

Have Some Energy On The House...

SOLAR

Questions and Answers
on Solar Water Heating

September 2003



DBEDT
THE DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
STATE OF HAWAII



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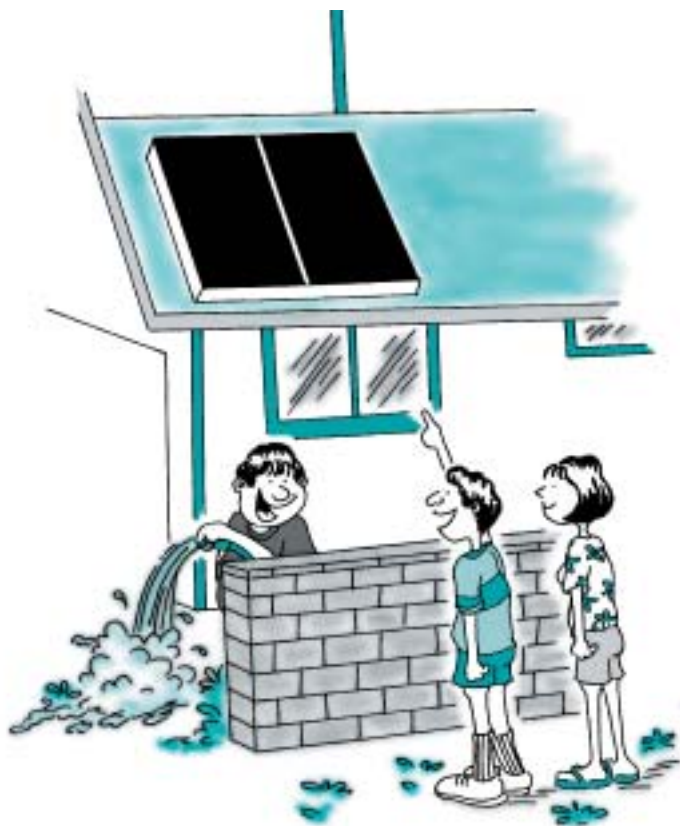
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Have Some Energy On The House ...

SOLAR



'Hi Neighbor! Whatcha got there on your roof?'

Solar Energy - What Your Neighbors Are Saying

In the face of rising energy costs, solar water heating can reduce your home energy consumption and save you money. Thousands of Hawaii's residents have installed solar systems in their homes. Here's what these residents have to say...



"Our light bill was getting out of hand. So my wife and I said, 'Ah, let's give it a try because the light bill isn't going to get any better.' We gave it a try, and I tell you, it's been terrific. Our bill, from \$121, came down to \$47." **John Freitas**, Pukalani, Maui



"I installed a solar unit with three panels. And a larger, 125-gallon tank. And very rarely, even with rainy weather in Hilo, do I have to use the electricity to back up my solar unit." **Naomi Morita**, Hilo, Hawaii



"The savings are the number one thing. My bills are now running about \$36 and I haven't had one bit of trouble with solar. As prices go up, I will be even happier, looking back and seeing how smart I was. Solar is the way to go!" **Marge Mulhall**, Kailua-Kona, Hawaii



"I live in a rain belt on Kauai. During the winter, I have to use my back-up electrical unit, but only for about six days out of the month. And only for a short time. During the summer it's no problem. I would recommend solar to anybody and everybody. If you have a family, however, I would suggest buying an over-sized tank." **John Arzadon**, Kailua Homestead, Kauai



"I'm a mechanical engineer. I've had my solar system for 15 years and my experience indicates that it saves money." **Dr. Jim Chou**, Salt Lake, Oahu

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INTRODUCTION

Tax Credit and Utility Rebates Reduce The Cost Of Solar.

State Income Tax Credit: 35 Percent

The Hawaii State Renewable Energy Tax Credit, which is 35 percent of the cost to purchase and install a system, is effective until January 1, 2008.

Utility Rebates

Some electric utilities offer rebates up to \$1,000 on qualified solar water heating systems. Check with your utility to find the current amount of the rebate, and to obtain a list of approved contractors.



The Value Of Solar Water Heating.

As a resident of Hawaii, you're probably spending a lot of your money for hot water. When you pay your electricity bill, or gas bill,

perhaps \$1 of every \$3 is used to heat water. And your total bill keeps going up because conventional energy costs keep going up.

There's a way out: the sun. The sun will heat your water at no charge. It will do so year after year, without regard for oil cartels or energy rate increases. To take advantage of this free energy, all you need is a solar water heating system. Most of the system should be a one-time investment with minimal maintenance. The longer you wait to invest, the more you will pay, both in the system costs and utility bills.

