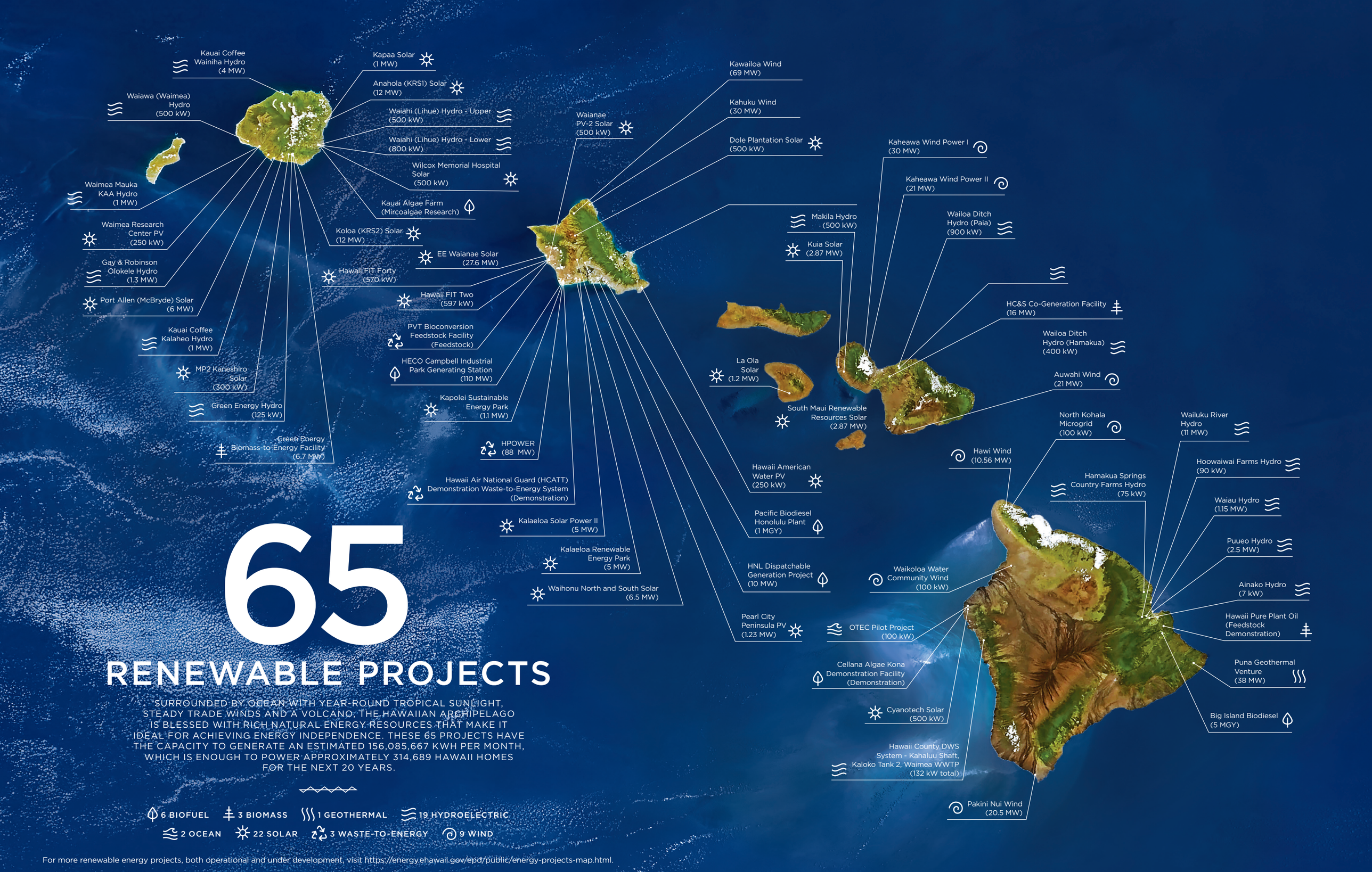
HAWAII'S EMERGING FUTURE

STATE OF HAWAII ENERGY RESOURCES COORDINATOR'S ANNUAL REPORT 2016



65

RENEWABLE PROJECTS

SURROUNDED BY OCEAN WITH YEAR-ROUND TROPICAL SUNLIGHT, STEADY TRADE WINDS AND A VOLCANO, THE HAWAIIAN ARCHIPELAGO IS BLESSED WITH RICH NATURAL ENERGY RESOURCES THAT MAKE IT IDEAL FOR ACHIEVING ENERGY INDEPENDENCE. THESE 65 PROJECTS HAVE THE CAPACITY TO GENERATE AN ESTIMATED 156,085,667 KWH PER MONTH, WHICH IS ENOUGH TO POWER APPROXIMATELY 314,689 HAWAII HOMES FOR THE NEXT 20 YEARS.

6 BIOFUEL · 3 BIOMASS · 1 GEOTHERMAL · 19 HYDROELECTRIC · 2 OCEAN · 22 SOLAR · 3 WASTE-TO-ENERGY · 9 WIND

For more renewable energy projects, both operational and under development, visit https://energy.ehawaii.gov/epd/public/energy-projects-map.html.

Special Message from Governor David Y. Ige

The 2016 Energy Resources Coordinator's Annual Report

December 1, 2016

Much has been done to achieve energy independence in Hawai'i. Much more remains to be done. Despite our advances, such as the recent rapid growth of renewable energy in Hawai'i's electricity sector, more than 80 percent of Hawai'i's energy system-wide still comes from petroleum. That is a grave threat to Hawai'i's energy, economic and environmental security. But, thanks to hard work and strategic decisions, I am proud to say that our state is on the right path to eliminate this threat.

Energy independence is the driving force behind our clean energy transformation, and it also holds tremendous opportunities for our state. Building a renewable energy sector can give us the great new engine of economic growth Hawai'i has long needed. Long-term renewable energy contracts will encourage higher levels of investment and capital spending among businesses. Already, Hawai'i is attracting entrepreneurs from around the world – looking to develop, test and prove emerging technologies and strategies before going to market – because of our commitment to clean energy.

That commitment began with a unique agreement between the U.S. Department of Energy and Hawai'i, which formed the Hawai'i Clean Energy Initiative (HCEI). HCEI encompasses an entire body of laws, policies and regulations as well, as collaboration among stakeholders that have led to explosive growth in energy efficiency and renewables.

While our progress is promising, I'm most heartened about the way clean energy has become a value, universally embraced throughout Hawai'i. HCEI has survived relatively intact through three gubernatorial administrations. I'm honored to uphold that legacy. It is my hope that Hawai'i's harnessing of our prodigious gifts from nature to create clean, renewable, sustaining energy will become a tradition as synonymous with our state as the aloha spirit we hold so dear.

Thank you to the many people whose hard work is reflected in this report for helping to lay the foundation for a clean energy paradise. We have much to do, but we know that when Hawai'i's people come together to achieve progress, we can change the world.

With warmest regards,

DAVID Y. IGE
Governor, State of Hawai'i

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ON THE COVER

The light bulb illuminating the front cover is based on a prototype under development at MIT that recycles its own heat, an efficiency jump of 80 percent that would put incandescent bulbs on par with LEDs for power usage. It symbolizes Hawaii's emerging clean energy future - a holistic approach to reach 100 percent renewable energy in electricity by 2045.

INTRODUCTION

In 2016, Hawaii's clean energy transformation continued its momentum as more solar and wind power were added to the state's electrical grids, boosting renewable energy to nearly one-quarter of all utility electricity sales. Distributed solar resources played a key role: on Oahu, nearly a third of single-family homes now have rooftop PV systems – a significant achievement for a metropolitan area of this size. It's one of many milestones this year's edition of the Energy Resources Coordinator's report highlights, as Hawaii progresses towards its goal of 100 percent renewable energy in the electricity sector by 2045.

Of course, Hawaii's clean energy transformation is about much more than our world-first 100 percent by 2045 goal – it's also bringing a host of economic benefits that go well beyond reducing Hawaii's exposure to volatile oil prices. Data compiled by the Department of Business, Economic Development and Tourism (DBEDT) show that the value of solar-related construction spending totaled $570 million in 2015. Hawaii's emergence as a test bed for clean energy solutions continues to fuel innovation and attract investment. Japan's top public research institute spent $55 million on its JumpSmart Maui project on the Valley Isle to develop technology for optimizing renewable energy use. The 42 portfolio companies participating in the Energy Excelerator, Hawaii's preeminent clean energy incubator, have raised $342 million in follow-on funding as they showcase the innovation and ingenuity of today's start-up energy companies. Their success is attracting the attention of businesses and governments from around the world as they watch and potentially try to ride the wave of enthusiasm created by an entrepreneurial drive to find solutions to today's energy challenges.

Everywhere you look, Hawaii's energy landscape is rapidly evolving and changing. It was evident in the expectations expressed by Hawaii's energy stakeholders about the role of the utility in our clean energy future as they reviewed the proposed NextEra-HECO merger. Though the merger did not come to pass, it is clear the utility is an integral partner in our clean energy transformation, the success of which depends on collaboration among all the stakeholders in our community.

To ensure that success, DBEDT, through its Hawaii State Energy Office (HSEO), is moving ahead with Hawaii's clean energy transformation. This transformation needs a diverse group of government agencies, businesses, non-profits, and individuals to be engaged in this journey. Together we can face the challenges that lie ahead and secure our clean energy future.

Sincerely,

Luis P. Salaveria
Director, Department of Business, Economic Development and Tourism

EXECUTIVE SUMMARY

With the establishment of the Hawaii Clean Energy Initiative (HCEI), the state set a bold and confident path for energy independence and security. It is that transformative journey that has yielded tremendous benefits to the state.

However, as the low-hanging fruit in the electricity sector are harvested, continued gains will require more and harder work. Completing Hawaii's clean energy transformation will not be easy, and the state and other energy stakeholders must balance a great many demands, like managing utility costs, maximizing savings opportunities, and maintaining security, and system reliability. Transforming Hawaii's energy ecosystem involves integration with larger and more complex aspects of energy in transportation. This must involve an array of interested parties from all sectors, public, private and non-profit, military and civilian, local and international. Clean energy represents a brand new sector of the economy that has grown exponentially from humble beginnings. This is occurring in an environment that is beginning to show the dramatic effects of climate change, the threat of which helped to spur the clean energy movement in the first place.

Fortunately, HCEI has proven to be as flexible and it is enduring. In addition to fulfilling the Energy Resources Coordinator's statutory requirement, this report is in essence a catalog of HCEI's breadth, describing its diverse range of activities, policy formulations, regulatory directives, approaches to innovation, collaborations and opportunities to advance Hawaii towards its many clean energy goals, which can be too easily overshadowed by the goal of reaching 100 percent renewable portfolio standards (RPS) by 2045. HCEI encompasses:

ENERGY EFFICIENCY DEPLOYMENT – While energy efficiency portfolio standards (EEPS) are no longer counted as part of Hawaii's RPS, Hawaii continued to make progress in cutting down energy usage by improving efficiency. In 2015 Hawaii's government agencies continued to lead the world in energy performance contracting, the best practice for financing energy improvements to buildings. An estimated 40 percent of energy is consumed in residential and commercial buildings, according to the Energy Information Administration. The state also continued advancements in new, energy-efficient construction, with building codes and financing for improvements that will save millions of dollars and cut millions of pounds of carbon dioxide emissions.

RENEWABLE ENERGY DEPLOYMENT – By separating EEPS from RPS in 2015, the state recognized that the two efforts, while mutually supportive, require different tools for measurement and have separate compliance mechanisms. Thanks to the success of HSEO and its many partners, renewable energy efforts have received worldwide attention. In 2015, Hawaii achieved a statewide RPS level of 23.4 percent, up from 21.1 percent in 2014, with notable advances in solar and wind. Hawaii is now almost a quarter of the way to its trailblazing goal of a 100 percent RPS by 2045.

