

CLEAN ENERGY

Supplement

OCTOBER 1, 2011



Achieving Hawaii's Energy Independence

By Estrella A. Seese

Acting Energy Program Administrator, State Energy Office

Hawaii is the most oil-dependent state in the nation with over 95% of its energy supplied by imported fossil fuel. This high dependence on imported fuels makes Hawaii's economy highly vulnerable to fluctuations in the price of oil often caused by factors that are beyond Hawaii's control. Every year, more than \$4 billion leaves our state to pay for

imported oil, monies that could be used to grow Hawaii's economy, create jobs, increase income, and generate tax revenues. Our electricity and gas bills are the highest in the country. Energy cost affects businesses and consumers, and all sectors of our economy. This is not sustainable. Reducing our need for imported oil and increasing our energy independence is imperative for Hawaii's future.

The Hawaii Clean Energy Initiative (HCEI), launched in 2008 as a partnership between Hawaii and the U.S. Department of Energy, provided a framework for reducing Hawaii's dependence on imported fossil fuels by at least 70 percent by 2030. Specifically, 40 percent of Hawaii's energy must be generated by renewable resources including solar, wind, geothermal, hydropower and biofuels and 30 percent through energy efficiency measures.

Everyone in Hawaii can help reach our 70% goal by saving energy at home and at work. Energy efficiency is the easiest way to decrease our

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CLEAN ENERGY SUPPLEMENT

ACHIEVING... (from page 8)

dependence on oil. There are many simple actions we can all take to save energy. There are cash rebates and tax incentives to put in solar water heating, which can typically cut residential electricity consumption by at least 30%. We also have very generous tax credits for installing photovoltaic systems (PV) in homes and businesses, and we have a well established Net Energy Metering Program that makes PVs very cost-effective. More rebates are available for energy-saving lights, energy efficient appliances, and other energy efficiency equipment offered through Hawaii Energy (www.hawaiienergy.com).

Hawaii is blessed with abundant renewable energy resources such as the sun, wind, and waves. However, there are some issues, like financing and community concerns, that we need to carefully address in order to harness these resources for the benefit of all of Hawaii. Our role at the Energy Office of the State Department of Business, Economic Development, and Tourism (DBEDT) is to facilitate and

encourage the development and deployment of renewables through innovative policies, facilitation of siting and permitting of renewable energy projects, and as the repository of energy information. We also promote and enable increase energy efficiency savings to the maximum extent possible.

During the past two years, we were fortunate to receive \$37.1 million in federal stimulus funding under the 2009 American Reinvestment and Recovery Act (ARRA), which we invested in energy efficiency rebate programs across the state, electric vehicle (EV) infrastructure, energy efficiency improvements to state buildings, and research and development to address barriers to renewable energy adoption. For instance, with the ARRA monies we provided rebates to replace over 4,300 old refrigerators across the state with new Energy Star refrigerators saving approximately 42.8 million kilowatt-hours throughout the estimated 12-years useful life. This is enough to power about 6,000 homes. In addition, we provided rebates to over 1,975

homes to install solar water heaters, generating approximately 61.2 million kilowatt-hours savings over the estimated 15-years useful life. This is enough to power another 8,500 homes. Furthermore, more than 400 low-income and Hawaiian Homestead residences received energy-saving CFL lighting retrofits. We also provided grants for electric vehicle chargers and education programs to facilitate the adoption of EVs. Hawaii has been chosen by several companies like Mitsubishi and NISSAN as launch sites for their EVs. To help with financing, we set up a loan loss reserve program to help lower loan costs for homes and businesses who want to install solar water heaters and other energy-saving equipment.

The state government, as the second largest user of energy, has implemented the Lead by Example program to reduce state facilities' energy consumption through energy efficiency measures, performance contracting, and purchase power agreements with third-party renewable energy developers. Since 2007, the state

facilities' electricity consumption has decreased by 59 million kWh, enough to power 8,200 households for a year. Last year alone, our state offices saved \$20 million on their electric bill, a 12% savings to tax payers. Recently, Hawaii placed in the top five for exceptional state-led energy efficiency programs recognized by the American Council for an Energy-Efficient Economy (ACEEE).

On the policy side we continue to work on facilitating some major initiatives to help Hawaii's transformation to clean energy. The amount and speed of deploying renewable energy is very much dependent on our ability to reduce or remove the physical and institutional barriers to allowing more renewable generation while safeguarding the stability and reliability of our island electric systems.

We are pleased to announce that we are on target towards our goal. Last year we surpassed our interim renewable portfolio standards goal of 10% by 2010, and achieved slightly over 20%. We are recognized nationally and internationally as an ideal test bed for

renewable energy development and some of our most innovative clean tech companies are already exporting their technology and expertise. We are number one in the nation in the number of solar water heaters with one out of every four homes in Hawaii having solar water heaters. We are second in the nation in PV penetration per capita (solar watt per capita) and third in the growth of green jobs. More than 60 renewable projects are currently being proposed throughout the state, ranging from biofuel farms to additional wind, geothermal, PV and waste-to-energy facilities.

There are many hurdles to overcome to transform Hawaii to a clean energy economy in a generation. We will need all available resources to reach our 70% clean energy goal. It's in everyone's best interest to contribute towards Hawaii's goal. If we can all do our part to conserve energy and support the development of more locally produced clean renewable energy, then together we can ensure and secure Hawaii's energy future for future generations.