This booklet was prepared for your use by the State of Hawaii Department of Business, Economic Development, and Tourism. It is part of the State government's determined effort to decrease Hawaii's dependence on imported fossil fuels and to help Hawaii become more self-sufficient in energy.



IS SOLAR WATER HEATING FOR YOU?

How Do You Decide?



Most likely, “solar” is a wise investment. But don’t just assume that. You should check these points:

- Do you use a substantial amount of hot water daily?
- Does enough sunshine fall on your home to make solar a good buy?
- How much will the tax credit and utility rebate reduce the real cost of a solar system?
- How will the resulting cost compare to savings over the life of a solar system?

Do You Use Substantial Amounts Of Hot Water?

Most likely, you do. Most people do. In most homes, heating water accounts for the single biggest part of the energy bill. Water heating could account for one-third or even one-half of your energy use. But your lifestyle may greatly reduce demand for hot water. If you like cold showers, if you do your laundry at the laundromat, if you eat out most of the time and have no dishes to wash -- then solar may *not* be for you.

Does Enough Sunshine Fall On Your House?

Because you live in Hawaii, most likely the answer is “yes.” But there are some areas not suitable for solar water heating systems. If you’re in doubt, check further.

How Much Will The Tax Credit and Rebate Reduce Your Real Cost?

In general, the answer is: A lot. You can expect to get back more than one-third of your money in the form of a tax credit, that is, provided you have taxes you otherwise would have to pay. A utility rebate will reduce your costs by up to \$1,000 more.

State Income Tax Credit. The Hawaii State Renewable Energy Tax Credit is 35 percent of the cost to purchase and install the system. The credit may be claimed for systems purchased and installed until January 1, 2008.

Each single family residential installation qualifies for a tax credit, up to a maximum value of \$1,750.



Each unit of a multi-unit residential building qualifies for a 35 percent tax credit, or \$350 per unit, whichever is less.

A tax *credit* is generous. It's not a mere tax *deduction*, which only reduces your taxable income. A tax credit directly reduces the taxes you pay, dollar for dollar. A \$1 tax credit is worth \$1.

Utility Rebate. Different electric utilities may have different rebates, and the amounts are also subject to approval by the State Public Utilities Commission, so be sure to call your local utility for current information. In the year 2003, rebates ranged up to \$1,000 per system. The utilities' telephone numbers are in the Directory at the end of this book.

Example. If you are claiming both the utility rebate and the tax credit, the rebate must be applied first. On a \$4,000 system, if the rebate was \$750, the final cost would be:



System cost	\$4,000
Utility Rebate	- \$750
Reduced System Cost	\$3,250
35% Tax Credit	- \$1,138
Your Final Cost	\$2,112

Although the total system cost would normally be \$4,000, if the utility rebate were \$750, you would only pay \$2,112 in this example if you utilized both the tax credit and utility rebate. Consult your paycheck stub, your employer, last

year's tax forms, or your accountant. If you need further information about the State Renewable Energy Tax Credit, telephone the Department of Taxation at 587-4242. Neighbor Islanders may call toll free 1-800-222-3229.

The state income tax credit applies to homeowner-built-and-installed systems, as well as commercial systems. The utility rebate, however, only applies to commercial systems installed by utility-approved contractors.

How Will Your Real Cost Compare To Your Solar Savings?

Cost. Costs vary. You should get prices from at least three solar dealers. The general agreement in the solar industry is that the price of solar systems will not go down. Prices will increase because of rising costs for labor, materials, and equipment.

Savings. Electrically heated water costs -- at 15¢ per kWh -- about \$15 a month per person on Oahu. Thus, a family of four pays about \$720 a year for water heating. Solar water heating can provide about 90 percent of a family's water heating needs, *saving* about \$648 of the annual water heating cost for a family of four.

Family Of Four



**Electric Heating
\$720 Annually**

VS

Family Of Four



**Solar Heating
\$72 Annually**

HOW TO SHOP FOR A SYSTEM

How Important Is It To Shop Around?



When you're shopping for a solar water heating system, *it's very important to shop around*. Prices and systems vary. You may encounter high-pressure sales tactics and sales gimmicks.

Take your time. Choose with care. You will want to buy a dependable system from a dependable dealer. You will want a good system which fits your needs and your budget. If you plan on taking advantage of a utility rebate, the utility will give you a list of qualified contractors to choose from.

A well designed, installed, and maintained solar system could have a life of about 20 to 25 years. The water storage tank, pump, and controls may need to be replaced in about 10 to 15 years.

To Whom Should You Talk?

Talk to anyone and everyone who can help you. You're spending a lot of money. You're making a decision that will affect you for years.

Compare notes with friends who share your interest.

Check with at least three dealers. Compare prices.
Compare systems. Compare the advice dealers give you.

