualities, correct or proper procedure, excellence, well-being, prosperity, welfare, benefit, behalf, equity, sake, true condition or nature, duty; moral, fitting, proper, righteous, right, upright, just, virtuous, fair, beneficial, successful…" (Hawaiian Dictionary, 1986). The CERAP emphasizes that pono is not just a principle but a guiding force that keeps the community at the center of the planning process, ensuring that renewable energy decisions are made in a way that is beneficial, ethical, and transparent. This holistic and culturally grounded approach has allowed stakeholders to work collaboratively, acknowledge past wrongs, and create a foundation of trust and accountability.

The Molokaʻi CERAP serves as a model for how diverse stakeholders can unite with the community at the heart of decision-making, encouraging transparency, building trust, and ensuring that renewable energy planning decisions are both equitable and culturally appropriate. The lessons from Molokaʻi's CERAP can be directly applied to help address the disconnections between PGV, County, State, community, and other stakeholders involved. The ongoing concerns around PGV, including underrepresentation, can be mitigated by adopting a similar approach that places Hawaiian cultural values, transparency, and community-led decision-making at the forefront. Just as the CERAP has allowed stakeholders in Molokaʻi to work collaboratively on energy solutions, PGV could benefit from a more inclusive planning process, where the Hawaiian community is truly represented and their needs, and concerns, and cultural values are prioritized.

The second example helpful in guiding in building connections with all stakeholders is the Corporate Social Responsibility (CSR). CSR has become an important tool for increasing collaboration and building connections between companies, local communities, and other stakeholders, especially in regions where there has historically been a lack of trust or communication (Sainio, 2017). Instead of a CBA, which is a legal binding contract between stakeholders, a CSR is a voluntary initiative that businesses adopt to operate in a socially responsible manner. The concept of CSR in Brazil focuses on creating positive social and environmental impacts through a variety of community-centered initiatives, such as supporting local education, health care, and environmental preservation (Sainio, 2017). One significant advantages of CSR in Brazil is its ability to mitigate the disconnection between companies and the communities they impact by directly engaging with local communities through projects that provide tangible benefits– such as job creation, infrastructure improvements, and support for local businesses– companies are able to build stronger relationships and address the concerns of local residents (Sainio, 2017).

In Brazil, CSR has been adopted by a wide range of sectors, including mining, energy, and agriculture, with companies recognizing the need to go beyond profit-driven goals and actively contribute to the social fabric of the communities they operate in. Initiatives like these not only improved relationships between companies and local populations but have also led to more sustainable development practices. As the practice continues to grow, other countries and regions, including parts of Latin America and Africa, have started adopting CSR frameworks to promote community engagement and improve the outcomes of large-scale infrastructure projects (Sainio, 2017). The lessons from Brazil's CSR efforts can be applied to help PGV build strong connections with the local community. By adopting a CSR approach that prioritizes community engagement, transparency, and

accountability, PGV could overcome the current disconnection and mistrust surrounding its geothermal operations.

Distrust

The Department of Hawaiian Homelands (DHHL) has created a policy known as the Beneficiary Consultation to emphasize the necessity of ongoing, structured engagement with Native Hawaiian communities that live within the Homestead. The Beneficiary Consultation is an important step in addressing the longstanding distrust that many Native Hawaiian communities have felt toward government agencies and private developers, particularly regarding land use and infrastructure projects. This policy emphasizes the need for continuous, structured dialogue with Native Hawaiians, ensuring that their voices are heard and integrated into decisions that affect their lands, livelihoods, and cultural practices (DHHL, 2009). By establishing a formalized process for consultation, DHHL creates a platform where the concerns, needs, and aspirations of Native Hawaiian beneficiaries can be expressed and considered. This approach helps rebuild trust by showing that their perspectives are not only valued but actively shape the decision-making process.

The DHHL's Beneficiary Consultation policy provides a framework for inclusive governance, helping to mitigate these concerns by requiring ongoing communication between stakeholders. It demonstrates a commitment to transparency, respect for Hawaiian values, and shared decision-making, which can help overcome the distrust that has often stalled progress on such projects (DHHL, 2009). For PGV, adopting a similar beneficiary consultation process could be a critical step in restoring trust and fostering positive relationships with the local community. If PGV engaged in a structured consultation with affected Native Hawaiian and local communities, ensuring their voices were heard throughout the planning, implementation, and operational phases of the geothermal project, it could lead to more collaborative, transparent decision-making. By directly addressing concerns about

environmental impact, cultural preservation, and social equity, PGV could begin to rebuild the fractured relationship with the community and make strides toward a more inclusive and responsible approach to energy development.

Limited Access to Information

The Hawai‘i State Energy Office (HSEO) Wayfinders Program plays a key role in addressing limited access to information by providing proactive solutions to improve community access to energy-related resources. The program is especially valuable for communities that have been historically underrepresented or lack the technical expertise needed to engage effectively with energy development projects. Through the Wayfinders Program, individuals and communities are empowered with clear, easily understandable information about energy options, policy changes, and opportunities for active participation in energy planning processes (Wayfinders Program). This initiative not only increases transparency but also facilitates the sharing of knowledge in ways that are accessible and relevant to local needs.

The Wayfinders work to meet people where they are by offering localized, culturally appropriate information that is tailored to the unique concerns of each community. By providing resources and guidance in accessible formats, they help bridge the gap between technical energy topics and the public, enabling individuals to engage meaningfully in energy decision-making. This approach helps break down barriers to participation and ensures that all members of the community can access the information they need to make informed decisions. The program’s emphasis on transparency and knowledge sharing strengthens community involvement and builds trust between energy developers, regulatory agencies, and the public.

While the Wayfinders Program has previously conducted outreach for geothermal energy and other renewable energy in Puna, there is a growing need for continued support. By working directly with

communities to ensure information is publicly accessible and presented in a way that resonates with local values and concerns, the Wayfinders Program can help bridge the information gap between the community and regulatory agencies. This could lead to more informed discussions, greater community involvement, and ultimately, a more inclusive decision-making process. Ensuring that information is both accessible and relevant to the community's context is essential to fostering trust and building stronger, more collaborative relationships in energy development projects like PGV.

Pacific and Hawaiian Methodologies

The common thread among the solutions derived from Aotearoa, Molokaʻi CERAP, Brazil's Corporate Social Responsibility (CSR), the DHHL Beneficiary Consultation, and HSEO Wayfinders Program is the focus on placing community, culture, relationships, transparency, accountability, and equity at the core of their approaches. Based on research that highlights the need for Hawaiians to be at the forefront of planning decisions, leveraging their traditional knowledge, and incorporating the experience and insights of local communities, I recommend that the following methodologies be integrated into research, planning, outreach, and decision-making processes.

Piko Analysis (Enos & Tamanaha, 2022). Integrating Piko Analysis into planning provides a culturally grounded methodology to align decision-making with Native Hawaiian values, emphasizing sustainability, equity, and the empowerment of Indigenous communities. The framework uses three layers– Piko O, Piko I, and Piko A– to guide planners through a holistic process that honors the past, addresses current challenges, and creates a resilient future.

Kūlana Noiʻi (IDEAS Program et al., 2018). The Kūlana Noiʻi emphasizes listening, observing, and reciprocal learning through cultural protocols, offering planners a pathway to ethically engage with communities and the ʻāina. The framework highlights the importance of transparency, which

encourages planners to actively participate in community processes, building trust and incorporating local knowledge into decision-making. This framework ensures cultural context is central, guiding development in a way that honors historical and cultural values and strengthens community identity.

Vanua (Nabobo-Baba, 2008). The Fijian methodology, Vanua, represents not just the land, but the deep interconnectedness of people, place, and culture, where land is a living part of identity rather than a separate commodity. In planning, Vanua encourages a shift from Western property concepts to viewing land as a shared cultural resource rather than as private property. This perspective prioritizes collective benefit over individual ownership. This methodology also supports equity by ensuring Indigenous and marginalized communities have access to land rights and decision-making processes that honor their connection to the land.

Pewa Framework (Deluze et al., 2023). The Pewa Framework promotes restorative approaches that acknowledge and repair historical harms, such as displacement and environmental degradation. The Framework emphasizes equity, inclusivity, and the integration of Indigenous knowledge systems into urban planning, landscaping, and community forestry. The Pewa Framework encourages collaboration and weaving together diverse perspectives, creating a guide for creating culturally grounded solutions that address modern challenges while honoring place-based practices.

Discussion

The findings from both secondary and primary research highlight that rebuilding trust and fostering meaningful relationships between PGV, the local community, and government entities is unattainable without prioritizing Hawaiian and local community representation in decision-making processes. The loss of trust in PGV stems from long standing concerns, including the initial approaches to geothermal extraction and persistent issues with transparency in sharing information. Additionally,

there are gaps in collaboration among key stakeholders such as DLNR, OHA, and Hawai‘i County, particularly regarding the effective use of Geothermal Royalty funds to support the impacted Puna District. This disconnect underscores the need for a more cohesive approach to identify and address community priorities and concerns. HELCO also has a significant role to play in providing tangible benefits to the community by improving energy accessibility for those affected by PGV operations. By working collaboratively with PGV and the local community, HELCO can help identify and address unmet energy needs and other gaps (DOE, 2017). Improved education and outreach are also essential to this process. Engaging the younger generation is important to ensure their active participation in planning and decision-making, encouraging a more informed and locally rooted workforce in renewable energy and planning sectors. Enhanced community conversations and educational initiatives can lead to better meeting dynamics, increased transparency, and a stronger foundation for building trust and collaborative solutions (PICHTER, 2013).

Based on the findings and best practices in moving forward in communities, the following is suggested for the PGV, Hawai‘i County, State, community, and other stakeholders involved in steps in moving forward shown in *Table 1*.

Table 1: Actions Steps in Moving Forward[8]

Time Horizon	Years (likely)	Possible Steps	Objective/Goal	Potential Stakeholders
Ongoing		Follow Pacific/ Hawaiian Methodology for Pono Planning	Ensure that decisions and processes are guided by Hawaiian and Pacific cultural values.	PGV, Hawai‘i County, Community leaders,
Short-term	1	Create Publicly Accessible Spending Reports & Biannual Meetings	Improve transparency and accountability in resource distribution and project outcomes.	Hawai‘i County, OHA, DLNR, PGV
	1-2	Establish a Native Hawaiian Commission	Enhance Hawaiian representation, accountability, and transparency in energy development.	Native Hawiian community leaders, Hawai‘i County Planning Department, Hawai‘i County Planning Commission
Medium-term	2-3	Adjust Geothermal Royalties Distribution	Ensure fair allocation of geothermal royalties to support Puna community needs	Hawai‘i County, OHA, DLNR
		Establish either a CBA or CSR	Formalize commitments and ensure direct, tangible benefits for the community.	PGV, HELCO, Puna community leaders
Long-term	3-5	Establish Energy and Outreach Initiatives for Comprehensive Planning and Education	Empower the younger generation and enhance local involvement in energy planning.	HSEO, DOE, Local schools, Community groups, Hawai‘i County
		Develop Educational Programs and Mentorships for Younger Generation	Cultivate informed future advocates and planners for community energy issues.	HSEO, DOE, Local schools, Community groups, Hawai‘i County

[8] Note: Puna Geothermal Venture (PGV); Office of Hawaiian Affairs (OHA); Department of Land and Natural Resources (DLNR); Hawaiian Electric Light Company (HELCO); Department of Education (DOE); Hawai‘i State Energy Office (HSEO); Community Benefits Agreement (CBA); Corporate Social Responsibility (CSR)

The table is intended to serve as a foundational framework for key stakeholders, including PGV, Hawai‘i County, the local community, DLNR, OHA, the Department of Energy (DOE), and others, to initiate meaningful change by placing Native Hawaiians and the broader community at the center of decision-making processes. Implementing this shift is undoubtedly complex, as PGV has operated for decades under a structure that has historically excluded the community from being integral to permitting and planning decisions.

However, this framework provides a pathway for those willing to champion change. By embracing these recommendations, stakeholders can take meaningful steps toward better supporting the Puna District, empowering Native Hawaiians and local residents, and addressing historical injustices. Breaking the cycle of path dependency requires a collective commitment to equity, transparency, and shared decision-making, and the table offers a strategic starting point to begin that journey.

