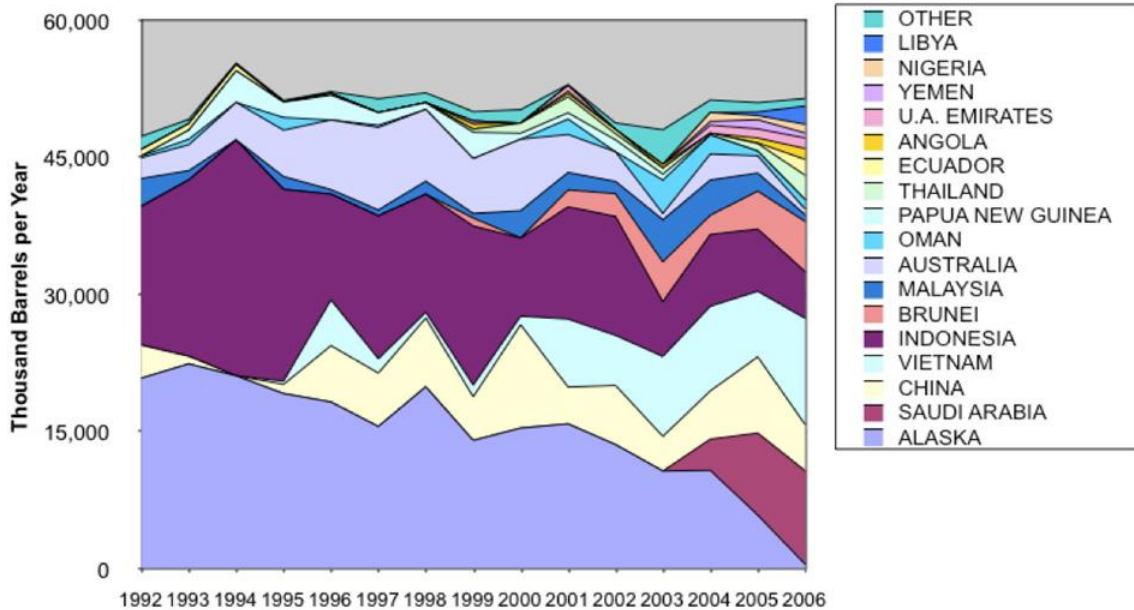


Saving \$\$ with Sun Power

By Linda Copman

Hawaii's Crude Oil Sources, 1992-2006



Sources: State of Hawaii Strategic Industries Division and U.S. Energy Information Agency, 2007

Image: Courtesy of Maurice Kaya, former Chief Technology Officer at the State Department of Business, Economic Development and Technology (DBEDT).

Twenty years ago the State of Hawai'i imported about half of its oil from domestic sources in Alaska. Today, Hawai'i imports nearly all of its oil from foreign sources. We are the most oil-dependent state in the nation, with petroleum products supplying roughly 90% of our energy statewide.

Hawai'i residents feel the impacts of our island's dependence on imported oil every day when filling our gas tanks or shopping for groceries. Many analysts agree that peak oil production occurred in about 2005, and that we are now entering the era of post-peak oil. The price of oil and gasoline, fertilizer and food, medicine and building materials and just about everything else sold on the island is rising and is not expected to fall.

Lowering Your Energy Costs Right Now

So what can you do right now to lower your energy costs? For most households, the best option is to invest in a solar hot water heater (SWH). The SWH will generally

pay for itself in less than four years, and pay for itself several times over the course of its lifetime through avoided energy costs. Other high-impact actions you can take to reduce your energy costs are to purchase the most fuel-efficient car that meets your needs, use the County's free mass transit system whenever possible, limit your use of air conditioning and install energy-efficient lighting in your home.

Harnessing solar energy to heat water and provide power is an excellent choice for Hawai'i's households. Solar resources are abundant and free, and there are a variety of public and private incentives to help residents afford the initial capital expense to install SWH and photovoltaic (PV) systems. Generating solar power can significantly reduce your monthly utility bills. In the bigger picture, solar power and other distributed generation technologies increase our island's energy independence, reduce our vulnerability to volatile world oil prices, contribute to a more diversified energy system, and reduce emissions of greenhouse gases.

