



**DEPARTMENT OF BUSINESS,  
ECONOMIC DEVELOPMENT & TOURISM**

**LINDA LINGLE**  
GOVERNOR  
**THEODORE E. LIU**  
DIRECTOR  
**MARK K. ANDERSON**  
DEPUTY DIRECTOR

No. 1 Capitol District Building, 250 South Hotel Street, 5th Floor, Honolulu, Hawaii 96813  
Mailing Address: P.O. Box 2359, Honolulu, Hawaii 96804  
Web site: www.hawaii.gov/dbedt

Telephone: (808) 586-2355  
Fax: (808) 586-2377

Statement of  
**THEODORE E. LIU**  
Director  
Department of Business, Economic Development, and Tourism  
before the

**HOUSE COMMITTEES ON  
ENERGY & ENVIRONMENTAL PROTECTION  
and  
HOUSING**

Tuesday, March 17, 2009  
9:30 a.m.  
State Capitol, Conference Room 325

in consideration of  
**SB390 SD2**  
**RELATING TO ENERGY RESOURCES.**

Bill No. 390  
Support  Y  N  
Date 3/16/09  
Time 1146  
Cat A  A  B  C  
Type  1  2  WI

Chair Morita, Chair Cabanilla, Vice Chair Coffman, Vice Chair Chong, and  
Members of the Committees.

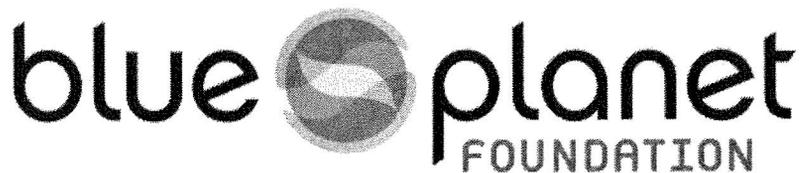
The Department of Business, Economic Development, and Tourism (DBEDT) supports SB390 SD2, which amends provisions of the mandatory solar water heating measure passed last session. The amendments transfer variance approval to the Public Benefits Fee Administrator (PBFA), clarify variance request procedures and authority, reduce the tax credit for substitute renewable energy systems installed under the mandate, provide guidance for solar water heater system standards, and allow use of demand-side management surcharge moneys for verification inspections.

We strongly support the amendment which transfers authority for variance approval to the PBFA in SB390 SD1, and offer an amendment to address any utility which collects the demand-side management surcharges but is not affected by the PBFA.

We offer an amendment to clarify administration of the variance by utilities not served by the PBFA for page 1, line 8, with the insertion of the following sentence: "For any utility which has received public utility commission approval to collect a demand side management surcharge from ratepayers, and which is not served by the public benefits fee administrator, the utility shall administer the variance and any standards established for solar water heating systems." Since the surcharge is used to support utility energy-efficiency and demand-side management programs, including solar water heating programs and standards, administration of the variance is in accord with these programs.

We defer to the Department of Taxation on tax matters.

Thank you for the opportunity to offer these comments.



Bill No. 390

Support  Y  N

Date 3/16/09

Time 12:44a

Cat AF AS AX  BC

Type  1  2  WI

HOUSE COMMITTEE ON ENERGY & ENVIRONMENTAL PROTECTION  
HOUSE COMMITTEE ON HOUSING  
March 17, 2009, 9:30 A.M.  
Room 325

(Testimony is 3 pages long)

### TESTIMONY IN SUPPORT OF SB 390 SD2 WITH AMENDMENTS

Chairs Morita and Cabanilla and members of the committees:

The Blue Planet Foundation strongly supports Senate Bill 390 SD2 with amendments, making clarifying amendments and improvements to Hawaii's historic Solar Roofs Act. The 2008 Solar Roofs Act, Act 204, was a critical step forward toward Hawaii's clean energy future as it ensures that nearly every new home will be equipped with a solar water heater.

**We strongly urge these committees to make at least one critical amendment to this measure: removing the "gas" variance option (original SB 390 language).** The gas option should only be allowed (and perhaps required) if the first and second variances are met—that is, the home has poor solar resource and solar would fail the cost-effectiveness test.

