POWERING UP

A SPECIAL REPORT ON ENERGY IN HAWAI'I

GENERATING INNOVATION

NATURAL RESOURCES MAKE ISLANDS A NATURAL MODEL FOR CLEAN TECH RD&D

GREEN ECONOMY
LOCAL BUSINESSES TAPPING INTO A FAST-GROWING MARKET

QUESTIONS
AN INTERVIEW WITH THE DBEDT CHIEF

BY THE NUMBERS
ENERGY FACTS & FIGURES

A publication of the Department of Business, Economic Development and Tourism

DBEDT
STATE OF HAWAI'I • DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

Kaua'i Algae Farm
Photo courtesy of Hawaii BioEnergy LLC

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energy.hawaii.gov/programs/cleanenergy-leaders
A look at 40 renewable energy projects in the state.

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Powering Up Magazine

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PacificBASIN COMMUNICATIONS

Gov. Neil Abercrombie and Japan-based NEDO President Hideo Hato agree to pursue a $37 million partnership to test smart grid technologies on Maui.

The Time is Now for Clean Energy

In August 2010, Gov. Neil Abercrombie launched his **"New Day Plan," which aimed to transform the state's energy policies and reinvigorate Hawai'i's economy.** The governor shares his insights on what he considers the "most important" economic enterprise today: Hawai'i's pursuit of becoming 70 percent energy independent by the year 2030.

Hawai'i has been talking about becoming energy independent for more than 40 years. That problem is even more urgent today.

In recent months, my administration has taken bold steps that will lay the groundwork for reducing this decades-long dependence on foreign oil and position Hawai'i as a leader in the clean energy sector.

Clean energy will serve as a cornerstone of Hawai'i's economy for generations.

This year, we worked closely with legislators, energy companies, environmental groups and other stakeholders to pass a measure that establishes the regulatory structure for financing and installing an undersea interisland transmission cable that could connect renewable energy sources—solar, geothermal, wind, small hydroelectric and ocean technologies—onto a single transmission system. This is not about one island producing energy for another.

If we are truly serious about making progress in the area of energy, our state must move away from insufficient, island-by-island silos and toward a reliable, statewide power network that is able to employ all available alternative energy options for the benefit of us all.

The state Department of Business, Economic Development and Tourism is now tracking over 80 renewable energy projects that are either operating today or are in the process of doing so. These are high impact solutions that provide a great opportunity for the creation of high-paying jobs.

Projects like these could generate much of the energy that's being produced in the islands and bring us closer to our clean energy goals for the year 2030.

Hawai'i as a clean tech role model.