Visit friends and neighbors who have systems.
Familiarize yourself with the systems and know what you want and can expect from your system. It is important to check with homeowners in your neighborhood because availability of solar radiation varies greatly from one neighborhood to another. The intensity of the solar radiation affects the effectiveness of flat plate solar collectors.

You may want to begin by calling the Hawaii Solar Energy Association and asking for their membership list (Telephone: 521-9085).



What Do You Need To Know?

In the process of shopping around, look for answers to these questions:

- Is the dealer responsive and reputable?
- Is the system properly sized?



- Is it made of materials that will last a long time?
- Who will install it?

As you get close to deciding, you'll also have to deal with yet another set of questions. These are the legal questions: contracts, warranties, and permits, which are discussed later.

How Much Water Do You Use?

Water Usage



15 - 20 Gallons Per Person Per Day

**(Add Several Gallons Per Person Per Day
For Each Large Hot Water Appliance)**

To get the system that's right for you, you will need to estimate your hot water requirements.

The rule of thumb is about 15 to 20 gallons of hot water a day for each person in the household.

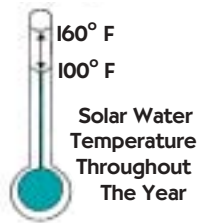
Add several gallons a day per person for each big hot water appliance (dishwasher, washing machine). Add a few more gallons for everyone who is incurably addicted to frequent, long, hot showers.

What About Storage?

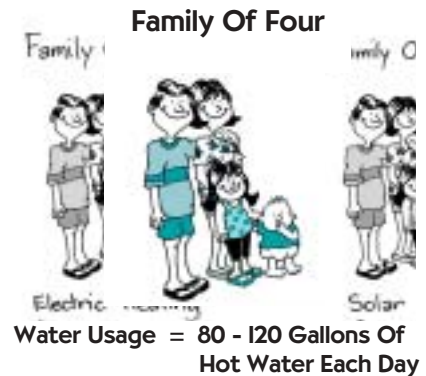
For a family of four, you may need at least 80 to 120 gallons of hot water each day. Therefore, you may want to buy a water storage tank that will hold your daily hot water demand. Size your collector area based upon your storage tank size.

Total collector area and water storage capacity should be balanced to supply water at about 140 degrees Fahrenheit -- definitely 140 degrees if you want to use a dishwasher, unless your dishwasher already has a water heater that can boost the temperature. Throughout the year, your water temperature will vary from 100 degrees to 160 degrees, depending upon the season, your location, and the weather.

Once you determine your daily hot water demand and the



collector area to heat that water storage, some dealers suggest that you may want to extend the capacity of your storage tank to the next larger size to allow for extra storage in case of poor weather or larger-than-usual hot water demand. Even with the additional storage, you still should be able to achieve sufficiently high temperatures without installing another panel.



Should You Buy A New Storage Tank?

You might want to. Particularly consider it if your existing tank is five years old or older, or too small for your requirements.

If you keep your old tank, insulate it. Solar installers can do the job for you, or you can buy a fiberglass insulation jacket at most home-improvement stores.



Also, it is important to insulate your hot water pipes. For more on this subject, see the section on "If Not Solar, Then What?"



How Many Square Feet Of Collection Area Do You Need?



1 Gallon

=



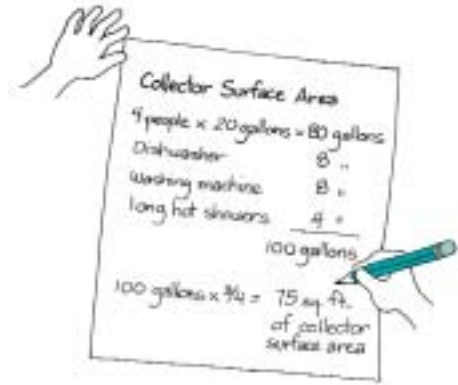
1/2 Sq. Ft.

80 Gallons = 40 Sq. Ft. Solar Collector

The general rule is: *You should have a half of a square foot of solar collector for every gallon of hot water you want each day.* If you want 80 gallons of hot water a day, you should have 40 square feet of solar collector.

This rule applies to very sunny areas.

You need more collector area if you live where there is less sun. To be safe, increase the size to about $3/4$ square feet of solar collector for every gallon of hot water you want each day. You then would have 75 square feet of collector area for a 100-gallon water storage tank.



What Should Collector Materials Be Made Of?

The quality of materials directly affects how well they work and how long they last.

Generally, the solar industry agrees that good materials include the following:

- Copper or aluminum collector plates (aluminum only if the box is well sealed against moisture) and copper waterways.
- Fiberglass and/or polyisocyanurate foam insulation.
- Selective coating on the absorber plates to increase the heat absorption.
- Aluminum box.
- Low iron tempered glass for the cover.

(See table on page 18.)