Conclusion

This capstone paper highlights the importance of recognizing the past injustices and to have the ongoing conversations with all stakeholders involved to be able to build trust and relationships. By placing Native Hawaiians and local communities at the forefront of decision-making, we must acknowledge their traditional knowledge and connection to the ‘āina. It is very important to analyze current policies to identify gaps between government, private and local stakeholders, ensuring equitable outcomes for all those impacted. Additionally, there is a need to bring the younger generation into these conversations and to keep locals in planning for the future of renewable energy and other development. By doing so, there needs to be planning in the education system and other programs to encourage and empower the younger generation.

To create a more pono planning practice, like the modeled CERAP, we must adopt Pacific methodologies that emphasize transparency, accountability, and Native Hawaiian values. As we move

forward, it is important to create spaces where diverse voices are heard and relationships that overcome past differences are built. By prioritizing Native Hawaiian communities in renewable energy discussions, we ensure that development meets today's needs while honoring the ʻāina and its people for generations to come. This holistic approach will not only advance Hawaiʻi's environmental goals but also strengthen the cultural and spiritual connections that unite the people and the ʻāina as one.

This paper ends with the quotes from Hauʻofa (1994) and Kimmerer (2013) to encourage the shift in planning to be in the hands of Native Hawaiians and local communities who are the knowledged ones of the ʻāina, and to build trust and relationships with one another for the sake of future generations.

"As I watched the Big Island of Hawaiʻi expanding into and rising from the depths, I saw it in the future for Oceania, our sea of islands. That the future lies in the hands of our own people, not those who would prescribe for us, get us forever dependent and indebted because they see no way out."

- Epeli Hauʻofa, Our Sea of Islands

"A species and a culture that treat the natural world with respect and reciprocity will surely pass on genes to ensuing generations with a higher frequency than the people who destroy it. The stories we choose to shape our behaviors have adaptive consequences."

- Robin Kimmerer, Braiding Sweetgrass

References

Adler, P. (2013). Geothermal Public Health Assessment: Findings and Recommendations. https://punageothermalproject.com/wp-content/uploads/2023/03/Geothermal-Public-Health-Assessment-Report-FINAL.pdf

Armitage, G., and Judd, H. (1944). A Forerunner of Pele: Ghost Dog and Other Hawaiian Legends.

Deluze, A. K., Enos, K., Mossman, K., Gunasekera, I., Espiritu, D., Jay, C., Jackson, P., Connelly, S., Han, M. H., Giardina, C. P., McMillen, H., & Meyer, M. A. (2023). Urban ʻĀina: An Indigenous, Biocultural Pathway to Transforming Urban Spaces. *Sustainability*, *15*(13), 9937-. https://doi.org/10.3390/su15139937

DHHL. (2009). Department of Hawaiian Homelands Beneficiary Consultation on Beneficiary Consultation. https://dhhl.hawaii.gov/wp-content/uploads/2018/09/Beneficiary-consultation-Policy.pdf

DLNR. (2023). Geothermal Royalties Dispositions and Status of Geothermal and Cable System Development Fiscal Year 2023. *Report to the Thirty-Second Legislature 2024 Regular Session*. https://files.hawaii.gov/dlnr/reports-to-the-legislature/2024/EN24-Geothermal-Report-FY23.

Dobbyn, P. (2023). Puna is the Fastest Growing Place in Hawaiʻi. But it Comes with a Catch. *Civil Beat.*https://www.civilbeat.org/2023/05/puna-is-the-fastest-growing-place-in-hawaii-but-it-comes-with-a-catch/

DURP: UH Mānoa. (2008). Planning Practicum: Mcullly-Mōʻiliʻili Neighborhood Planning Study.

Eisen, J. B., & Glick, M. B. (2024). A Model for Community-Led Energy Planning and

Climate Justice: Renewable Energy Development on the Hawaiian Island of Molokai. *Washington University Journal of Law and Policy*, *74*(1), 001-.

Enos, K., & Tamanaha, M. (2022). Ownership as Kinship: Restoring the Abundance of Our Ancestors. https://nonprofitquarterly.org/ownership-as-kinship-restoring-the-abundance-of-our-ancestors/

Environment Hawaii. 1992. Health Concerns Unheeded, Say Neighbors of Geothermal Plant. https://www.environment-hawaii.org/?p=3855

Fletcher, C. H. (2019). Climate Change : What the Science Tells Us (Second edition.). J*ohn Wiley & Sons, Inc*.

Hawaiian Dictionaries. https://wehewehe.org/gsdl2.85/cgi-bin/hdict?d=D18537&l=en&e=d-11000-00---off-0hdict--00-1----0-10-0---0---0direct-10-ED--4--textpukuielbert%2Ctextmamaka-----0-1l--11-haw-Zz-1---Zz-1-home-pono--00-4-1-00-0--4----0-0-11-00-0utfZz-8-00

Hawaii Tribune. (2016). PGV Sued for Gas Leak; Class Action Lawsuit Seeks Compensation for Hydrogen Sulfide Exposure. https://classactionreview.com/pgv-sued-for-gas-leak-class-action-lawsuit-seeks-compensation-for-hydrogen-sulfide-exposure/

Hauofa, Epeli. (1994). Our Sea of Islands. *The Contemporary Pacific*, 6(1), pp. 147–61.

HSEO. (2023). Hawai‘i Pathways to Decarbonization: Act 238, Session Laws of Hawai‘i

2022: Report to the 2024 Hawai‘i State Legislature. https://energy.hawaii.gov/wp-content/uploads/2022/10/Act-238_HSEO_Decarbonization_FinalReport_2023.pdf

Gayen, D., Chatterjee, R. & Roy, S. A review on environmental impacts of renewable energy for sustainable development. Int. J. Environ. Sci. Technol. 21, 5285–5310 (2024). https://doi.org/10.1007/s13762-023-05380-z

IDEAS Program, He‘eia National Estuarine Research Reserve, University of Hawai‘i Sea Grant College Program, Kua‘āina Ulu ‘Auamo, and Paepae o He‘eia. (2018). Kūlana Noi‘i: Version 2.0. https://seagrant.soest.hawaii.edu/wp-content/uploads/2021/09/Kulana-Noii-2.0_LowRes.pdf

Kent, G. (1981). Community-Based Development Planning. *Third World Planning Review*, *3*(3), 313–326. https://doi.org/10.3828/twpr.3.3.q07416r622q2uj02

Kime, S., et al. (2023). Evaluating equity and justice in low-carbon energy transitions. Environmental research letters. https://doi.org/10.1088/1748-9326/ad08f8

Kim, A. (2024). Hawaii County Council Considers Lower Puna Water Study. *Big Island Now*. https://www.higp.hawaii.edu/hggrc/hawaii-county-council-considers-lower-puna-water-study/

Kimmerer, R. (2013). Braiding Sweetgrass: Indigenous Wisdom, Scientific Knowledge and the Teachings of Plants (1st ed.). *Milkweed Editions.*

MacKenzie, M. K., Serrano, S., & Kaulukukui, K. L. (2007). Environmental Justice for Indigenous Hawaiians: Reclaiming Land and Resources.

McAllister, T., Hikuroa, D., & Macinnis-Ng, C. (2023). Connecting Science to Indigenous Knowledge. *New Zealand Journal of Ecology*, *47*(1), 1-13.

Matsuoka, J. K., McGregor, D. P., Minerbi, L., Kanahele, P., Kelly, M., Barney-Campbell, N.,

Saulsbury, J. W., & Trettin, L. D. (1996). Native Hawaiian Ethnographic Study for the Hawaii Geothermal Project Proposed for Puna and Southeast Maui. *Oak Ridge National Laboratory.* https://doi.org/10.2172/463547

Matunga, H. (2013). Theorizing Indigenous Planning. In *Reclaiming Indigenous Planning* (pp. 3–32). MQUP. https://doi.org/10.1515/9780773589933-004

Matunga, H., Porter, L., Viswanathan, L., Patrick, L., Walker, R., Sandercock, L., Moraes, D., Frantz, J., Thompson-Fawcett, M., Riddle, C., & Jojola, T. (Ted). (2017). Indigenous Planning: from Principles to Practice/A Revolutionary Pedagogy of/for Indigenous Planning/Settler-Indigenous Relationships as Liminal Spaces in Planning Education and Practice/Indigenist Planning/What is the Work of Non-Indigenous People in the Service of a Decolonizing Agenda?/Supporting Indigenous Planning in the City/Film as a Catalyst for Indigenous Community Development/Being Ourselves and Seeing Ourselves in the City: Enabling the Conceptual Space for Indigenous Urban Planning/U. *Planning Theory & Practice*, *18*(4), 639–666. https://doi.org/10.1080/14649357.2017.1380961

Minerbi, L. (2013). Hawaii Should adopt community benefit agreements. *Star Advertiser*

MCEH. (2023). Molokai Community Energy Resilience Action Plan. https://www.molokaicleanenergyhui.org/molokai-cerap

McGregor, D. P. (2007). Puna: A Wahi Pana Sacred to Pelehonuamea. In *Na Kua`aina* (pp. 143-). University of Hawaii Press.

McGregor, D. P. I. (1993). Pele vs. Geothermal: A Clash of Cultures. *Bearing Dreams, Shaping Vision: Asia Pacific American Facing the 1990s*, 45-59.

McGregor, D. P. (1996). An introduction to the Hoa`aina and their rights.

Nabobo-Baba, U. (2008). Decolonising Framings in Pacific Research: Indigenous Fijian

Vanua Research Framework as an Organic Response. *AlterNative : An International Journal of Indigenous Peoples*, *4*(2), 140–154. https://doi.org/10.1177/117718010800400210

Parsons, M., et al. (2019). Disrupting path dependency: Making room for Indigenous Knowledge in river management. Global Environmental Change. 95-113. https://doi.org/10.1016/j.gloenvcha.2019.03.008

PICHTR. (2013). Hawaii Geothermal Assessment and Roadmap. https://www.hnei.hawaii.edu/wp-content/uploads/Hawaii-Geothermal-Assessment-and-Roadmap.pdf

Porter, L. (2010). Unlearning the Colonial Cultures of Planning. 1st Ed.

Preza, D. (2010) The Empirical Writes Back: Re-Examining Hawaiian Dispossession Resulting from the Māhele of 1848. Thesis Dissertation. https://malu-aina.org/wp-content/uploads/2018/11/Preza.Thesis.The-Empirical-Writes-Back-copy.pdf

Sandercock, L. (2007). Commentary: Indigenous planning and the burden of colonialism. Planning Theory & Practice. Vol.5:1; pg. 118-124. https://doi.org/10.1080/1464935042000204240

Sainio, H. (2017). CSR in Brazil: The impact of culture and values. Department of Romance Studies a and Classics. Stockholms Universitet. http://www.diva-portal.org/smash/get/diva2:1150415/FULLTEXT01.pdf

Sayed, E., et al. (2021). A critical review on environmental impacts of renewable energy systems and mitigation strategies: Wind, hydro, biomass and geothermal. ScienceDirect. Vol. 766:20. https://doi.org/10.1016/j.scitotenv.2020.144505

Stantec Consulting Services Inc. (2023). Puna Geothermal Venture Repower Project Final

Environmental Impact Statement. https://punageothermalproject.com/wp-content/uploads/2024/08/2024-01-08-HA-FEIS-Puna-Geothermal-Venture-Repower-Project.pdf

Taute, N., Morgan, K., Ingham, J., Archer, R., & Fa'aui, T. (2022). Māori values in geothermal management and development. *AlterNative : An International Journal of Indigenous Peoples*, *18*(4), 548–555. https://doi.org/10.1177/11771801221118629

Taute, N., Morgan, T. K. K. B., Ingham, J., Archer, R., & Fa'aui, T. (2023). Cultural sustainability thresholds to measure the mauri of Indigenous Māori values impacted by geothermal engineering projects. *Environmental and Sustainability Indicators*, *20*, 100303-. https://doi.org/10.1016/j.indic.2023.100303

Trask, H.-K. (1991). Coalition-Building between Natives and Non-Natives. *Stanford Law Review*, *43*(6), 1197–1213. https://doi.org/10.2307/1229037

U.S. Department of Energy (DOE). (2017). Guide to Advancing Opportunities for Community Benefits through Energy Project Development. *Office of Minority Business of Economic Development*. https://www.energy.gov/justice/articles/community-benefit-agreement-cba-resource-guide

Wallsgrove, R. J. (2022). Restorative Energy Justice.

