

# HAWAII STATE ENERGY OFFICE STATE OF HAWAII

235 South Beretania Street, 5th Floor, Honolulu, Hawaii 96813  
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804

Telephone:  
Web:

JOSH GREEN, M.D.  
GOVERNOR

SYLVIA LUKE  
LT. GOVERNOR

MARK B. GLICK  
CHIEF ENERGY OFFICER

(808) 451-6648  
energy.hawaii.gov

## Testimony of **MARK B. GLICK, Chief Energy Officer**

### before the **SENATE COMMITTEE ON COMMERCE AND CONSUMER PROTECTION**

Tuesday, April 7, 2026  
9:25 AM  
State Capitol, Conference Room 229 and Videoconference

In Support of  
**HB 350, HD2**

### **RELATING TO ENERGY.**

Chair Keohokalole, Vice Chair Fukunaga, and Members of the Committee, the Hawai'i State Energy Office (HSEO) supports HB 350, HD2, that expands the types of water heater systems that may satisfy the relevant requirement for the issuance of a building permit for new single-family dwellings to include ENERGY STAR certified heat pump water heaters.

Today's modern, ENERGY STAR Certified heat pump water heaters are highly energy efficient and able to participate in demand-response and time-of-use programs.<sup>1</sup> The ability to efficiently and flexibly use electricity makes them an excellent match for the use of excess on-site or grid-provided solar energy. This has the potential to provide grid support and cost savings now, with even greater benefits in the future.<sup>2,3</sup>

Therefore, allowing the choice of an ENERGY STAR Certified heat pump water heater is consistent with Hawai'i's energy goals.

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<sup>1</sup> US Environmental Protection Agency, <https://www.energystar.gov/productfinder/download/certified-heat-pump-water-heaters/> : Low-Usage Uniform Energy Factor (UEF): 2.52-3.45; Medium-Usage UEF: 3.0 – 3.88; High-Usage UEF: 2.85-4.07.

<sup>2</sup> Hawaii Energy, <https://hawaiienergy.com/for-homes/water-heating/heat-pump/>

<sup>3</sup> Kauai Island Utility Cooperative, <https://kiuc.coop/great-water-heater-debate-heat-pump-or-solar>

HSEO also supports the requirement that only ENERGY STAR-certified demand water heaters be included as acceptable alternatives if solar or heat pump water heaters are not feasible. There are currently 170 models of ENERGY STAR Certified gas-fueled demand water heaters.<sup>4</sup>

Thank you for the opportunity to testify.

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<sup>4</sup> U.S. Environmental Protection Agency, <https://www.energystar.gov/productfinder/download/certified-gas-water-heaters/> Medium-Usage Uniform Energy Factor (UEF): 0.97; High-Usage UEF: 0.95-0.98



**Testimony to the Committee on Commerce and Consumer Protection**

Tuesday, April 7, 2026, 9:25 AM

Conference Room 229 & Videoconference

Hawaii State Capitol

HB350 HD2

Chair Keohokalole, Vice Chair Fukunaga and Members of the Committee,

Hawaii Gas appreciates the Legislature's ongoing commitment to Hawai'i's renewable and energy efficiency goals and respectfully submits comments on HB350 HD2.

We note that the original intent of this statute was to promote renewable energy, however, there are times when that is not practicable due to poor solar resource or where it is cost prohibitive. While we have no opinion on the inclusion of a variance for electric heat pump water heaters, if powered by today's electric grid, it would be utilizing 70% fossil fuel.

Furthermore, there is already a variance that allows for that technology to qualify. Heat pump water heaters are already receiving variances and based on recent data reported by the Hawaii State Energy Office, electric heat pumps received almost 60% of the solar water heating variances, calling into question the necessity of this bill.

HRS §196-6.5 establishes a clear policy preference for solar water heating in new single-family homes while recognizing that a limited, carefully administered variance process is necessary when solar systems are not feasible, not cost effective, or not appropriate for a specific property. It advances renewable energy adoption while ensuring that homeowners are not forced into systems that cannot perform reliably or safely under real world conditions. Approval is granted only on a case-by-case basis where site conditions, structural limitations, shading, roof orientation, or cost effectiveness make solar water heating impractical.