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HAWAII MOVING TOWARD CLEAN ENERGY FUTURE

By Senator Mike Gabbard, Chair, Senate Committee on Energy & Environment

Want to hear a sad statistic? Each year we send \$3.6 billion dollars overseas to buy over 40 million barrels of oil to light up our homes, drive our cars, and keep our jets fueled to bring in tourists. This is absolutely absurd given the fact that Hawai'i has so many renewable natural

resources built in. We have abundant sunshine, great wind, powerful ocean currents, underground pools of magma on the Big Island and Maui, and fantastic growing conditions for biofuels. Yet, we're more dependent on fossil fuels than any other state in the nation. This is unacceptable!

I took over as Chair of the Senate's Energy and Environment Committee in 2009.

Since assuming this post, I've made it my mission to get Hawai'i to kick its addiction to imported fossil fuel by exploring every avenue for energy efficiency and utilization of renewable energy resources.

Many of you may know that our state launched the Hawai'i Clean Energy Initiative (HCEI) in 2008 with the goal of having 70% of our energy needs met through energy efficiency and renewable energy by 2030. This is a lofty goal, but it's attainable if government, our utilities, the private sector, and each of us in the community continue to focus on making Hawai'i a leader in cutting edge clean energy technology.

One of the highlights of my job is visiting with homeowners and businesses that have put photovoltaic (PV) panels and solar water heaters on their rooftops to lower energy costs. It's true that the upfront costs can sometimes discourage people from making these very important in-



Senator Mike Gabbard (center) helped install a photovoltaic solar panel on the roof of a home in Hickam Air Force Base on July 15th. The 4MW photovoltaic solar system will supply power to 2,000 homes in that community. | Photo by Hickam Communities

vestments. However, you should know that both homeowners and businesses in our state can take advantage of tax credits and rebates to make both PV and solar water heaters more affordable.

One bright spot from this past legislation session was Act 204. This new law directs the Public Utilities Commission (PUC) to investigate an on-bill financing program for residential electric utility customers to finance energy efficiency or renewable energy systems and pay for them through their regular monthly electric bills. The PUC is currently doing the study and may implement on-bill financing in the coming years.

SunRun and SolarCity have also entered the Hawai'i market recently. These companies actually lease PV systems to homeowners at a fixed monthly cost. This arrangement was made possible by legislation I authored in 2011 which became Act 9.

Our state ranks first in the nation in PV capacity installed per capita. But we've got a long way to go, because out of the 267,000 single family homes in the state, only 5,000 currently have PV. At the Legislature, we've worked to make sure that we've kept incentives in place

during our economic downturn. The state Renewable Energy Income Tax Credit provides up to 35% of the actual cost with the following caps:

- \$5,000 per PV system for a single family house
- \$350 per unit per system for multi-family residential
- \$500,000 per system for commercial system

Folks are also eligible for federal tax credits that cover 30% of the cost. However, this one is set to expire at the end of 2016.

We also rank first in the nation in solar water heaters per capita. To date, there are close to 100,000 residential systems installed. We were also the first state in the nation to pass a law in 2008, which mandates that all new single family homes have solar water heaters. Our tax credit for solar water heaters is up to 35% with the following caps:

- \$2,250 per system for single-family house
- \$350 per unit per system for multi-family residential
- \$250,000 per system for commercial property

Please bear in mind that you can also qualify for a federal *(continued on page 8)*



Solar water heater | Photo by gnomits

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3rd Annual Asia-Pacific Clean Energy Summit and Expo

KAKALATAK
By Carolyn Weygan-Hildebrand

On the last day of the 2011 Asia-Pacific Clean Energy Summit, Mayor Jason Hu of Taichung (Taiwan) received a standing ovation for reciting statistics of achievement that spelled "HOPE!" Sandwiching wit and humor between statistical data, he masterfully convinced the hundreds of Summit participants that Taichung made significant strides in managing waste, greening urban spaces, lengthening bikepaths, increasing public transport ridership, multiplying public participation in cultural events, and more. His city is using its new status as an eco-city to bring in business and investments. His keynote message was all about what his city achieved in ten years and how it plans to move forward. Signaling that it is the city of the

future, Taichung is seeking the right to host the 2017 East Asian Games. To win, it is offering something competitors are not offering, and that is, a vow to reduce the 10-day event's carbon footprint from 3,700 tons of carbon dioxide by 3,000 tons.

"How do you do it?" I asked after his speech. "I have a smart and educated community," he said. "You have to work on making everyone understand what it is that you are doing."

There is no way around smartness when dealing with clean energy and sustainability. Hawaii's goal of 70% clean energy by 2030 - 40% from renewables and 30% from efficiency - is a statement that distills the extreme complexity of harnessing renewable energy from different sources, integrating and storing the generated energy, distributing and converting for consumer use, and improving overall efficiency.

On one end, the four Hawaii mayors and their sister cities had reassuring information. They talked of



ground-level and commercial products like solar installation, green buildings, and electric vehicles. They also reported that commercial production of energy from geothermal and waste is generating supply that replaces imported oil.

On another end, the 2011 Defense Energy Challenge offered possibilities for the more distant future. The US Military signaled that they were looking for good ideas from everywhere; The National University of Singapore was selected to present a cooling technology solution that has a promising Defense application. The future can dramatically be different, California

Energy and Power presented its vertical axis wind turbines, the looks of which are nowhere like the wind turbines as we know them today.

In between the two ends were hard-hitting Summit sessions about challenges and opportunities involving innovation, funding, policies, regulations, markets, communication, environment, and others. The 2011 Summit organized its program to let its participants huddle around five areas - efficiency and sustainability, renewable energy, infrastructure, policy and economic development, and military. In a session on funding disruptive innova-

tion, attendees learned that venture-capitalists like products that are ready for commercialization. Participants who were just developing ideas need federal government financing. The State of Hawaii recognized that it did not have a lot of money. Instead, Senator Roslyn Baker of Maui talked about policies designed to spur the growth of environmentally- and socially-responsible businesses.