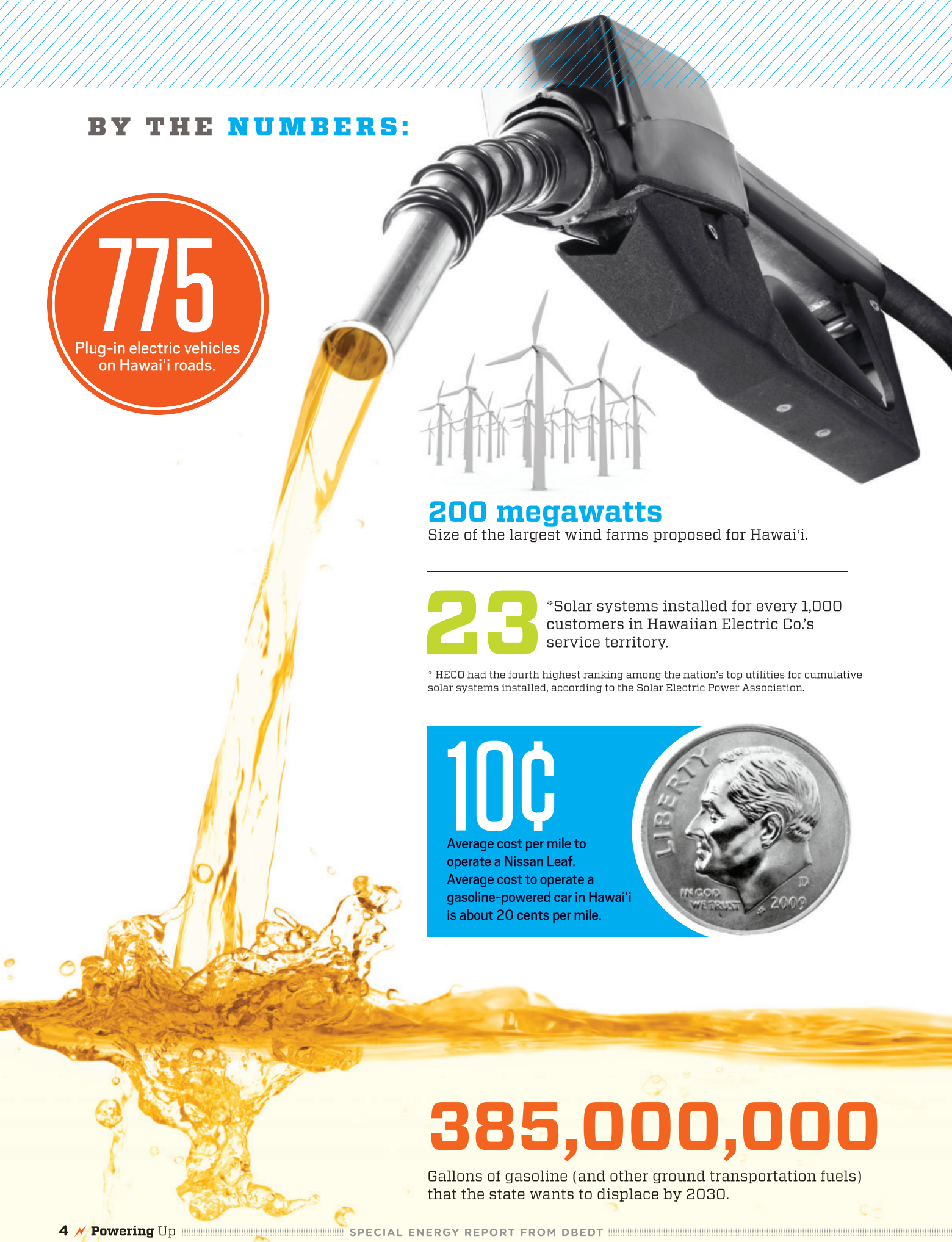
In November, I signed two international agreements that underscore the state's critical development as a clean tech testbed.

The first was signed during the Asia Pacific Economic Cooperation Summit with the China Council for Promotion of International Trade to pursue mutual interests in clean energy development. The second with Japan-based New Energy and Industrial Technology Development Organization (NEDO) is a $37 million in research and development partnership to test advanced smart grid technologies on the island of Maui.

The state is in the midst of finalizing a third partnership with South Korea to test smart grid technologies in hotels and the electric vehicles markets on O'ahu. ■

BY THE NUMBERS:

775
Plug-in electric vehicles on Hawai'i roads.



200 megawatts
Size of the largest wind farms proposed for Hawai'i.

23 *Solar systems installed for every 1,000 customers in Hawaiian Electric Co.'s service territory.

* HECO had the fourth highest ranking among the nation's top utilities for cumulative solar systems installed, according to the Solar Electric Power Association.

10¢
Average cost per mile to operate a Nissan Leaf. Average cost to operate a gasoline-powered car in Hawai'i is about 20 cents per mile.

385,000,000
Gallons of gasoline (and other ground transportation fuels) that the state wants to displace by 2030.

Q&A:

PHOTO: Olivier Koning

Now is Not the Time to Relax

During the past two years, Hawai'i's clean energy sector has leapfrogged over other states when it comes to the development of its clean energy industry. Hawai'i is third in the nation when it comes to clean tech job growth, second in the U.S. for installed photovoltaic capacity per capita, and first when it comes to performance contracting and availability for electric vehicle charging stations. But Richard Lim, director of the state Department of Business Economic Development and Tourism, believes that this is no time to be complacent.

Q: The state is poised to meet many of its near-term renewable energy goals, but what challenges does the state face in meeting its longer term goal of becoming 70 percent energy independent by 2030?

Hawai'i currently generates about 12 percent of its energy from renewablesources such as wind, solar, geothermal and biofuels, and is well on its way toward reaching its renewable portfolio standard goal of 15 percent by 2015.