Hawai'i Island household electricity costs were 36.4 cents per kWh as of April 1, 2008. Look at the prices for the other islands (HECO – O'ahu, MECO – Maui, and KIUC – Kauai) and compare them to the U.S. average. Most telling is the last column which attempts to illustrate how much of the electricity price is tied to fuel costs paid by the utility. On average across the state, 50% of the revenues of Hawai'i's electric utilities are tied to imported fuel oil costs that are simply passed on to consumers.

Electricity Prices, 2005-2008

	2005 cents/KWH	2008 cents/KWH	% Oil Cost
HECO	18.6	25.7	45
HELCO	29.0	36.4	41
MECO	27.6	32.6	54
KIUC	30.1	41.3	57
US Avg	9.3	10.0	<5

Note: 2008 Figures from DBEDT as of April 01; % oil cost calculated as ECAC contribution to total cost

Image and Caption: Courtesy of Maurice Kaya, former Chief Technology Officer at the State Department of Business, Economic Development and Technology (DBEDT).

Following are some innovative programs designed to help you install a solar hot water or solar electrical system on your roof now and start saving money and resources.

HELCO's Solar Water Heater Rebate

Qualifying HELCO customers who purchase a SWH system from a participating contractor are eligible to receive an instant rebate of \$1,000 off the installation bill for the system. To qualify for the rebate, a home must currently utilize an electric water heater, as opposed to a gas water heater. The rebate will be paid directly to the contractor and will be passed along to the consumer as a deduction from the total installation charges. There are currently 32 participating solar contractors on Hawai'i Island. An added benefit of participating in the HELCO rebate program is that the utility inspects all SWH systems for which homeowners have applied for a rebate to ensure that these systems are functioning optimally. If, for example, HELCO determines that any of the system's solar panels are not "hot" enough, the utility will require the contractor to replace the panel with a better performing panel prior to issuing the rebate. In effect, the HELCO inspection provides an extra layer of quality control for the consumer. For more information on the HELCO rebate program, call the utility at (808) 969-0127.

HELCO's rebate program is funded through the utility's demand-side management (DSM) program. DSM costs are reflected in monthly electric bills under the "IRP Cost Recovery" line item, so, in effect, ratepayers help to subsidize HELCO's rebate program. The utility currently charges 60% overhead for administering the DSM program, meaning that only 40% of DSM funds are available for programs, which directly benefit its customers.

Hawai'i Electric Light Company (HELCO) has relinquished management of the DSM program to a third-party administrator. The new administrator has its overhead expenses capped at 10%, so that 90% of DSM funds can be applied directly toward energy-efficiency programs, like the SWH rebate program. The Hawai'i County Energy Sustainability Plan advocates for increasing the amount of the SWH rebate from \$1,000 to \$1,500 in 2009, further reducing the initial cost of such systems and their corresponding payback times.

Federal and State Tax Credits

There are multiple tax credits available to homeowners who install a SWH or PV system. The federal government offers a 30% tax credit off the total cost of the system, and the Hawai'i State government offers a 35% tax credit to a limit of \$2,250 for a single-family residence. These generous tax credits may be applied directly to reducing income tax liability for the year in which a qualifying solar system is installed. If there is no tax liability, or if the credit exceeds the amount

of tax liability, then the credits may be carried over to subsequent tax year(s), until the credits are fully expended.

On October 3, 2008, President Bush signed into law the “Emergency Economic Stabilization Act of 2008.” This bill extended federal tax credits for solar energy systems through the end of 2016. New tax credits were established for small wind energy systems and plug-in hybrid electric vehicles. Tax credits for builders of new energy efficient homes and tax deductions for owners and designers of energy efficient commercial buildings were also extended. To learn more about these federal tax credits for energy efficiency visit their webpage at http://www.energystar.gov/index.cfm?c=products.pr_tax_credits.