In a session of entrepreneurs, technology leaders were asked to share their secrets; Darren Kimura of Sopogy explained that doing business in Hawaii means dealing with both policy and business, a model that requires new thinking; Heidi Kuehnle of Kuehnle AgroSystems shared the exciting future of energy from algae, business viability from integrating different renewable sources, and the need for human resource expertise in helping workers change from researchers to commercial producers; Bob King of Pacific BioDiesel talked about stabiliz-

(continued on page 5)

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Geothermal Energy Binds Big Island and Ormoc as Sister Cities

By Carolyn Weygan-Hildebrand

Hawaii Convention Center, Honolulu. A new sister-city relationship was born because of a shared interest in geothermal energy, a renewable energy that the Philippines wants to be the world's number one producer of.

The County of Hawaii and Philippines' Ormoc City, represented by their respective mayors, recently signed a sister-city agreement. The agreement was one of four sister-city agreements included in a September 14 signing ceremony luncheon of the inaugural Hawaii Sister-Cities Summit. The three other sister cities were Honolulu and Chengdu (China), Kauai and Iwaki (Japan), and Maui and Goyang (South Korea). The eight cities and/or counties share a common interest in cleaner energy solutions for their respective communities. The sister-city relationship agreements are internationally accepted standards upon which closer economic, business, and cultural exchanges between two foreign cities are promoted.

Hawaii County Mayor, Billy Kenoi, cited similarities of

the two places - in population, economic needs, and growing pains. "One thing intriguing and exciting is that the County of Hawaii produces 30 megawatts of geothermal power annually and leads the State in geothermal production," he said. "My friends from Ormoc City have the privilege and honor of producing 770 megawatts of geothermal energy. I believe they hold the key for the future of Hawaii county and the State of Hawaii in maximizing geothermal production while still preserving the culture, the environment, the community, and the quality of life for residents."

Ormoc Mayor, Eric Codilla, expressed appreciation for the invitation to be a sister city. He says that he once had the impression that invitation to become a sister city was reserved for big cities only. "We will try to finish with a sustainable agreement not only in geothermal," he responded, "but also in governance as well as culture and anything else."

The Energy Development Corporation led by its manager, JoseMaria Hernandez assisted Mayor Codilla in showcasing the geothermal operations that is spurring economic growth in Ormoc City. A video presenta-



Ormoc City Mayor Eric Codilla delivers his speech at the September 14 Sister Cities Signing Ceremony Luncheon at the recent Asia Pacific Clean Energy Summit and Expo in Honolulu. | Photo Credit: usgs.gov

tion revealed an operation that is massive --e.g. large interconnecting distribution pipes dwarfing the surrounding forest trees and vegetation. It also revealed a corporate operation that did more than geothermal production- e.g. The company distributed school supplies to children, improved community health facilities and training of health workers, introduced livelihood opportunities to adults, and preserved forest biodiversity.

Geothermal means heat (thermal) from the earth (geo) and can be and already is accessed by at least 78 countries for electricity, spas, space heating, greenhouse and agriculture drying, cooling and snowmelt-industrial and others. Geothermal resources range from shallow ground to hot water and rock several miles below the earth's surface, and even farther down. It is a thermal energy that is clean (emits little or no greenhouse gases) and can be and already is accessed by drilling water or steam wells. Hawaii and the Philippines are both situated in the Pacific Ring of Fire - an arc stretching from New Zealand, East Asia, Alaska, and North and South America that has 75% of the earth's volcanoes and an acknowledged hotspot for geothermal resources.

At a separate panel discussion hosted by the Asia Pacific Clean Energy Summit and Expo, Geothermal Association

of the Philippines trustee Fernando Penarroya stated that the Philippines wants to overtake the United States as the number one producer of geothermal electricity.

According to International Geothermal Association 2010 data, the top countries in installed capacity are: US (3,086 Megawatts or MW); Philippines (1,904); Indonesia (1,197); Mexico (958); Italy (810.5); New Zealand (628); Iceland (575); Japan (536); Iran (250); and El Salvador (204).

Based on Penarroya's presentation, the current capacity of the Philippines comes from Tongonan, Leyte Province (722 MW or megawatts), Mt. Makiling-Banahaw, Laguna-Quezon Provinces (458 MW), Tiwi, Albay Province (289 MW), Palinpinon, Negros Occidental Province (192 MW), Bacon-Manito, Albay/Sorsogon Province (151.5MW), and Mt. Apo, North Cotabato/Davao Provinces (108 MW), and Northern Negros, Negros Occidental (49 MW).

Future production may come from areas that are currently in pre-production stage or feasibility assessment stage.

The areas are: Kalinga (60MW); Bontoc-Sadanga, Mountain Province (80 MW); Buguias-Tinoc, Benguet/Iligao (60 MW); Daklan, Benguet (60 MW); Acupan, Benguet (20 MW); Natib,

Bataan (40MW); Maibrara, Laguna (20MW); Mabini, Batangas (20 MW); Montelago, Oriental Mindoro (40 MW); Biliran, Biliran (20 MW); Mt. Cabalian, Southern Leyte (80MW); Sta. Lucia-Iwahig, Palawan (1 MW); Mainit, Surigao del Norte (30 MW); Amacan, Compostela Valley in Davao Region (20 MW); Mt. Labo, Camarines Sur (65 MW); Isarog, Camarines Sur (70 MW); and Mt. Bulusan, Sorsogon (40 MW).