By hitting this key benchmark, we've made a lot of progress toward protecting Hawai'i's environment and bolstering our energy security. Clean energy has now become a major driver in Hawai'i's economy.

But Hawai'i's clean energy agenda faces substantial challenges over the long-term. In the year 2020, the state's RPS goal will leap to 25 percent, or more than double the existing level.

To meet this mid-term goal, Hawai'i must promote the most diverse array of large-scale renewable energy projects—wind, solar, geothermal, biofuels and even ocean technologies—to meet this 25 percent goal.

We don't have the luxury of relying on just one industry. We need to be agnostic toward renewable energy sources and need to support the ones that have the greatest probability of success and will generate the most economic activity. We need them all.

Q: Where does the undersea cable fit into this?

An undersea cable provides the necessary link between O'ahu, where demand is greatest, and the neighbor islands, where most of the renewable sources are located.

Of the 75 largest renewable projects around the state, more than half are located on Maui, the Big Island and Kaua'i. By contrast, all three neighbor islands combined account for about only a third of O'ahu's electricity demand.

Connecting the islands to a single integrated grid will allow us to harvest Hawai'i's rich portfolio of renewable resources, and is the only means to achieve our clean energy goal. ■

Green Companies on the Cutting Edge

Innovative clean energy technologies in Hawai'i are attracting RD&D worldwide

Maui-based Kuehnle AgroSystems Inc., helmed by CEO Heidi Kuehnle and Mark Ritchie, chief business development officer, is focusing on biofuel development.

LOCAL CLEAN TECH START UP KUEHNLE AGROSYSTEMS INC. is hoping to strike it green by turning ordinary pond scum and other forms of algae into jet fuel.

The Mānoa-based company partnered with a major defense contractor, General Atomics, to cultivate locally sourced, oil-rich algae species. Kuehnle Agrosystems provided the algae feedstock that General Atomics grew at large scale for conversion to biofuel.

"Hawai'i's ideal weather and geographical conditions and an abundance of federal research and development funding make it attractive for developing biofuels," said Mark Ritchie, Kuehnle's Chief Business Development Officer.

Kuehnle is just one of scores of innovative companies that are taking part in Hawai'i's green boom.

> "Alignment of clean energy goals between the state, the Department of Defense and our community are all contributing to making Hawai'i the testbed ... for clean energy research, development and demonstration."
>
> —Lt. Governor Brian Schatz

KAS is working to develop jet fuel from oil-rich forms of algae grown in the islands.

> "The Hawai'i State Energy Office greatly assisted us with other state agencies in obtaining the required permitting and authorizations that allowed us to start up the operation of our Renewable Natural Gas Pilot Plant."
>
> —Richard DeGarmo, Director of Renewable Energy & Capital Projects, The Gas Company

From wind and solar to ocean thermal and wave technologies, to advanced smart grid and battery storage projects, Hawai'i is quickly making a name for itself as a testbed for leading edge clean tech research and development.

Driven by one of the most ambitious clean energy policies in the world and bolstered by tax credits and federal stimulus funding, Hawai'i is the focus of investors and government partners from Japan, China, Korea and the U.S. Mainland.

"Hawai'i is deeply committed to a clean energy economy," said Lt. Governor Brian Schatz. "Supportive public policy, alignment of clean energy goals between the state, the Department of Defense and our community are all contributing to making Hawai'i the testbed of the Asia-Pacific region for clean energy research, development and demonstration."

Hawai'i's policies are attracting millions of dollars in research and development, and one of the biggest RD&D projects in the isles is the Japan-U.S. Grid Project, a $37 million partnership between the state, Japan's New Energy and Industrial Technology Development Organization (NEDO), Hitachi Ltd., Hawaiian Electric Co., Mizuho Corporate Bank and the University of Hawai'i.

The project, located in Kihei, Maui, will test advanced smart grid and smart meter technologies, which are designed in part to better manage energy use, beef up grid reliability and allow local utilities to bring on more renewable energy.

About 200 households are being recruited by the NEDO venture, which will include an electric vehicle component that will provide valuable data on how the batteries in EVs can be integrated into electric grid management.