ENERGY PLANNING AND TRANSPORTATION SOLUTIONS – An important aspect of HCEI that deserves more attention is clean transportation. Compared to RPS progress, Hawaii has much ground to make up in shifting the enormous amount of energy used on transportation from petroleum to renewable resources. The wealth of knowledge gained from the HCEI Transportation Energy Analysis (HTEA) establishes a firm and credible framework for the next phase as stakeholders are reconvened to plan and plot a course to bring the tactics and solutions onto roadways, airways and sea lanes.

Similarly, painstaking planning is ongoing to address needs across the entirety of HCEI policies and programs to ensure that progress is on the right path with the flexibility necessary to adapt to a changing energy landscape. HSEO is working to enhance internal capacity and modeling capabilities to better integrate renewable resources onto the grid while bolstering energy security and assurance in case of emergencies.

POLICY AND REGULATORY ADVANCEMENTS –HSEO continues to work with legislators and regulators to develop policies that support and encourage energy independence. Of major note in 2016 was the Public Utilities Commission's (PUC) ruling dismissing NextEra Energy's proposed acquisition of Hawaiian Electric Industries Inc. in accordance with HSEO's view that NextEra failed to demonstrate that the deal was reasonable and in the public interest.

OUTREACH AND STAKEHOLDER ENGAGEMENT – A great deal of HSEO's success in advancing Hawaii's clean energy agenda occurs behind the scenes in creating the foundation for sharing and advancing knowledge, resources and capacity needed to make the clean energy vision a reality. From innovative financing tools to electric vehicle charging station locating apps, from global conferences to memoranda of understanding with the U.S. military and international partners, the emerging clean energy sector in Hawaii is well covered.

ABOUT THE ENERGY RESOURCES COORDINATOR

According to the Hawaii Revised Statutes, Chapter 196-4, the Director of the Department of Business, Economic Development & Tourism is the state's Energy Resources Coordinator (ERC), responsible for energy planning, policy and programs. The ERC has delegated that responsibility to HSEO, which is actively positioning the state as a global leader in clean energy innovation.

HAWAII'S CLEAN ENERGY VISION

Seeing Commitments Through

THE HAWAII STATE ENERGY OFFICE'S (HSEO) mission is to maximize Hawaii's energy self-sufficiency and security by developing and utilizing local energy resources in a balanced way. In doing so, HSEO will guide our state toward the HCEI MAX goals to achieve 100 percent renewable energy in the electricity sector by 2045, reduce electricity consumption by 4,300 gigawatt-hours by 2030, and reduce petroleum use in transportation. To this end, HSEO works toward the deployment of clean energy infrastructure and serves as a catalyst for energy innovation and test bed investments. By achieving these goals, HSEO will grow the clean energy sector and transform Hawaii's economy.

Aiming for 100 percent renewable energy in Hawaii's electricity sector by 2045 was big news last year. It's now time to put those words into action, which will not be an undertaking for the faint of heart. Achieving Hawaii's bold commitments will require even bolder actions – a combination of hard work, innovative thinking and a continuation of the collaboration that has underpinned Hawaii's clean energy transformation to date.

There will be no shortage of challenges. Accommodating more intermittent renewables on increasingly saturated electric grids, developing the expertise to deliver technical solutions, attracting the large amounts of capital necessary to finance the transformation and dealing with legacy issues such as stranded costs and long-term fossil fuel assets are just a few of the hurdles that will have to be overcome. Still, there are reasons to be optimistic. Among them:

- The clean energy movement is gaining traction globally, with the traditional base of supporters growing to include deep-pocketed investors looking to capitalize on what they see as a significant growth market.
- As renewable energy approaches critical mass worldwide, innovation is driving down the cost of renewables everywhere, including Hawaii.
- Hawaii has the invaluable support of the U.S. Department of Energy and its network of national laboratories for key clean energy projects in Hawaii, such as grid modernization and data visualization.
- Hawaii continues to build its credentials internationally as a place where next-generation clean energy solutions will be born.
- Stakeholders drawn together under the umbrella of the HCEI are strengthening their resolve to make Hawaii's clean energy vision a reality.

THE BIG PICTURE

The Global Shift to Grid Parity and Hawaii's Leadership

RECORD INVESTMENTS - Globally, investors poured a record $329 billion into clean energy projects in 2015, extending a decade-long upward trend, according to a report from Bloomberg New Energy Finance. The total is impressive given several drags on investor's appetites for renewables, most notably a plunge in fossil fuel commodity prices, diminishing returns per dollar invested due to solar PV cost declines, and an economic weakening in Europe, formerly a renewable energy investment powerhouse.

These trends highlight the improving cost competitiveness of solar and wind, and a reversal is unlikely in light of the Paris Climate agreement, in which 195 nations committed to lowering greenhouse gas emissions to fight climate change. That bodes well for Hawaii, and the nation as a whole, as attractive markets for clean energy investment.

BILLIONAIRE BUY-IN – Investor appetite for clean energy projects is being matched by a new push for greater investment in clean energy research and development. More than 20 billionaires, led by Microsoft founder Bill Gates, formed a group last year called the Breakthrough Energy Coalition (BEC) to invest in new technologies for generating, storing and transmitting renewable energy. Calling the threat of climate change too serious to allow technology to evolve at its own pace, Gates pledged $1 billion of his own money to the BEC and also helped to form Mission Innovation, a pledge by 20 countries and the European Union to double government investment in clean energy research over five years. Announced by President Obama and other global leaders at the COP21 conference on climate change in Paris last year, the initiative builds on the U.S.'s sustained commitment to unlock clean energy R&D funding under the leadership of U. S. Department of Energy (DOE) Secretary Ernest Moniz.

The Department of Energy is pleased to support Hawaii as it undertakes the most ambitious energy transformation in the United States.

FEDERAL SUPPORT - Secretary Moniz praised Hawaii's contribution to the nation's clean energy transformation, and pledged continued support for Hawaii's efforts.

"As you know, the Department of Energy is pleased to support Hawaii as it undertakes the most ambitious energy transformation in the United States," Secretary Moniz wrote in a letter to Sen. Brian Schatz. "The progress Hawaii has made to date is impressive, and is inspiring others to emulate your achievements."

Federal support is made possible by memorandum of understanding (MOU) between the state and the DOE that gives Hawaii access to the resources of the National Renewable Energy Laboratory (NREL) and the other national laboratories.

Moniz was encouraged that DOE and HSEO staff were already collaborating to appropriately align utility modeling with state energy policy. The data visualization capabilities of the Center for Advanced Energy Studies at Idaho National Laboratory and the Insight Center at NREL's Energy Systems Integration Facility will provide an exciting opportunity to broaden the reach of complex energy systems modeling by HSEO.

Maintaining a balance of distributed and utility-scale renewables appears to provide the best value to all ratepayers.

COST COMPETITIVE - Making renewable energy cost-competitive with oil-fired generation eases the state's clean energy transformation. Technological innovation, expanded manufacturing and increased competition have lowered prices for wind and solar energy in Hawaii and across the globe, and the cost of energy for distributed PV is expected to continue falling even with the likely phase-out of tax credits, according to a report from the Rocky Mountain Institute. However, as prices for PV continue to tumble, Hawaii's utilities approach the limit of rooftop solar power they can absorb into their grids. For distributed systems, a crucial question is when solar-plus-battery grid parity will be a reality for Hawaii.

Utility-scale generation costs are also trending lower in Hawaii. Hawaiian Electric Co. recently signed power purchase agreements as low as 11 cents per kilowatt-hour (kWh) for solar and 15 cents per kWh for wind. And on the Garden Isle, the Kauai Island Utility Cooperative (KIUC) signed a power purchase agreement (PPA) to pay a developer 14.5 cents per kWh for power from a 13 MW battery-backed solar farm touted as the first fully-dispatchable solar PV plant in the U.S. Maintaining a balance of distributed and utility-scale renewables appears to provide the best value to all ratepayers.

MODEL FOR CLEAN ENERGY INNOVATION - The KIUC solar farm is one of several projects that distinguish Hawaii as a leader in clean energy innovation. The 52 MWh battery system will feed up to 13 MW of electricity onto the grid to "shave" the amount of conventional power generation needed to meet the evening peak, from 5:00 pm to 10:00 pm. Under the terms of the 20-year PPA, KIUC will pay a lower rate than the current cost of conventional generation and only slightly more than the cost of energy from KIUC's two existing 12 MW solar arrays, which are limited to daytime-only output.

$342 MILLION RAISED
IN FOLLOW-ON FUNDING

On Oahu, Hawaiian Electric Co. is working with a half dozen technology partners on System to Edge-of-Network Architecture and Management System (SEAMS), a federally funded project aimed at better integrating and managing the impact of PV panels and storage systems on the grid. SEAMS combines short-term forecasting and weather prediction tools to provide grid-responsive controls to link distributed energy resources with the larger utility system. One of the partners in the SEAMS project is Stem, a technology firm participating in Hawaii's leading energy incubator, the Energy Excelerator. Stem uses innovative software and banks of lithium-ion batteries to manage electricity in buildings and save energy costs. Stem is just one of 42 Energy Excelerator portfolio companies that have raised $342 million in follow-on funding since the incubator's launch in 2013.

HCEI MAX - The foundation on which Hawaii's clean energy transformation is being built is the Hawaii Clean Energy Initiative (HCEI). HCEI has grown stronger during the course of three gubernatorial administrations and four biennial legislative sessions. The initiative was launched in 2008 under a landmark partnership between the state of Hawaii and the DOE. The two sides recommitted to the initiative under a second Memorandum of Understanding signed in 2014, and it was rebranded as HCEI MAX to reflect Hawaii's leadership in setting bold goals, including a 100 percent target for renewable energy in the electricity sector.

More than a collection of statutes and regulations, HCEI is the web connecting the diverse group of stakeholders who have joined together to deliver Hawaii's clean energy future. Electric utilities, their customers, energy companies, special interests, non-profits and policymakers are all working toward energy self-sufficiency for Hawaii. The state is well ahead of schedule in meeting both its RPS and EEPS, testament to HCEI's positive results in the electricity sector.

Maintaining progress with the RPS and EEPS will remain a priority for HCEI, but its focus has been broadened to cover another important piece of Hawaii's energy puzzle: reducing fossil fuel use in the transportation sector. The convening of a transportation charrette in 2014 and subsequent publication of the HCEI Transportation Energy Analysis in 2015 allowed HSEO to chart an energy in transportation roadmap that will guide future efforts.

Decarbonizing energy in transportation requires even broader stakeholder alliances and more difficult choices than encountered in the utility sector. Fortunately, HSEO has the support of the Hawaii State Department of Transportation, which has formed a Sustainable Transportation Forum to bring in more stakeholders to make commitments on various tactics identified in the HTEA report for reducing fossil fuel use in transportation.


$342
MILLION
IN FOLLOW-ON FUNDING
FOR 42 ENERGY EXCELERATOR
PORTFOLIO COMPANIES
SINCE 2013.

ENERGY EFFICIENCY DEPLOYMENT

THE CLEANEST ENERGY

Reducing Energy Usage Saves Money and the Environment

According to the U.S. Energy Information Administration, "In 2015, about 40 percent of total U.S. energy consumption was consumed in residential and commercial buildings..." Buildings are major consumers of energy and present significant opportunities to reduce energy consumption and increase energy efficiency. Realizing those opportunities enhances the triple bottom line of increased energy savings, improved economic benefit, and a cleaner environment. A well-designed and managed building provides occupants with better indoor air quality and lighting for improved well-being and greater productivity. Putting efficiency first is the smartest, most cost-effective action to reduce energy use in a building.