Geothermal energy is replacing imported oil without a doubt; The Big Island derives 20% of its current electricity needs from geothermal energy recovered by the Puna Geothermal Venture, a part of the publicly-listed Ormat Technologies Inc; The Philippines derives 27% of electricity from the various geothermal plants owned by Energy Development Corporation and Chevron Geothermal Philippines Holdings Inc. However, geothermal has a long way to go. It needs investors, technology research and development, clearer and more transparent regulatory policies, education, and stakeholders' buy-in. Michael Kaleikini of Puna Geothermal Venture, talked about creating a position whose sole task is communication with stakeholders; Penarroya believed that there are better solutions now to some stakeholders' concerns- e.g. clearer laws with respect to indigenous rights, and vertical drilling technologies that are less intrusive on surface environments.; Kasumi Yasukawa of the National Institute of Advanced Industrial Science and Technology of Japan explained that after the March 2011 earthquake, the Japanese government is finally revisiting geothermal energy again after decades of favoring nuclear energy.

For the Philippines, at least, one looming issue is the implementation of Philippine Renewable Energy Act of 2008 and the entry of 100% foreign-owned corporation in the geothermal industry.



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CLEAN ENERGY SUPPLEMENT

TEN REASONS WHY NUCLEAR ENERGY IS NECESSARY FOR ANOTHER 50 YEARS

By Panos D. Prevedouros

Energy is the fundamental element to a nation's prosperity. This realization is more critical for developing economies.

I summarize below ten key reasons why nuclear energy is necessary for cities and regions that anticipate growth in one million people increments. Many areas worldwide fit this growth profile including several in the Philippines.

- 1) World population was 3 Billion in 1960, 6 Billion in 1999 and expected to be 9 Billion in 2046. Population growth and improving standard of living globally demand increasing amounts of energy. Energy production must roughly double in the next 30 years to accommodate demand.
- 2) Fossil fuels are being depleted, are not renewable and carbon taxes or pollution limits incentivize low carbon power production alternatives, one of which is nuclear.
- 3) The post WWII rapid growth of 1st world countries was facilitated in large part by electric power plants of various types and sizes.

Many of them are past 50 years of age and need replacement.

- 4) China alone is growing very fast and a major bottleneck of its growth may become the supply of electric power. Mopeds are electric in its large cities and BYD and CODA are selling full-featured electric vehicles. China is one of a few nations with no apparent hesitation for the deployment of nuclear energy.
- 5) Uranium as a fuel has advantages: It is relatively abundant, it does not cost much, not a lot of it is needed to fuel nuclear reactors, and supply comes from stable countries such as Australia and Canada. It is only mildly radioactive and its alpha radiation does not penetrate the skin. Uranium metal is commonly handled with gloves as a sufficient precaution.
- 6) Large nuclear power plants provide vast amounts of power, typically over 1 GW which is 1,000 megawatts. One 1.5 GW plant can cover the needs of a 1st world city of about one million population. Its impact on land and other earth resources is very small compared to many other clean energy sources such as hydro-



An explosion ripped through Unit 3 of the Fukushima Dai-ichi Nuclear Power Station in northeastern Japan and destroyed the roof of a reactor building. Photo credit: <http://greatpowerobserver.blogspot.com>

- 7) Familiarity: By 2010 there were 440 nuclear power plants in 31 countries supplying about 15% of the world electric power. Also, there are hundreds of naval vessels with compact nuclear reactors. This count does not include the Bataan nuclear power plant in Luzon, Philippines which was constructed at a cost of over \$2 Billion but was never fueled and put into operation.
- 8) Earth is on an unsustainable energy trajectory and the development of a disruptive and affordable new energy is essential for the billions of peoples on the planet and particularly in fast growing China, India, Indonesia and Nigeria. Add the U.S. (~500 million) and the Philippines (~200 million) to those four and their combined population projection for 2100 reaches 4 Billion!

voltaic and wind.

- 9) Normal safety: Current nuclear plant designs have many more safety features than the 1950s-era power plants that exhibited critical problems in Pennsylvania, Russia and Japan. Here is an example of a late 1980s nuclear reactor that shut down recently because it auto-detected some equipment failure (http://www.huffingtonpost.com/2011/04/22/us-nuclear-reactor-shuts-down-georgia_n_852515.html).
- 10) Catastrophe scenario: The Fukushima Daiichi nuclear power plant failure is a great example of resilience. Whereas nature's force and infrastructure failures in the 9 R earthquake on March 11, 2011 (Tōhoku earthquake) claimed over 30,000 lives, this major nuclear power plant accident had no fatalities. The plant designed with 1950s technology and

built for an 8 R earthquake actually withstood an earthquake that was 10 times stronger. Flood water from the powerful tsunami jumped over the 25 ft. protective sea-walls and drowned the external diesel generators used to circulate water and cool the reactors. Because of the surrounding catastrophe, nobody was able to fix this external power system. After the 8-hour backup batteries ran out, cooling stopped and partial meltdown commenced. TEPCO Power Company is "making every effort to enable evacuees to return to their homes and for all citizens to be able to secure a sound life."

Without adequate and affordable power community well-being cannot be supported. Power fundamentally affects our basic needs such as water distribution, sanitation, food production and transportation. Until a feasible and affordable breakthrough is achieved in the energy field, nuclear energy is a major option for large populations because of its cost per MW, safety and near zero carbon emissions.