There has been a clear decline in the use of this variance for on demand water heaters, which already have a narrow and rigorous process for approval. It is a safeguard designed to address the realities of Hawai'i's diverse housing stock and geography. These water heaters continue to play a critical role in natural disaster recovery, providing reliable hot water, particularly during electric power outages as experienced last week. Hawai'i's electric grid is subject to disruptions from severe weather events, wildfires, equipment failures, and planned maintenance outages. During these periods, gas water heaters remain operational and provide essential hot water for sanitation, cooking, and basic household needs. This reliability supports public health and safety and is especially important for vulnerable populations. Certain housing types depend on gas water heating because no other option is feasible within existing physical and electrical constraints.



However, this bill adds new requirements to the variance pathway, including additional justification for gas demand water heaters by adding the addition of a more complex life-cycle cost analysis.

This change makes the variance process even more restrictive and costly for households that are economically challenged or physically unable to utilize solar water heaters.

Also, we note, as a result of hours conversations which included diverse stakeholders including the Hawaii Solar Energy Association (HSEA) and other solar water heating advocates, engineers, housing developers and the State Energy Office, variance requests were agreed upon with two very high hurdles to prove. 1) It must be prepared and submitted by licensed professionals and 2) it must be reviewed by the Hawaii State Energy Office using standardized criteria, including life cycle cost analysis of fifteen-years, which was substantiated by the HSEA white paper (attached) that stated that warranties for solar water heaters ranged from six to twelve years. All stakeholders agreed a fifteen-year life cycle analysis was more than generous given the industry standard warranty was far less than that.

We respectfully request if the Committee moves forward on HB350 HD2, that the following amendments be added:

Page 2 line 16 be amended from **“and” to “or”** to keep the intent in the original statute and Page 2 line 17 be amended to add **“that does not exceed twelve years”**

**Page 2**

13 (4) [A] An ENERGY STAR certified demand water heater  
14 device [~~approved by Underwriters Laboratories Inc.,~~]  
15 is installed; provided that at least one other gas  
16 appliance is installed in the dwelling[;] **[and ] or a life**  
17 **cycle cost-benefit analysis that does not exceed twelve years justifies the variance.**  
18 For the purposes of this paragraph, “On demand water  
19 heater” means a gas-tankless instantaneous water  
20 heater that provides hot water only as it is needed.

Thank you for the opportunity to testify.



**Hawaii Solar Energy Association**  
*Serving Hawaii Since 1977*

## White Paper

### Providing Hot Water Heating Load for a Residential Dwelling & Comparison between Solar Hot Water and Photovoltaic Cost for Same Dwelling

Hawaii Solar Energy Association

October 22, 2012

#### Summary

The following analysis compares the average cost to produce hot water suitable for use in a residence between solar hot water (SHW) and a photovoltaic system (PV). The data used to compare the two technologies has several limitations, and any conclusions should be taken in the context of a changing and nuanced marketplace. For instance, although the utility has collected data for SHW over the past three decades, data for PV is much less comprehensive and tested, and only reflects limited studies over the past decade. Data for SHW is based on statewide numbers, which may or may not be applicable in certain sun zones found in the islands. In addition, rising PV costs in an unstable market could dramatically impact a PV v. SHW comparison, as well as other factors such as PV degradation rates and other efficiency and maintenance concerns. Also, local conditions can easily sway a cost impact analysis, and may depend upon site conditions, local weather, household water use, and so on.