Wayfinders Program. https://energy.hawaii.gov/get-engaged-2/clean-energy-wayfinders-2/

Zandt, B. (2024). Communities in Hawaii and Alaska Exchange Ideas to Engage Residents in Energy Transitions. NREL. https://www.nrel.gov/news/program/2024/communities-in-hawaii-and-alaska-exchange-ideas-to-engage-residents-in-energy-transitions.html

Appendix A

IRB Approval

UNIVERSITY of HAWAI'I® SYSTEM

Office of Research Compliance
Human Studies Program

DATE:	July 11, 2024
TO:	Das, Ashok, University of Hawaii at Manoa, Urban and Regional Planning Neal, Kara, MA, University of Hawaii at Manoa, Urban and Regional Planning
FROM:	Bacon, Kristin, Rsch Supp, Hum Stds Prog, Social&Behav Exempt
PROTOCOL TITLE:	Renewing Community Trust: Fostering Pilina and Embracing Cultural Knowledge for Renewable Energy Planning
FUNDING SOURCE:	None
PROTOCOL NUMBER:	2024-00459
APPROVAL DATE:	July 11, 2024

NOTICE OF APPROVAL FOR HUMAN RESEARCH

This letter is your record of the Human Studies Program approval of this study as exempt.

On July 11, 2024, the University of Hawaii (UH) Human Studies Program approved this study as exempt from federal regulations pertaining to the protection of human research participants. The authority for the exemption applicable to your study is documented in the Code of Federal Regulations at 45 CFR 46.104(d) 2.

Exempt studies are subject to the ethical principles articulated in The Belmont Report, found at the OHRP Website www.hhs.gov/ohrp/humansubjects/guidance/belmont.html.

Exempt studies do not require regular continuing review by the Human Studies Program. However, if you propose to modify your study, you must receive approval from the Human Studies Program prior to implementing any changes. You can submit your proposed changes via the UH eProtocol application. The Human Studies Program may review the exempt status at that time and request an application for approval as non-exempt research.

In order to protect the confidentiality of research participants, we encourage you to destroy private information which can be linked to the identities of individuals as soon as it is reasonable to do so. Signed consent forms, as applicable to your study, should be maintained for at least the duration of your project.

This approval does not expire. However, please notify the Human Studies Program when your study is complete. Upon notification, we will close our files pertaining to your study.

2425 Campus Road, Sinclair 10
Honolulu, HI 96822
Telephone: (808) 956-5007 • Fax: (808) 956-9150
An Equal Opportunity/Affirmative Action Institution

Appendix B

Consent Forms

University of Hawai‘i
Consent Form
Ashok Das, Principal Investigator
Kara Neal, Researcher
Project Title: Renewing Community Trust: Fostering Pilina and Embracing Cultural Knowledge for Renewable Energy Planning

Renewing Community Trust: Fostering Pilina and Embracing Cultural Knowledge for Renewable Energy Planning

Interview Consent Form (to be conducted with planners/officials of the state, county, and Puna Geothermal Venture representatives)

2024

Aloha! You are being asked to participate in an interview session a part of a research study conducted by Kara Neal and Ashok Das from the Department of Urban and Regional Planning at the University of Hawai‘i. The support researcher, Kara Neal, in her capstone study seeks to understand how to strengthen community-based planning and community relationships with the state and other stakeholders for infrastructure development and renewable energy.

What am I being asked to do?
If you participate in this project, I will meet with you for an interview at a location and time convenient for you.

Taking part in this study is your choice.
Your participation in this project is completely voluntary. You can choose to take part or you can choose not to take part in this study. You also can change your mind at any time. If you choose to stop, there will be no penalty or loss to you.

Why is this study being done?
The purpose of my project is to understand how to develop a better planning system for communities and build relationships between community and the State. I am asking you to participate because there is the need to have a more concrete understanding for the future plans in Hawai‘i in regard to renewable energy and planning infrastructure.

What will happen if I decide to take part in this study?
The semi-structured interview will consist of 10-12 open ended questions. It will take 45 minutes to an hour. The interview questions will include questions like, “What role does the State play in geothermal energy projects? What measures are being taken to ensure meaningful engagement and collaboration with the affected community moving forward?”

Only you and I will be present during the interview. With your permission, I will audio-record the interview so that I can later transcribe the interview and analyze the responses. You will be one of about three people I will interview for this study.

What are the risks and benefits of taking part in this study?
I believe there is little risk to you for participating in this research project. If you become stressed or uncomfortable at any point of the interview, you can skip the question or take a break. You can also stop the interview or you can withdraw from the project altogether.

University of Hawai‘i
Consent Form
Ashok Das, Principal Investigator
Kara Neal, Researcher
Project Title: Renewing Community Trust: Fostering Pilina and Embracing Cultural Knowledge for Renewable Energy Planning

There will be no direct benefit to you for participating in this project. The results of this project may help the community of Puna have direct benefits after decades of being neglected and future communities that will be impacted by renewable energy and other infrastructure development in Hawai‘i.

In-Person Research Risk:
For the safety and protection of yourself, the research team and others, we strongly recommend that you wear a well-fitting mask that covers nose and mouth (CDC guidance) during each research-related encounter to reduce the spread of common respiratory diseases such as the Rhinovirus (common cold), the Influenza (Flu), Respiratory Syncytial Virus (RSV), and Coronavirus Disease of 2019 (COVID-19). Members of the research team will wear a well-fitting mask that covers nose and mouth at all times.

Results of Research:
The results will be directly shared with the participants and will be cleared with them before publication of results.

Privacy and Confidentiality:
I will keep all study data secure in a locked filing cabinet in a locked office/encrypted on a password protected computer. Only my University of Hawai'i advisor and I will have access to the information. Other agencies that have legal permission have the right to review research records. The University of Hawai'i Human Studies Program has the right to review research records for this study.

After I write a copy of the interviews, I will erase or destroy the audio recordings.When I report the results of my research project, I will not use your name. I will not use any other personal identifying information that can identify you. I will use pseudonyms (fake names) and report my findings in a way that protects your privacy and confidentiality to the extent allowed by law.

Future Research Studies:
Identifiers will be removed from your data, and after removal of identifiers, the data may be used for future research studies or distributed to another investigator for future research studies and we will not seek further approval from you for these future studies.

Questions: If you have any questions about this study, please email me at *kneal6@hawaii.edu* You may also contact my advisor, Ashok Das, at *ashokdas@hawaii.edu.*

You may contact the UH Human Studies Program at 808.956.5007 or uhirb@hawaii.edu to discuss problems, concerns and questions, obtain information, or offer input with an informed individual who is unaffiliated with the specific research protocol. Please visit http://go.hawaii.edu/jRd for more information on your rights as a research participant.

If you agree to participate in this project, please sign and date the following signature page and return it to: *Kara Neal*

University of Hawai‘i
Consent Form
Ashok Das, Principal Investigator
Kara Neal, Researcher
Project Title: Renewing Community Trust: Fostering Pilina and Embracing Cultural Knowledge for Renewable Energy Planning

Keep a copy of the informed consent for your records and reference.

Signature(s) for Consent:

I give permission to join the research project entitled, “Renewing Community Trust: Fostering Pilina and Embracing Cultural Knowledge for Renewable Energy Planning”

Please initial next to either “Yes” or “No” to the following:

_____ Yes _____ No I consent to be audio-recorded for this interview.

Name of Participant (Print): _____

Participant’s Signature: _____

Signature of the Person Obtaining Consent: _____

Date: _____

Mahalo!

University of Hawai'i
Consent Form
Ashok Das, Principal Investigator
Kara Neal, Researcher
Project Title: Renewing Community Trust: Fostering Pilina and Embracing Cultural Knowledge for Renewable Energy Planning

Renewing Community Trust: Fostering Pilina and Embracing Cultural Knowledge for Renewable Energy Planning

Talk Story Consent Form Round 1

2024

Aloha! You are being asked to participate in a talk story session as a part of a research study conducted by Kara Neal and Ashok Das from the Department of Urban and Regional Planning at the University of Hawai'i. The support researcher, Kara Neal, in her capstone study seeks to understand how to strengthen community-based planning and community relationships with the state and other stakeholders for infrastructure development and renewable energy.

What am I being asked to do?
If you participate in this project, you will be asked to share your thoughts and insights of geothermal, PGV, and community-based planning. You do not have to speak if you do not want to, if you would just like to sit and listen that is okay too. This is meant to be a comfortable space to share how you feel about past infrastructure development and the changes that can be made to strengthen community relationships with government and private organizations. You will also have the opportunity to participate in a second round of talk story.

Taking part in this study is your choice.
You can choose to take part, or you can choose not to take part in this session/study. You also can change your mind at any time. If you stop at any time, there will be no penalty or loss to you.

Why is this study being done?
The purpose of my project is to understand how to develop a better planning system for communities and build relationships between community and the State. I am asking you to participate in this study to help voice community concerns, values, and questions regarding renewable energy and infrastructure planning.

What will happen if I decide to take part in this study?
The talk story discussion will be guided by about five open-ended questions. It will take about at least an hour. The questions will be centered around past, present, and future of geothermal energy and Puna Geothermal Venture (PGV), county planning decisions in renewable energy, and community relationships with private companies and government.

The talk story session will be held at Uncle Roberts Farmers Market. It is expected to have at least ten community members show up for talk story. Photos will be taken during the session to

show the commitment of the community voicing their feelings and values for change.

What are the risks and benefits of taking part in this study?

I believe there is little risk to you in participating in this research project. You may become stressed or uncomfortable answering any of the questions or discussing topics during the talk story session. If you do become stressed or uncomfortable, you can skip the question or take a break. You can also stop participating at any time.

There will be no direct benefit to you for participating in this focus group. The results of this project may help the community of Puna have direct benefits after decades of being neglected and future communities that will be impacted by renewable energy and other infrastructure development in Hawai‘i.

In-Person Research Risk:
For the safety and protection of yourself, the research team and others, we strongly recommend that you wear a well-fitting mask that covers nose and mouth (CDC guidance) during each research-related encounter to reduce the spread of common respiratory diseases such as the Rhinovirus (common cold), the Influenza (flu), Respiratory Syncytial Virus (RSV), and Coronavirus Disease of 2019 (COVID-19). Members of the research team will wear a well-fitting mask that covers nose and mouth at all times.

This research will be held at an outdoor space so there will be no need to wear a mask unless you prefer too.

Results of Research:
The results will be directly shared with the participants and will be cleared with them before publication of results.

Privacy and Confidentiality: I will keep all study data secure in a locked filing cabinet in a locked office/encrypted on a password protected computer. Only my University of Hawai‘i advisor and I will have access to the information. Other agencies that have legal permission have the right to review research records. The University of Hawai'i Human Studies Program has the right to review research records for this study.

There will be photographs taken during the session to capture the sense of place. The faces of the individuals will be blurred out using a digital photo-editing software. Although we ask everyone in the talk story group to respect everyone’s privacy and confidentiality, and not to identify anyone in the group or repeat what is said during the group discussion, please remember that other participants in the group may accidentally disclose what was said. Avoid sharing personal information that you may not wish to be known.

University of Hawai'i
Consent Form
Ashok Das, Principal Investigator
Kara Neal, Researcher
Project Title: Renewing Community Trust: Fostering Pilina and Embracing Cultural Knowledge for Renewable Energy Planning

Future Research Studies:
Identifiers will be removed from your identifiable private information, and after removal of identifiers, the data may be used for future research studies or distributed to another investigator for future research studies and we will not seek further approval from you for these future studies.

Questions: If you have any questions about this study, please email me at *kneal6@hawaii.edu*

You may contact the UH Human Studies Program at 808.956.5007 or uhirb@hawaii.edu to discuss problems, concerns and questions, obtain information, or offer input with an informed individual who is unaffiliated with the specific research protocol. Please visit http://go.hawaii.edu/jRd for more information on your rights as a research participant.

If you agree to participate in this project, please sign and date the following signature page and return it to: Kara Neal

Keep a copy of the informed consent for your records and reference.