PANOS D. PREVEDOUROS is professor of Civil Engineering, University of Hawaii at Manoa (pdp@hawaii.edu)

SUPPORT FOR A CLEAN ENERGY FUTURE STARTS WITH ALL OF US

Special to the Hawaii Filipino Chronicle
By Peter Rosegg, HECO Communication Specialist

We have a problem. In Hawaii, like many places around the world, we depend too much on oil. Almost all our energy for air, ground and sea transportation AND electricity comes from oil. In other places, oil is used mostly for transportation while primarily other fuels -- coal, natural gas, hydro or nuclear power -- produce electricity.

All the oil (plus a little coal) we use must be shipped in over very long distances, mainly from Asia and the Middle East. Among major fuels, the cost of oil is the most unstable and we have no control over these prices.

Further, climate change poses a serious threat. For an island state where we live near shorelines, the potential impact if sea levels rise or storms get worse could be devastating.

But there are solutions. We

can become less dependent on oil. It starts with all of us as individuals.

First, look around our homes and businesses to find ways to use less electricity and use it wisely. Try simple changes such as installing compact fluorescent bulbs and using power strips to turn off electronic equipment when not in use. Adjust the water heater or the air conditioner to a comfortable setting that will save energy and money.

When it's time to replace appliances such as refrigerators, dish washers, clothes washers and dryers, or electronics such as televisions and DVD players,

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CLEAN ENERGY SUPPLEMENT

WHAT YOU NEED TO KNOW ABOUT GREEN JOBS

By Carolyn Weygan-Hildebrand

The Hawaii Clean Energy Initiative and the quest for 70% clean energy by 2030 have exponentially increased the interest in “green jobs” in the islands. In April of this year, the Department of Labor and Industrial Relations’ Hawaii Green Jobs Initiative was presented to the public as a workforce development initiative that intends to support Hawaii’s 2030 Clean Energy Goal. Preliminary green labor market information was explained to the public at job fairs, clean energy day events, media, and other forums.

The five things to know about green jobs are:

#1 Green job have no one universal definition. Statisticians and analysts have to start somewhere to begin to understand a job phenomenon. Hawaii’s first baseline survey of green jobs in Hawaii used a working definition that met U.S. Bureau of Labor Statistics (BLS) guidelines. Many other States adopted the same guidelines. When employers were asked to tell the DLIR whether they had green jobs and workers, they were asked to define “green job” as one that’s

directly engaged in:

- G-generation of clean, renewable, and sustainable energy;
- R-reduction of pollution and waste;
- E- Energy efficiency (reduce the amount of energy used to produce a unit of output);
- E-ducation, training, and support green workforce development; and/or
- N-natural, Sustainable, Environmentally-Friendly Production.

For purposes of estimating the number of green jobs, support staff are included as “green” when a business is 100% green (one or more of the above). When a job containing green responsibilities is performed on a part-time basis, it is considered “green” when the responsibility occurs on a recurring basis. If an economic activity is known to be environmentally harmful, then any job associated directly would not be classified as green.

(Source: Volume 1-Hawaii Green Workforce: A Baseline Assessment, 8-9).

#2 Green jobs are not work that has to do with farming and gardening only. Green jobs are found in different industries. Many attendees of a recent

JobQuest associated green jobs with farming and “aina” only. The December

2010 baseline survey of private sector employers shows that the construction industry had the most green jobs followed by retail & wholesale trade industry. This excludes a category called “Others” which actually had the most green jobs. Chart 1 offers a projection of where the green jobs will be based on the December 2010 baseline survey.

(Source: Volume 2-Hawaii Green Workforce: Beyond the Baseline-Hawaii Green Jobs Outlook, 5)

#3 Not all green jobs are new jobs. The biggest misconception about green jobs is the idea that all green jobs are new jobs. Only two of the top 20 green occupations in the construction industry could be classified as green, new, and emerging occupations. Most are classified as “green increased demand occupations” which means that there are old jobs that will increase in number on account of green activities.

Occupation	2010	2015	2020	2025	2030	2035	2040	2045	2050	
Agriculture, Forestry, Fishing, and Hunting	278	6,462	495	331	707	382	919	434	1,229	485
Construction and Maintenance	3,330	28,843	4,796	3,950	6,825	4,874	8,280	5,288	9,450	5,518
Manufacturing	347	13,498	398	366	443	378	487	385	529	393
Wholesale and Retail Trade	389	28,311	401	412	420	442	426	462	425	475
Health Care and Social Assistance	1,494	84,805	1,641	1,561	1,838	1,633	2,014	1,701	2,186	1,761
Finance, Insurance, and Real Estate Services	98	27,474	-	-	-	-	-	-	-	-
Health Care and Social Assistance	183	18,885	202	192	225	204	249	216	272	226
Accommodation and Food Services	174	88,879	276	204	384	236	496	267	611	299
Services	4,854	128,006	5,717	5,271	6,617	5,680	7,506	6,050	8,347	6,359
Total Private Industry	11,448	468,824	14,348	12,188	16,833	13,348	19,888	14,333	22,796	14,283

Chart 1. Twenty-Five New and Emerging Green Occupations Identified by O'NET Source: www.greenjobshawaii.org

Others are classified as “green enhanced skills occupations” and this means that there are old jobs whose skills and knowledge have been altered. Designs, processes, and materials result in a significant change to the work and worker requirements of an existing jobs.