Specifically, Blue Planet supports the following changes to Act 204 (Solar Roofs Act):

1. **Blue Planet supports charging the new public benefits fund administrator with the duty to accept and issue variances** instead of the energy resources coordinator at the Department of Business, Economic Development, and Tourism. We understand that there is some discussion about the legality of tasking a private entity with this somewhat regulatory responsibility, but if it is allowed, aligning the existing demand side management entity with this duty makes sense. The public benefits fund administrator should have an up-to-date understanding of the solar technology and the basis for granting or denying waivers.
2. **Blue Planet strongly supports removing the on-demand gas heater variance option.** Such an option should only be allowed (and perhaps required) if the first and second variances are met—that is, the home has poor solar resource and solar would fail the cost-effectiveness test. We fear that the current language in the law may provide a loophole and create new all-gas subdivisions (particularly if the Gas Company provides infrastructure to new developers to encourage gas use).

3. **Blue Planet supports using a portion of the demand side management surcharge for maintaining a post-installation inspection process.** Such an inspection would verify that the solar water heater was installed in accordance with the quality and performance standards established in §269-44.

Our testimony in support of the Solar Roofs Act in general follows.

The 2008 Solar Roofs Law will provide far-reaching environmental and economic benefits for Hawai'i and is the type of transformative policy that will help define our clean energy future. Based on current solar adoption rates, this new policy will reduce the need for thousands of barrels of oil annually and reduce greenhouse gas emissions by thousands of tons from the residential sector. For the first time, the Act established in law the creation of quality and performance standards for new solar water heaters. Starting in 2010, with solar water heaters a standard feature on new homes, residents will be more accustomed to the benefits of solar, turning more of them into potential customers for photovoltaic and other renewable energy devices.

Last year's historic Solar Roofs Act has broad support. People get it. It rings true. Houses should be built with solar up front. To spend more to retrofit a home later just doesn't make as much sense. Last year's bill passed with the support of numerous organizations (including the AIA), many individuals, and the editorial boards of both Honolulu dailies. The law also put Hawai'i on the map as a national leader in clean energy. Being the first state in the nation with such a progressive energy requirement launched Hawaii into the pages of the *New York Times* and *USA Today* and onto MSNBC and CNN.

Solar water heating is a foundation block in building Hawaii's clean energy future. A solar water system is the most basic renewable energy device to harness the clean energy from the sun. The technology is mature, tested, and works (the Romans, in fact, used solar energy to heat the water flowing to baths in aqueducts). Solar water heaters provide the greatest energy savings per dollar for reducing substantial residential energy demand. The Solar Roofs Act ensures that the vast majority of new homes come equipped with this clean energy device, and helps to smooth the transition toward zero-energy homes of the future.

With 60,000 new homes planned for O'ahu alone over the next 20 years, the Solar Roofs Act is critically needed to ensure that we build them energy-smart and minimize the need for additional electricity demand. The first step toward zero-energy homes is the use of solar water heaters (the next step is to reduce electricity demand with efficient appliances and lighting, and the final step is to meet the remaining electricity demand with solar photovoltaic or other clean energy device). New homes, of course, are only part of the picture—hundreds of thousands of existing housing units in Hawai'i need to be retrofit with solar water heaters as well.

While Hawai'i leads the nation in the percentage of installed residential solar water heaters, some 75% of homes still lack this basic amenity. That means hundreds of thousands of housing units in Hawai'i rely on fossil fuel to keep their showers hot. Some local builders are starting to

offer solar water heating as an option for new home buyers, but the majority of new homes built in Hawai'i do not use solar. Even with the established solar industry in Hawai'i and ample incentives, the most new homes are not converting to solar. Considering that we are adding around 5,000 new homes in Hawai'i annually, the Solar Roofs Act will go a long way to reduce fossil fuel use and greenhouse gas emissions.