The following analysis compares the average cost to produce hot water suitable for use in a residence between solar hot water and a photovoltaic system. Using data from the KEMA Energy and Peak Demand Impact Evaluation Report of the 2005-2007 Demand Side Management Programs prepared for HECO, MECO, & HELCO, the cost comparison results between PV and SHW depend upon family size and installed PV system cost. PV is generally more cost effective than SHW to heat water for a family of one or two. SHW is more cost effective once the family size is three or greater, with an average net-installed cost for a family of four of \$1,962 for SWH and \$2,789 for PV. As the family size increases, the cost efficiency of installing SHW increases, with the installation of a PV system for a family of six costing approximately \$1,959 more than the cost to install an appropriately sized SHW system for the same sized family. Cost comparisons include deductions for rebates and current tax incentives, and are calculated using a metric of \$5.50/watt to install PV. This comparison assumes consistent water use, and would not apply in vacation homes or other situations where water use was intermittent.

## Analysis

In order to compare the cost efficiency of SHW to PV when heating water for residential use, the following analysis first determined the amount of energy saved when SHW replaced an electric water heater. A PV system was then sized to generate the same amount of electricity, and the relative costs were compared. Please find the data for the following analysis in the attached excel documents.

### 1. Average Electric Use for Electric Water Heater and Savings with SHW

This analysis begins with the solar sample base case which quantifies the annual electric use for an electric water heater for an average number of occupants. It then looks at the average savings with installed SHW. The difference between these two is the average savings per year or the average amount of energy saved per person, which was found to be 1.53 kWh/person/day. This data includes an average efficiency loss for various types of systems.

### 2. How many PV panels would be needed to save the same amount of electricity?

To determine the cost of installed PV to offset the same amount of electricity when heating water with SHW, the daily savings of 1.53 kWh/day/person needs to be translated from AC to DC as solar panels are rated at DC. Loss of converting electricity from DC to AC runs at about 19%. Thus, the kWh needed would be 19% higher in a PV system, which takes the needed generation from 1.53 kWh/day/person to 1.88 kWh/day/person. Next, this analysis assumes 5.2 sun hours per day as a statewide average solar resource. This number may be more or less, depending upon the location. At 5.2 sun hours/day, the required PV array DC to generate the same amount of electricity as the SHW would be sized at 362 watts/person. At \$5.50 watt installed, the system cost would be approximately \$1,992/person.

### 3. How do the costs of the two systems compare?

In order to determine how the costs compare between the two systems, both the installed cost of the system and any tax credits or rebates must be considered. For a SHW system, the average installed cost for an 80 gallon system is \$6,357 and for a 120 gallon system is \$7,106, minus the HEP rebate, and the state and federal tax credits currently in place in 2012. The combined weighted average system cost is \$6,625. The cost for a PV array increases with family size, minus current state and federal tax credits. For a household of one to two persons, the cost of a PV system to heat water is less than the average cost of SHW of an 80 gallon system. For households of three persons, or more, SHW is more cost effective than PV for heating water.

## Other Considerations and Assumptions

### 1. Assumptions

The KEMA hot water averages were determined using data from monitored systems located in a wide range of sunshine zones. The results will change for installations in zones that are different from the average. In addition, when PV is used to heat water, the heat loss due to the efficiency of the water heater has not been considered here. This heat loss would decrease PV's overall cost efficiency when compared to SHW.

### 2. Economies of scale

The fiscal advantage of SHW over PV diminishes with reduced water use. For instance, using the analysis shown above, the overall net cost difference between SHW and PV is \$1,959 for a family of six, while the overall cost difference of SHW over PV to heat water for a family of four is \$827. Keep in mind that these figures are averages, and will vary depending upon system efficiency and water use.

### 3. Efficiency depends upon consistent use

The cost efficiency of SHW depends upon how the water is used. For instance, in the preceding example for a family of six, the assumption is that the family has roughly the same water use every day. In the case of a vacation rental, however, SHW would not have the same advantage if the water is only heated a few times a month, or if the system had to be sized to accommodate a large group for a short period of time.

### 4. SHW does not impact circuit penetration levels

SHW systems do not produce electricity, and are therefore not connected to the residence's electrical system. Thus, a SHW system would never add to local circuit penetration levels. On the other hand, a PV system engineered to provide electricity to heat hot water may impact circuit penetration levels. Whether the PV impacted circuit penetration levels would depend upon the size, engineering of the system, and the total capacity of all distributed generation technologies on the circuit.