Signature(s) for Consent:

I give permission to join the research project entitled, "Renewing Community Trust: Fostering Pilina and Embracing Cultural Knowledge for Renewable Energy Planning"

Please initial next to either "Yes" or "No" to the following:

_____ Yes _____ No I consent to having my photo taken for the talk story session and I understand that my face will be blurred out using a digital photo-editing software.

Name of Participant (Print): _____

Participant's Signature: _____

Signature of the Person Obtaining Consent: _____

Date: _____

Mahalo !

University of Hawai'i
Consent Form
Ashok Das, Principal Investigator
Kara Neal, Researcher
Project Title: Renewing Community Trust: Fostering Pilina and Embracing Cultural Knowledge for Renewable Energy Planning

Renewing Community Trust: Fostering Pilina and Embracing Cultural Knowledge for Renewable Energy Planning

Talk Story Consent Form Round 2

2024

Aloha! You are being asked to participate in a talk story session as part of a research study conducted by Kara Neal and Ashok Das from the Department of Urban and Regional Planning at the University of Hawai'i. The support researcher, Kara Neal, in her capstone study seeks to understand how to strengthen community-based planning and community relationships with the state and other stakeholders for infrastructure development and renewable energy.

What am I being asked to do?
If this is your first time participating in the talk story sessions, you will be asked to share your your thoughts and insights on geothermal, Puna Geothermal Venture (PGV), and community-based planning. If this is your second time participating, you will be asked to add new or more specific/detailed thoughts and insights based on the guiding questions for the session, some of which are prompted by what we discussed in the first talk story session. You do not have to speak if you do not want to, if you would just like to sit and listen that is okay too. This is meant to be a comfortable space to share how you feel about past infrastructure development and the changes that can be made to strengthen community relationships with government and private organizations.

Taking part in this study is your choice.
You can choose to take part, or you can choose not to take part in this session/study. You also can change your mind at any time. If you stop, there will be no penalty or loss to you.

Why is this study being done?
The purpose of my project is to understand how to develop a better planning system for communities and build relationships between community and the State. I am asking you to participate in this study to help voice community concerns, values, and questions regarding renewable energy and infrastructure planning. This second round of talk story is aimed to allow the participants, both returning and new, to provide stories or feedback anew or on specific aspects or in more detail.

What will happen if I decide to take part in this study?
The talk story discussion will take between one to two hours. The session will be guided by about five open ended questions similar to the first talk story session (geothermal and renewable energy, PGV, community relationships with government). The goal of the second round of talk

story is to elaborate more based on what was discussed in the first session and decide on the potential solutions moving forward.

The talk story session will be held at Uncle Roberts. It is expected to have at least five community members from the first talk story session to participate and at least five new participants for the second session of talk story. There should be a total of at least 10-15 participants for the second session. Photos will be taken during the session to show the commitment of the community voicing their feelings and values for change.

What are the risks and benefits of taking part in this study?

I believe there is little risk to you in participating in this research project. You may become stressed or uncomfortable answering any of the questions or discussing topics during the talk story session. If you do become stressed or uncomfortable, you can skip the question or take a break. You can also stop participating at any time.

There will be no direct benefit to you for participating in this focus group. The results of this project may help the community of Puna have direct benefits after decades of being neglected and future communities that will be impacted by renewable energy and other infrastructure development in Hawai‘i.

In-Person Research Risk:
For the safety and protection of yourself, the research team and others, we strongly recommend that you wear a well-fitting mask that covers nose and mouth (CDC guidance) during each research-related encounter to reduce the spread of common respiratory diseases such as the Rhinovirus (common cold), the Influenza (flu), Respiratory Syncytial Virus (RSV), and Coronavirus Disease of 2019 (COVID-19). Members of the research team will wear a well-fitting mask that covers nose and mouth at all times.

This session will be held outdoors and in an open space, masks are not required for this session.

Results of Research:
The results will be directly shared with the participants and will be cleared with them before publication of results.

Privacy and Confidentiality: I will keep all study data secure in a locked filing cabinet in a locked office/encrypted on a password protected computer. Only my University of Hawai‘i advisor and I will have access to the information. Other agencies that have legal permission have the right to review research records. The University of Hawai'i Human Studies Program has the right to review research records for this study.

There will be photographs taken during the session to capture the sense of place. The faces of the individuals will be blurred out using a digital photo-editing software. Although we ask

everyone in the talk story group to respect everyone's privacy and confidentiality, and not to identify anyone in the group or repeat what is said during the group discussion, please remember that other participants in the group may accidentally disclose what was said. Avoid sharing personal information that you may not wish to be known.

Future Research Studies:
Identifiers will be removed from your identifiable private information, and after removal of identifiers, the data may be used for future research studies or distributed to another investigator for future research studies and we will not seek further approval from you for these future studies.

Questions: If you have any questions about this study, email me at *kneal6@hawaii.edu* . You may also contact my advisor, Ashok Das, at *ashokdas@hawaii.edu.*

You may contact the UH Human Studies Program at 808.956.5007 or uhirb@hawaii.edu to discuss problems, concerns and questions, obtain information, or offer input with an informed individual who is unaffiliated with the specific research protocol. Please visit http://go.hawaii.edu/jRd for more information on your rights as a research participant.

If you agree to participate in this project, please sign and date the following signature page and return it to: Kara Neal

Appendix C

Talk Story Session 1 & 2

Materials

Aloha Communities of Puna

Come talk story with a researcher in how community can move forward with planning decisions related to renewable energy. This is a great opportunity to share stories, listen to others, and collaborate on the changes that need to be made in regards to planning and renewable energy (using PGV as an example)

share your mana'o on planning for community

share stories of the impact of PGV

share your mana'o on how trust can be rebuilt between community and State

Date: Saturday, August 17th (08/17/24)
Time: 12:30 p.m.
Location: Uncle Roberts Farmers Market
12-5032 Pāhoa Kalapana Rd.

Goal: To develop a policy for community who has been impacted by planning infrastructure & renewable energy (PGV)

snacks will be provided
&
coloring sheets for keiki

A consent form will be present to respect boundaries and for community to understand the goals of the session. If you would like to review the consent form before hand, please email kneal6@hawaii.edu. If you can't make this session, there will be a following one in September

Come Join the Conversation on Solutions Addressing PGV, Renewable Energy, & Community Planning

PAST

PRESENT

FUTURE

Saturday, September 21st (09/21/24)
1:00 p.m.
Uncle Roberts
12-5038 Pāhoa Kalapana Rd.

If you missed the first session, you still have the chance to share your experience and insights on these topics as well

The first talk story was a meaningful and impactful session to hear from community on the past and current impacts of PGV, renewable energy, and planning decisions. The researcher and community began talking about solutions for these topics and will continue to do so for the next session. The researcher will propose the potential actions to move forward and wants to hear from you!

Your voice helps push towards the changes needed for putting community needs, wants, beliefs, and values first in planning decisions

Come Join!

Snacks Provided
&
Coloring Sheets for Keiki

Any questions please email Kara, at **kneal6@hawaii.edu**

Ground Rules:

1. Respect each other
    a. Value all opinions and experiences
    b. No personal attacks
2. Listen Actively & with Openness
    a. Please listen to others when they are speaking
    b. Avoid interrupting to allow each person to express their views fully
    c. Please try to avoid side conversations, especially if audible
3. Be Respectful of Privacy
    a. Respect the privacy of personal stories and information shared in the session
    b. The researcher will maintain confidentiality
4. Avoid Conflicts, Disagree with Respect
    a. Address disagreements with respect and understanding
    b. Focus on understanding different viewpoints
    c. Seek to find common ground and resolve conflicts amicably
5. Be Inclusive
    a. Encourage participation from everyone
6. Be Mindful of Time
    a. Focus on subject we are discussing
    b. Help the conversation keep moving forward
7. Spread Aloha & Positivity
    a. Maintain a positive and constructive attitude throughout the session
    b. Work towards building a supportive and harmonious environment

Appendix D

Photos


TOPIC 1:
TOPIC 2:


TOPIC 1:
TOPIC 2:

GEOTHERMAL ELECTRICITY IS AN ECONOMIC FAILURE

Without Government Assistance It Would Not Exist

The development of commercial level geothermal electricity generation in the United States began in 1960 at the Geysers geothermal field in California, just north of San Francisco. For 22 years this field was the only operating geothermal field in the United States. Its phenomenal success spawned geothermal developments in many other areas of the United States beginning in 1982. None of the subsequent developments have reached anywhere near the level achieved at the Geysers. Yet the belief in that possibility led to the opening of dozens of geothermal plants in the United States over the next 40 years. Most of this development was spurred by two legislative packages which were passed by the US Congress in 1978 and 2009, although there were numerous others.

The following essay attempts to give details about economic aspects of geothermal energy development in the United States, and the government's role in promoting it. The discussion below is based upon data from the Federal government and state agencies. The primary resource has been the US Environmental Information Agency (EIA)[i]. This site provides detailed plant-level data for all US geothermal plants from the beginning of 2001 onward. The EIA site also provides access to various reports dating all the way back to geothermal energy's beginning in 1960. This data is not as comprehensive, especially at the plant level. There is fairly comprehensive data for the period from 1989-1998[ii], but I have only been able to find data for other years through the state of Nevada [iii] and the California Energy Commission [iv].

Figure 1 below shows details of these developments. There was a meteoric rise in geothermal capacity and production during the period from 1980-1990. Since 1993 total production has actually decreased, in spite of a doubling of the geothermal capacity. Until 1990 the Geysers was still the almost exclusive producer of geothermal electricity in the United States, therefore the national production was closely tied to the Geysers production. Since 1990, opening of new geothermal plants in the United States has been largely confined to Nevada. Production at the Geysers in 2023 was less than half of its production in 1990. The addition of 26 new plants in Nevada and seven others in five other states have been insufficient to overcome that decline. That is a very clear example of failure. As of the end of 2023, the Geysers had still produced 57% of the entire United States geothermal industry output.

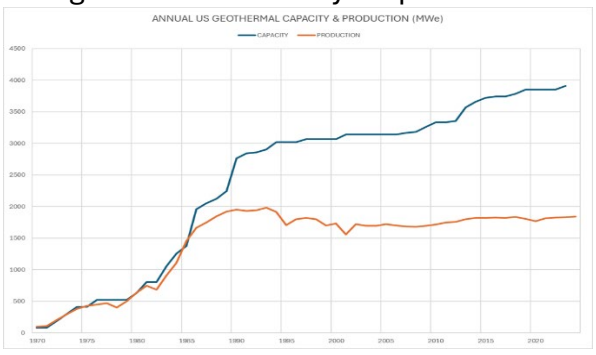


Figure 1. Total US Geothermal Capacity/Production

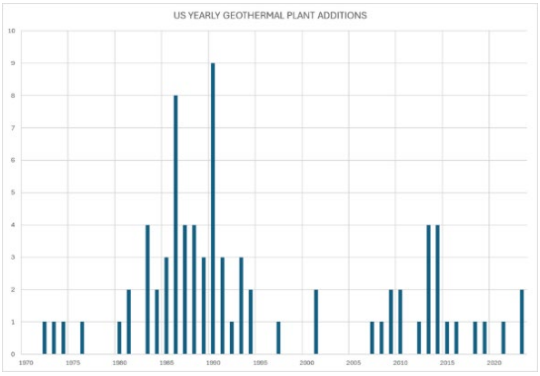


Figure 2. Total US Geothermal Plant Additions

Figure 2 above details the two main episodes of geothermal plant building in the United States since the first plant opened in 1960. These two periods are the entire 1980s as well as an interval between 2008 and 2015. Development between 1993 and 2008 was limited to 7 plants; from 2015 to 2023 it was also 7. My contention is that those two episodes of rapid geothermal growth were a direct product of legislation passed by the US Congress in 1978 and 2009. The Acts to which I am referring to are the "Public Utilities Regulatory Policies Act" (PURPA) in 1978[v], and the "American Recovery and Reinvestment Act" (ARRA) of 2009.[vi]

After the passage of PURPA in 1978, new startups quickly rose and by 1990, 40 new plants had been built, quintupling US capacity from 522 MW per year in 1980 to 2764MW in 1990. The only peak after that begins in 2009 with the passage of ARRA, which took capacity from 3182 MW in 2008 to 3660 MW in 2014, when the initial program ended. 13 new geothermal plants opened during this interval. Thus, it seems fair to conclude that the legislation had a major influence on the number of plant startups. The great majority of plant startups resulting from PURPA were in California, while a majority of those from ARRA were in Nevada.