“Solar Installers” are listed as green, new and emerging occupations. “Construction carpenters” are listed as green, increased demand type and “Architects” are listed as “green enhanced skills occupations.” (Source: Volume 3-Hawaii Green Workforce: Beyond the Baseline-Training Gap Assessment, 50-51)

#4 Green jobs are not only for those who can study engineering and technology. The national database of occupations called O'NET offered profiles of 25 new and emerging occupations. Not all the emerging jobs were engineering or technician jobs. It is true though that these emerging jobs require training beyond high school. Interested individuals must know that good

standardized training may not always be readily available. All future work will not be green jobs but every workplace will expect employees to have “sustainability” skills and abilities such as ability to reduce and recycle paper, buy more energy efficient equipment, use-solutions to communicate, and others. (Source: Hawaii Green Workforce: Green Occupational Profiles)

#5 Green jobs can only get better and clearer. Green jobs are like information technology (IT) jobs in the 1990s when the internet and world wide web exploded. Then, the accounting of IT jobs was problematic. Accounting for green jobs will go through some growing pains, too. Shortly the website, www.hiwi.org, will be presenting a summary report called, “Projected Green Jobs.” Meanwhile, two recently launched portals, greenjobshawaii.org and seshahawaii.org, have information about green jobs (job ads) and green training.

Hawaii's Green Workforce Will Become Greener

As the State of Hawaii focuses on the goal set forth by the Hawaii Clean Energy Initiative (HCEI) of reducing its dependency on imported oil from 95 percent to being 70 percent reliant on renewable energy by 2030, the “greening” of Hawaii’s workforce plays a major role in the achievement of this objective. According to a green jobs survey conducted by the Department of Labor and Industrial Relations’ Research and Statistics office in 2010, the long term outlook for the green workforce in Hawaii remains very optimistic. The number of green jobs is anticipated to expand from 11,445 to 14,253 or possibly go as high as 21,766 by 2018. This means that growth is expected to reach at least 28 percent and could more than double over the next seven years. Only some of the findings from the 2010 Hawaii Green Jobs Survey are presented in this analysis. For more detailed information regarding the survey, refer to the publication titled “Hawaii’s

Green Workforce – Beyond the Baseline” on the HIWI website at www.hiwi.org.

Results from the survey indicate that growth in Hawaii’s green jobs sector will vastly outpace the total overall growth rate of nearly all private jobs statewide. Annually, green jobs are projected to expand by at least 3.5 percent through 2018 and could rise as much as 13 percent, compared to 0.7 percent for the state as a whole. Green workers in nearly all private industry sectors, with the exception of finance, insurance, and real estate, will experience growth well above their respective industry averages. Even industries that are forecasted to decline over the long term such as the agriculture, forestry, fishing, and hunting industry group as well as the manufacturing industry will see a rise in the creation of green jobs from 2010 to 2018.

Industry	Green Jobs Employment			Long Term Projections				
	2010	2015	2018	2015	2018	2018		
Agriculture, Forestry, Fishing, and Hunting	278	1,120	38	485	9.1%	6,750	6,580	-0.2%
Construction & Mining	3,330	8,450	21,518	8,158	8.1%	15,500	16,200	4.0%
Manufacturing	347	1,587	875	389	8.3%	4,800	14,000	11.0%
Transportation, Warehousing & Utilities	389	420	12%	472	2.1%	29,440	32,230	0.6%
Health & Welfare Services	1,494	5,188	8.1%	731	2.2%	21,500	21,110	-0.2%
Finance, Insurance, & Real Estate	98	27,474	0.1%	220	2.2%	84,300	78,600	1.9%
Health Care & Social Assistance Services**	183	274	5.1%	220	2.2%	84,300	78,600	1.9%
Accommodation & Food Services	174	31,425	200	204	0.2%	28,000	28,000	0.0%
Other Services	4,854	8,347	9.0%	6,359	3.3%	29,230	27,410	0.6%
Total Private Industry	11,448	22,768	13.8%	14,253	3.8%	381,550	428,830	9.7%

*The number of green jobs is greater than zero but less than ten.

**Long term projections include government.

Chart 2. List of emerging jobs www.greenjobshawaii.org

Engineering Technologists

Energy Auditors
Energy Engineers
Fuel Cell Engineers
Fuel Cell Technicians
Geospatial Information Scientists and Technologists
Geothermal Production Managers
Geothermal Technicians
Manufacturing Engineering Technologists
Manufacturing Engineers
Manufacturing Production Technicians
Photonics Engineers
Precision Agricultural Technicians

Recycling and Remediation Workers

Regulatory Affairs Managers
Regulatory Affairs Specialists
Remote Sensing Scientists and Technologists
Robotics Engineers
Solar Panel Installers
Supply Chain Managers
Validation Engineers
Weatherization Installers and Technicians
Wind Energy Engineers
Wind Energy Operations Managers
Wind Energy Project Managers
Wind Turbine Technicians

Note: O'NET or Occupational Information Network is the primary source of occupational information. See onetsource.org. This list should not be interpreted as green jobs that are currently available in Hawaii.

CLEAN ENERGY SUPPLEMENT

3RD ANNUAL... (from page 4)

ing supply and trying different biofuel sources including sunflower.

Handouts from sessions I missed show that more complexity looms ahead; Ocean cables to interconnect the different islands are not new but Request for proposals to get contractors working on the project have to be carefully crafted; Construction of facilities like a BioFuel Plant will require over 100 permits and counting; Solar energy supply is not stable and mathematical formulas, guiding policy and regulations are among the most complex ones that have ever been presented to a non-

technical audience.

Finally, Ben Taub of the Global Cleantech Cluster Association lists a few more trends with low impact on green businesses until 2015- shortage of skilled workers will become more severe; sustainability is widely integrated; production of biodegradable synthetic materials; true behavioral change of society; "carbon-free" power sector industrialized countries; and others.

We know that clean energy is "pono" and there is no turning back to oil dependency. The Summit simply reminded that being "pono" has to be accompanied by lots of smartness!