### 5. SHW heats water that can be used later during peak load hours

SHW heats and stores water effectively so that it may be used during the evening utility peak load which occurs after sundown in Hawaii. To date about 30MW of generating capacity required by HECO to meet peak demand has been deferred by SHW systems installed on Oahu alone. PV systems do not provide electricity to heat water after sundown unless the system has battery backup. Water heated by PV and stored in the water heater may have peak load use, depending upon the size and efficiency of the water heater and the household water use.

### 6. Maintenance costs

Maintenance costs for PV are somewhat lower than maintenance costs for SHW. However, should a home owner need to re-roof or perform roof repairs, removal and reinstallation costs for PV are much higher than they are for SHW.

#### 7. Roofspace

Available roof space can also be an important consideration when deciding between PV and SHW. In a lot of cases, the south facing roof area is at a premium and can be best utilized using SHW first, and then PV. In addition, hot water collectors can be side tilted on west or east facing roof, leaving more prime south roof space for flush mounting PV panels.

#### 8. Product Warranties

Product warranties for PV and SHW are roughly the same. Warranties for PV modules range from 10-25 years (inverters from 10-25 years) where warranties for SHW solar tanks range from 6-12 years and 10-12 years for solar collectors.

April 7, 2026

Senator Jarret Keohokalole  
House Committee on Energy and Environmental Protection

**RE:** HB350 HD2- Relating to Energy  
**Hearing:** Monday, April 7 2026  
**Position:** **OPPOSE AND OFFER AMENDMENTS**

Chair Keohokalole, Vice Chair Fukunaga, and members of the Committee,

My name is Will Giese. I am the Senior Director of Government Affairs for Solaray Corporation. Solaray was founded in 1975 in Hawai'i and does business in Hawai'i as Inter-Island Solar Supply. Solaray also wholly owns Pacific Panel Cleaners ("PPC"), Generator & Power Systems ("GPS"), both Hawai'i Corporations, SunEarth, Inc., a California Corporation, and Alternate Energy Technologies (AET), a Florida Corporation. SunEarth & AET are domestic manufacturing companies producing American made clean energy products, much of which is installed and operated throughout Hawaii for 50 years. GPS is the Generac Industrial generator distributor for Hawai'i. Solaray Corp., and its wholly owned subsidiaries, are proudly 100% employee owned.

Solaray is in **OPPOSITION** to HB350 HD2 relating to water heating systems as written, but are generally in support of the intent of this legislation and offers comments to that effect.

This bill authorizes building permit variances for certain high-efficiency electric water heating systems utilizing heat pump technology, rather than solar water heater systems. It expands the renewable energy technologies income tax credit to include high-efficiency electric water heating systems.