So far I have spoken only in generalizations, but a few specific cases will make the basis of my thoughts more apparent. Most of the plants that were built during the 1980s were in the Geysers geothermal field just north of San Francisco in California. A large geothermal development also occurred on the shores of the Salton Sea in Southern California. Together these two areas account for most of the plants opened as a result of PURPA. They have long been and remain the two largest areas of geothermal production in the United States.

The Geysers area is by far the largest geothermal field in the world. During the 1980s a wildcat environment prevailed with dozens of entities opening 20 geothermal plants in an area of 50 square miles. PURPA companion legislation mandated that utilities purchase energy from "renewable" sources. At that time, geothermal was the only "renewable" possibility, with the exception of hydropower, so this almost mandated purchase from geothermal plants.

The Act directed individual states to develop policies for pricing electricity as well as long-term contracts. California became the leader in this endeavor since it was the only state with geothermal plants at that time. They developed what became known as "standard offer" contracts which dictated prices as well as increasing rate charges over the time of contracts, which were typically for 30-year purchase power agreements.

The first PURPA contracts were signed in the early 1980's, when natural gas prices were very high. This made these early contracts very lucrative. During the mid-1980's natural gas prices (the main fuel used to generate electricity in California) decreased considerably, yet the utilities were still forced to pay the high rates for geothermal power, so they raised their rates and customers began to complain. This necessitated a change in the terms of the standard offer contracts so that they were based on natural gas prices.

Subsequently, the economic attractiveness of geothermal plants decreased, and no major geothermal plants were developed at the Geysers after 1985. So many plants had been built at the Geysers that by 1987 wellhead pressure values and production began to decrease. But the wave of new plants dwindled, so that only 3 small plants were opened after 1985. By 1993 production at the Geysers was only half of what the production was at its peak in 1987. This represents a classic case of over-development, "too many straws sucking from the same glass".

By 1980, significant pressure decreases and water deficits had begun to appear at the Geysers. In response, and with some foresight, the Northern California Power Authority (NCPA) initiated the building of a new geothermal plant near the southern edge of the Geysers field. Planned in conjunction with the plant, a pipeline pumping sewage effluent from Santa Rosa to the plant was built to forestall the reservoir declines which had been observed at some existing plants at the Geysers. This pipeline was built with a capacity of 10 million gallons a day.

The overall production at the Geysers plummeted beginning in 1989. Due to the success of the NCPA pipeline project, two much larger pipelines were built which came into operation in late 1997. These pipelines were built by Lake County and Santa Rosa, each with a capacity of 19 million gallons a day. The current capacity of these pipelines is 40 million gallons a day, with an average usage volume of 30 million gallons a day.

Additional pipelines have been built to distribute the effluent among the other Geysers plants. This import of water definitely lessened the steady decline in overall production of the Geysers field, but by 1995 it was 60% of its 1987 peak; today its production is only 45% of its level in the 1980s. While some of this decrease can be attributed to overdevelopment, it is typical of most geothermal plants in the United States.

As a whole, plants in the United States have averaged a 3% yearly decrease in production unless new processing facilities are built or new wells are drilled. There has not been a new plant opened at the Geysers since 1989.

Economically, this decrease is not sustainable. Geothermal plants require massive amounts of up-front capital to drill the wells and create the generating facility. Roads and transmission lines to connect to the grid are another major possible expense. Return on investment is increasingly difficult to maintain, especially in competition with solar, for which costs are still decreasing rapidly.

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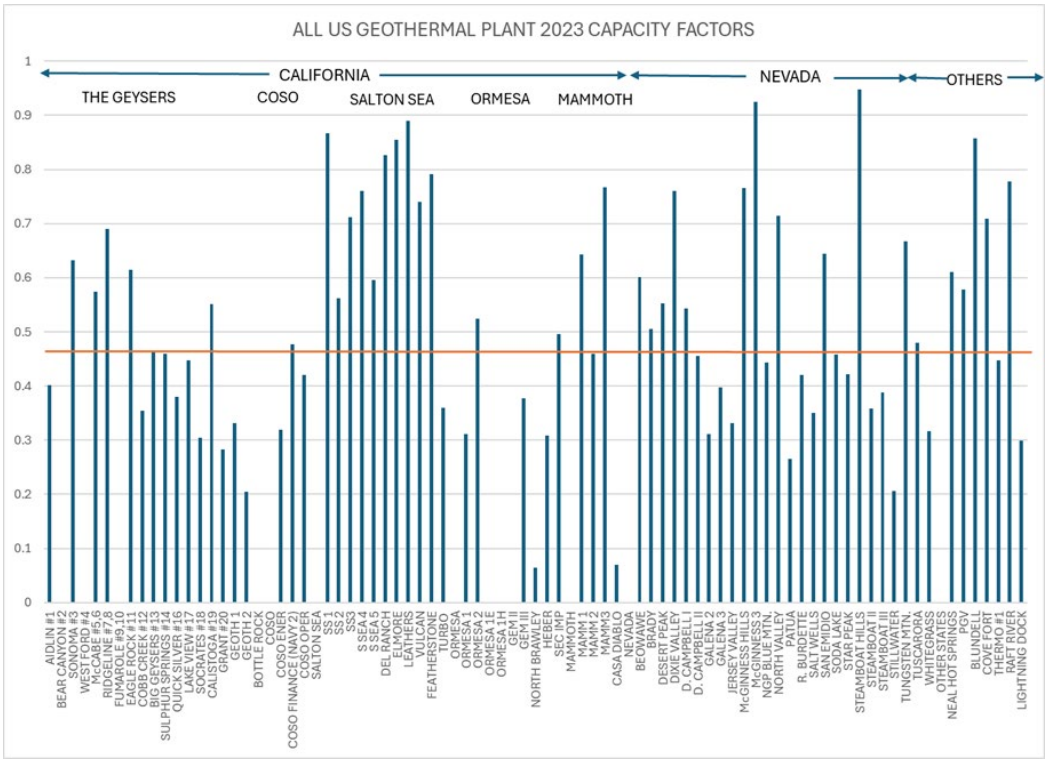

Figure 3. All US geothermal plant capacity factors for 2023

Figure 3 above shows capacity factors for all US geothermal plants in 2023, grouped by areas and states. Capacity factor is determined by dividing the total electrical output by the number of hours in a year. If a plant were operating at full capacity for an entire year, the capacity factor would be 100%. The horizonal red line shows the average capacity factor for all US power plants, which is 47%.

The National Renewable Energy Lab (NREL) attempts to include all possible costs in order to evaluate what they term the Levelized Cost of Energy (LCOE)[vii]. In their standard tables there is an estimation of capacity factors which they arbitrarily place at 90% for steam/flash plants and 80% for binary plants. Currently about half of the US geothermal fleet is steam/flash, which would place their average estimated capacity at 85% according to the NREL. Figure 3 shows the actual capacity factor which should be used is 47%. Thus, if a true capacity factor were to be used in the NREL calculations, an 80% reduction would be necessary in the estimated geothermal revenue of the plant (85/47=1.81). This makes geothermal far more costly than any other renewable energy.

Another factor overlooked by the NREL is declining geothermal production. Figure 4 below illustrates typical behavior of individual geothermal plants over time. Unless new processing facilities are added or new wellfields developed, this behavior seems universal. The Coso operating area in eastern California provides a classic example of this. The field is exploited by 3 plants, 2 of the plants operate in a US Naval Weapons Testing Area. Military authorities are reluctant to allow frequent outside visitors. Therefore, there has been almost no new development in the field since it became fully operational in 1990.

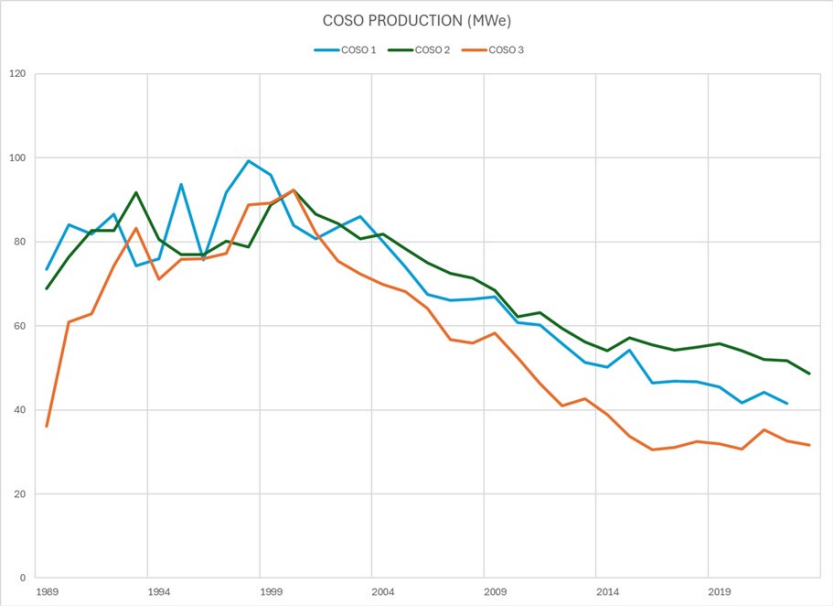

Figure 4 – Coso production 1989-2023

Production at all 3 areas in Coso peaked in the late 1990's and has since declined to less than half of that amount in a period of 25 years. Yet the NREL also assumes minimal operating costs throughout a plant's lifetime. Without new processing equipment or new wells, production will decline so that the average capacity factors discussed above will worsen over time for each individual plant.

Doubling the NREL estimates for geothermal LCOE would be very conservative if this decline and other factors are considered. The NREL has a category for variable expenses incurred at a geothermal plant but zero is the assigned estimate. This assumes that a plant can operate for 30 years without drilling new wells or replacing generating equipment. It looks like NREL estimates it will cost $8 million dollars a year in fixed operating expenses for a 40MW plant, which if operating a full capacity and prevailing rates would generate about $35 million a year gross income.

The NREL assumes that geothermal power would cost between $.062 -.106 per KWH. Doubling these estimates is justified by Figures 3 and 4, which would place geothermal energy's LCOE at $.124 -.212. This places it far above any renewable energy in cost. The LCOE of Solar plus Storage is $.075-.123. An additional factor to consider is that almost all new geothermal plants will be binary, which is at the high end of the geothermal cost estimates, and surely over $.20 per KWH.

The Geysers is not only the greatest geothermal production area in the United States, it is also the largest geothermal producing area in the world and has been for over 50 years now. It represents a resource that has no equal anywhere else on earth. Production from lesser areas is even more subject to economic uncertainties. Many plants never reach their projected capacity, and some are abandoned after only a few years of operation. The second most productive geothermal area in the United States is located on

the southeastern shore of the Salton Sea in the southern California desert. In this small area of 50 square miles, there are 11 operating geothermal plants. Seven of them were developed in the years while PURPA was still in force, between 1982 and 1990.

The Salton Sea area was a glamourous resort from the 1950-70s. Salton Sea has since become an unmitigated environmental disaster, yet the presence of eleven geothermal plants near the sea's southeastern shore is rarely, if ever, mentioned as a possible cause of this degradation. The salinity of the lake has increased dramatically since the 1980s. As a result, there have been massive fish die-offs as well as massive die-offs of the migratory birds which feed on these fish in the lake. There are reports of respiratory difficulties and documented high concentrations of hydrogen sulfide in the lake and surrounding areas.

The level of the Salton Sea has declined since the 1980s, leaving contaminated salt flats. The geothermal plants also use thousands of acre-feet of pumped Colorado river water (billions of gallons) per year to help maintain their operations. Meanwhile, the plants produce about 300MW per year. This amount could be generated by using the space set aside for the geothermal plants to produce solar energy without using any water, but that does not seem to have occurred to government planners.

Geothermal energy has caused numerous environmental problems which have been experienced throughout the world. The three primary environmental difficulties, which seem to be almost universal are: increased seismicity, toxic gas emissions and land subsidence. Indigenous religious and cultural beliefs and practices have also been ignored and damaged. Economic values cannot be placed on these problems, even though they are more significant.