County Real Property Tax Credit

The Hawai`i County Council established a new solar tax credit in June 2008. The new law provides a tax credit of \$300 for homeowners who install a solar water heater after January 1, 2008. The one-time credit of \$300 per tax map key is applied to the homeowner’s property tax liability. To obtain the credit, homeowners must submit an application to the Real Property Tax Department by September 30, for credit in the following tax year. To download the application visit their webpage at <http://www.hawaiipropertytax.com/pdffiles/SOLAR%20WATER%20HEATER%20TAX%20CREDIT.pdf>.

Consider the potential cost savings by combining a HELCO rebate with the federal, State, and County tax credits:

\$7,000	Cost of SWH system
<u>-\$1,000</u>	HELCO Rebate
\$6,000	Balance after rebate
<u>-\$1,800</u>	30% federal tax credit (\$6,000 x 30%)
<u>-\$2,100</u>	35% State tax credit (\$6,000 x 35%)
<u>-\$ 300</u>	\$300 County tax credit
\$1,800	Balance after rebate and tax credits

If your SWH system saves your household \$50 per month through avoided energy costs, which is the typical monthly savings for a family of four, then it will take you 36 months or 3 years to repay the \$1,800 balance you spent on the system. Once the system is paid off, you continue to realize \$50 per month in savings for the lifespan of the system. Most systems are fully warranted for ten years with an expected lifespan of twenty years, provided the system is maintained properly, which translates to \$50/month for 7 years, or \$4,200 of savings. This level of savings does not include expected increases in utility energy prices, which increase the monthly savings for installing a SWH.

Low-Interest Financing

Most of us can see the logic behind installing a SWH system simply by doing the math. However, the system may still be out of reach due to the \$6,000 to \$8,000 price tag. Many Hawai'i residents cannot wait for the tax credits to write off the initial investment for the SWH system or they do not have the out-of-pocket money to buy the system. Zero or low-interest financing options are currently available through some private contractors who sell and install the SWH systems. At least one local contractor offers zero-percent financing for up to one year. Check the ads in your local paper for special financing offers.