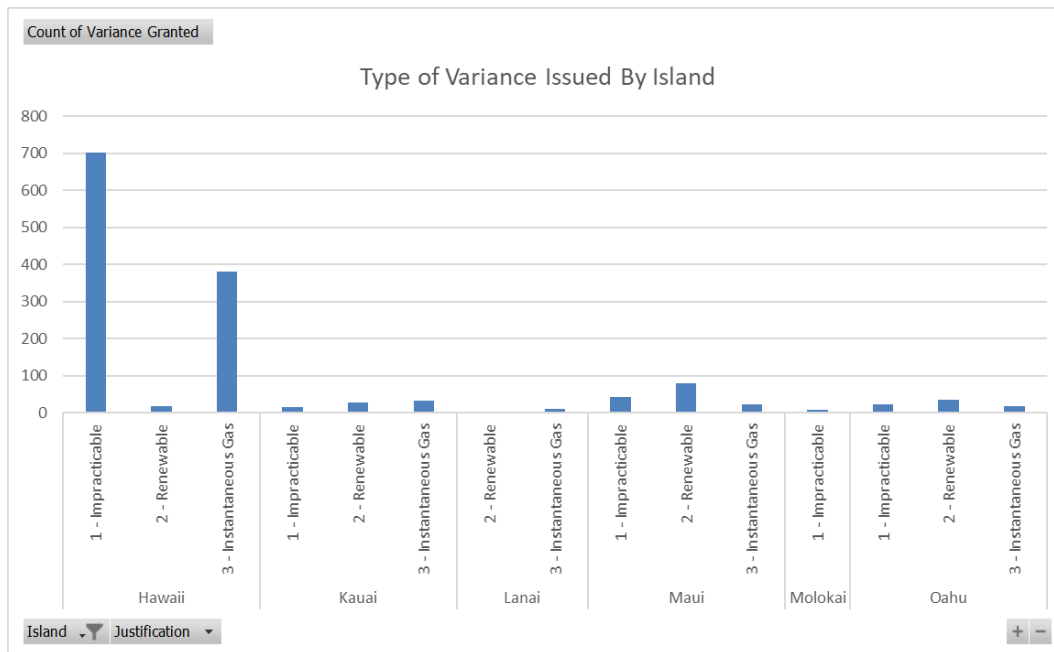
## **COMMENTS**

Solar water heaters are an essential part of Hawaii's energy landscape and provide millions of gallons of hot water heated by the sun to thousands of homes and businesses throughout Hawaii each year, while supporting a diverse local installer network. In fact, Hawaii has one of the most successful solar water heating industries in the United States, with almost 1 in 3 single family homes having installed solar water heaters for over 40 years. Because of the abundant solar resources available in the state, Hawaii rightly recognized over 15 years ago that the most cost effective and efficient way to heat water *and* reduce or almost entirely eliminate one of the largest single energy loads in a home was to require solar water heaters as part of all new home construction.

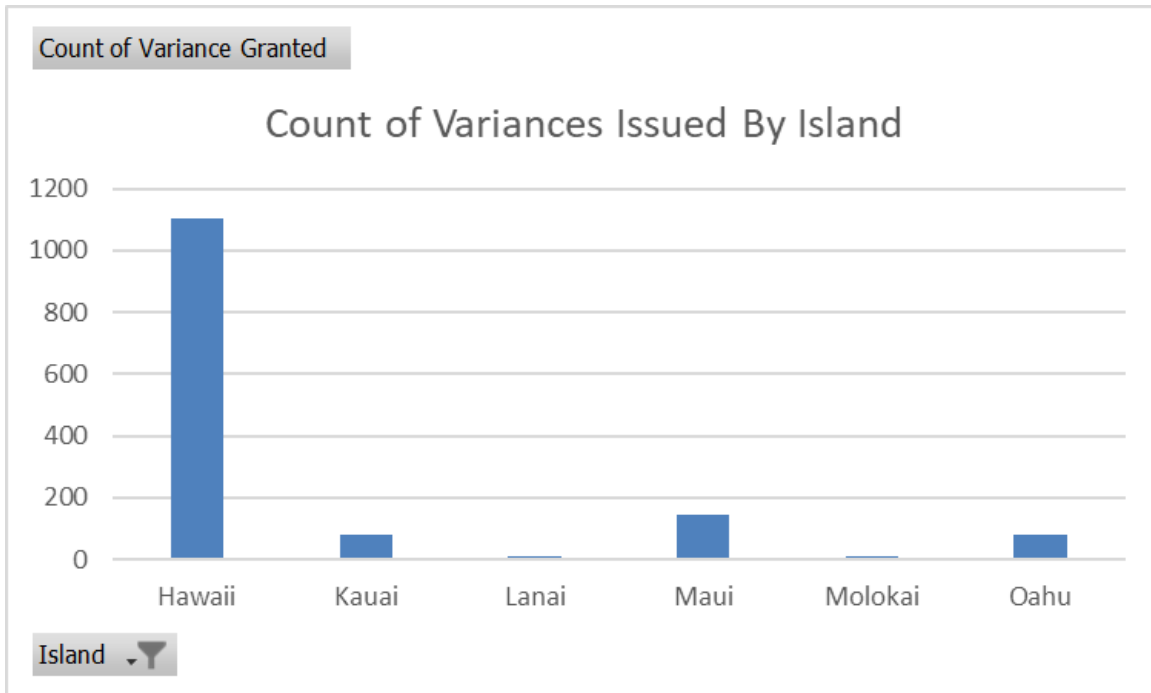
Solar water heaters are highly effective at heating water for residences throughout the state, because the state mandates that solar water heaters provide 90% or greater thermal energy to heat water directly from the sun. Current guidelines regarding the variance process requires that a majority of the energy used to heat water is offset by a renewable source, unless there are specific reasons that the home is incapable of installing a solar water heater, such as poor solar resources. In fact, the current variance process allows for heat pumps and solar PV water heaters to be selected as an alternative. Over half of all variances applied for and approved by the Hawaii State Energy Office were either PV or heat pumps.<sup>1</sup>