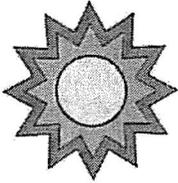
Solar water heating is the single best "clean" energy alternative for residences in Hawai'i. A typical family home with solar water heating avoids over 2.5 tons of carbon dioxide from being emitted annually (about 3000 kilowatt-hours avoided). If approximately 5000 new homes are built annually and only 25% eventually have water heaters installed, the Solar Roofs Act prevent nearly 10,000 tons of greenhouse gases additionally from being emitted every year and over 3 million tons after 25 years. What's more, the energy from the sun is stored in the form of hot water, offsetting the electrical system peak that occurs in the evening. This helps offset the need for expensive new power plants—another societal benefit from increased residential solar energy use.

The Solar Roofs Act will greatly increase the efficiency and affordability of new homes built in Hawai'i. Solar water heaters are among the most effective means of reducing the high electricity cost burden that residents now endure. The solar roofs bill makes the cost of living more affordable by slashing the electric utility bill of an average new home by 30 to 40 percent—saving over \$1000 annually for an average household on Kaua'i.

With average household use, most solar water heaters will pay for themselves in energy savings between 3 and 7 years. When systems are built into a home during construction—and when many systems are installed simultaneously in a larger subdivision and economies of scale are realized—solar water heaters are less expensive than an electric heater retrofit. When rolled into a 30-year mortgage, homeowners with solar will start saving money on day one. Even with other financing schemes, solar is a no-brainer investment that brings down the monthly cost of living. If current trends continue, the cost of residential electricity will continue to grow, making electric water heating even more expensive—and solar water heating more of a "no-brainer."

The cost of living is a top-of-mind issue for many in Hawai'i. The Solar Roofs Act makes new home ownership more affordable by reducing the monthly utility burden.

Thank you for the opportunity to testify.



# INTER-ISLAND SOLAR SUPPLY

Serving Hawaii and the Pacific Islands Since 1975

761 AHUA STREET, HONOLULU, HAWAII 96819 Tel: (808)523-0711 Fax: (808)536-5586

Bill No. 390

Support Y N

Date 3/16/09

Time 1302

March 17, 2009

Testimony before the House Committees on Energy & Environmental Protection and Housing on  
**Senate Bill 390 SD2 Relating to Energy Resources**

Chairs Morita and Cabanilla, Vice Chairs Coffman and Chong, Members of the Committee,

Cat AF AS AX  C

My name is Cully Judd and I own Inter-Island Solar Supply (IISS), a local wholesale/ distributor of solar energy and energy efficiency products, including gas water heaters for over 35 years in Hawaii.

Type 1 2 WI

Senate Bill 390 SD2 somewhat improves upon Act 204 passed last legislative session. Act 204 attempted to mandate solar water heating systems for all newly constructed single-family dwellings beginning 2010. IISS strongly believes that the best course of action this legislature could take this session is to **repeal Act 204**. Given that unlikely outcome, IISS has identified the following areas where the state's objectives of reducing dependence on imported fossil fuels and increasing use of solar and other renewable energy technologies can be enhanced by amending this bill as follows:

**Delete Gas Variance.** The purpose of Act 204 was to mandate solar water heating to get the state off of fossil fuels. Hawaii gas is made from oil. The legislature eliminated incentives for builders to install solar water heating systems. Builders are now incented to install gas heaters because of lower first cost. To correct this subversion of the mandate the gas variance should be deleted. The Gas Company will not be excluded from installing gas heaters. **There are four opportunities for the gas utility to sell gas.**

- Gas can be used as a back-up for a mandated solar water heater
- Gas can be used if a variance is granted because solar water heater is not cost-effective
- Gas can be used if a variance is granted due to inadequate solar resource
- Gas can be used if a variance is grated for substitute renewable energy technology

For the record, Inter-Island Solar Supply is one of the State's largest suppliers of gas water heaters. We are not opposed to the use of gas per se. We oppose it as a variance to a mandated solar water heater. Tankless gas heaters are not all that their cracked up to be. See the attached Consumer Reports article.