Even upon strict economic grounds, geothermal energy should not exist. It was created and survives through subsidies and other incentives institutionalized by PURPA and ARRA as well as numerous other bills over the last 45 years.
Similar economic incentives were also included in the Big Beautiful Bill of 2025[viii] which cancels all residential renewable electricity tax credits but continues tax credits for commercial level geothermal projects.

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[i] EIA data is available through the Electricity Data Browser located at: https://www.eia.gov/electricity/data/browser/

[ii] EIA form EIA-867,"nonutility power producer report 1989-1998 available at: EIA.gov//electricity/data/EIA923. (The actual data table can be downloaded from the historical data section near the bottom of the page under:"1989-1998:EIA-867.)

[iii] State of Nevada Bureau of Mines available at : https://pubs.nbmg.unr.edu/Data-tables-and-graphs-p/of2012-03.htmli

[iv] California Energy Commission available at:

https://www.energy.ca.gov/data-reports/california-power-generation-and-power-sources

[v] PURPA - Public Law No. 95-617 (92 Stat. 3117).

[vi] ARRA – Public Law No 111-5 2009.

[vii] NREL – LCOE available at : https://atb.nrel.gov/electricity/2024/geothermal

[viii] Big Beautiful Bill – Public Law 119-21 2025 largely preserves investment and production tax credits for geothermal plants: National Groundwater Association: ngwa.org

SB-3081
Submitted on: 2/15/2026 8:28:30 PM
Testimony for EIG on 2/17/2026 3:05:00 PM

Submitted By	Organization	Testifier Position	Testify
Raenette Marino	Individual	Oppose	Written Testimony Only

Comments:

Born and raised on Moku o Keawe, I oppose SB3081. As a homeowner, I have invested in solar power energy because I believe in clean energy. As a teacher, I also understand the need for affordable energy. However, as a keiki o ka ʻāina, I vehemently oppose any exploration of underground energy in Kaʻū or any other place on our island.

SB-3081
Submitted on: 2/16/2026 12:01:08 AM
Testimony for EIG on 2/17/2026 3:05:00 PM

Submitted By	Organization	Testifier Position	Testify
Dana Keawe	Individual	Oppose	Remotely Via Zoom

Comments:

Bill number(s): SB3081

Position: STRONG OPPOSITION To SB3081

RE: STRONG OPPOSITION TO INDUSTRIALIZED GEOTHERMAL DEVELOPMENT AND DRILLING INTO KŪPUNA PELE ON PUBLIC TRUST AND DHHL LANDS — MOKU O KEAWE AND STATEWIDE

Aloha Chair and Members of the Committee:

My name is Dana Keawe, and I am standing in protection of Aloha 'Āina to protect our "Natural Resources" otherwise known to Kānaka as our Nā Akua, elemental beings from invasive developments such as geothermal in the name of "Renewable Energy". I respectfully submit this testimony in STRONG OPPOSITION to HB1982 HD1 with amendments, a bill that would authorize geological subsurface characterization activities under the guise of research, while undermining the cultural, environmental, and public health concerns deeply felt by many Native Hawaiians and community members.

I submit this testimony in strong opposition to any bill or measure authorizing industrialized geothermal exploration and development that would result in drilling into Kūpuna Pele within and throughout Moku o Keawe and equally in opposition to its statewide initiative on public trust lands and Department of Hawaiian Home Lands (DHHL) Crown trust lands on any of our Moku of Hawai'i Nui Akea.

Geothermal is not merely an “energy resource.” It is Kūpuna Pele. For Kānaka or by definition in legislative matters Native Hawaiians, geothermal activity is the physical manifestation of a living ancestral presence, inseparable from our genealogies, ceremonies, and spiritual obligations to ʻāina. To authorize industrialized geothermal development is to authorize drilling into the body of Kūpuna Pele herself. This act constitutes desecration of a sacred elder and severs an enduring cultural relationship that predates the State of Hawaiʻi. No economic valuation can replace this relationship, and no regulatory framework can render such desecration acceptable.

Because of this cultural reality, industrialized geothermal development and drilling into Kūpuna Pele are fundamentally incompatible with the State’s constitutional and statutory duties. Article XI, Section 7 of the Hawaiʻi State Constitution establishes that natural resources are held in public trust for the benefit of present and future generations. The public trust doctrine imposes an affirmative obligation upon the State to protect these resources and to prevent their impairment. Authorizing industrial drilling into geothermal systems prioritizes commercial extraction for monetary gain over protection and violates this constitutional mandate. There is no balance with invasive desecration of our already limited resources, and Akua PELE is not a resource to be tampered with.

These obligations are further reinforced by the Hawaiʻi Admissions Act of 1959, which transferred former Crown and Government Lands to the State to be held in trust for specific public purposes. Those lands — often referred to as ceded lands — are subject to fiduciary duties that require their management for the benefit of the public and Native Hawaiians. Industrialized geothermal development and drilling into Kūpuna Pele on these lands constitutes a misuse of trust assets and a breach of the State’s fiduciary responsibilities under both federal and state law.

The history of geothermal development in Hawaiʻi, particularly in Wao Kele o Puna, illustrates this constitutional failure. In the late 1980s and 1990s, Native Hawaiian practitioners and community members engaged in sustained protests to protect Wao Kele o Puna from industrialized geothermal development and drilling into Kūpuna Pele. Despite clear evidence of cultural, ecological, and spiritual significance, the State advanced geothermal drilling in the area, resulting in arrests of protectors, prolonged litigation, and irreversible disruption of a living forest ecosystem. These actions demonstrated the State’s prioritization of industrial extraction over its public trust duty to protect trust resources and Native Hawaiian traditional practices.

Rather than serving as a cautionary example, current geothermal proposals repeat the same pattern of constitutional disregard. The State now seeks to expand industrialized geothermal exploration under a statewide initiative, including on DHHL lands and former Crown and Government Lands, once again elevating energy policy and projected revenue generation —

including claims of 100% royalties — over its constitutional and fiduciary obligations. This initiative would further entrench the practice of drilling into Kūpuna Pele as a matter of public policy. This is not a localized land-use issue; it is a systemic threat to the trust corpus across all islands.

Industrialized geothermal development and drilling into Kūpuna Pele further endanger interconnected trust resources, including groundwater, air quality, and geologic stability. These risks are especially acute on the Moku o Keawe, where volcanic and aquifer systems are inseparable from subsistence practices, burial grounds, and ceremonial sites. The State cannot lawfully authorize degradation of these resources under Article XI, Section 7 of the Hawai‘i State Constitution or under the fiduciary standards imposed by the Admissions Act of 1959 in the name of speculative energy benefit or promised 100% royalty revenues.

With respect to DHHL lands, the breach is even more severe. These lands are held in trust under the Hawaiian Homes Commission Act for the exclusive benefit of Native Hawaiian beneficiaries. Legislation proposing industrialized geothermal exploration or development that authorizes drilling into Kūpuna Pele on DHHL lands without prior beneficiary authorization already constitutes a violation of fiduciary duty. Beneficiary consultation cannot be treated as a procedural afterthought or a remedy for an unlawful act.

Consultation does not cure desecration. The proposal of industrialized geothermal development and drilling into Kūpuna Pele on trust lands without consent reflects a failure to honor both the cultural foundations of these lands and the legal obligations attached to them. Beneficiaries are not merely stakeholders; they are trust beneficiaries whose rights must guide, not follow, legislative action.

WE DO NOT CONSENT TO ANY GEOTHERMAL DEVELOPMENT IN HAWAI'I. DHHL HAS FAILED TO CONSULT WITH OUR PEOPLE!

Accordingly, I urge this Committee to reject any geothermal-related legislation that:

1. Treats geothermal as a commodity rather than Kūpuna Pele;

2. Authorizes industrialized geothermal exploration, development, or drilling into Kūpuna Pele on public trust lands, former Crown and Government Lands, or DHHL lands within the Moku o Keawe and statewide;

3. Violates the State’s duties under Article XI, Section 7 of the Hawai‘i State Constitution and the fiduciary obligations imposed by the Admissions Act of 1959;

4. Repeats the historic failures exemplified by Wao Kele o Puna; or

5. Substitutes delayed consultation for prior consent by beneficiaries.

WE DO NOT CONSENT TO ANY GEOTHERMAL DEVELOPMENT IN HAWAI'I. DHHL HAS FAILED TO CONSULT WITH OUR PEOPLE!

Energy policy must not override culture. Revenue — even when framed as 100% royalties— must not override constitutional and fiduciary law. Industrialized development must not override ancestral relationships.

For these reasons, I respectfully request that this Committee uphold their fiduciary obligations and Public Trust duty and decline any measure authorizing industrialized geothermal exploration or development that would result in drilling into Kūpuna Pele on public trust, former Crown and Government, and DHHL lands.

I Strongly Oppose SB3081.

Dana Keawe

Truth for the People

Moku O Keawe

SB-3081
Submitted on: 2/16/2026 8:52:37 AM
Testimony for EIG on 2/17/2026 3:05:00 PM

Submitted By	Organization	Testifier Position	Testify
Jasmine Steiner	Individual	Oppose	Remotely Via Zoom

Comments:

Aloha Chair and members of the Committee,

My name is Jasmine Steiner. I am a born-and-raised Puna woman, born in 1988 and raised right next to the state's geothermal plant my entire life. I also run KahuPuna, a grassroots community effort to raise awareness and provide true education on geothermal energy while protecting the lower Puna coastline and all life within it.

As a mom and kamaʻāina who has lived through this nightmare for years—fighting geothermal desecration alongside my ʻohana and community—I testify in strong opposition to SB3081.

This bill allocates state money for "characterization" of underground resources using slim-hole bores and exploratory drilling—the exact invasive work that leads to expanding projects like Puna Geothermal Venture (PGV). We've endured nearly 50 years of lies, cover-ups, and real harm from drilling on an active volcano.

The bill calls these "slim" bores, but it specifies 7-inch diameter holes. That's not truly slim—typical slim-hole geothermal exploration uses much smaller diameters, often 2.5 to 6 inches, with many examples (including Hawaii's own Scientific Observation Hole program) at 3–4 inches. A 7-inch hole pushes beyond standard "slim" definitions, making it larger, closer to conventional setups, and potentially more invasive. Even smaller true slim holes were meant to minimize footprint and cost, yet they haven't prevented disasters here.

Slim-hole drilling isn't safe on our active volcano. It can hit high-pressure, high-temperature zones unexpectedly in fractured volcanic rock. The 1991 KS-8 blowout at PGV released massive toxic steam with hydrogen sulfide (H_2S) for over 30 hours—creating a 60-foot plume, evacuating 75+ people, and exposing residents (including myself, my mother, and my father) to dangerous levels (up to 1,680 ppb H_2S nearby). We suffered respiratory issues, eye irritation, nausea,

headaches, and other health crises. The state halted drilling temporarily after that incident. There have been many more incidents, including unreported ones in 2025 (which I obtained via UIPA request after community members fell ill without answers).

Toxic gases like H_2S, heavy metals, and corrosives are released or mobilized, contaminating air, water, and soil. In our active rift zone, risks include blowouts, lost circulation, induced seismicity, and aquifer pollution. History shows slim holes don't prevent major blowouts—PGV's records highlight unpredictable subsurface conditions, volcanic hazards, and the need for extra blowout prevention in Hawaii's unique environment.

Personally, my dad has 90% mercury poisoning linked to PGV emissions. I've battled chronic illnesses from the plumes. My child struggled to breathe properly at school due to not being able to withstand the daily unmonitored gassings by the geothermal that we already have and that you folks wont monitor here in this State . My mother, Sara Steiner—the fearless pro se litigant behind Hawaii's unprecedented geothermal injunction—is now fighting stage 2 melanoma, one of the top cancers tied to these emissions. She's sued PGV, the County Planning Department, and others, in 2024 in the unprecedented Hawaii Geothermal Injunction,over their fraudulent EIS claiming "no underground impacts" while fracking destroys our rift zones. Her historic injunction includes over a dozen community members and two volcano scientists, and seeks a permanent stop to PGV expansion proving decades of fallacies and mis reportings , but it's stalled in the Intermediate Court of Appeals as efforts fast-track more geothermal islandwide. This is criminal !