The $14 million Maui Smart Grid Project is recruiting another 200 volunteers from the South Maui community to test smart meters, battery storage technologies and other leading edge, in-home technologies.

A joint venture between Maui Electric Co. and the Hawaii Natural Energy Institute, the Maui Smart Grid Project will demonstrate and evaluate new technologies that will help residents better manage and reduce energy consumption during peak demand periods and will help MECO operate the electricity grid more efficiently.

Hawai'i energy officials are finalizing the details of a similar partnership with the Korea Smart Grid Institute to test advanced smart grid technologies on O'ahu. The Hawai'i-South Korea project will attempt to integrate hotels and an electric vehicles rental program into the smart grid framework.

Hawai'i's private sector is also playing a major role in developing new clean tech products. Since its launch in 1996, Pacific Biodiesel has become a global leader in the biodiesel industry.

The Kahului-based company initially got its start to help avert a serious health hazard facing Maui County whose landfills were being over loaded with dangerous levels of used cooking oils.

Photo courtesy of Hawaii BioEnergy LLC

Hawaii BioEnergy is developing biofuels on Kaua'i from such sources as eucalyptus, sorghum and algae.

The Maui plant became the first commercially viable biodiesel plants in the U.S. when it started to covert the used cooking oil and restaurant waste into fuel for diesel engines. Since then, the company has built 12 biodiesel plants throughout the U.S. Mainland and Japan.

Last month, Pacific Biodiesel opened its new $12 million Big Island plant, which will eventually employ 20 people and will produce as much as 5.5 million gallons of biodiesel each year, or enough to displace hundreds of tons of waste oil that would otherwise end up in the state's crowded landfills.

Another biofuels company, Hawaii BioEnergy LLC, is conducting research on Kaua'i on how to develop jet fuel from Hawai'i's abundant forms of feedstock such as eucalyptus, sorghum and even algae.

The company—whose investors include Kamehameha Schools, Grove Farm Co. Inc., Maui Land and Pineapple and Silicon Valley venture capitalist Vinod Khosla—also has signed a contract with HECO to supply 10 million gallons a year of locally produced biofuels.

"This holds a lot of potential for Hawai'i," said Joel Matsunaga, Hawaii BioEnergy's chief operating officer. "It's leading edge technology that's being developed in Hawai'i that we can all be proud of." ■

Nature's Gift: Clean Energy for Hawai'i

From solar to wind power, businesses and jobs are growing across the state

PHOTO: Olivier Koning

Robert Johnston and his company, Hawaii Pacific Solar, blanketed the Aiea High School roof with solar panels.

WHEN THE GREAT RECESSION HIT Maui's high-end real estate market in 2008, Robert Johnston shuttered his development business and rolled the dice on a fledgling sector: solar energy.

Since then, Johnston's company, Hawaii Pacific Solar, has seized on this opportunity, amassing an impressive portfolio of commercial solar projects that includes rooftop panels at dozens of Hawai'i's schools and military bases. Over the next several months, Hawaii Pacific Solar plans to expand its work crews from 12 to 20 thanks to its growing stockpile of work.

"We started out as a company with a handful of partners working for free," Johnston said. "We certainly think the future is very bright."

Hawaii Pacific Solar is one of hundreds of local, national and international companies that are riding Hawai'i's clean energy boom. Fueled by favorable legislative changes, attractive state and federal tax incentives and a statewide push to achieve 70 percent energy independence by 2030, the state's green energy sector is generating tens of millions of dollars in new investment and bringing thousands of new jobs to an economy long dependent on tourism and government spending.

According to the state Department of Labor and Industrial Relations' Hawai'i Green Jobs Initiative, Hawai'i's clean energy sector currently employs 11,145 people. This represents about 2.4 percent of all private jobs statewide and is nearly equivalent to the number of people employed by Hawai'i's real estate industry.

And the numbers are growing.

According to the Labor Department, the number of clean energy jobs in Hawai'i is expected to grow by 26 percent by the end of year, which will help offset job losses in Hawai'i's traditional construction sector, where the unemployment rate is running around 30 percent.