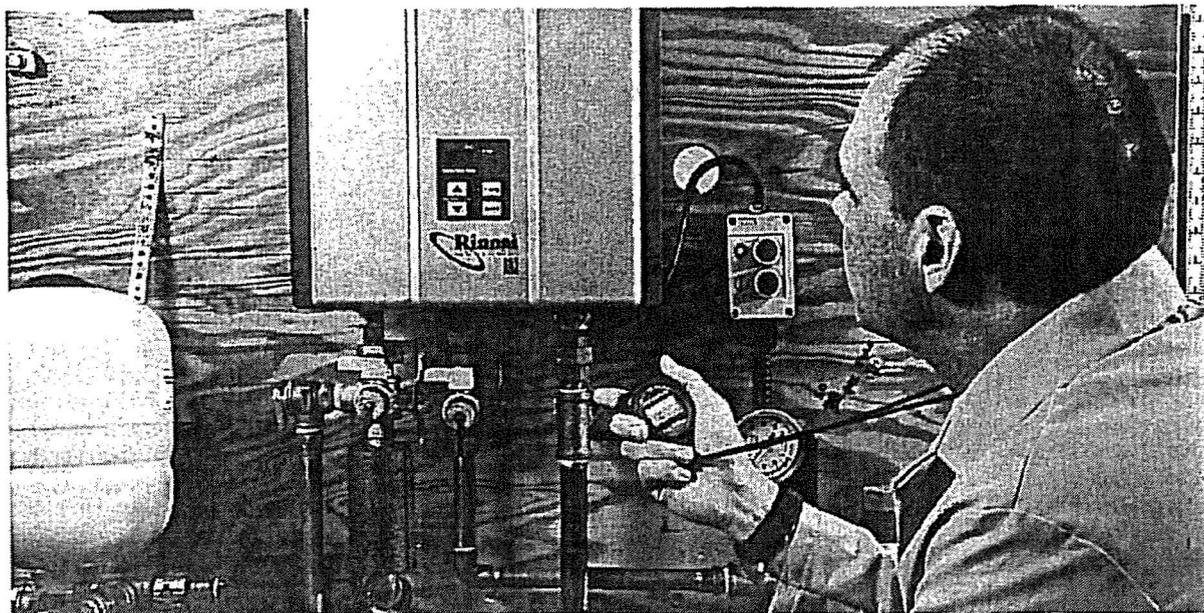
**Require ENERGY STAR Heaters When Variances Are Granted.** Variance should be granted only rarely if at all. If a bona fide situation arises that merits a variance, then the water heater used should be ENERGY STAR rated. ENERGY STAR ratings are available for many gas and electric heaters.

**Reduce Tax Credits for Substitute Renewable Energy Technologies.** If and when any variance is granted for the use of an eligible substitute renewable technology, the tax credit should be reduced by the amount that would have been allocated to a solar water heater absent the mandate. As currently written, SB390 SD2 incents builders to install substitute renewable technologies and not solar water heaters.

**Require Substitute Renewable Energy Technologies to Produce, at a Minimum, Equivalent Solar Water Heater Energy.** Section 2(a)(3) on page 2 at lines 1-3 provides for a variance to the mandated solar water heating system if "a substitute renewable energy technology systems, as defined in section 235-12.5, is used as the **primary** [emphasis added] energy source for heating water." The term "primary" is too general. Webster's definition of primary is "of first rank, importance, or value." Any substitute renewable energy technology system that contributes more than 50% to the water heating load would satisfy the provisions of this variance. Yet the "mandated" solar water heating system is presumed to provide that same level of savings as the current utility grade solar water heating system which, on average, contributes 90% of the water heating load. Therein lies the rub.

**Clarify Applicability of Tax Credits for Systems Installed on Single-Family Homes Built Prior to 2010.** Amend HRS 235-12.5(a)(1)(A) as follows: "Single-family residential property for which a building permit for a new single-family dwelling was issued prior to January 1, 2010:"

Please amend SB 390 SD2 to address the deficiencies described above.



WATER WORKS Project leader John Banta checks the temperature and flow rate on a Rinnai model during our hard-water test.