SELF-FUNDING ENERGY SAVINGS

Energy Performance Contracting is a Smart Investment

Energy Performance Contracting (EPC) finances energy and water efficiency improvements with the future savings from the energy and water conservation measures installed. Under an EPC, the energy service company contracted for the conservation measures will guarantee the savings or pay for the shortfall. EPC lets government agencies maximize their energy investments because they can include deferred maintenance and performance period maintenance services under a single contract with guaranteed savings measures. The economic impacts of performance contracting are significant, providing great value to the state.

RACE TO THE TOP AWARD - For the fifth year in a row, the Energy Services Coalition (ESC) ranked Hawaii first in the nation in government energy performance contracting (EPC) for 2016. Hawaii's $325.25 per capita investment beat out second place Kentucky ($172.84), third place Delaware ($154.47) and far outpaced the national average ($53.93).

The award recognizes Hawaii for its outstanding achievements in energy efficiency, environmental stewardship and economic development through EPC. Since HSEO started the performance contracting program in 1996, state and local government agencies have signed a total of over $442.4 million in performance contracts that are estimated to save in excess of $1.1 billion over the life of the contracts. These savings are the equivalent of powering 368,426 homes for one year. The projects comprise over 96 million square feet in 225 buildings or facilities.

ENERGY SERVICES COALITION RANKING			
State	**Population**	**Performance Contracting**	**Dollars per Capita**
1. Hawaii	1,360,301	$442,432,189.00	$325.25
2. Kentucky	4,339,367	$750,000,000.00	$172.84
3. Delaware	897,934	$138,707,463.00	$154.47
4. Massachusetts	6,547,629	$865,349,091.00	$132.16
5. Ohio	11,536,504	$1,252,683,627.00	$108.58
National Average Per Capita: $53.93			

*ESC is a national nonprofit organization of experts working together to increase energy efficiency and building upgrades through energy performance contracting.

BUILDING BETTER BUILDINGS - On September 10, 2013, HSEO became a partner in the DOE's Better Buildings Initiative, a national leadership initiative calling on state and local officials to "make substantial commitments to improve the energy efficiency of their buildings and plants, save money, and increase competitiveness." HSEO joined the Better Buildings Performance Contracting Accelerator "to significantly expand the use of performance contracting by state and local governments ... to catalyze public sector energy efficiency investments of $2 billion from January 2013 to December 2016..." The partnership committed the state to executing $300 million in performance contracting within the three-year period. As of summer 2016, HSEO had led Hawaii to nearly 95 percent of the target, working with agencies to sign over $283.98 million in performance contracts. As additional performance contract projects are under discussion, there is a good chance the state will exceed HSEO's goal.

Better Buildings Performance Contracting Accelerator Progress	
Department of Transportation (Airports/Highways/Harbors)	$244,804,877
City and County of Honolulu, Board of Water Supply	$33,125,198
City and County of Honolulu, Kailua Wastewater Treatment Plant	$6,054,178
Total January 2013 to Date	**$283,984,253**

The largest single performance contract in the nation is worth $158 million, signed by the Hawaii Department of Transportation – Airports. Using EPC, 12 of the state's 15 airports statewide will be updated with the latest in energy efficient and green technology. The project is projected to reduce energy use overall by 49 percent.

Improvements will include:

- Replacing 74,500 light fixtures and 372 transformers
- Installing 9,100 solar photovoltaic panels (about 2.7 MW)
- Upgrading and replacing chilled water and air conditioning systems
- Installing smart controls
- Addressing deferred maintenance such as roof repairs to accommodate the upgrades

At signing, the projected economic benefits over the two-year construction period and eighteen-year performance period included:

- Over $518 million guaranteed savings in energy costs; actual savings realized are now estimated to be 8 percent higher.
- $20.3 million in tax revenues (in 2015 dollars).*
- $153.1 million in income to households (in 2015 dollars).*
- 867 jobs generated or supported each year during the first two years of construction and installation and an average of 63 jobs generated or supported each year during the following 18 years of the performance period.*

*Source: DBEDT Research & Economic Analysis Division

STATE AND COUNTY PERFORMANCE CONTRACTING - The chart below illustrates the number of EPC projects conducted by state and county agencies from 1996 through 2015. In addition, over $8 million in rebate incentives have been claimed from Hawaii Energy, reducing the cost of the energy efficiency improvements through performance contracting projects. Looking ahead, the state anticipates more EPC investments.

STATE AND COUNTY ENERGY PERFORMANCE CONTRACTS

Agency	Year(s)	Contract Amount	Estimated Savings Over Life of Contract
UH-Hilo	1996-2012	$6,402,695	$14,630,066
County of Hawaii	1997-2026	$2,215,546	$8,157,880
County of Kauai	1998-2012	$525,965	$1,205,990
C&C of Honolulu	2001-2025	$11,900,205	$36,066,761
Hawaii Health Systems Corporation	2002-2022	$21,936,997	$55,766,364
Judiciary	2003-2012	$1,474,406	$9,785,036
Department of Accounting and General Services Phase I	2009-2029	$36,873,266	$72,580,767
Department of Public Safety	2010-2030	$25,511,264	$57,211,112
University of Hawaii Community Colleges	2012-2032	$34,207,392	$37,000,000
C&C Honolulu Kailua Wastewater Treatment Plant	2013-2033	$6,054,178	$13,693,910
Department of Accounting and General Services Phase II	2013-2033	$17,400,000	$28,000,000
Department of Transportation	2013-2035	$244,804,877	$730,027,690
Honolulu Board of Water Supply	2016-2036	$33,125,398	$56,173,154
	TOTAL	**$442,432,189**	**$1,120,298,730**

Source: Hawaii State Energy Office

For nearly 20 years, HSEO has been leading the state's award-winning EPC efforts with a policy offering technical assistance to state agencies contemplating performance contracting. HSEO has assisted the following entities:

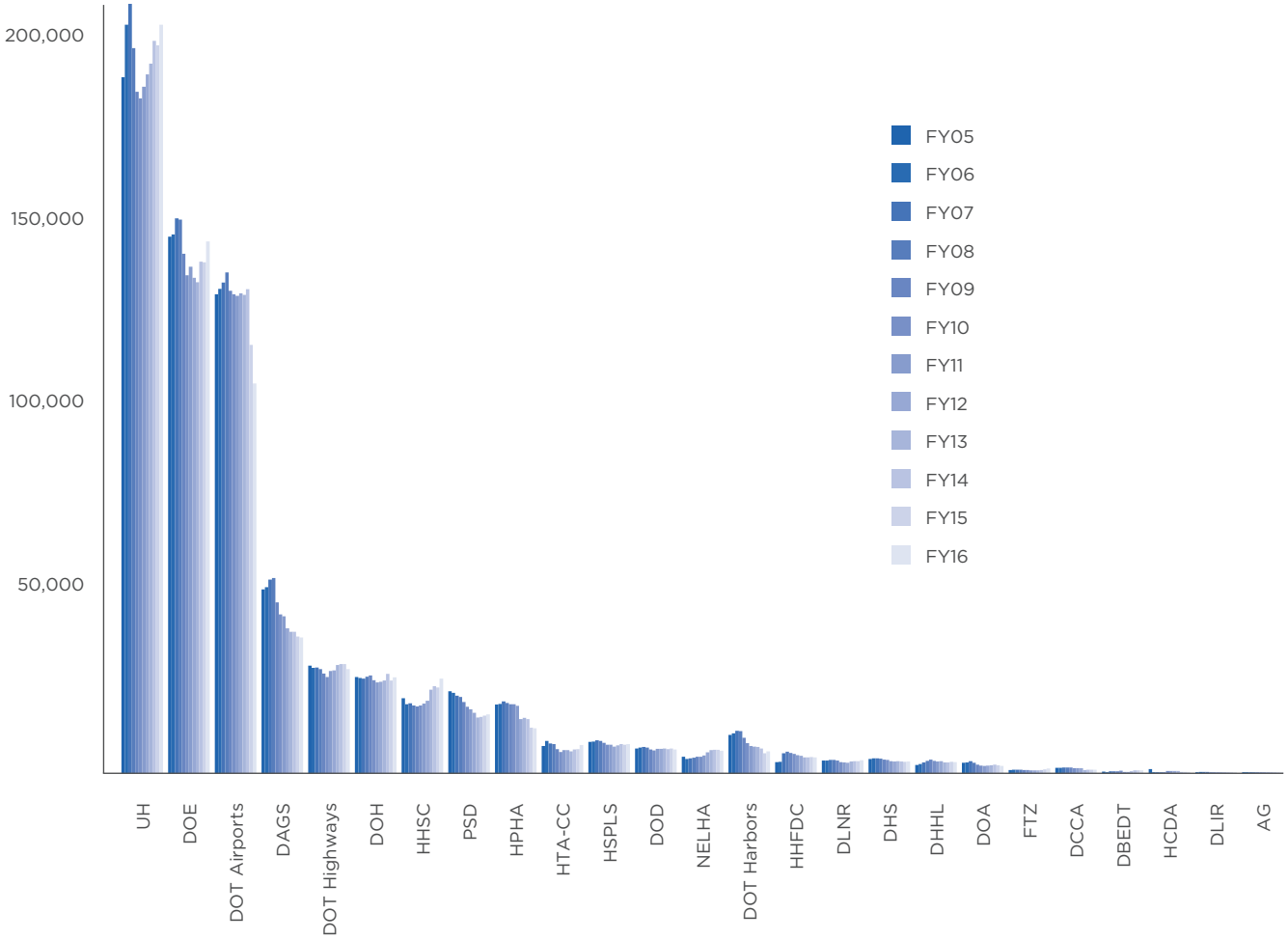
- University of Hawaii at Hilo
- Hawaii Health Services Corporation
- City and County of Honolulu's four city buildings and Kailua Wastewater Treatment Facility
- County of Hawaii
- County of Kauai
- The Judiciary
- Department of Accounting and General Services (DAGS)-Phase I-10 large office buildings
- University of Hawaii Community Colleges
- Department of Public Safety's four large facilities
- Department of Transportation-Airports, Highways and Harbors
- DAGS Phase II -33 buildings
- Honolulu Board of Water Supply

The types of technical assistance offered include:

1. Assisting an agency in compiling building plans and other information to use in solicitations
2. Reviewing draft solicitations
3. Evaluating proposed energy conservation measures, including renewable and water efficiency measures
4. Setting energy performance baselines
5. Reviewing methods for estimating energy savings (including formulas and simulation models); measurement and verification
6. Reviewing investment grade energy audits
7. Reviewing draft contract documents
8. Advising on commissioning
9. Advising on how project risks can be allocated and minimized for the state agency

LEAD BY EXAMPLE - In 2006, legislative and executive mandates to incorporate energy and resource efficiency and conservation in government facilities, fleets and personnel practices gave impetus to the state's Lead by Example (LBE) initiative to put state agencies at the forefront of energy independence efforts. As shown in the graph below, Hawaii state agencies' electricity consumption through 2016 has declined 5.3 percent from 2005 (the baseline year). Due to staff reductions, HSEO will no longer provide a special report on LBE, but electricity use by state agencies will continue to be tracked and reported.