"Clean technology represents both an opportunity to revive and modernize Hawai'i's infrastructure," said John White, executive director of the Pacific Resource Partnership, a consortium of the Hawai'i Carpenters Union and the state's unionized contractors. "Just as important, it provides a path to economic growth for the state."

Solar projects are just part of the picture. Today, there are enough clean-energy projects on the drawing board to handle up to 40 percent of Hawai'i's current electricity demands.

The Department of Business, Economic Development and Tourism (DBEDT)

> "Hawai'i's evolution to clean energy is a complex effort, and the Energy Office is playing an essential leadership role for our state to make it happen."
>
> —Wren Wescoatt, Development Manager, First Wind

currently is tracking project activity from more than 80 utility-scale renewable-energy projects featuring Hawai'i's diverse array of renewable sources, including wind, sun, hydropower, biofuel, waste-to-energy, geothermal, ocean thermal and wave energy.

Boston-based First Wind said it plans to create an additional 8-10 permanent jobs in Hawai'i and work opportunities for an estimated 180 construction employees as the company completes its large wind farm projects on Maui and O'ahu's North Shore.

That work will also provide benefits for about 50 local businesses that are part of the supply chain that provides the building materials and services the equipment for the wind farms, which will have the combined capacity of about 150 megawatts or enough energy to meet the needs of about 6 percent of the state's population.

Kekoa Kaluhiwa, First Wind's director of external affairs, likens the economic impact of the construction of a large-scale electricity power plant. The added bonus is that it will provide consumers with long-term access to cheaper electricity.

Maui-based Pacific Biodiesel said it plans to add as many as 20 local jobs when the company's newly completed $12 million Big Island plant ramps up. The clean tech company, which turns used cooking oil into biodiesel that's blended into conventional diesel, said construction of its new buildings, tanks and other technical equipment is creating another 85 jobs in the Keeau community.

For local economist Tom Loudat, the benefits go beyond the construction jobs and staffing needed to build and run the new solar, wind and other renewable energy plants. New clean tech projects also benefit the subcontractors and vendors that make up the vast supply chain that serve the new facilities. More important, consumer savings from these new green projects–a big chunk of the $4 billion a year that would otherwise be paid to foreign oil producers–recirculates in Hawai'i's economy, he said.

Loudat cites his own example. Several years ago, he installed solar panels and a solar water heater to lower his own energy costs which were running between $300 and $400 a month. His monthly electricity bill now averages about $100 a month. Over the 30-year life of his solar upgrades, Loudat will save thousands of dollars–money that he can use to purchase more locally sold goods and services or reinvest in his business. When you project these kinds of savings onto macro scale, it becomes a huge driver for Hawai'i's economy.

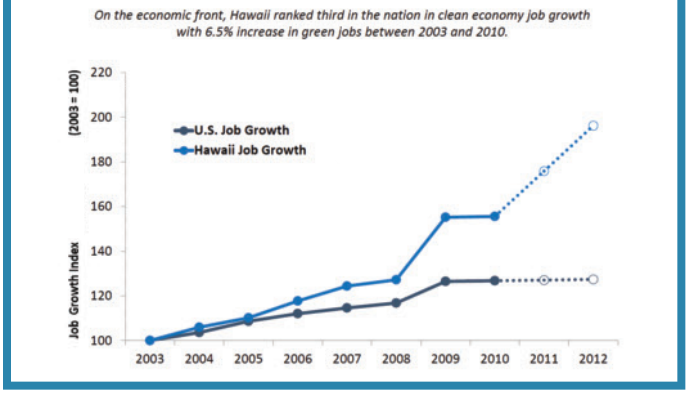
"This is a gift that will keep on giving back to the local economy for 30 years," Loudat said. ■

Hawai'i Green Jobs

COUNTY	PRIVATE SECTOR GREEN JOBS	% OF COUNTY JOBS	ADDITIONAL GREEN JOBS BY 2012
Hawaii	1,222	2.5	510
Honolulu	6,866	2.0	1,885
Kauai	460	1.9	71
Maui	2,597	4.6	437
State Total	11,145	2.4	2,903

Source: Hawaii's Green Workforce: A Baseline Assessment, December 2010 (Department of Labor and Industrial Relations)

Hawai'i's Clean Economy Job Growth



Source: Sizing the Clean Economy, August 2011 (Brookings Institute)

> "The Energy Office has been a great resource for KIUC. Since any proposed project will inevitably be challenged in some way, it is important that we have people at the state level willing to champion the good projects."
>
> —Brad Rockwell, Power Supply Manager, Kaua'i Island Utility Cooperative

Tom Loudat

A crew installs rooftop solar panels.