This legislation adds a variance that is functionally already being used. In 2025, of the 1436 variance request received by the HSEO 1225 of them were approved (85%). 370 of these approvals were for instantaneous gas (30%) and 707 were for heat pumps due to impractical solar resource (57%). If we assume similar construction rates for new single-family homes in 2025 as in 2024 (around 2500 homes), this is a little under 50% of all homes having approved variances for SHW, and around 26% have heat pumps.

**The simple truth is that there isn't a need for a heat pump specific mandate, as half of all single family homes are getting a variance for a solar water heater already under current law.**



<sup>1</sup> See HSEA SHW Variance Data here: <https://energy.hawaii.gov/what-we-do/energy-efficiency/solar-water-heat-variance/>



If the legislature intends to install heat pumps, **we suggest they do so as HB2608 suggested, by pairing them with a photovoltaic system.**

We also suggest that, as an amendment to this bill, the legislature consider directing the Public Utilities Commission to update the standard by which solar water heating is adopted in this state. Solar water heating technology has changed significantly since 2009, yet the standards surrounding their installation in Hawaii have remained the same. For instance, the average life of a solar water heater is at least 20-25 years yet Section 195-6.5 only allows the comparison of a solar water heater at 15 years. This oversight distorts the value of solar water heaters and makes a lifecycle cost analysis appear less affordable than the technology actually is. Updating the standards allows the state to account for these technological innovations and gives the state an opportunity to amend existing standards to lower the cost of solar water heating compared to other technology. That standard exists in HRS Section 269-44 (which is referenced in Section 196-6.5). We recommend the following amendments in red, at page 4, line 7 and as a new section:

**PAGE 4, LINE 7 of HB2608**

- (1) Installation is impracticable due to poor solar resource;
- (2) Installation is cost-prohibitive based upon a life cycle cost-benefit analysis that incorporates the average residential utility bill and the cost of the new solar water heater system ~~with a life cycle that does not exceed fifteen years;~~
- (3) A renewable energy technology system, as defined in section 235-12.5, is substituted for use as the primary energy source for heating water; or

[(4) A demand water heater device approved by Underwriters Laboratories, Inc., is installed; provided that at least one other gas appliance is installed in the dwelling. For the purposes of this paragraph, "demand water heater" means a gas-tankless instantaneous water heater that provides hot water only as it is needed.]

(4) A high-efficiency electric water heating system utilizing heat pump technology, as defined in section 235-12.5, when installed in conjunction with a photovoltaic system, is substituted as the primary energy source for heating water."