What Should You Look For In A Dealer?

Basically, you will want a reputable dealer with real know-how and business integrity. Ask dealers for customers' names in your neighborhood; then ask the customers if their systems have performed well and if the dealer has provided good service.

Will the dealer also install the system? Or will another company?

To install a system, a dealer must have a contractor's solar specialty license. If the dealer does not install the system, you also should evaluate the installer.



Is The Dealer Reputable?

Will the dealer live up to the contract and warranty?

If the dealer or manufacturer goes out of business, your chances of collecting on the terms of a warranty are dim.

The State Department of Commerce and Consumer Affairs (DCCA) investigates complaints of unfair and deceptive business practices. Ask DCCA if any complaints have been filed against a dealer. DCCA will answer this question over the phone. You can review DCCA records of completed cases (Telephone: 587-3222 or 587-3295).

You can also inquire about a dealer through the Better Business Bureau (Telephone: 536-6956).

If you are using a utility rebate program, the utility has already screened its contractors to ensure that the solar systems installed under their program meet their standards. To get a list of these contractors, call:

Hawaiian Electric Company (Oahu): 947-6937
Hawaii Electric Light Company (island of Hawaii):
969-0127
Kauai Island Utility Cooperative: 246-8284
Maui Electric Company (Maui, Molokai and
Lanai, toll-free): 1-888-632-6786



Solar Collector Materials Performance and Evaluation

COMPONENT	MATERIAL	ADVANTAGES	DISADVANTAGES
Cover	Low iron tempered glass	Increases transmissivity and increases collector performance Scratch resistant Cleans easily Lasts indefinitely if not broken	Expensive compared to plastics Could break
	Plastic	Inexpensive Easy to handle Light weight	Not as transmissive as low iron glass Needs replacement every few years (2-10 yrs.) After time deforms and deteriorates from ultraviolet rays & age Easily scratched Attracts dust
Absorber Plate	Copper	Noncorrosive Excellent conductivity	Expensive
	Aluminum	Good conductivity	Subject to galvanic corrosion
	Galvanized Steel	Inexpensive Good conductivity	Conductivity not as high as copper Subject to rusting
Absorber Plate Coating	Non-selective Flat black paint	High heat absorptance of about 0.95	Heat emittance of about 0.95
	Selective Black chrome Black nickel Copper oxide	High heat absorptance of about 0.95 Low heat emittance of about 0.09	More expensive than flat black paint
Insulation	Fiberglass	Good for retarding heat loss Excellent for resistance to volatile outgassing* Excellent for temperature resistance - degradation under high temperature Desirability: Recommended. Can be used in conjunction with other insulation (see note) to maximize performance	Fair for moisture resistance
	Urethane foam	Excellent for retarding heat loss Excellent for moisture resistance Fair for temperature resistance - degradation under high temperature	Poor for resistance to volatile outgassing Desirability: Not recommended for high temperature application
	Extruded polystyrene	Good for retarding heat loss Good for moisture resistance Fair for resistance to volatile outgassing	Poor for temperature resistance - degradation under high temperature Desirability: Not recommended for high temperature application

* Normally, the insulation nearest the absorber plate is exposed to higher temperatures than those insulations far away from the absorber plate. High temperatures in the collector may cause certain insulation materials to outgas. Outgassing is the breakdown of cell structure and the emission of gas. These volatile elements can condense on the inner surface of the glass and other portions of the collector and reduce efficiency. It is possible to use one type of insulation adjacent to the absorber plate (e.g, fiberglass) and another type (polyurethane, polyisocyanurate, etc.) in an area that will not be exposed to extreme temperatures.

Who Installs The System?

One of three parties can install the system. One is the dealer, but to do so the dealer must have a contractor's solar specialty license. You can install your own system, using a licensed plumbing contractor and a licensed electrical contractor to do the plumbing and electrical work, respectively. The third possibility is a professional installer. Again, this person must have a contractor's solar specialty license.

If you're using a utility rebate program, call the utility on page 17 for a list of their approved contractors.

What Should You Look For In An Installer?

Basic questions still apply:

- How many solar systems has the installer put in?
- Is the installer licensed?
- How satisfied are his customers?

Installers must be licensed by the DCCA as contractors. You can check to see if an installer is properly licensed by calling the Consumer Resource Center of the DCCA at 587-3222 or 587-3295.



LEGAL QUESTIONS

What Legal Questions?

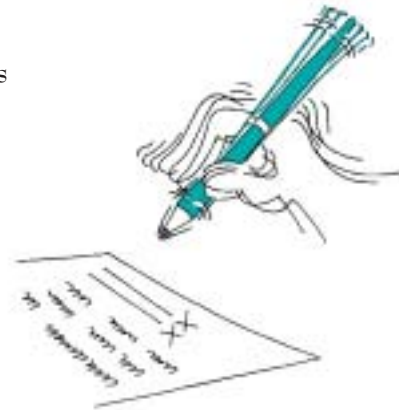
Legal questions relating to solar systems fall into three areas:

- Contracts
- Warranties
- Building permits

What Should A Contract Cover?