We're not abstract , we don't just “not like the geothermal for no reason” —we're families paying the price while "safe exploration" promises ignore our scars.

This bill bypasses true consultation with Puna, Keaukaha, and ALL Kanaka Maoli BENEFICIARY voices. It violates Native Hawaiian rights under Article XII, Section 7 to protect traditional practices, desecrates Pele, and funds more risk when solar and wind provide clean energy without poisoning our children or disrespecting our akua.

Bill hb1982 hd1 had over 40 opposing and only 2 for it yet YOU PASS IT ANYWAY HOW ARE WE SUPPOSED TO HAVE FAITH IN THIS SYSTEM???

We've stopped this before—through hearings, lawsuits, protests, and more since the '80s– and are ready and able to do so again as the Hawaii community.

Please vote NO on SB3081. No more funding harm. Mālama ʻāina for real.

Mahalo,

Jasmine Steiner

@KahuPuna (also #WeArePuna #EndGeothermal #aolepgv)

Pohoiki road

Puna, Hawaiʻi Island

SB-3081
Submitted on: 2/16/2026 11:43:43 AM
Testimony for EIG on 2/17/2026 3:05:00 PM

Submitted By	Organization	Testifier Position	Testify
Roxane Keliikipikaneokolohaka	Individual	Oppose	Written Testimony Only

Comments:

I strongly oppose this bill. Geothermal energy exploration is not an alternative natural energy source that I support.

GEOTHERMAL ELECTRICITY IS AN ECONOMIC FAILURE

Without Government Assistance It Would Not Exist

The development of commercial level geothermal electricity generation in the United States began in 1960 at the Geysers geothermal field in California, just north of San Francisco. For 22 years this field was the only operating geothermal field in the United States. Its phenomenal success spawned geothermal developments in many other areas of the United States beginning in 1982. None of the subsequent developments have reached anywhere near the level achieved at the Geysers. Yet the belief in that possibility led to the opening of dozens of geothermal plants in the United States over the next 40 years. Most of this development was spurred by two legislative packages which were passed by the US Congress in 1978 and 2009, although there were numerous others.

The following essay attempts to give details about economic aspects of geothermal energy development in the United States, and the government's role in promoting it. The discussion below is based upon data from the Federal government and state agencies. The primary resource has been the US Environmental Information Agency (EIA)[i]. This site provides detailed plant-level data for all US geothermal plants from the beginning of 2001 onward. The EIA site also provides access to various reports dating all the way back to geothermal energy's beginning in 1960. This data is not as comprehensive, especially at the plant level. There is fairly comprehensive data for the period from 1989-1998[ii], but I have only been able to find data for other years through the state of Nevada [iii] and the California Energy Commission [iv].

Figure 1 below shows details of these developments. There was a meteoric rise in geothermal capacity and production during the period from 1980-1990. Since 1993 total production has actually decreased, in spite of a doubling of the geothermal capacity. Until 1990 the Geysers was still the almost exclusive producer of geothermal electricity in the United States, therefore the national production was closely tied to the Geysers production. Since 1990, opening of new geothermal plants in the United States has been largely confined to Nevada. Production at the Geysers in 2023 was less than half of its production in 1990. The addition of 26 new plants in Nevada and seven others in five other states have been insufficient to overcome that decline. That is a very clear example of failure. As of the end of 2023, the Geysers had still produced 57% of the entire United States geothermal industry output.

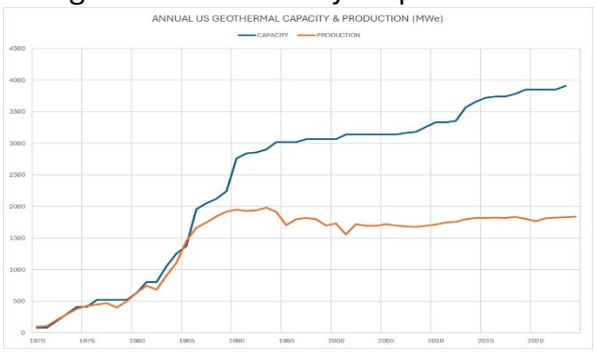

Figure 1. Total US Geothermal Capacity/Production

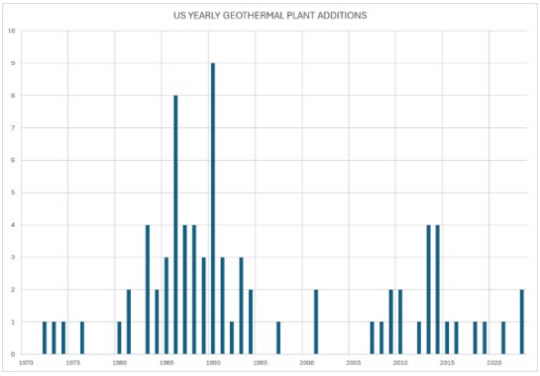

Figure 2. Total US Geothermal Plant Additions

Figure 2 above details the two main episodes of geothermal plant building in the United States since the first plant opened in 1960. These two periods are the entire 1980s as well as an interval between 2008 and 2015. Development between 1993 and 2008 was limited to 7 plants; from 2015 to 2023 it was also 7. My contention is that those two episodes of rapid geothermal growth were a direct product of legislation passed by the US Congress in 1978 and 2009. The Acts to which I am referring to are the "Public Utilities Regulatory Policies Act" (PURPA) in 1978[v], and the "American Recovery and Reinvestment Act" (ARRA) of 2009.[vi]

After the passage of PURPA in 1978, new startups quickly rose and by 1990, 40 new plants had been built, quintupling US capacity from 522 MW per year in 1980 to 2764MW in 1990. The only peak after that begins in 2009 with the passage of ARRA, which took capacity from 3182 MW in 2008 to 3660 MW in 2014, when the initial program ended. 13 new geothermal plants opened during this interval. Thus, it seems fair to conclude that the legislation had a major influence on the number of plant startups. The great majority of plant startups resulting from PURPA were in California, while a majority of those from ARRA were in Nevada.

So far I have spoken only in generalizations, but a few specific cases will make the basis of my thoughts more apparent. Most of the plants that were built during the 1980s were in the Geysers geothermal field just north of San Francisco in California. A large geothermal development also occurred on the shores of the Salton Sea in Southern California. Together these two areas account for most of the plants opened as a result of PURPA. They have long been and remain the two largest areas of geothermal production in the United States.

The Geysers area is by far the largest geothermal field in the world. During the 1980s a wildcat environment prevailed with dozens of entities opening 20 geothermal plants in an area of 50 square miles. PURPA companion legislation mandated that utilities purchase energy from "renewable" sources. At that time, geothermal was the only "renewable" possibility, with the exception of hydropower, so this almost mandated purchase from geothermal plants.

The Act directed individual states to develop policies for pricing electricity as well as long-term contracts. California became the leader in this endeavor since it was the only state with geothermal plants at that time. They developed what became known as "standard offer" contracts which dictated prices as well as increasing rate charges over the time of contracts, which were typically for 30-year purchase power agreements.

The first PURPA contracts were signed in the early 1980's, when natural gas prices were very high. This made these early contracts very lucrative. During the mid-1980's natural gas prices (the main fuel used to generate electricity in California) decreased considerably, yet the utilities were still forced to pay the high rates for geothermal power, so they raised their rates and customers began to complain. This necessitated a change in the terms of the standard offer contracts so that they were based on natural gas prices.

Subsequently, the economic attractiveness of geothermal plants decreased, and no major geothermal plants were developed at the Geysers after 1985. So many plants had been built at the Geysers that by 1987 wellhead pressure values and production began to decrease. But the wave of new plants dwindled, so that only 3 small plants were opened after 1985. By 1993 production at the Geysers was only half of what the production was at its peak in 1987. This represents a classic case of over-development, "too many straws sucking from the same glass".

By 1980, significant pressure decreases and water deficits had begun to appear at the Geysers. In response, and with some foresight, the Northern California Power Authority (NCPA) initiated the building of a new geothermal plant near the southern edge of the Geysers field. Planned in conjunction with the plant, a pipeline pumping sewage effluent from Santa Rosa to the plant was built to forestall the reservoir declines which had been observed at some existing plants at the Geysers. This pipeline was built with a capacity of 10 million gallons a day.

The overall production at the Geysers plummeted beginning in 1989. Due to the success of the NCPA pipeline project, two much larger pipelines were built which came into operation in late 1997. These pipelines were built by Lake County and Santa Rosa, each with a capacity of 19 million gallons a day. The current capacity of these pipelines is 40 million gallons a day, with an average usage volume of 30 million gallons a day.

Additional pipelines have been built to distribute the effluent among the other Geysers plants. This import of water definitely lessened the steady decline in overall production of the Geysers field, but by 1995 it was 60% of its 1987 peak; today its production is only 45% of its level in the 1980s. While some of this decrease can be attributed to overdevelopment, it is typical of most geothermal plants in the United States.

As a whole, plants in the United States have averaged a 3% yearly decrease in production unless new processing facilities are built or new wells are drilled. There has not been a new plant opened at the Geysers since 1989.

Economically, this decrease is not sustainable. Geothermal plants require massive amounts of up-front capital to drill the wells and create the generating facility. Roads and transmission lines to connect to the grid are another major possible expense. Return on investment is increasingly difficult to maintain, especially in competition with solar, for which costs are still decreasing rapidly.

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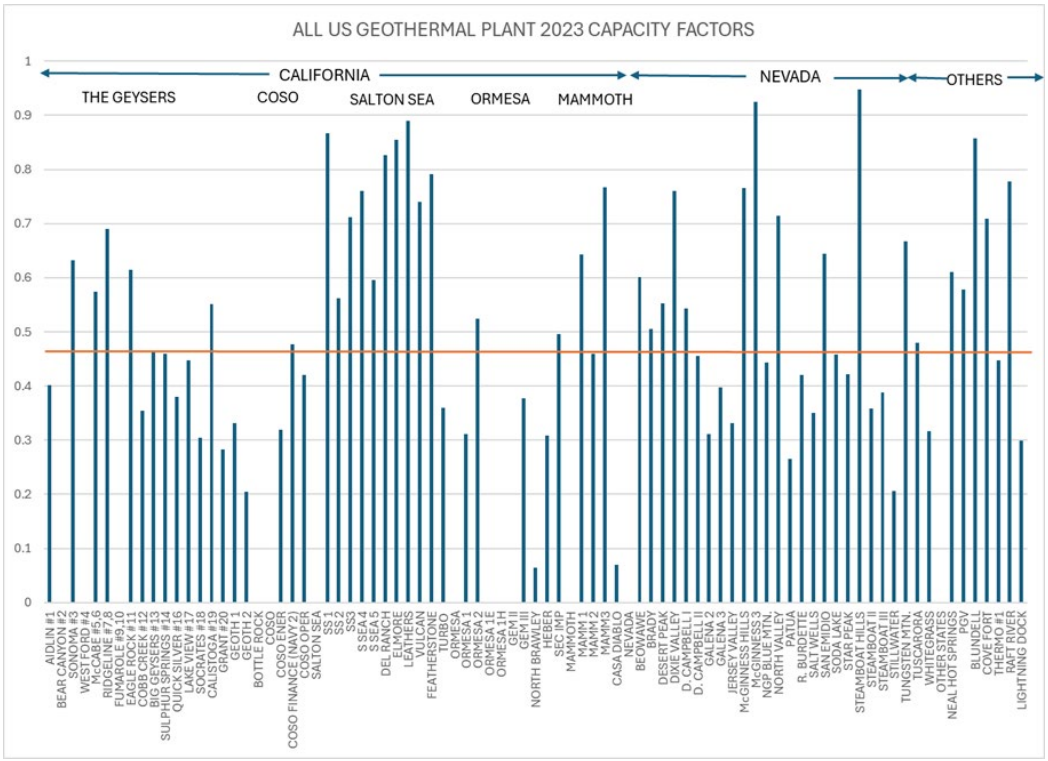