Power Management

Local company designed system to help MECO store and access data quickly

Founded in 1996, Hawai'i-based Referentia employs about 100 people in Hawai'i, California and Virginia, and at military installations throughout the world.

Referentia /

REFERENTIA SYSTEMS INC. carved a comfortable niche for itself as a high-end provider of cyber security and network solutions for military and government clients.

But in recent years, the local information technology company has discovered a new, fast-growing market for its database management expertise: green energy.

Working with Maui Electric Co., Referentia has developed a highly specialized database management system that allows the local utility to collect the mountains of data on how its customers are using electricity every other second.

The database—the Time Series Rapid Exploration System, or T-REX—allows utilities to visualize what is happening on the grid in real time, and help successfully integrate more solar, wind, smart-grid technologies, and other clean energy assets while improving service reliability.

"Referentia developed a database application for our computer control systems in a Hawai'i Renewable Energy Development Venture-funded project," said Maui Electric Co. President Sharon Suzuki. "The application efficiently stores and allows MECO operations personnel to graphically view large amounts of data quickly, easily and securely to improve efficiency and reliability of service to our customers." Referentia is one of hundreds of companies that make up the diverse chain of suppliers, vendors and consultants that are helping to fuel Hawai'i's clean tech boom and are developing the state's reputation as a clean tech testbed.

"It's homegrown companies like this that are helping to drive innovation and job growth in Hawai'i's clean tech sector," said Richard Lim, director of the state Department of Business, Economic Development and Tourism. ■

Referentia's T-REX is a high performance time series database designed to provide the instant data accessibility needed to enable planning and operational decision making. The T-REX team includes, from left, Iris Koga, Christopher Dietsch, Ejay Tumacder, Ryan Rolland and Matthew Shawver.

Going Green's Good for Gelateria

Italian ice cream company reaps savings with energy efficient strategies

Il Gelato Hawaii

Founded in 2010 by Dirk Koeppenkastrop and his wife Nicole Lueker. Flavors: more than 95. Local ingredients include pineapples from Kunia, coffee from Kona, macadamia nuts and guavas from the Big Island. Imported ingredients include vanilla pods from Tahiti, pistachios from Sicily, dark chocolate and cocoa from Belgium, and hazelnuts, almonds, walnuts and pine nuts from Italy.

Il Gelato Hawaii /

FOR DIRK KOEPPENKASTROP, green business practices not only protect the planet. They're also good for business.

Koeppenkastrop, co-founder of Il Gelato Hawaii, a fast-growing maker of premium, Italian-style gelato and nonfat sorbettos, said his company's investments in energy efficient equipment and fuel reduction strategies are paying off handsomely.

"Green business strategies not only benefit the environment. It also benefits the bottom line." —Dirk Koeppenkastrop

While company revenues have grown five-fold in the past two years, Koeppenkastrop said energy costs have remained flat.

"Green business strategies not only benefit the environment. It also benefits the bottom line," he said.

"I never felt for one second that it was a waste of time or money."

Dirk and Nicole Koeppenkastrop (left) save $1,500 a month on Il Gelato's electricity bill by using energy efficient equipment. Shown with them are their son Moritz and daughter Anna.

Il Gelato merges traditional Italian ice cream-making with local and international flavors.

Koeppenkastrop's company manufactures its high-end, locally flavored products at its Iwilei plant and wholesales those products to such fine-dining restaurants and hotels as Roy's and Michel's. Like many in the food business, Il Gelato uses a lot of electricity and gasoline to make and distribute its products.

Il Gelato delivers its products in six-quart plastic tubs, which it recycles, saving the company having to send more than 15,000 plastic tubs each year to Hawai'i's already crowded landfills.