Be sure all important points of your agreement with the dealer are in writing. Most importantly:

- Price.
- Starting and completion dates.
- A detailed description of the job, specifications of materials, and brand names.
- A schedule of payment.
- Make sure that repair or replacement will be made within a reasonable time period.
- Make sure that you will not have to do anything unreasonable to get warranty service (such as ship the collector panels to a mainland manufacturer).



- Make sure that if the product cannot be fixed (or hasn't been fixed after a reasonable number of tries), you get your choice of a new one or your money back.

You may want to include the following clauses in your contract:

- A “hold-back” clause, which allows you to hold back payment on 10 percent until 30 days after the job is completed to determine if your system is functioning properly and to ensure warranty service.
- A “clean-up” clause, which will make the contractor responsible for clean-up and removal of debris after installation.
- A “payment upon delivery” clause, which would withhold payment until installation begins, to ensure delivery of product.

What Should Your Warranty Cover?

Ask to see and read the warranty *before* you decide to buy. Federal law does not require that all dealers give warranties. But if written warranties are given, dealers have to provide either full or limited warranties. State law requires that warranty terms must be in easy-to-read, easy-to-understand language.



It is important to get all terms in writing; otherwise they may

not be binding. Be sure all terms are either in the warranty or contract, and not on an additional sheet of paper without signatures. Make sure you know what is and is *not* covered. Understand the time limits of warranties. Understand what you need to do to keep a warranty in force.

Full Warranty. This is a sample of a full warranty:

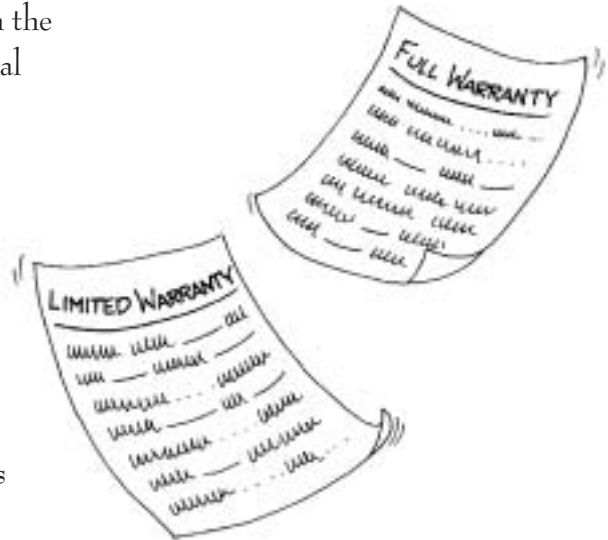
“This product is guaranteed against all defects in construction and against corrosion for a period of five years. Manufacturer will pay all labor and parts to correct problems.”

A full warranty means a defective product will be repaired or replaced free, including removal and reinstallation if necessary.

Limited Warranty. This is a sample of a limited warranty:

“This product is guaranteed to be one of the finest solar systems ever manufactured. Manufacturer will pay only for costs of parts to correct any problem.”

A limited warranty may leave you responsible for removing and reinstalling a defective system. You may also be responsible for major costs, such as shipping the system to the factory.



Be sure you know what is *not* covered by a warranty.

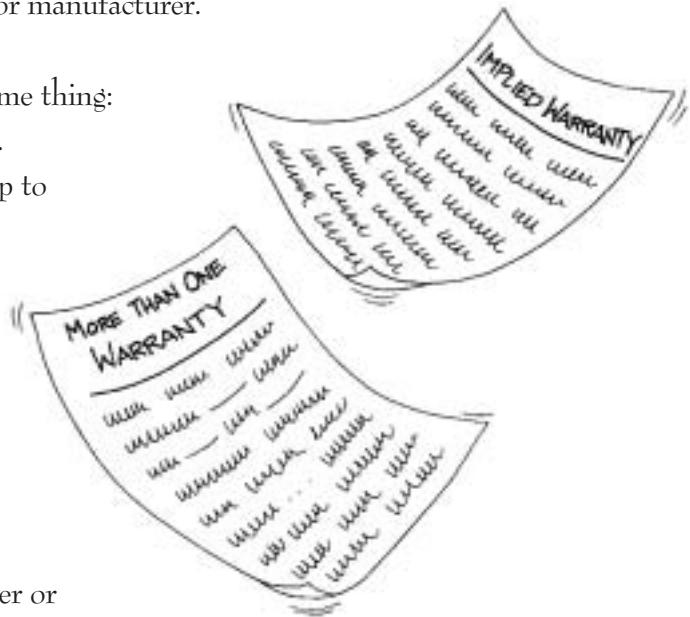
Would the parts not covered be likely to break? Are they expensive? Are the services not covered likely to be needed? Are they expensive? Are service calls included?