## **NEW SECTION AMENDMENTS**

**[\$269-44] Solar water heater system standards.** Not later than July 1, 2009, or as soon as reasonably practicable, the public utilities commission shall adopt or establish by rule, tariff, or order, standards for solar water heater systems to include, but not be limited to, specifications for the performance, materials, components, durability, longevity, proper sizing, installation, and quality to promote the objectives of section 269-124. **The commission shall update these rules, tariffs, or standards on or before July 1, 2027 and every five years after that date to account for advances and innovations in solar water heating technology.** [L 2008, c 204, §3]

While there are limited cases in which solar water heaters do not make sense for the average new home build, in most cases solar water heating is the most cost-effective and resilient way for the average home in Hawaii to heat water. This is why there is a variance process, and also why variances should "rarely, if ever" be granted. The variance process, if properly implemented by HSEO, works as intended and residents are able to enjoy the most efficient water heating technology available to them on the market.

As a local, employee-owned solar business owned and operated in Hawaii for over 50 years, we **ARE IN OPPOSITION AND OFFER COMMENTS FOR HB350 HD2** and urge the committee to consider our suggested amendments to this measure.

Thank you for your time and consideration,

Will Giese  
Senior Director, Government Affairs  
Solaray Corporation



**Hawaii Solar Energy Association**  
*Serving Hawaii Since 1977*

**Testimony of the Hawaii Solar Energy Association (HSEA) Regarding HB350 HD2, Relating  
Energy, Before the Senate Committee on Commerce and Consumer Protection**

**Tuesday, April 7, 2026**

Aloha Chair Keohokalole, Vice Chair Fukunaga, and committee members,

The Hawaii Solar Energy Association (HSEA) **opposes HB350 HD2 as written**, which would add ENERGY-STAR certified heat pump water heaters as an eligible technology under Hawaii's solar water heater requirement for new construction under certain requirements.

**Solar water heating remains the most efficient and cost-effective way to utilize Hawaii's exceptional solar resource for heating water.** Since 2008, the Legislature has correctly prioritized solar water heating for new single-family homes, recognizing it as the most direct and reliable way to reduce energy costs and greenhouse gas emissions. Solar thermal systems have been successfully deployed across Hawaii for decades, offering residents an affordable and sustainable solution.

While ENERGY STAR-certified heat pump water heaters offer an attractive alternative **when they are paired with PV and energy storage systems**, solar thermal water heating systems remain particularly well-suited to Hawaii's abundant solar resource. Moreover, the current variance process effectively addresses cases where solar water heating is impractical or cost-prohibitive.

**We support amendments offered by Solaray Corp (an HSEA member)** as they offer a common-sense approach to improve the existing rules rather than complicating them with difficult-to-administer or unclear new requirements.

We urge the Committee to preserve the original legislative intent of prioritizing solar water heating while recognizing heat pumps as an appropriate alternative where justified. Maintaining this preference ensures Hawaii continues its leadership role in providing affordable and efficient clean energy solutions for its residents.

Mahalo for the opportunity to provide testimony in opposition.

**/s/ Rocky Mould**

Executive Director



 808-733-7060  
 808-737-4977

 1259 A'ala Street, Suite 300  
Honolulu, HI 96817

April 7, 2026

**LATE**

**The Honorable Jarrett Keohokalole, Chair**  
Senate Committee on Commerce and Consumer Protection  
State Capitol, Conference Room 229 & Videoconference

**RE: House Bill 350, HD2, Relating to Energy**

**HEARING: Tuesday, April 7, 2026, at 9:25 a.m.**

Aloha Chair Keohokalole, Vice Chair Fukunaga, and Members of the Committee:

My name is Lyndsey Garcia, Director of Advocacy, testifying on behalf of the Hawai'i Association of REALTORS® ("HAR"), the voice of real estate in Hawaii and its over 10,000 members. HAR **supports** House Bill 350, HD2, which expands the types of water heater systems that may satisfy the relevant requirement for the issuance of a building permit for new single-family dwellings to include ENERGY STAR certified heat pump water heaters. Effective 7/1/3000.

Under current law, new single-family homes must include a solar water heater system to obtain a building permit. However, some homes may have limited sunlight exposure, which would make solar water heating less effective. HAR supports allowing ENERGY STAR certified heat pump water heaters as a viable alternative.

Mahalo for the opportunity to testify on this measure.