SUPPORT... (from page 6)

look for the ENERGY STAR® label which signifies a rigorous energy efficiency standard. Hawaii Energy (www.hawaiienergy.com) can offer advice and rebates for Hawaii residents and businesses.

Hawaiian Electric also offers free guides for our customers. Power to Save and 101 Ways to Save lists handy tips to help save energy around our homes; Ways to Save at Work features easy-to-follow workplace tips we all can use; and Power to Save for Small Business can help employers and employees boost energy conservation. More information is available at www.heco.com.

Maybe you're already conserving energy at home and at work. What more can you do to support a clean energy future

for Hawaii? You can learn about Hawaii's clean energy initiatives and new developments in technology taking shape both in Hawaii and around the world that will allow us to sustainably harness our natural resources.

Hawaiian Electric launched a Hawaii's Energy Future (www.hawaiisenergyfuture.com) campaign several years ago to help consumers understand the changing face of the energy industry and share what the company has been doing to move towards a clean energy future for Hawaii. The site offers information on biofuels, biomass, solar, wind, geothermal, waste-to-energy, ocean/wave energy, smart grid and electric vehicles, and features the latest developments in Hawaii. Website visitors are encouraged to ask questions

HAWAII... (from page 2)

eral tax credit of up to 30% and a \$750 rebate from Hawai'i Energy, which is the entity that manages the public benefit fee you pay each month on your HECO bill.

I'm one of the lucky ones who purchased an all-electric Nissan Leaf in April of this year. I can't tell you how great it is not having to worry about the high cost of gas. Our state also allows electric vehicles to be exempt from HOV/Zipper lane regulations and not have to pay state and county parking meters. Here are some of the policies in place to make an



Nissan Leaf electric car

- electric car affordable for you.
- \$7,500 federal tax credit for the purchase of an electric car (doesn't expire until car manufacturers sell 200,000 of their electrical vehicles)
- \$4,500 state tax credit for purchase of electric car

(have to apply by Jan. 2012)

- \$1,000 federal tax credit for electric charging station
- \$500 state tax credit for electric charging station

As you can see, there are some great programs that can help you make the switch to reduce your electricity bill and leave the gas pump behind. We, as elected officials, can talk until we're in blue in the face about how great these programs are, but it's going to take you buying in to make Hawai'i a world leader in clean energy.

through a comment link.

Hawaii has a lot of decisions to make and actions to take for our clean energy future. It won't be fast or easy. There will be questions, debates, even arguments. Will we accept more renewable energy projects on Oahu, including more wind and solar, even when we can see it around us? Will the Big Island and maybe Maui get more geothermal energy, tapping the heat of the earth for power? Can we boost agriculture in Hawaii, growing more of our own energy crops on lands now vacant on all islands? Can we move renew-

able energy and fuel from the Neighbor Islands (which have a lot of renewable resources) to Oahu where the demand for electricity is greatest? Will we pay for the investment needed to make these islands better for our children and grandchildren?

You can step up and get involved in the public discussion. Go to a meeting; write to the newspaper; ask politicians about it when they come to the door asking for your vote. Achieving Hawai'i's clean energy future is a journey. We all have a part in that journey.

CLEAN ENERGY FAIR

October is Energy Aware-

ness Month and in celebration, Hawaiian Electric Company will present the "Clean Energy Fair" on Saturday, October 15, 2011, 10 a.m. to 3 p.m. at Pearlridge Center, Uptown Center Court. This free family fun event features interactive displays on clean energy topics; energy games and prizes; live entertainment by Mad Science of Hawaii, Na Hoku Hanohano Award-winning recording artist Hoku Zuttermister, and Kapolei High School's Polynesian Club. For more information, call 543-7511 or visit www.heco.com.

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CLEAN ENERGY SUPPLEMENT

Simple Ways to Conserve Energy at Home

by Gregory Bren Garcia

In the past, we wanted to use of energy was associated with industrial might, ingenuity, and the triumph of the human spirit over nature. But just around four decades ago, people began to realize the terrible effects of unrestricted anthropogenic activities, including humanity's insatiable appetite for energy. Whereas before, people labored under the delusion that they are separate from nature, today they understand that they, too, are but a part of the proverbial circle of life. At present, there is still much debate about just how much the human civilization's demand for energy affects our planet's climate. In fact, there are people who choose to go against what mainstream scientific literature says about the greenhouse gases' role in climate change. But what these people still fail to appreciate is the fact that conventional energy sources nevertheless cause pollution, and more importantly, they are finite. Climate change or no climate change, we still have to deal with the social, economic, and environmental costs of pollution, and we also still have to sort out how we are going to cope with the inevitable depletion of our fossil fuel reserves.

According to data from The World Factbook, the U.S. remains as the world's largest consumer of oil, burning around 18.7 million oil barrels per day. The U.S. consumes way more oil than the world's second largest consumer, China, which uses 8.2 million oil barrels per day. Furthermore, the U.S. trumps even the entire European Union, which consumes just 13.7 million oil barrels a day.

In terms of electricity usage, Americans use a total of 3.74 billion megawatt hours of electricity per year, second only to China's consumption of 4.19 billion megawatt hours per year. Do note, however, that China's population is more than four times the population of the United States.

According to the World Re-

sources Institute, the U.S. also has one of the highest greenhouse gas emissions per capita in the world. In a list of 186 countries, the U.S. ranks seventh, with the average American producing 23.5 tonnes of greenhouse gases every year.

While individuals may not have the political power to change this big picture, there are still ways to help one's society conserve energy, mitigate the effects of pollution, and prevent the scenario of a future global energy crisis. And it all begins at home. Enumerated below are some of the things you can do to minimize your energy consumption and save some dollars at the same time.