More Than One Warranty. Some products have more than one warranty. A full warranty may cover a certain part, but not the whole product. The rest may be covered only by a limited warranty. So read all warranty information with an eye to this possible problem.

Using Your Warranty. Again, it's important to keep in mind your responsibilities for keeping a warranty in force. If you use your warranty, keep a record of all the problems you report to the dealer or manufacturer.

A warranty and a guarantee are the same thing: a promise to stand behind the product. Manufacturers and dealers must live up to written promises and, in some situations, even go beyond what is written down.

If your product breaks down, read your warranty. See if the breakdown is covered. Follow the directions for warranty service. If you don't have your warranty, ask the dealer or



manufacturer to give you one and to give you service information.

Check with the Federal Trade Commission for its excellent publications on warranty information (Telephone: 1-877-382-4357; or www.ftc.gov).

Implied Warranty. State law provides consumers with an implied warranty. An implied warranty means that the product you buy will do what it is designed to do. That is, a solar water heating system, for example, must be able to provide hot water through the use of solar energy.

What If You Change Your Mind?

If you sign the contract in the dealer's office, it is usually immediately binding. You cannot cancel.

However, if you were enticed to the office by the offer of a free gift, you have three business days to cancel.

If you signed outside the office (in a door-to-door sale, for example), you probably have three business days to cancel.

By law, the salesman must tell you of this right to cancel. The contract, or receipt, must contain the following near your signature: "You, the Buyer, may cancel this transaction at



any time prior to midnight of the third business day after the date of this transaction.”

The salesman also must give you two copies of a Notice of Cancellation form, which will tell you how to cancel. Basically, the steps are: Detach, sign, and date one copy of the notice. Send or deliver the notice to the seller within three *business* days. Keep one copy of the notice, along with contract or receipt, for your records.

To Install The System, Do You Need A Building Permit?

Whether you, your dealer, or an installer handles the installation, a *building permit is required*. If you install your own system, you still need a permit. If a company installs the system, it will usually secure the permit for you. The permit should be posted while the system is being installed.

Must The Installer Be Licensed?

LICENSE NUMBER
ABC - 99999

EXPIRATION DATE
04/30/99

STATE OF HAWAII DEPARTMENT OF COMMERCE AND CONSUMER AFFAIRS
CONTRACTORS LICENSE BOARD
CONTRACTOR

JOHN DOE CONSTRUCTION, INC.
1010 RICHARDS ST.
HONOLULU HI 96813

(SIGNATURE OF LICENSEE) _____

Yes. The installer must have a Hawaii State contractor’s solar specialty license. Ask to see the installer’s pocket license card (see illustration). It will carry a license number. You can double check this number against the contractor’s license number on your building permit. They should be the same number.

The State Department of Commerce and Consumer Affairs (DCCA) licenses and regulates contractors. It will also investigate complaints against licensed contractors. If a contractor is licensed, it means he has met the State's professional and financial requirements. You, the consumer, are ensured of legal recourse if the contractor's work proves unsatisfactory.

If the installer is not licensed, your contract with the installer may be voided.

If you wish to verify a contractor's license number, or if you want to know if complaints have been lodged against a specific contractor, check with the DCCA (Telephone: 587-3222 or 587-3295).

Plumbing. Regardless of who does the installation, the final plumbing hookup must be done by a licensed plumber employed by a licensed contractor.

Electricity. All electrical wiring must be done by a licensed electrician employed by a licensed contractor.

Form No. BSD-2 (Rev. 1/79)

CITY AND COUNTY OF HONOLULU
BUILDING DEPARTMENT
BUILDING SAFETY DIVISION \$ _____ PERMIT FEE

BUILDING PERMIT

FOR THE PERFORMANCE OF WORK UNDER THE
 BUILDING ELECTRICAL PLUMBING AND SIDEWALK CODES
 CHAPTERS 16, 17, 19, AND 20, RESPECTIVELY, AND UNDER CHAPTER 18
 (FEES AND PERMITS) OF THE REVISED ORDINANCES OF
 THE CITY AND COUNTY OF HONOLULU
 AT