Il Gelato also consolidated truck delivery and pick-up schedules, sharply reducing its gasoline expenses. It also has invested in a large, state-of-the-art walk-in freezer, replacing seven wall freezers that required more energy. The walk-in freezer is saving the company about $1,500 a month in electricity costs.

Koeppenkastrop said his company will really move the needle when it completes the installation of solar panels at its offices, which will eventually provide most, if not all of the company's energy needs.

"This investment will pay for itself in four years," he said. "After that, we will be getting energy for free." ■

Energy Savings in Historic Spaces

Grantmaking foundation leading the way in using technology, natural resources during renovations

PHOTO: Olivier Koning

The Hau'oli Mau Loa Foundation made energy efficient upgrades to its downtown offices, including motion and sound sensitive light controls.

THE HAU'OLI MAU LOA FOUNDATION believes strongly in practicing what it preaches.

Before the local foundation moved into its new 4,500-square foot office in the historic Dillingham Transportation Building downtown, it invested in a number of retrofits that cut its electricity usage by 30 percent and water usage by more than 40 percent.

The energy efficiency and water reduction updates—which includes motion and sound sensitive light controls and low-flow water fixtures—made the foundation one of the few in Hawai'i to receive a prestigious Leadership in Energy and Environmental Design platinum certification from the U.S Green Building Council.

"This is mission driven for us," said Janis Reischmann, the foundation's executive director. "We wanted to help others see that historic buildings and historic spaces could be renovated in a green way."

The nonprofit Hau'oli Mau Loa Foundation provides grants to partners that work with underprivileged children and seek to enhance the stewardship, preservation and protection of the environment.

Reischmann said her organization doesn't view its green practices in terms of the money it saves on its electricity bills. What's important is the organization's role in helping preserve the environment, she said.

"We think we have a responsibility to do this and a mission mandate to renovate in a way that is respective and responsive to our natural resources," she said.■

About the Hau'oli Mau Loa Foundation

Established in 1990 by Helga Glaesel-Hollenback, a German transplant to the islands. Hau'oli mau loa is Hawaiian for "eternal happiness." On Glaesel-Hollenback's 75th birthday community members from Kaua'i gave her the Hawaiian name Kalehuamakanoe—meaning "the lehua blossom in the mountain mist." The foundation's logo is the lehua makanoe blossom.

PHOTO: David Croxford

Watch a video of Duane and Sarah Preble talking about the environment at http://www.youtube.com/watch?v=mg3T5TyS3n0

'The Right Thing To Do'

Mānoa couple's home has gradually grown more green since the mid-1970s

DUANE AND SARAH PREBLE ARE THE VERY DEFINITION OF LIVING GREEN.

From the recycled building materials used to renovate their Mānoa home, to the solar panels on their roof, the Nissan Leaf electrical car they drive and the 500-gallon water catchment tank for watering their garden, the Prebles have been at the forefront of sustainable living for more than four decades.

"Our house is like any other house, except we have a lot of solar panels on the roof and a lot of gadgets on our computer," Sarah Preble said.

The Prebles were ahead of the times in 1976 when they installed their first solar water heater. That solar water heater, which paid for itself within a few years, has been replaced by a newer version.

The couple also installed their first solar panels in 2004 and gradually added to their solar array, which now has more than 40 panels.

On hot summer days, the solar panels generate more than double the amount of electricity the family typically uses. Even on cold rainy days, the solar system generates nearly enough energy to meet all of the family's needs.

Excess energy generated by the panels is credited to the couple's monthly electricity bill, which ranges from zero to next to nothing.

"Our goal is to become net zero," Sarah Preble said.

The Prebles credit their green lifestyle to the thrifty practices they learned from their parents, who grew up during the Great Depression when food, materials and energy were scarce. Living on an island where more than 80 percent of all goods are shipped in makes those green practices even more imperative, Sarah Preble said.

"We do these things not so much to be 'green.' We do them because they seem like the right thing to do," she said. ■

PHOTO: Olivier Koning

"We now focus our limited resources on high impact solutions that are most likely to move the needle toward our clean energy goals."

Driving Toward a Clean Future

Mark Glick was appointed Administrator for the State Energy Office in October 2011 and it's been full speed ahead since for the state's clean energy agenda. In the past year, Hawai'i officials have signed international agreements with Japan, China and Korea to develop green technologies and advanced smart grid systems. Glick believes that a clear policy vision and focused approach to deploying clean energy infrastructure is the trick to staying ahead of the curve.