ENERGY CONSUMPTION BY STATE AGENCIES



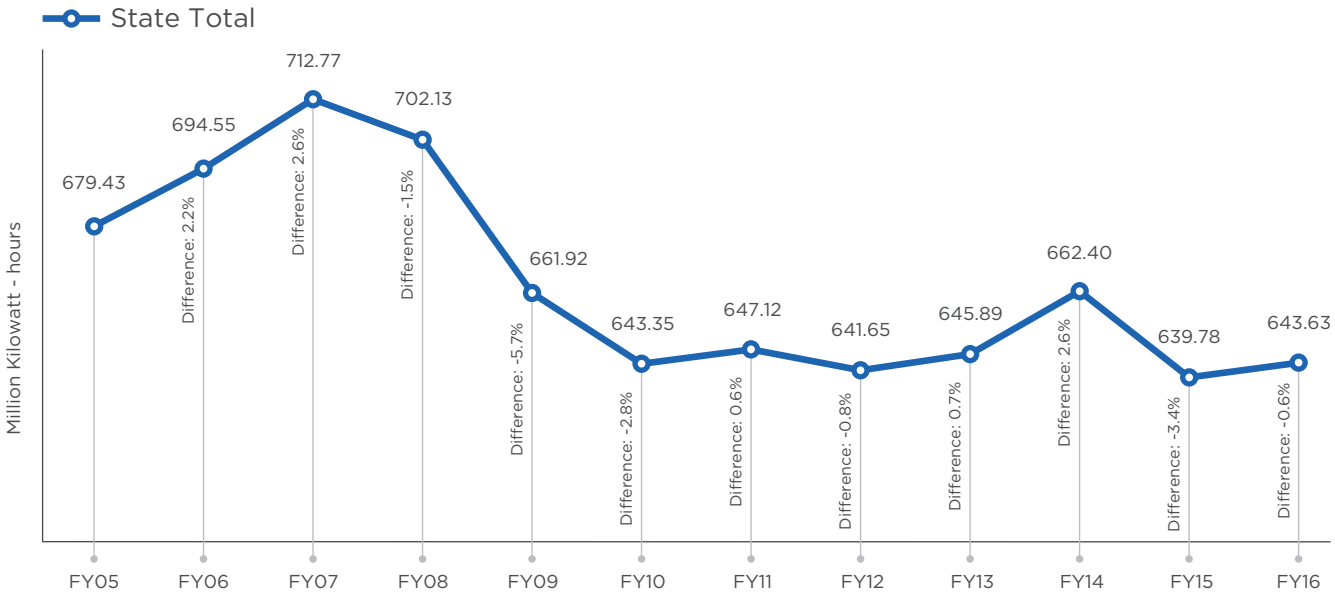
Sources: DBEDT Research & Economic Analysis Division; Utility (HECO, MECO, HELCO, & KIUC) Billing data

ABBREVIATION	NAME OF STATE AGENCY
AG	Department of the Attorney General
DAGS	Department of Accounting and General Services
DBEDT	Department of Business, Economic Development & Tourism
DCCA	Department of Commerce and Consumer Affairs
DHHL	Department of Hawaiian Home Lands
DHS	Department of Human Services
DLIR	Department of Labor and Industrial Relations
DLNR	Department of Land and Natural Resources
DOA	Department of Agriculture
DOD	Department of Defense
DOE	Department of Energy
DOH	Department of Health

ABBREVIATION	NAME OF STATE AGENCY
DOT Airports	Department of Transportation/Airports Division
DOT Harbors	Department of Transportation/Harbors Division
DOT Highways	Department of Transportation/Highways Division
FTZ	Foreign-Trade Zone Division
HCDA	Hawaii Community Development Authority
HHFDC	Hawaii Housing Finance & Development Corporation
HHSC	Hawaii Health Systems Corporation
HPHA	Hawaii Public Housing Authority
HSPLS	Hawaii State Public Library System
HTA-CC	Hawaii Tourism Authority – Convention Center
NELHA	Natural Energy Laboratory of Hawaii Authority
PSD	Department of Public Safety
UH	University of Hawaii

POWERING DOWN

State and County Agency Electricity Consumption



Sources: DBEDT Research & Economic Analysis Division; Utility (HECO, MECO, HELCO, & KIUC) Billing data

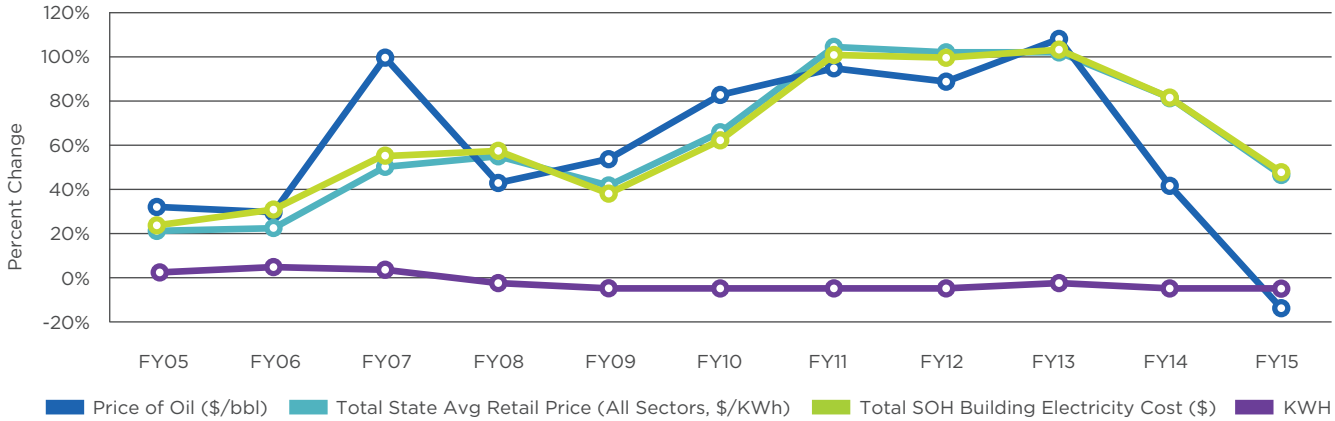
DOWNWARD TREND

Statewide Electricity Consumption Since 2005

Percentage change in energy consumption, from baseline (2005) and each following year. Shown are the price of oil, the average retail price of electricity*, total statewide electricity costs and electricity consumption (kWh).

Since 1996, state agencies have received more than $11.15 million in efficiency rebates from Hawaii Energy, the Hawaiian Electric Company and its subsidiaries. Combined, these rebates have resulted in more than $196.68 million estimated cumulative dollar savings and 1.1 billion Kwh electricity savings. Over the life of the equipment, the savings would be enough to power approximately 172,086 households for a year. In 2016, state agencies received $1.59 million in rebates.

**Based on U.S. Energy Information Administration 826 reporting, dividing utility total revenues by total kWh sold, including fuel adjustment cost.*



Sources: NYMEX WTI Future Price; EIA-826 ; Utilty (HECO, MECO, HELCO, & KIUC) Billing data

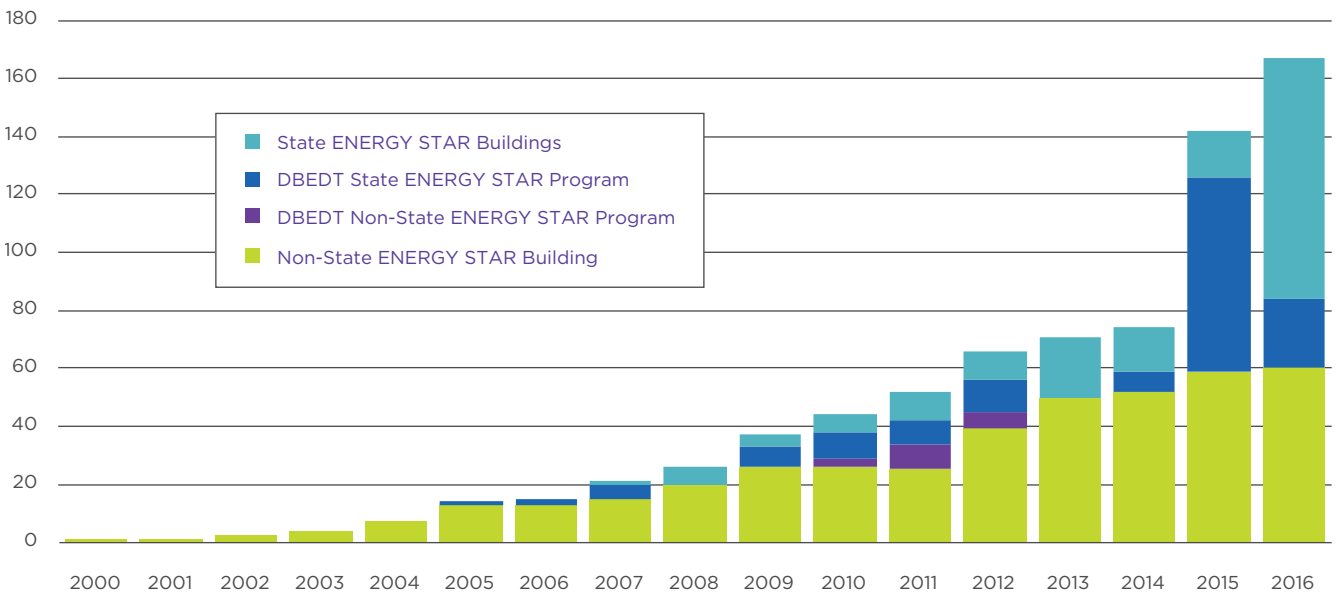
STARRING HAWAII

Energy Star Buildings, Statewide

ENERGY STAR® BUILDINGS - To help identify energy efficiency investment priorities, agencies and private sector building owners and managers can benchmark buildings to compare energy usage with other buildings in their portfolio or similar buildings nationally. If a building's performance, as reflected in its ENERGY STAR score, ranks in the top 25 percent of all buildings of its type, it can be certified as an ENERGY STAR building.

The chart below shows the rapidly increasing number of ENERGY STAR certified buildings in Hawaii. To qualify for certification, a building must meet ENERGY STAR requirements as verified by a licensed professional engineer or architect. The U.S. Environmental Protection Agency (EPA) then evaluates the verification submitted and, if approved, will officially certify the applicant as an ENERGY STAR building. Since 2000, 166 Hawaii buildings have received the ENERGY STAR certification, including 103 public and 63 private buildings. During this time, HSEO has helped benchmark 83 state facilities. Because energy use is constant, buildings should be verified and certified as ENERGY STAR annually to ensure optimum efficiency.

In 2016, Hawaii communities appeared in the EPA's ENERGY STAR Top Cities rankings. Honolulu ranked 22nd of the Top 25 Cities, with 69 buildings totaling over 9.6 million total square feet, saving $23 million a year. Honolulu also ranked second among Top Mid-Size Cities. Among Top Small Cities, Hilo ranked 8th with 9 buildings and Kahului/Wailuku/Lahaina ranked 9th with 8 buildings.



Sources: Hawaii State Energy Office, U.S. Environmental Protection Agency

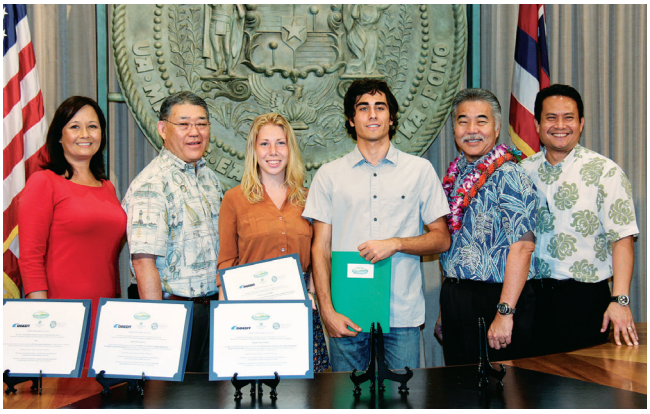
LEANER, GREENER BUSINESS

Going Green Helps the Environment and the Bottom Line

HAWAII GREEN BUSINESS PROGRAM - Hawaii's businesses are also contributing to the clean energy movement by improving their operations in an environmentally, culturally and socially responsible manner. To help businesses implement energy and resource efficiency practices, the state set up the Hawaii Green Business Program as a partnership between HSEO, the Department of Health, the Board of Water Supply and the Chamber of Commerce of Hawaii. When businesses embrace green business practices, they don't just enjoy utility cost savings – they also contribute to Hawaii's collective energy independence goals and, ultimately, a more sustainable environment.