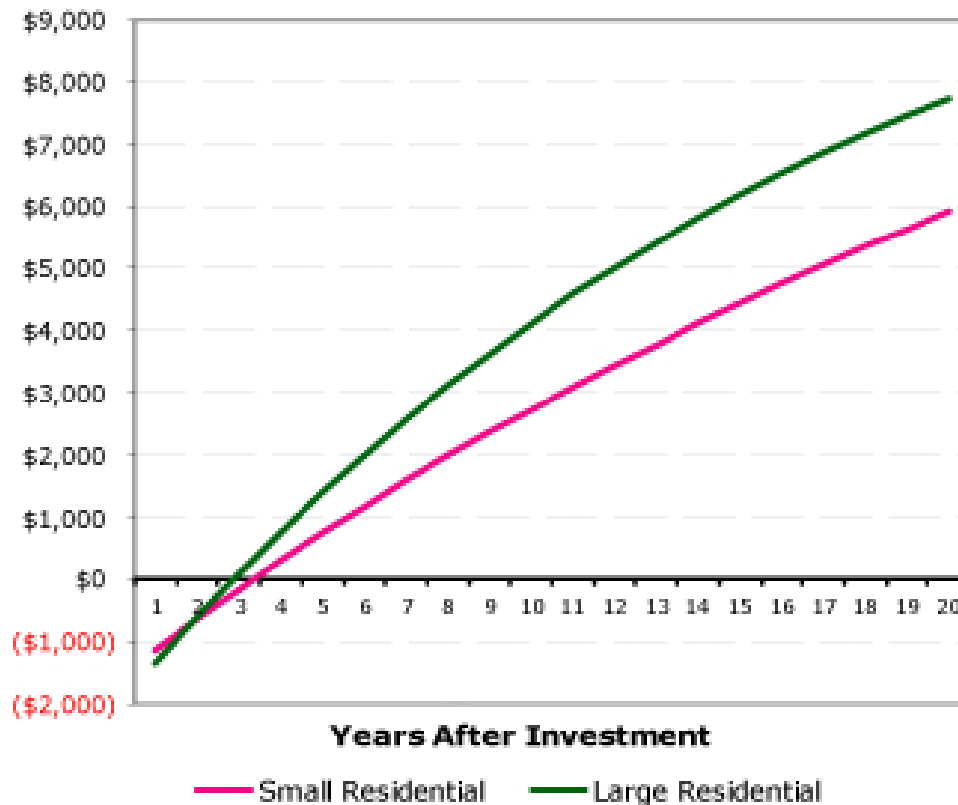


Image: An 80-gallon solar water heater tank, which serves households of one to four people, should pay itself off within four years under the right climatic conditions. A 120-gallon tank, which serves households of four to six people, can be expected to pay for itself in less than three years (see image above). Large systems require a greater initial investment, but they accrue more savings over time because of greater avoided electricity costs. Image and caption from the Hawai'i County Energy Sustainability Plan.

Low and middle-income homeowners may also be eligible for low-interest loans through the Residential Emergency Repair Program (RERP) administered by the County's Office of Housing and Community Development. The RERP program offers loans ranging from \$2,500 to \$25,000, at 3% interest over a term of 15 years. Solar hot water systems are allowable under RERP. Applicants age 62 or older may also be eligible for loan forgiveness amounting to 30% of the principal balance. Contact the Office of Housing and Community Development at (808) 961-8379 or download the 2008 RERP application online at http://www.hawaii-county.com/directory/dir_housing.htm.

We encourage you to look into these zero- and low-interest financing options, as the energy savings associated with solar water heaters are substantial.

Solar Saver Pilot Program

Another innovative financing mechanism available to residents on the islands of O'ahu, Maui and Hawai'i is the SolarSaver Program (SSP), a three-year pilot program to offer zero-interest loans to utility customers who install a new SWH system. Unlike other financing options, the SSP program is available to any residential homeowner, renter, or property owner. Customers select one of the utility-approved participating solar contractors to install the system, the utility pays the contractor for the SWH system, and the customer repays the utility over a term of up to 12 years.

The monthly payment on the loan is roughly equal to the energy savings provided by the system, so most customers will pay about \$50 per month. The loan is designed to allow the customer to break even each month: you save \$50 per month by installing a SWH, but instead of pocketing these savings, you pay \$50 to the utility to repay the cost of the system. Once your repayment term is completed, you pocket the monthly savings yourself. Repayments are made through a surcharge on your monthly electric bill, making this an extremely convenient program for participants.

Most SWH systems have a ten-year warranty on the tank and solar panels, if mandatory anode service is done in seven years. In addition to the standard warranty, under the SolarSaver Program most repairs are covered by an insurance policy purchased by the utility. The SSP system is covered by this policy for the duration of the loan period, not to exceed 12 years. If a problem occurs with the SWH system, the customer is instructed to contact the solar contractor who installed the system to arrange for necessary repairs. The contractor then submits their bill to the utility's insurance provider for reimbursement. The customer pays nothing for covered repairs.

The bad news is that the three-year pilot program, which started in mid-2007, is limited to 50 customers per year on Hawai'i Island. Solar contractors have

established wait lists for the available slots, and it is advisable to get on the list with your preferred contractor now, if you are interested in participating in the SSP program in 2009. To obtain a SSP application, call a participating solar contractor or contact HELCO at (808) 969-0162.

Net Metering Increases

If you have ever considered using solar energy to do more than heat your water, now is the time to act. Photovoltaic systems (PV) convert solar energy into power to run your electric appliances and your lights, and possibly even charge a plug-in vehicle. Off-the-grid PV systems store the energy produced in a bank of batteries, for later household use. Such systems are quite widespread in rural areas of Hawai'i Island, where utility hookups are not available. More recently, some utility customers have made the switch to solar power, to offset high utility costs or reduce their environmental impacts. Such customers have taken advantage of a law, which permits "net energy metering," or feeding the energy they produce back into the grid, as well as using energy provided through the grid by the utility.