How has Hawai'i emerged as a Top Five national leader when it comes to solar water installations, green job growth, installed photovoltaic capacity and electric vehicle charging station availability?

Much of it has to do with the clear goals established by Hawai'i's renewable energy portfolio standards, which calls for 40 percent of all electricity produced by the year 2030 come from solar, wind, geothermal and other renewable sources. The combination of state and federal incentives and unified support by the public and private sector for deploying a clean energy infrastructure is an equally important driving force.

This unified support sets the stage for attracting long-term investment and economic growth. An example of this is the bipartisan, private and public sector support for the cable legislation, which will be a game-changer when it comes to deploying new renewable sources.

How has the State Energy Office evolved to lead the transformation from conventional energy systems and fuels to a clean energy future?

We've established a new strategic plan whose mission is to establish a clean energy infrastructure as a catalyst for economic growth, for developing "testbed" investments and advancing Hawai'i's energy security. We now focus our limited resources on high impact solutions that are most likely to move the needle toward our clean energy goals. For instance, we recently developed a Top 40 list of renewable projects, which aims to identify projects that can make the biggest impact on Hawai'i's renewable energy future.

We engage our clean energy stakeholders through our updated website energy.hawaii.gov. Stakeholders can find our Top 40 list there as well as our "Permitting Wizard," which lists all of the regulatory steps that a developer would face for installing clean energy projects around the state. ■

40% by 2030

Clean Energy Solutions

Hawai'i and U.S. Dept. of Energy working together to build a global model for the future

OVER THE PAST DECADE, Hawai'i has built a close relationship with the U.S. Department of Energy (DOE) in pursuing clean energy solutions. In 2008, DOE and the state entered into a long-term partnership, known as the Hawai'i Clean Energy Initiative (HCEI), to pursue "a fundamental and sustained transformation in the way in which renewable energy and efficiency resources are planned and used in the state."

DOE has helped advance HCEI by providing extensive technical analyses and funding for multiple projects across the islands. These projects include: detailed wind and solar integrations studies, distributed photovoltaics, a wind farm on O'ahu, smart grid projects, electric vehicle charging networks, energy efficient appliance and solar water heating rebates, and low-interest loans. More than $175 million in DOE funds have helped catalyze $2 billion in potential investments in Hawai'i.

DOE staff from its Energy Offices and the National Renewable Energy Laboratory (NREL) has been working in Hawai'i supporting the clean energy initiative continuously since 2007.

"This vital collaboration not only allows us to better understand Hawai'i's natural advantages and challenges to meeting its energy goals but also will provide a replicable model for a clean energy future around the globe," said Jim Spaeth, the current DOE Pacific Region representative. Spaeth previously served as director of the Office of Commercialization & Project Management in the Golden, Colo., office.

NREL Senior Project Leader Ken Kelly has spent the past two years in Hawai'i supporting the HCEI. Among his many contributions, Kelly led the development of the HCEI roadmap for achieving the 2030 clean energy vision and helped to catalyze electric vehicle use and other transportation solutions for Hawai'i.

"The results over the past four years have been truly transformational," Kelly said. "Renewable electricity generation is expanding rapidly. Hawai'i is currently ranked first in the nation for energy savings performance contracting and leads the nation in electric vehicle infrastructure."

The DOE partnership with Hawai'i will continue and grow with future technical and environmental analyses of island clean energy options, and exciting new investments in areas such as solar, hydrogen, wave and smart grid technologies. ■

Ken Kelly / SENIOR PROJECT LEADER
National Renewable Energy Laboratory

Jim Spaeth / SENIOR ADVISOR
Pacific Region, U.S. Department of Energy

PHOTOS: Olivier Koning

The Future is Bright

Department of Business, Economic Development & Tourism
Hawai'i State Energy Office

Working to ensure Hawai'i's energy independence and security by advancing clean energy technology and infrastructure throughout the islands.

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STATE OF HAWAII • DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM

Hawai'i Powered
Hawai'i Clean Energy Initiative