From 2009-2016, over 100 business and government entities have benefited from the program, including sectors such as hospitality, commercial office, retail, restaurant, food services, grocery, venue and green events. Their savings amounts to:

- 18.532 million kWh of energy (equivalent to powering 2,886 homes for one year in Hawaii)
- 94.4 million gallons of water
- $4.967 million in energy costs



Hawaii Green Business Award presented to the University of Hawaii at Manoa 4th Annual Sustainability in Higher Education Summit.

Hawaii Green Business Award presented to the Sheraton Princess Kaiulani Hotel.

IUCN WORLD CONSERVATION CONGRESS, HAWAII 2016 – In preparation for the International Union for Conservation of Nature's (IUCN) 2016 World Conservation Congress in Hawaii. the Hawaii Green Business Program team worked with the Hawaii Lodging and Tourism Association, the IUCN's Green Team and the Sustainability Working Group in Hawaii, to ensure that the event's lodging partners were properties participating in the Hawaii Green Business Program or the IUCN's Green Hotels Initiative.

A total of 16 entities were recognized in the Hawaii Green Business Program Governor's Award ceremonies in 2016, achieving the IUCN's Green Hotels Initiative level one, two or three designation by completing the Green Hotel Checklist, participating in a verification site visit, committing to mentoring at least one other business and presenting at the Annual Green Hotel Forum.

HSEO has doubled the number of ENERGY STAR buildings in Hawaii.

U.S. DEPARTMENT OF ENERGY COMPETITIVE AWARD – The state submitted a winning proposal to a national competition conducted by the DOE, garnering a $350,000 award to implement a project to strengthen whole building retrofit energy efficiency programs, identify best practices, develop a database of over 500 state facilities and explore financing options for energy savings. The proposed project will:

- Benchmark buildings under the U.S. Environmental Protection Agency's Energy Star Portfolio Program Manager guidelines
- Train state building managers to benchmark buildings and implement energy efficiency best practices
- Conduct a gap analysis of energy efficiency opportunities
- Present a showcase project to represent Hawaii
- Develop an implementation model for benchmarking and data baselining
- Score 65 buildings according to the USDOE's Asset Scoring Tool

As of mid-2016, through this competitive award, HSEO has doubled the number of ENERGY STAR buildings in Hawaii, including 83 school campuses' ENERGY STAR certifications. The project has allowed HSEO to gather as much data as possible to benchmark nearly 300 properties with over 900 buildings.

HAWAII ENERGY BUILDING CODE - On July 14, 2015, the State Building Code Council (SBCC) unanimously voted to adopt the International Energy Conservation Code (IECC) 2015, with the Tropical Climate Zone Code for residential dwellings and other amendments appropriate for Hawaii's climate.

HSEO serves on the SBCC, which was established by statute to update building codes. With the unanimous adoption of the IECC 2015, HSEO developed Hawaii Administrative Rules to codify the IECC 2015. HSEO provided IECC 2015 technical assistance and staff training for over 300 private and public sector design professionals and county building officials. HSEO will also testify in support of IECC 2015 when the county councils hold public hearings on their adoption.

These savings could power 732,514 homes in 2036, assuming the code is adopted by all counties.

The estimated net savings from the 2015 IECC with Hawaii amendments is 12,962 MWh in 2016, 1,083,590 MWh in 2026 (year 10), 1,991,059 MWh in 2030 and 4,702,738 MWh in 2036 (year 20). These savings could power 732,514 homes in 2036, assuming the code is adopted by all counties.

Commercial Code Savings: Commercial buildings would achieve a 35-40 percent energy saving by adopting the base 2015 IECC with references to ASHRAE 90.1-2013 (compared to 2006 HEC with references to ASHRAE 90.1-2004). Amendments under consideration by HSEO will further increase potential energy savings.

Residential Code Savings: Fully conditioned 2015 IECC residences would achieve a 1 to 3 percent improvement in energy efficiency.

HSEO's website has more information on the updated energy code at energy.hawaii.gov/hawaii-energy-building-code, including a report on the analysis of the code amendments, FAQs gathered from the various training sessions statewide, presentation webinars, fact sheets and a report forecasting the energy savings for the updated code.

Energy savings over the life of the equipment is equivalent to powering 4,650 households in one year.

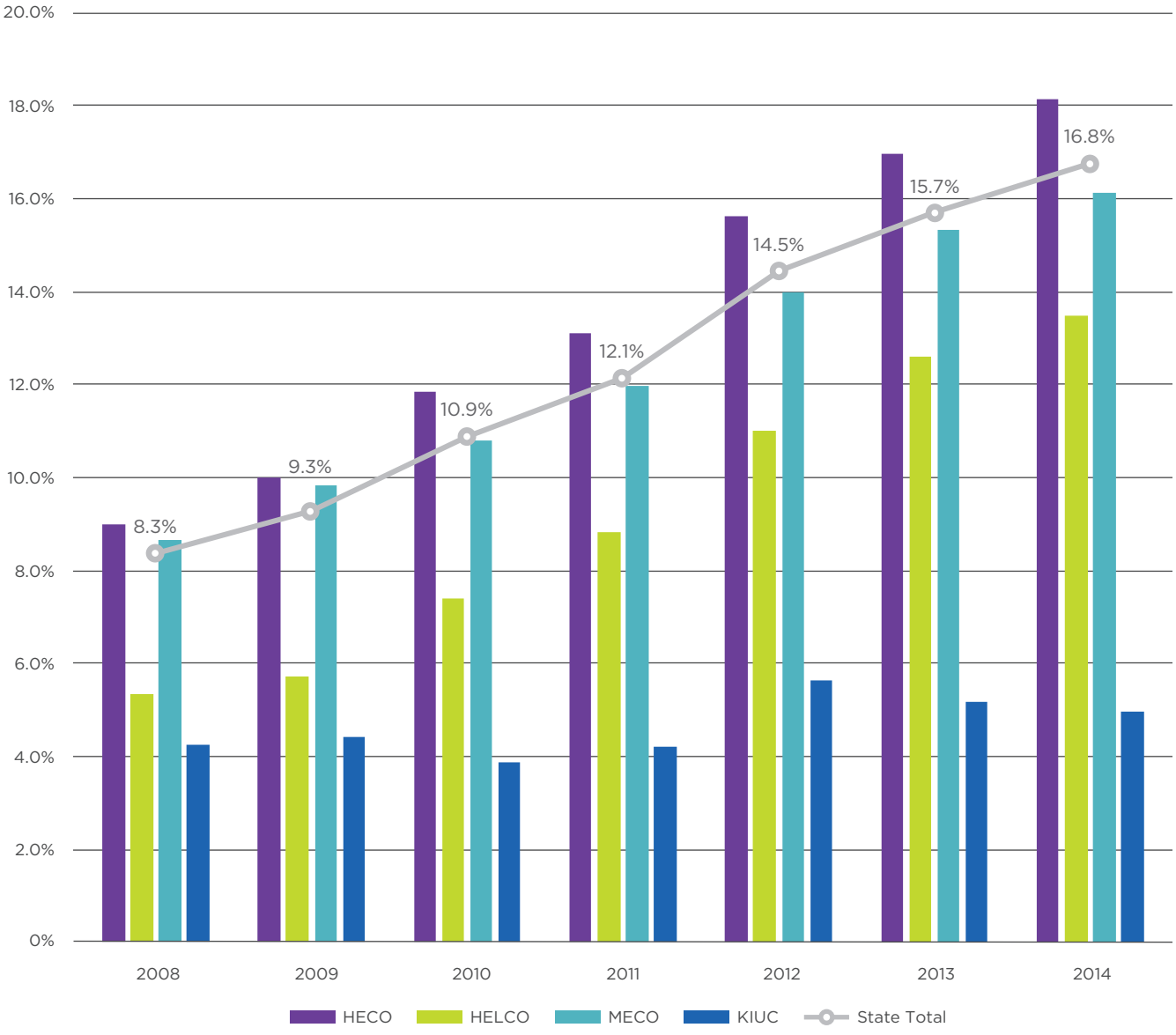
GREENSUN HAWAII LOAN PROGRAM – The GreenSun Hawaii Loan Loss Reserve Program was established with American Recovery and Reinvestment Act of 2009 (ARRA) funds and was successful in issuance of 204 loans totaling over $4.8 million. For three years, the GreenSun Hawaii program helped extend loan availability to a larger pool of Hawaii property owners for energy efficiency and renewable energy retrofits to their homes, apartment complexes, and facilities. It did so by providing local financial institutions with access to a DOE-funded loan loss reserve that could cover up to 100 percent of actual losses. The public-private partnership had the ability to leverage $4.25 million in federal funds into $85 million in energy efficiency and renewable energy equipment loans statewide. The 204 GreenSun Hawaii loans will save 29.9 million kWh of electricity over the life of the installations, which will save participants in excess of $13.2 million over the life of the installations and reduce CO2 by 2,247,000 lbs. annually (44.9 million lbs. over the life of the installations). Energy savings over the life of the equipment is equivalent to powering 4,650 households in one year.

Due to changes in the ARRA finance program rules, GreenSun Hawaii program funds can be repurposed for broader uses pursuant to the rules of DOE's Energy Efficiency and Conservation Block Grant Program.

ENERGY EFFICIENCY PORTFOLIO STANDARDS - Per legislative changes that took effect on January 1, 2015, RPS reporting no longer includes EEPS. Under HRS 269-96, relating EEPS, the PUC is responsible for establishing standards that will maximize cost-effective energy-efficiency programs and technologies.

EEPS levels from 2008-2014 appear below; the original goal for EEPS was a reduction of electricity consumption by 4,300 gigawatt-hours by 2030. HSEO held stakeholder meetings in the fall of 2016 to discuss the status of EEPS.

HAWAII ENERGY EFFICIENCY PORTFOLIO STANDARDS (EEPS)

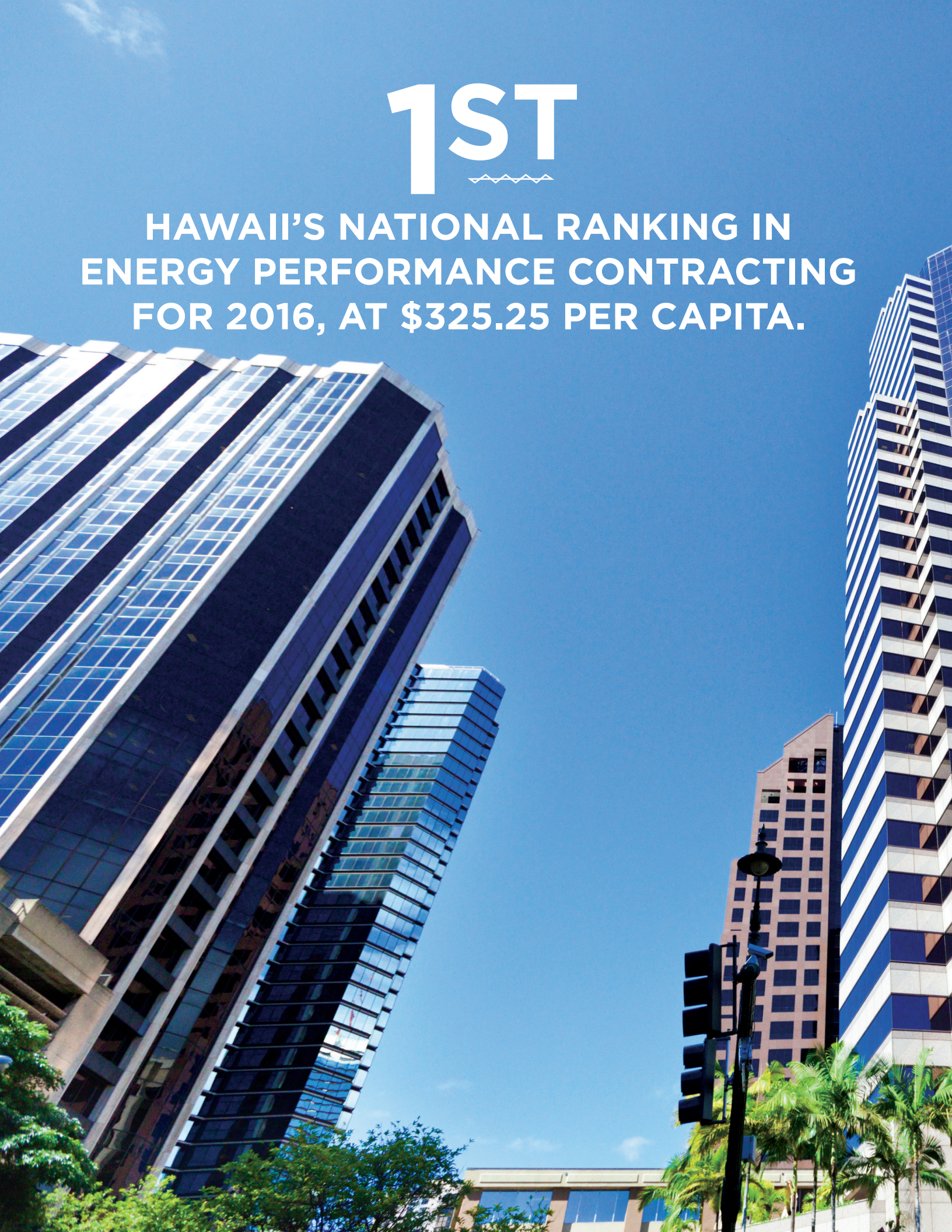


Source: Renewable Portfolio Standards Status Reports, 2008-2014 (Hawaii Public Utilities Commission)