Net metering PV systems capable of satisfying a typical household's energy needs cost about \$30,000 total, including solar panels, an inverter, meter and installation charges. Payback time varies depending on the financing terms, if any, and the household's typical usage, but a good estimate is about eight years for a family of four. In light of rising electricity costs, payback times are decreasing – making PV systems more desirable and increasing the local demand for such systems among solar contractors on the island.

The Public Utilities Commission (PUC) establishes the overall limits on how much energy individual residents on the island can generate and feed back into the utility's distribution grid. Up until March 2008, the cap on total power production by individual producers was 0.5 percent of HELCO's peak demand. In March, the PUC doubled this cap to allow power production of up to one percent of peak demand. Peak demand is approximately 200 MW; the new limits are therefore set at approximately 2 MW. The new rules announced in March also doubled the size of the generators allowed on Hawai'i Island from 50 kW to 100 kW.

Measurements of net energy produced are calculated at the end of a monthly billing cycle. PV systems produce energy during the day when the sun is shining, and the customer feeds excess power into the grid during daylight hours. A special electric meter installed on-site measures the difference between the amount of power produced on-site and the power supplied by HELCO, allowing the utility to calculate the total amount of energy used during the billing cycle. If the net metering customer produces more energy in the billing cycle than he or she uses, then he or she receives a credit on the monthly utility bill. This credit can be carried over for up to one year, allowing customers to utilize excess

generation in the summer months to cover any shortfalls in production during the shorter days of winter. At the end of the calendar year, any unused credits lapse and the cycle begins again.

If, for example, the customer's PV system generates 350 kW in a given billing cycle and the customer uses 330 kW of power supplied by HELCO during that same billing cycle, the customer will have a net credit of 20 kW to apply toward any shortfall in production in the following month(s). When the customer produces more energy than he or she uses, the utility charges its minimum monthly bill, currently \$22.16 per month.

Because the PUC has capped net metering generation at one percent of peak demand, one local solar contractor estimates that there is only enough capacity remaining on this island to install about 100 new PV systems. Net metering customers receive retail value for the electricity they generate, whereas independent power producers receive wholesale value for their power. Federal tax credits of 30% and State tax credits of 35% are also available for the purchase of a PV system. As with the SWH tax credits, any unused credits can be rolled over to subsequent tax years, until the credits are fully expended.

Table 4.1: State tax credits for renewable energy systems

	Solar Thermal Systems (e.g., Solar Water Heaters)	Wind Systems	Photovoltaic Systems
Single family	35% or \$2,250	20% or \$1,500	35% or \$5,000
Multi-family	35% or \$350/unit	20% or \$200/unit	35% or \$350/unit
Commercial	35% or \$250,000	20% or \$500,000	35% or \$500,000

Image: Table 4.1 from the Hawai'i County Energy Sustainability Plan provides a summary of State tax credits for solar thermal, wind, and photovoltaic systems, installed after July 1, 2006. After deducting any utility rebate, the lesser of the two values is applied to the State tax liability. Therefore, you must have a tax liability to get this credit, but it can be applied over multiple years to fully realize the maximum benefit.

For more information, contact your solar contractor or the PUC at Hawaii.PUC@hawaii.gov.

Mandatory Solar Water Heaters for New Construction in 2010

The Hawai'i State Legislature passed the nation's first law requiring the installation of solar water heaters on all new homes built in the state, effective in 2010. The cost of solar water heaters will be incorporated into the mortgage for the new home, adding \$6,000 to \$7,000 to the cost of the home – but saving the

homeowner several times that amount in avoided energy costs over the years spent in the home. Thus, the cost of living in the home is effectively reduced, making it more affordable in the long run.

This new law also stipulates that homes built after January 1, 2010 is ineligible for the 35% State tax credit for installation of a SWH. By removing the tax credit, State legislators are incentivizing builders to incorporate the cost of the SWH into their fixed costs that are included in the new home mortgage. The 35% tax credit will still be available for installation of a SWH on homes built prior to 2010; thus, providing a strong financial incentive to switch to solar water heating.