Eliminate vampire power

A study conducted by scientists from the Lawrence Berkeley National Laboratory in California revealed that in 1998 home devices left on standby mode accounted for about 5 percent of U.S. residential electricity consumption, totaling about \$3 billion in annual energy costs. This is why it is important to eliminate what is known as vampire power or phantom load—electricity coming devices that are either switched off or running in standby mode.

Walk around your home and locate electronic devices that are left plugged into sockets even when they are not in use—common examples are computers, television sets, and mobile phone chargers. Make sure to unplug these devices.

Laundry and dishwashing tips

Take note that it takes just the same amount of electricity to wash a full load of clothes and to wash just half a load. Thus, it would be wise to do your laundry only when you already have a full load of used clothes to wash.

Furthermore, you should wash your clothes at lower temperatures. It is estimated that heating accounts for about 90 percent of the energy used in laundry. According to a 2008 news report from the BBC, washing at 30°C (86°F) instead

of 60°C (140°F) saves enough carbon gases to fill 4 million double-decker buses. So just imagine the amount of energy you will save if you wash not just with warm water, but with cold water. Remember this golden rule in running home appliances: when you use more heat, you use more energy.

In view of this, it also makes sense to use the clothes dryer less frequently. If you live in a warm, sunny place, why not use a spin dryer (which does not use heat) and hang your washed clothes on a clothesline to dry instead? Another option is to buy a folding clothes dryer on which you can hang your clothes to dry inside a warm room.

The same rules are applicable to dishwashing. Making sure that your dishwasher is carrying a full load before you run it not only helps you save water, it also helps you save energy. Try not using the heat-dry feature of the machine, and just use the air-dry option. According to the Consumer Energy Center in California, air-drying can cut your dishwasher energy use anywhere from 15 percent to 50 percent.

Heating and cooling your home

Make sure not to overheat or overcool your home. According to Trechugger.com, lowering your thermostat by just 2°F during winter saves about 6 percent of heating-related carbon gas emissions. That is equivalent to saving 420 pounds of carbon gas emissions every year for a typical American home.

In Hawaii, the Department of Energy suggests a thermostat setting of 78°F for homes that are occupied. For much colder places, homeowners may set their thermostat at 68°F in daytime, and 55°F at night during winter. Consider installing separate thermostats so you can control the temperature settings in different areas of your house. Also consider using programmable thermostats for added convenience and savings. Programming your home heating and cooling can help you save more than \$100 every year.

If your home is located in a dry climate environment, you might want to try a whole-house evaporative cooler (a swamp cooler) instead of an air condi-

tioning unit. Swamp coolers use 75 percent less energy compared to equivalent air conditioning units.

When buying cooling or heating units, seek help from qualified technicians who can ensure that you are choosing properly sized products for your home. Units that are too large will cost more to operate and to maintain over time. Furthermore, make sure to replace air filters if necessary. Remember that energy is wasted every time you run a dirty air conditioner or a dirty hot air furnace. Such units also release an additional 175 pounds of carbon gas emissions every year.

Lighting your home

People with a modicum of good sense should know by now that turning lights off when they are not in use saves energy. If you make a conscious effort to look around your house, you might be surprised at how many lights are running unnecessarily.

You should also install only lighting fixtures that use Light Emitting Diodes (LED) technology. Not so long ago, compact fluorescent lamps (CFLs) were touted as the best alternative to incandescent light bulbs. However, LED lights soon became the ideal option because they are more energy efficient, they last longer, and they don't contain toxic mercury, which is found in CFLs.

LEDs use less wattage per unit of light generated (lumens), which help reduce energy costs and greenhouse gas emissions. LED lights consume just 6 to 8 watts, compared to CFLs, which use between 13 to 15 watts, and to incandescent light bulbs, which use about 60 watts of energy. The average lifespan of an LED bulb is 50,000 hours; compare this to 8,000 hours for CFLs and just 1,200 hours for incandescent bulbs. Just make sure that you clean your LED lighting fixtures regularly to optimize their usage.

Furthermore, consider re-designing parts of your home to accommodate more natural lighting during daytime. You can also apply simple changes, like repainting your walls with light-colored paint to optimize lighting, or planting trees out in your yard to provide shade in areas of

your house where heat and lighting is not much needed.

Worthy investments

When buying new electronic equipment for your home, check for labels like the Energy Star logo. Energy Star labels ensure that you are buying energy efficient products, which generally use between 20 and 30 percent less energy.

Likewise, when renovating your home, consider investing in items that will help make your home more energy efficient. For instance, if a typical American home had proper insulation installed on its walls and ceilings, its occupants would save as much as 30 percent in home heating bills, and reduce carbon gas emissions by as much as 2,000 pounds every year.

Other examples of energy-efficient devices are solar panels, solar water heaters, high efficiency water heaters, and heat pumps.

Did you know that in addition to the energy savings you will get, available rebates, state tax credits, and federal tax credits can help you cut your water heating costs by as much as 90 percent when you install a solar water heater at home? According to the Hawaii Department of Business, Economic Development and Tourism, a typical Hawaii resident uses about 49 percent of his or her home's hot water in the bathroom. So the savings really mean a lot, especially for people who love taking baths!

You can check out programs offered by organizations like Hawaii Energy to learn more about how you can save energy and money through energy solutions like those mentioned above.

Make life simple

Conserving energy at home is often a matter of being practical and adopting a more spartan way of life. For example, why drive when you can walk or ride a bike instead? Such choices will not only help you save on gas money, they will also help you get some exercise as well. It is also a more personal way of getting around your neighborhood.

Remember that change begins with the individual. So start making a difference by conserving energy at home today.