# Tankless water heaters

They're efficient but not necessarily economical

**H**EATING WATER accounts for up to 30 percent of the average home's energy budget. Some makers of gas-fired tankless water heaters claim their products can cut your energy costs up to half over regular storage heaters. So is it time to switch?

Probably not. Gas tankless water heaters, which use high-powered burners to quickly heat water as it runs through a

heat exchanger, were 22 percent more energy efficient on average than the gas-fired storage-tank models in our tests. That translates into a savings of around \$70 to \$80 per year, based on 2008 national energy costs. But because they cost much more than storage water heaters, it can take up to 22 years to break even—longer than the 20-year life of many models. Moreover, our online poll of 1,200 readers revealed

wide variations in installation costs, energy savings, and satisfaction.

With the help of an outside lab, we pitted Takagi and Noritz gas-fired tankless water heaters against three storage water heaters. We didn't test electric tankless heaters because many can't deliver hot water fast enough to replace a conventional water heater if groundwater is cold. Even in areas with warm groundwater,

## What you'll pay

### Tankless vs. storage-tank water heaters

We based our comparisons on natural-gas-fueled water heaters producing 75 gallons of hot water in a 24-hour period. Water was heated from 54° F to 124° or greater (a 70° temperature rise). Our costs are based on national averages and don't include rebates. Your costs may vary and could shorten or lengthen payback time.

Model	TANKLESS WATER HEATER		HIGH-EFFICIENCY TANK 50-gallon	STANDARD TANK 50-gallon
	Takagi T-K3	Noritz N-0751M	A.O. Smith Vertex GPHE-50	GE SG50T1ZAVH
Retail price	\$800	\$1,150	\$1,400	\$480
Estimated installation cost	\$1,200	\$1,200	\$500	\$300
Annual operating cost*	\$320	\$330	\$331	\$400
Energy savings (annual over standard tanked unit)	\$80	\$70	\$69	NA
Payback period (years)	15	22	16	NA

\*We used the 2008 national average energy costs of \$13.65 per 1,000 cubic feet (MCF) of natural gas and \$0.108 per kilowatt hour of electricity.

most homeowners would need to upgrade their electrical service to power a whole-house tankless model.

Our tests simulated daily use of 76 to 78 gallons of hot water. That's the equivalent of taking three showers, washing one laundry load, running the dishwasher once (six cycles), and turning on the faucet nine times, for a total of 19 draws. While that's considered heavy use compared with the standard Department of Energy test, we think it more accurately represents an average family's habits. We also ran more than 45,000 gallons of very hard water through a tanked model and a Rinnai tankless model to simulate about 11 years of regular use.

Here's what else we found:

**Water runs hot and cold.** Tankless manufacturers are fond of touting their products' ability to provide an endless amount of hot water. But inconsistent water temperatures were a common complaint among our poll respondents. When you turn on the faucet, tankless models feed in some cold water to gauge how big a temperature rise is needed. If there's cool water lingering in your pipes, you'll receive a momentary "cold-water sandwich" between the old and new hot water. And a tankless water heater's burner might not ignite when you try to get just a trickle of hot water for, say, shaving.