Figure 3. All US geothermal plant capacity factors for 2023

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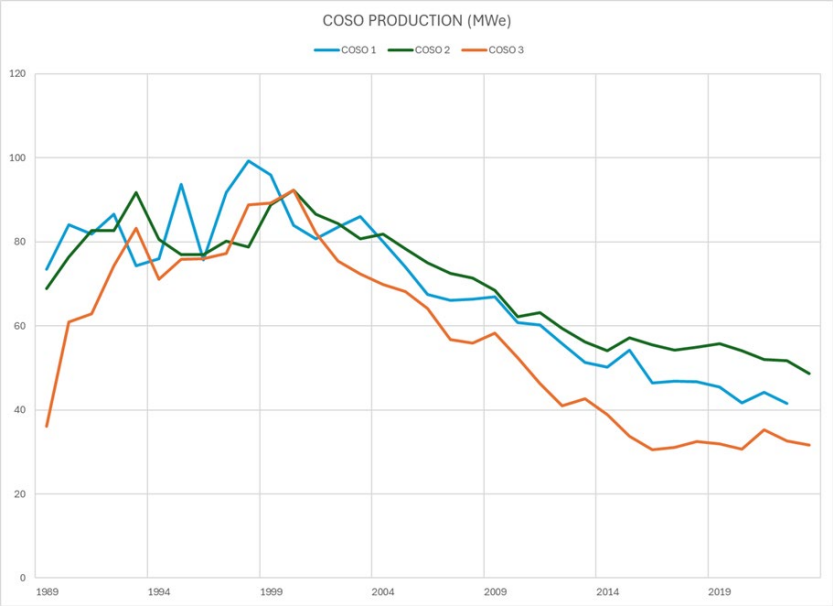

Figure 4 – Coso production 1989-2023

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Doubling the NREL estimates for geothermal LCOE would be very conservative if this decline and other factors are considered. The NREL has a category for variable expenses incurred at a geothermal plant but zero is the assigned estimate. This assumes that a plant can operate for 30 years without drilling new wells or replacing generating equipment. It looks like NREL estimates it will cost $8 million dollars a year in fixed operating expenses for a 40MW plant, which if operating a full capacity and prevailing rates would generate about $35 million a year gross income.

The NREL assumes that geothermal power would cost between $.062 -.106 per KWH. Doubling these estimates is justified by Figures 3 and 4, which would place geothermal energy's LCOE at $.124 -.212. This places it far above any renewable energy in cost. The LCOE of Solar plus Storage is $.075-.123. An additional factor to consider is that almost all new geothermal plants will be binary, which is at the high end of the geothermal cost estimates, and surely over $.20 per KWH.

The Geysers is not only the greatest geothermal production area in the United States, it is also the largest geothermal producing area in the world and has been for over 50 years now. It represents a resource that has no equal anywhere else on earth. Production from lesser areas is even more subject to economic uncertainties. Many plants never reach their projected capacity, and some are abandoned after only a few years of operation. The second most productive geothermal area in the United States is located on

the southeastern shore of the Salton Sea in the southern California desert. In this small area of 50 square miles, there are 11 operating geothermal plants. Seven of them were developed in the years while PURPA was still in force, between 1982 and 1990.

The Salton Sea area was a glamourous resort from the 1950-70s. Salton Sea has since become an unmitigated environmental disaster, yet the presence of eleven geothermal plants near the sea's southeastern shore is rarely, if ever, mentioned as a possible cause of this degradation. The salinity of the lake has increased dramatically since the 1980s. As a result, there have been massive fish die-offs as well as massive die-offs of the migratory birds which feed on these fish in the lake. There are reports of respiratory difficulties and documented high concentrations of hydrogen sulfide in the lake and surrounding areas.

The level of the Salton Sea has declined since the 1980s, leaving contaminated salt flats. The geothermal plants also use thousands of acre-feet of pumped Colorado river water (billions of gallons) per year to help maintain their operations. Meanwhile, the plants produce about 300MW per year. This amount could be generated by using the space set aside for the geothermal plants to produce solar energy without using any water, but that does not seem to have occurred to government planners.

Geothermal energy has caused numerous environmental problems which have been experienced throughout the world. The three primary environmental difficulties, which seem to be almost universal are: increased seismicity, toxic gas emissions and land subsidence. Indigenous religious and cultural beliefs and practices have also been ignored and damaged. Economic values cannot be placed on these problems, even though they are more significant.

Even upon strict economic grounds, geothermal energy should not exist. It was created and survives through subsidies and other incentives institutionalized by PURPA and ARRA as well as numerous other bills over the last 45 years.
Similar economic incentives were also included in the Big Beautiful Bill of 2025[viii] which cancels all residential renewable electricity tax credits but continues tax credits for commercial level geothermal projects.

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[i] EIA data is available through the Electricity Data Browser located at: https://www.eia.gov/electricity/data/browser/

[ii] EIA form EIA-867,"nonutility power producer report 1989-1998 available at: EIA.gov//electricity/data/EIA923. (The actual data table can be downloaded from the historical data section near the bottom of the page under:"1989-1998:EIA-867.)

[iii] State of Nevada Bureau of Mines available at : https://pubs.nbmg.unr.edu/Data-tables-and-graphs-p/of2012-03.htmli

[iv] California Energy Commission available at:

https://www.energy.ca.gov/data-reports/california-power-generation-and-power-sources

[v] PURPA - Public Law No. 95-617 (92 Stat. 3117).

[vi] ARRA – Public Law No 111-5 2009.

[vii] NREL – LCOE available at : https://atb.nrel.gov/electricity/2024/geothermal

[viii] Big Beautiful Bill – Public Law 119-21 2025 largely preserves investment and production tax credits for geothermal plants: National Groundwater Association: ngwa.org

LATE

SB-3081
Submitted on: 2/16/2026 5:47:32 PM
Testimony for EIG on 2/17/2026 3:05:00 PM

Submitted By	Organization	Testifier Position	Testify
Pua Case	Individual	Oppose	Written Testimony Only

Comments:

Aloha I am in strong oppostion of SB3081 as a kanaka maoli, protector of Mauna Kea concerned about the impacts of the passing of this bill.

Pua Case

LATE

SB-3081
Submitted on: 2/16/2026 6:24:53 PM
Testimony for EIG on 2/17/2026 3:05:00 PM

Submitted By	Organization	Testifier Position	Testify
Mar Ortaleza	Individual	Oppose	Written Testimony Only

Comments:

Subject: Opposition to HB3081 – Geothermal Exploratory Drilling

Dear Chair, Vice Chair, and Members of the Committee,

I am writing in strong opposition to HB3081, which would allow or expand geothermal exploratory drilling.

While renewable energy is important, geothermal exploration through drilling carries significant environmental, cultural, and community risks — especially in sensitive areas. Exploratory drilling is not a minor action. It can open the door to long-term industrial development that permanently alters land, water systems, and nearby communities.

Many residents remain concerned about:

- Potential groundwater contamination
- Air quality impacts from released gases
- Seismic activity risks
- Insufficient community consultation
- Impacts to Native Hawaiian cultural sites and practices

Exploratory drilling should not move forward without comprehensive, transparent environmental review, meaningful community consent, and clear long-term safeguards. Once drilling begins, the consequences cannot easily be undone.

Hawai‘i deserves renewable solutions that are truly safe, community-supported, and culturally respectful.

For these reasons, I respectfully urge you to vote NO on HB3081.

Sincerely,

Mar Ortaleza

Pahoa. HI

LATE

SB-3081
Submitted on: 2/16/2026 7:49:13 PM
Testimony for EIG on 2/17/2026 3:05:00 PM

Submitted By	Organization	Testifier Position	Testify
Shannon Rudolph	Individual	Oppose	Written Testimony Only

Comments:

Oppose

LATE

SB-3081
Submitted on: 2/16/2026 8:38:01 PM
Testimony for EIG on 2/17/2026 3:05:00 PM

Submitted By	Organization	Testifier Position	Testify
Kealani Makaiwi	Individual	Oppose	Written Testimony Only

Comments:

Relating to a Program to Characterize the Potential of Underground Energy Resources Statewide

Aloha Chair, Vice Chair, and Members of the Committee,

My name is Kealani Makaiwi. I respectfully submit this testimony in opposition to SB3081, which seeks to establish a statewide program to characterize underground energy resources.

While I understand the desire to plan for future energy needs, SB3081 raises serious concerns about the protection of ʻāina, wai, and culturally significant subsurface resources across Hawaiʻi. Underground exploration—regardless of how minimal it is described—poses real risks to fragile island aquifers, geological systems, and places that hold deep cultural and spiritual meaning for Native Hawaiian communities.

What exists beneath the surface is not vacant or expendable. For our people, subsurface lands are part of a living, interconnected system tied to ancestral knowledge, water sources, and responsibility to future generations. A statewide characterization program risks treating these places as purely technical or extractive zones, rather than as sacred trust resources requiring the highest level of care and consent.

Although SB3081 may include environmental review requirements, experience has shown that such processes often fall short in fully accounting for cumulative impacts, Native Hawaiian cultural knowledge, and long-term consequences—especially when programs are designed to advance future development rather than prioritize protection. Once subsurface damage occurs, it cannot be easily reversed.

As a mother and educator, I am deeply concerned about the precedent this bill sets for our keiki. Our children learn from how we govern the ʻāina entrusted to us. Decisions made today will shape the water they drink, the lands they inherit, and the values they carry forward. As a Christian, I also believe we are called to be faithful stewards of creation, exercising restraint and humility where understanding is incomplete and risks are irreversible.

SB3081 advances a statewide approach without sufficient assurance that Native Hawaiian communities and those most affected will have meaningful authority—not merely consultation—in decisions about their lands. For these reasons, I respectfully urge you to oppose SB3081 and to pursue energy strategies that do not compromise Hawaiʻi's ʻāina, wai, or cultural integrity.

Mahalo for the opportunity to testify and for your consideration.

Respectfully,

Kealani Makaiwi

Mother & Educator

LATE

SB-3081
Submitted on: 2/16/2026 9:00:24 PM
Testimony for EIG on 2/17/2026 3:05:00 PM

Submitted By	Organization	Testifier Position	Testify
jeanne wheeler	Individual	Oppose	Written Testimony Only

Comments:

Aloha: I'm writing in opposition to this bill, please do not pass it! Mahalo, JW

LATE

SB-3081
Submitted on: 2/17/2026 2:50:21 AM
Testimony for EIG on 2/17/2026 3:05:00 PM

Submitted By	Organization	Testifier Position	Testify
melissa tomlinson	Individual	Oppose	Written Testimony Only

Comments:

More geothermal in Hawai‘i? Absolutely Not!

i vehemently oppose this Bill! Whoever brought forth this bill should be made to leave Hawai‘i. Geothermal is not a solution to supplying energy needs for the population. It is a violent extractive and exploitive venture to literally suck the life out of Mother Earth and then sell it to the public= sucking the life from the People through the means of servitude to the elite class for basic human rights that must be free. We are sick of Hawai‘i being destroyed and we will not allow it. There will be opposition every step of the way because geothermal in Hawai‘i is a nightmare for every species in the islands. Hawai‘i the endngered species capital of the world because this is what Capital does, it destroys life. I‘m so furious this is even a Bill and then to know there‘s gonna be corrupt poloticians that try to pass this. Every single one that votes to support this Bill is not just dirty, they're greedy pyschopaths. This is not what our future generations need. Absolutely not, oppose this Bill.

LATE

SB-3081
Submitted on: 2/17/2026 6:01:33 AM
Testimony for EIG on 2/17/2026 3:05:00 PM

Submitted By	Organization	Testifier Position	Testify
Tara Rojas	Individual	Oppose	Remotely Via Zoom

Comments:

Aloha Chair and Members,

My name is Tara Rojas. I stand in STRONG OPPOSITION to SB3081.

While this bill is framed as “statewide energy resource characterization,” it explicitly authorizes slim-hole drilling to identify underground energy resources, including geothermal. This is not neutral data collection - this is ground-level exploration activity.

We are seeing a pattern: first “characterization,” then “exploration,” then “development.”

This bill expands that pathway statewide — including areas where communities have not consented and where risks to water, ʻāina, and public health remain unresolved.

Past experiences in places like Puna have already raised serious concerns about toxic exposure, lack of transparency, and incomplete monitoring data.

We cannot move forward with more drilling - even “exploratory” - without:

Full community consent

Independent oversight

Public access to all environmental data

This bill moves ahead of that.

NO is NO.

I respectfully urge you to reject SB3081.