ZONE	SEC	PLAT	PARCEL	LOT

OWNER _____ LOCATION _____

<p>GENERAL CONTRACTOR</p> <p><input type="checkbox"/> SIDEWALK <input type="checkbox"/> DRIVEWAY <input type="checkbox"/> CURB</p>	<table border="1" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> No Electrical Work <input type="checkbox"/> Electrical Work Authorized <input type="checkbox"/> Electrical Work Not Authorized <input type="checkbox"/> Supplemental Permit Required <input type="checkbox"/> Electrical Work Authorized Except For These Phases _____ Supplemental Permit Required </td> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> No Plumbing Work <input type="checkbox"/> Plumbing Work Authorized <input type="checkbox"/> Plumbing Work Not Authorized <input type="checkbox"/> Supplemental Permit Required <input type="checkbox"/> Plumbing Work Authorized Except For These Phases _____ Supplemental Permit Required </td> </tr> </table>	<input type="checkbox"/> No Electrical Work <input type="checkbox"/> Electrical Work Authorized <input type="checkbox"/> Electrical Work Not Authorized <input type="checkbox"/> Supplemental Permit Required <input type="checkbox"/> Electrical Work Authorized Except For These Phases _____ Supplemental Permit Required	<input type="checkbox"/> No Plumbing Work <input type="checkbox"/> Plumbing Work Authorized <input type="checkbox"/> Plumbing Work Not Authorized <input type="checkbox"/> Supplemental Permit Required <input type="checkbox"/> Plumbing Work Authorized Except For These Phases _____ Supplemental Permit Required
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DATE ISSUED _____ For Director and Building Superintendent

ELECTRICAL AND PLUMBING WORK TO BE DONE BY LICENSED PERSONS AS REQUIRED UNDER CHAPTER 448 E. HAWAII REVISED STATUTES.
 THIS PERMIT MUST BE POSTED IN A CONSPICUOUS PLACE ON THE SITE DURING THE PROGRESS OF WORK. THIS PERMIT MAY BE REVOKED IF WORK IS NOT STARTED WITHIN 180 DAYS OF DATE OF ISSUANCE OR IF WORK IS SUSPENDED OR ABANDONED FOR 120 DAYS.

PERMIT No. 319301

Could Your Roof Warranty Be Jeopardized By A Solar Installation?

Yes, it could. If you're in doubt, double check the terms of your roof warranty.

On a practical level, if you will need to re-roof, have the solar dealer and roofer discuss the installation.

“Remove-and-Replace.” If your roof is not in good shape, but you're still determined to install a solar system, ask the dealer if he will agree to remove and re-install the system in the event of roof repairs. This agreement and the cost, if any, should be written into the contract.



Can Solar Help With Your Mortgage?

The U.S. Environmental Protection Agency's "Energy Star Homes" program helps homeowners with solar water heaters qualify for Energy Efficient Mortgages. These may, for instance, stretch qualifying ratios, lower interest rates, or reduce closing costs. Please call your local electric utility for more information.

The U.S. Department of Housing and Urban Development also has mortgage programs which consider solar system savings. Please call the HUD office in Honolulu at 522-8175.

Need More Information?

The Federal Trade Commission has three free publications which are pertinent:

- Warranties
- The Cooling-Off Rule (When You Can Cancel A Purchase)
- Service Contracts

The Department of Commerce and Consumer Affairs (DCCA) offers a brochure focusing on consumers' rights to refunds and exchanges in Hawaii. You may contact the DCCA for a free copy of this brochure, Refunds And Exchanges.

The Hawaii Solar Energy Association also provides assistance and information. You may call them at 521-9085.

If you need additional information, call the DBEDT Strategic Industries Division's Hilo office at 933-0312. Ask for other free publications on energy, such as:

- *Hawaii State Renewable Energy Tax Credits*
- *Guidelines for Energy Performance, Comfort, & Value in Hawaii Homes*
- *A Home-Owner's Guide To Solar Water Heating with Oahu Sunshine Map*
- *Hawaii Island Sunshine Map* • *Kauai Sunshine Map* • *Maui Sunshine Map*

These and other resources are listed in the Solar Directory at the end of this booklet.

IF NOT SOLAR, THEN WHAT?

How Can You Save Energy Without Solar Power?

If solar power is not for you, you still can save a lot of money on your energy bill. It is basically a six-step plan:

- Conserve your hot water.
- Use cooler water if you can.
- Install a timer on your hot water heater.
- Turn down your thermostat. (Before you do, don't forget to disconnect your electricity.)
- Insulate your hot water tank to keep in the water's heat.
- Consider installing a heat pump water heater.

Although water heating is the biggest part of your utility bill, you can save energy and money by conserving energy elsewhere in your home, too.

Your refrigerator is your second-largest electricity user. When buying a new refrigerator or other major appliance, look for the yellow Energy Guide labels to select the most efficient model for your needs. Energy Star® appliances exceed federal standards.

For lighting, switch to compact fluorescents to enjoy cool, efficient lighting.