HAWAII'S NATIONAL RANKING IN ENERGY EFFICIENCY

2016 ENERGY STAR® Top Cities

- Top 25 Cities: Honolulu 22nd
- Top Mid-Size Cities: Honolulu 2nd
- Top Small Cities: Hilo 8th, Kahului, Wailuku, Lahaina 9th


1ST
HAWAII'S NATIONAL RANKING IN ENERGY PERFORMANCE CONTRACTING FOR 2016, AT $325.25 PER CAPITA.

RENEWABLE ENERGY DEPLOYMENT

HAWAII'S NATURAL ADVANTAGE

Using Renewable Energy to Change Hawaii and the World

If you were able to pick and choose the ideal natural elements for a renewable energy Mecca, what you'd end up with would be much like Hawaii. With abundant sunshine, dependable trade winds, powerful oceans and waterfalls, a lush biosphere, and active volcanism, the Hawaiian Islands have a tremendous natural advantage in the race to secure a clean, renewable energy future. Crucially, those resources must be matched with the political will to effect an energy regime change and the technical acumen to make it possible. Everything is in place except for the last of those elements. As the information on the following pages makes clear, the state is assiduously working on numerous fronts to solve the technical challenges that remain before the potential of Hawaii's natural gifts can be realized and Hawaii can take its place as a clean energy paradise.

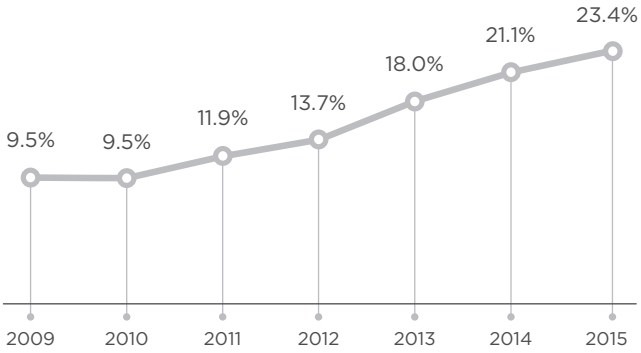
MOVING THE NEEDLE

Renewable Energy Portfolio Standards Progress

IN 2015 EACH ISLAND CONTINUED TO ADVANCE TOWARDS THE STATE'S LANDMARK GOAL TO BE 100 PERCENT RENEWABLE IN ELECTRICITY SALES BY 2045. KIUC FOR EXAMPLE, EXPERIENCED A STAGGERING JUMP IN RPS FROM 17.5 PERCENT IN 2014 TO 27.3 PERCENT IN 2015.

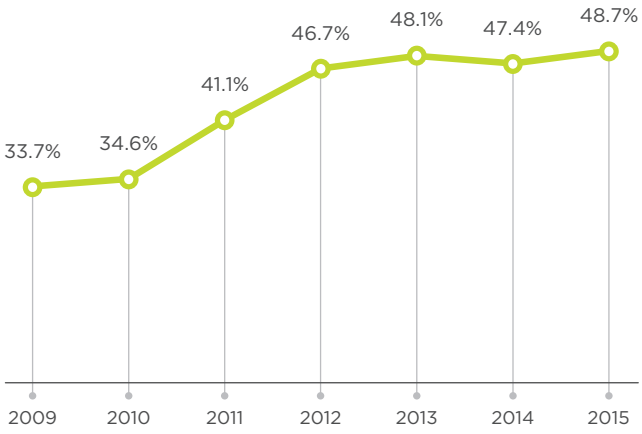
STATE TOTAL

RPS Level (%)



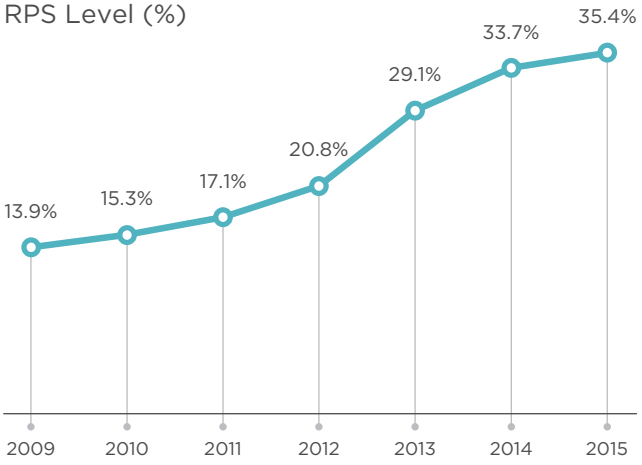
HELCO

RPS Level (%)



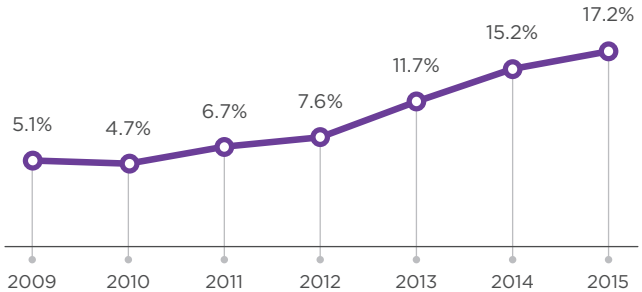
MECO

RPS Level (%)



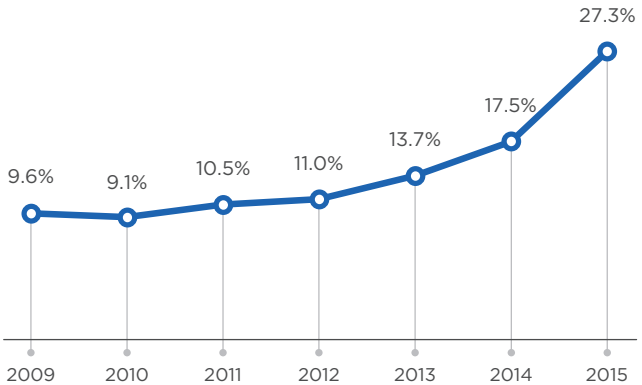
HECO

RPS Level (%)



KIUC

RPS Level (%)

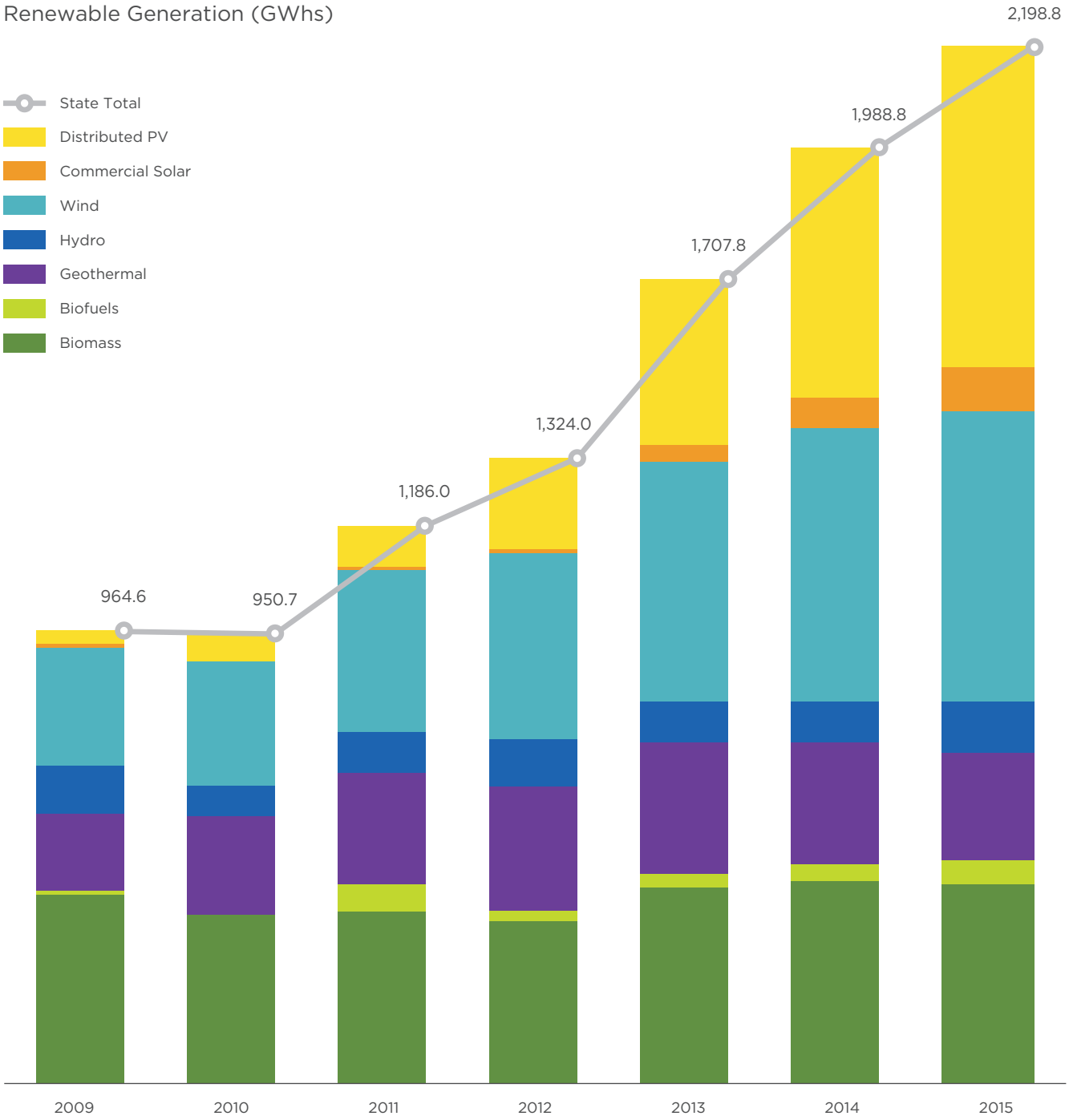


Source: Renewable Portfolio Standards Status Reports, 2009-2015 (Hawaii Public Utilities Commission)