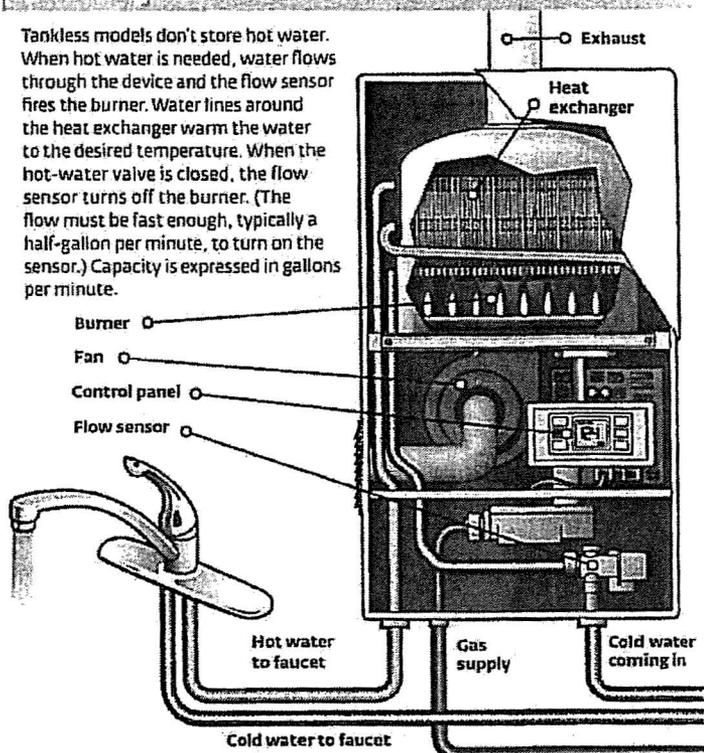
Nor do tankless water heaters deliver hot water instantaneously. It takes time to heat the water to the target temperature, and just like storage water heaters, any cold water in the pipes needs to be pushed out. And tankless models' electric controls mean you'll also lose hot water during a power outage.

**Up-front costs are high.** The tankless heaters we tested cost \$800 to \$1,150, compared with \$300 to \$480 for the regular storage-tank types. Tankless models need electrical outlets for their fan and electronics, upgraded gas pipes, and a new ventilation system. That can bring average installation costs to \$1,200, compared with \$300 for storage-tank models.

**Tankless units might need more care.** During our long-term testing, an indicator on the tankless model warned of scale buildup. We paid \$334 for special valves and a plumber to flush out the water heater with vinegar. Many industry pros recommend that tankless models be serviced once a year by a qualified technician. Calcium buildup can decrease efficiency, restrict water flow, and damage tankless models. Experts suggest installing a water

## How they work

Tankless models don't store hot water. When hot water is needed, water flows through the device and the flow sensor fires the burner. Water lines around the heat exchanger warm the water to the desired temperature. When the hot-water valve is closed, the flow sensor turns off the burner. (The flow must be fast enough, typically a half-gallon per minute, to turn on the sensor.) Capacity is expressed in gallons per minute.



softener if your water hardness is above 11 grains per gallon. Ignoring this advice can shorten your warranty.

**Efficient storage models are pricey.** We also tested the \$1,400 Vertex, a high-efficiency storage water heater by A.O. Smith. The manufacturer claims its installation costs are similar to a regular storage model. But its high cost offsets much of the roughly \$70 per year the Vertex will save you. Instead, we recommend buying a conventional storage water heater with a 9- or 12-year warranty. In previous tests, we found that those models generally had thicker insulation, bigger burners or larger heating elements, and better corrosion-fighting metal rods called anodes.

### How to choose

Tankless models probably aren't for you if higher up-front costs and long payback are a concern. But they do use less energy and might make sense for long but infrequent use, such as back-to-back showers. Keep these points in mind:

**Factor in location.** Unlike a regular water heater, a tankless model's water output is immediately affected by ground-

water temperatures. The same model that produces 7.2 gallons per minute (GPM) when installed in a warm Florida garage will output only 4.2 GPM in a cold New England basement because the colder water requires the temperature to be raised 77 degrees rather than 44. Use your coldest groundwater temperature to calculate the gallons per minute you'll need.

**Know your flow.** Undersizing a tankless water heater is a common mistake. Use our online calculator, at [www.ConsumerReports.org/hotwater](http://www.ConsumerReports.org/hotwater), to help you calculate your hot-water use.

**Get the details right.** Look for an oxygen-depletion sensor that shuts off the water heater if carbon monoxide is detected and a film wrap around the heat exchanger that will shut off the device if it gets too hot. Since tankless models are still relatively uncommon, consider using manufacturer-trained installers. Some companies extend the warranty if you do.

**Look for rebates or incentives.** Many tankless models qualify for utility rebates and state tax credits. Check the Database of State Incentives for Renewables & Efficiency at [www.dsireusa.org](http://www.dsireusa.org).