Also, insulate your roof and walls so your home will be more comfortable without needing air conditioning. Not using A/C may also reduce the risk of mold problems.

How Can You Conserve Hot Water?



- Install water-flow restrictors on your faucets and water-conserving showerheads. They will cut down on total water use and save your hot water. Look for them at any hardware or appliance store.
- When you shower, turn off the water while you lather and scrub.
- Fix leaky faucets.
- If you run a dishwasher and/or use hot water for laundry, run full loads. Otherwise, it's a waste of energy.



When Can You Use Cooler Water?

Chances are your hot water heater is set too high. You can save energy by simply turning the screw which sets your thermostat. Try 120 degrees. If you use a dishwasher, set the thermostat at 140 degrees, unless it has its own heating element (check your dishwasher's instructions). If you have an electrically-heated tank and the thermostat is *inside* the tank access panel, turn off your electricity before you turn down the thermostat.

Also, use cold water to wash clothes. And take shorter, cooler showers.



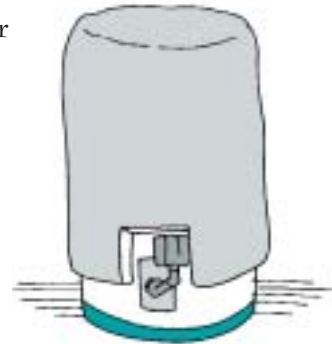
How Will A Timer Save Energy Dollars?

A timer is a clock and a switch. It will turn your water heater on and off. The timer will turn the heater on when you want hot water -- for example, the next morning, or the next afternoon -- and off after bath time in the evening.

How Will Insulation Save Energy Dollars?

Just as a coat keeps the body warm, extra insulation keeps water warm. Insulation saves energy.

Insulate your hot water heater. You also can insulate your hot water pipes. You'll find insulating jackets for sale at stores which handle home-repair equipment.



What Is A Heat Pump?

A heat pump water heater is a device which removes heat from the air and puts it in your water heater. Heat pumps can save you money on your water heating bill...though not as much as solar can. A heat pump may be the answer for people who can't use solar, like those living in apartments. (There is a 20% State tax credit for heat pumps, and there may also be utility rebates.)

A decorative horizontal line of small teal dots leads to a teal rectangular box with a decorative border. Inside the box, the title "Solar Heater Maintenance Tips" is written in a bold, white, sans-serif font.

Solar Heater Maintenance Tips

Be sure to ask your general contractor or solar installer for maintenance guidelines and a schedule when your system is installed.

Your contractor should also be able to describe how the system works. If you understand how the solar heater operates, most maintenance is a simple matter. If you prefer to hire a solar professional, many offer routine maintenance services at reasonable fees.

Here's an annual solar water heater maintenance schedule most homeowners can follow:

Flush your storage tank. Small bits of debris can collect at the bottom of the tank and affect your pump or valves. A water filter on your incoming supply line can help remove grit from your water supply. If you have a filter, change the cartridge regularly.

Inspect your system. Look for leaks in the pipes. Make sure the collectors and sensors are weather-tight. If there is dirt or debris on the collectors' glass, wash it off when the glass is cool. Repaint the pipe insulation. Check the points where the collector supports penetrate the roof; add roofing compound if needed to seal leaks. Look for corrosion on metal parts. Clear away any debris that is caught on the collector mounting structure.

Replace anode rod. An anode rod is inside your tank to protect it from corrosion. The hotter your water gets, the faster the anode wears away. Anodes should be checked and probably replaced every 5 years; sooner if your water is usually hotter than 150 degrees. Professional help might be needed, since the job could require an impact wrench.

Solar Information Directory

State Offices:

Department of Business, Economic
Development & Tourism
Strategic Industries Division
www.state.hi.us/dbedt/ert
Hilo office ... 933-0312

Department of Commerce and
Consumer Affairs
Consumer Resource Center ...
587-3222 or 587-3295
Consumer Dial ... 587-1234
www.state.hi.us/dcca

Department of Taxation,
Taxpayers Services Branch
Oahu ... 587-4242
Neighbor Islands (Toll Free) ...
1-800-222-3229
www.state.hi.us/tax



Federal Offices:

Federal Trade Commission (Toll Free) ...
1-877-382-4357; www.ftc.gov
Department of Housing and Urban
Development ... 522-8175;
www.hud.gov

Other Offices:

Better Business Bureau ... 536-6956
Hawaii Solar Energy Assn. ... 521-9085
Hawaii Electric Light Co. ... 969-0127
Hawaiian Electric Co. ... 947-6937
Kauai Island Utility Co-op. ... 246-8284
Maui Electric Co. ... 1-888-632-6786





Hawaii Dept. of Business,
Economic Development, and
Tourism

P.O. Box 2359
Honolulu, Hawaii 96804-2359



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