BEING RESOURCEFUL

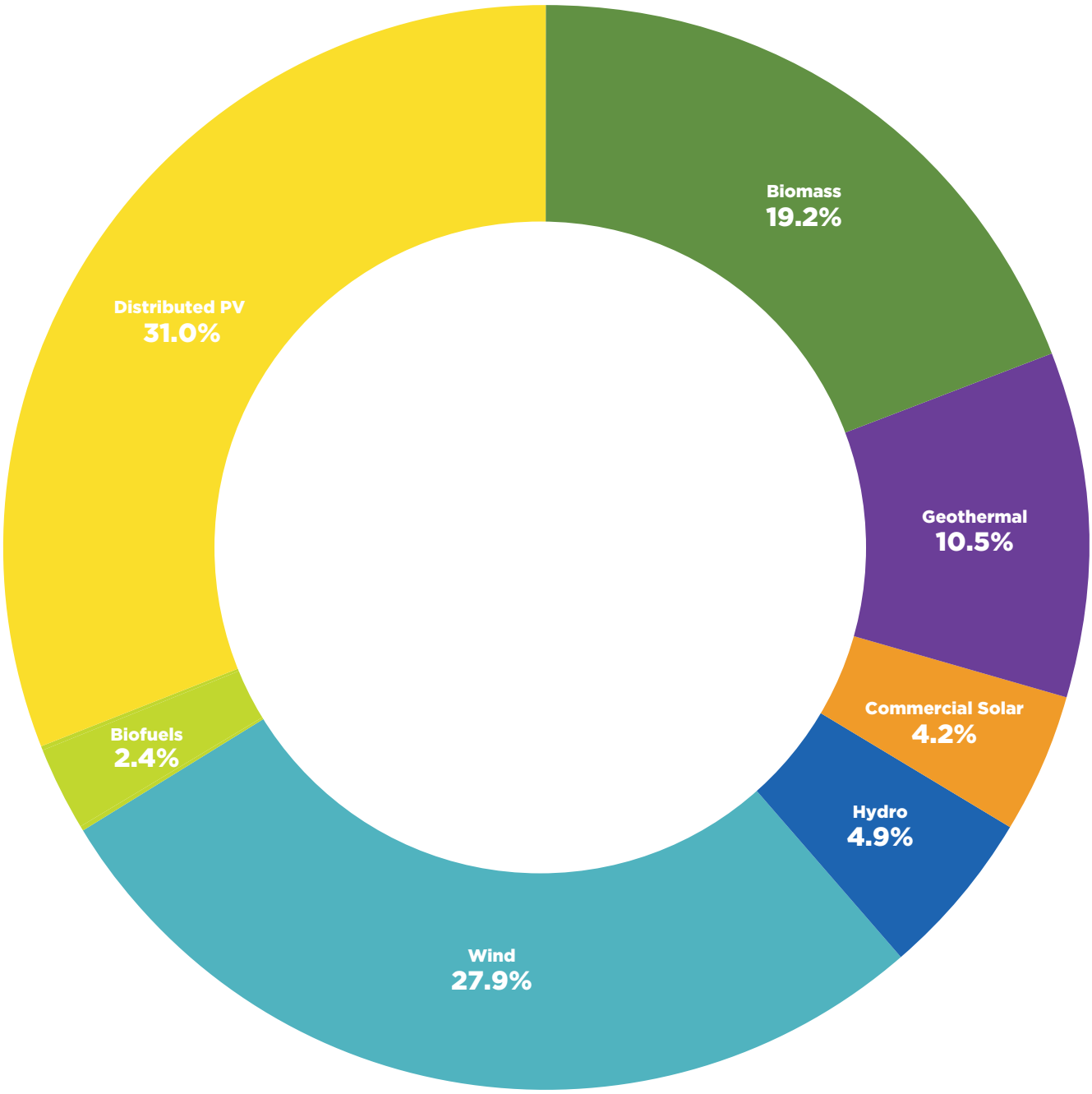
Renewable Energy Generation by Resource

HAWAII'S MIX OF RENEWABLE ENERGY IN 2015 CONTINUED TO FAVOR DISTRIBUTED AND COMMERCIAL SOLAR AS WELL AS WIND, WITH GAINS MORE THAN OFFSETTING DECLINES IN GEOTHERMAL AND BIOMASS GENERATION.



Source: Renewable Portfolio Standards Status Reports, 2009-2015 (Hawaii Public Utilities Commission)

PERCENTAGE OF 2015 RENEWABLE ENERGY GENERATION FROM EACH RESOURCE

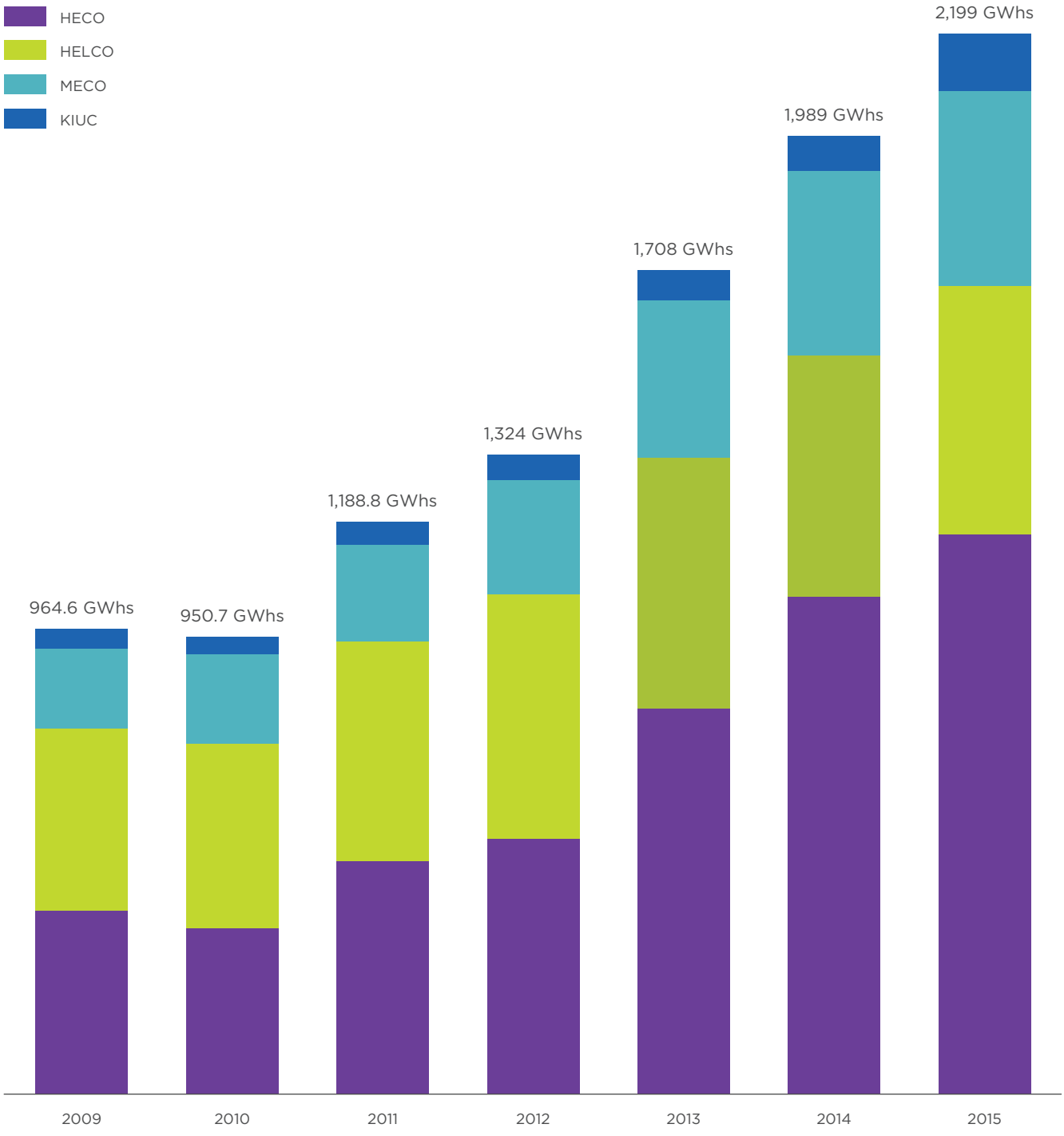


Source: Renewable Portfolio Standards Status Reports, 2009-2015 (Hawaii Public Utilities Commission)

LEVELING UP

Renewable Energy Generation by Utility

IN 2015, KIUC LED ALL UTILITIES IN RATE OF RENEWABLE GENERATION GROWTH, BOOMING 57.1 PERCENT WITH THE ADDITION OF 42,823 MWH SINCE 2014. HECO GENERATED 130,560 MWH OF ADDITIONAL RENEWABLE POWER, THE LARGEST NET INCREASE FOR ANY UTILITY AND A 12.7 PERCENT INCREASE OVER 2014 LEVELS.



Source: Renewable Portfolio Standards Status Reports, 2009-2015 (Hawaii Public Utilities Commission)

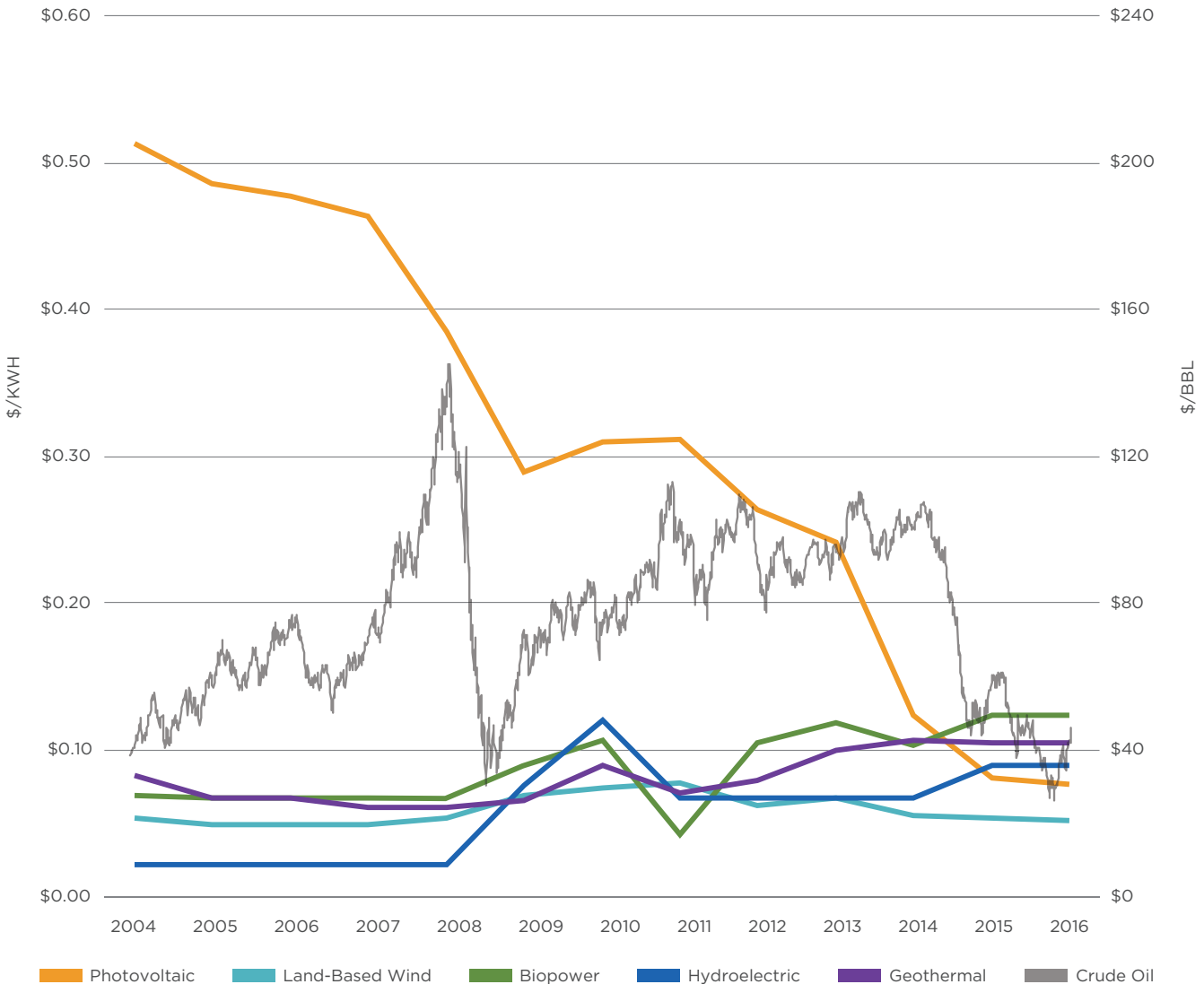
CLEANER AND MORE STABLE

Cost of Energy Resources

Renewables are not only kinder to the environment, they largely remove the element of price volatility of oil that can hurt the economy. Unpredictable and changing oil prices can delay business investment, force costly reallocation of resources, reduce consumer spending and slow job growth. Long-term fixed contracts for renewable energy, by comparison, lock in stable, predictable prices over time. As these charts show, renewable energy prices are continuing to trend lower, with solar playing a pivotal role both on the Mainland and in Hawaii.

VOLATILITY OF OIL VS. STABILITY OF RENEWABLES – U.S., 2004-2016

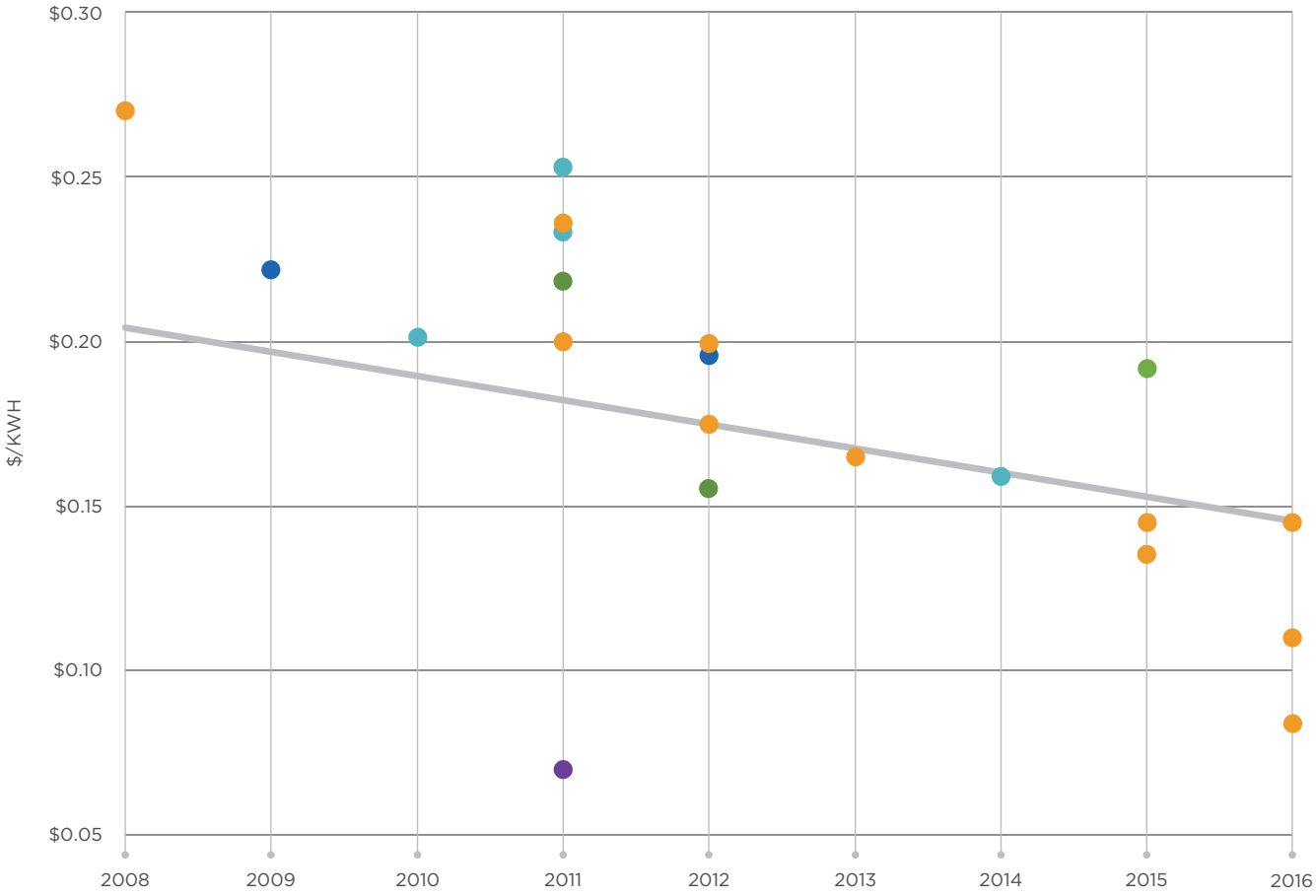
This graph compares the volatile crude oil market versus the stable – and in some cases declining – renewable energy market in the U.S. As the graph measures oil in dollars per barrel and renewables in dollars per kilowatt hour, it is meant to be directional and does not serve to compare the prices against one another.



Sources: Renewable energy pricing 2004 to 2014 from Open Energy Information's Transparent Cost Database: en.openei.org/apps/TCDB/. Renewable energy pricing 2015 to 2016 from NREL's 2016 Annual Technology Baseline: nrel.gov/analysis/data_tech_baseline.html. Crude oil pricing from Energy Information Administration (EIA): eia.gov/dnav/pet/pet_pri_spt_s1_d.htm.

HAWAII RENEWABLE ENERGY PRICING & AGGREGATE PRICE TRENDLINE 2008-2016

The renewable energy price trendline represents an aggregate power purchase agreement (PPA) price for all graphed renewable energy projects since 2008 with the assumption that all projects are equally weighted. PPA prices for each project have been approved by the Hawaii Public Utilities Commission (PUC) or have been submitted to the PUC for approval, and are averaged over the lifetime of the project without factoring in escalators or other adjustments.



ENERGY RESOURCE	PROJECTS
SOLAR	MP2, Kawailoa, Lanikuhana, Waiau PV, EE Waianae Solar, Kalaeloa RE Park, Kalaeloa Solar Two, Lanai Sustainability Research, KRS1, KRS2, Port Allen Solar, Kapaa Solar, KIUC/Solar City, West Loch, Kuia Solar and South Maui Renewable Resources Solar
WIND	Kahuku Wind, Na Pua Makani Wind, Kawailoa Wind and Auwahi Wind
GEOTHERMAL	Puna Geothermal Venture Expansion
HYDRO	Green Energy Hydro and Kauai Coffee/McBryde Sugar Co.
BIOMASS	Green Energy Team, H-POWER Expansion and Hawaiian Commercial & Sugar
RENEWABLE ENERGY PRICE TRENDLINE	

Source: Various PPAs filed with the PUC.

THE KEY TO A CLEAN ENERGY FUTURE

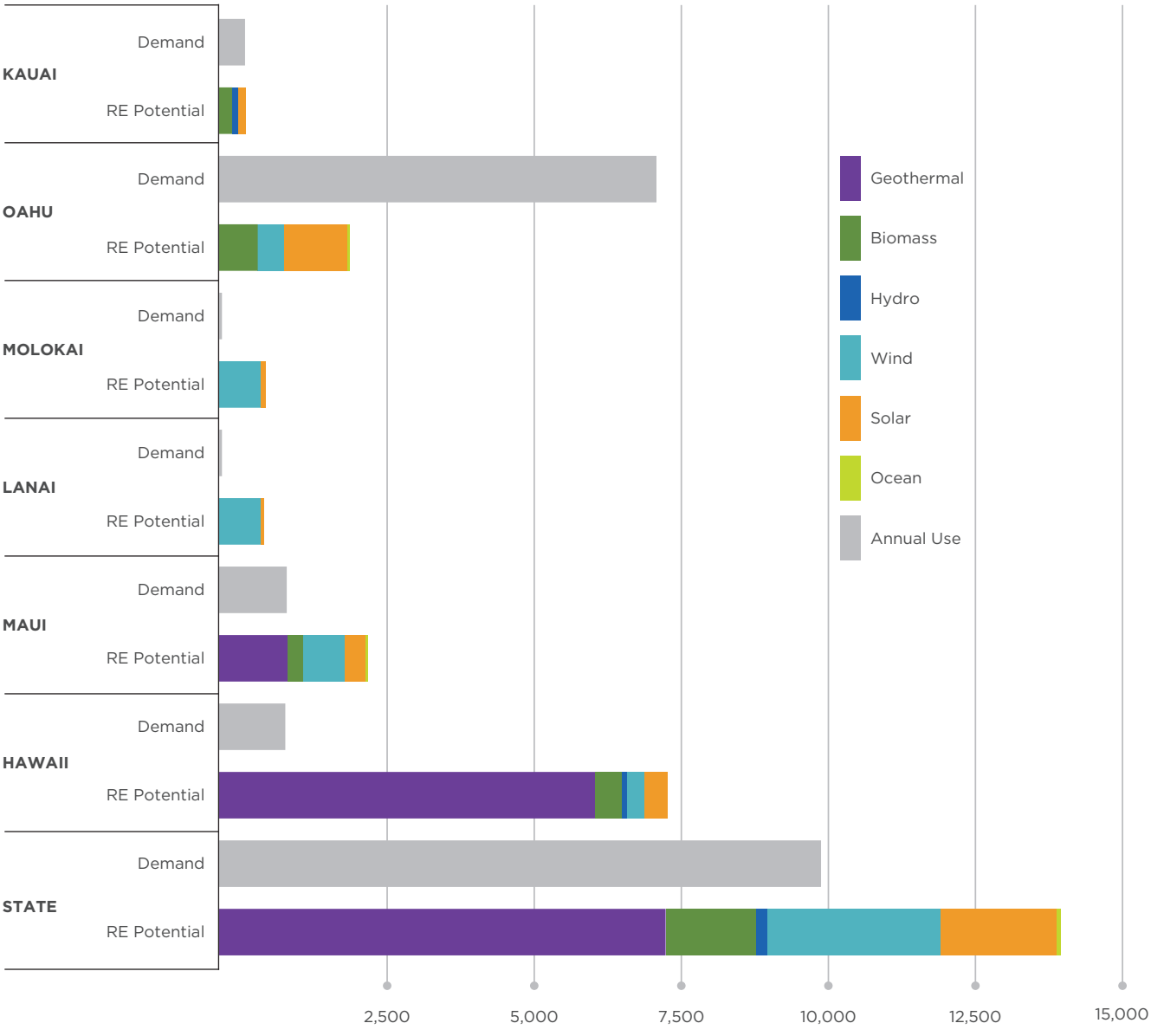
Renewable Energy Potential

Hawaii is fortunate to have an abundance of renewable energy resources. Renewable Energy is defined by Hawaii Revised Statutes Chapter 269-1 as energy from:

- Sun (i.e. solar)
- Wind
- Falling water (i.e. hydropower)
- Bioenergy, including biomass (e.g. crops, agricultural and animal residues, municipal and other solid waste); biofuels, and biogas
- Geothermal
- Ocean water, including ocean thermal energy conversion (OTEC) and wave energy
- Hydrogen produced from renewable energy sources

As the chart shows, statewide renewable energy potential is greater than current electricity demand (National Renewable Energy Laboratory, Hawaii Clean Energy Initiative Scenario Analysis, 2012; and DBEDT).

RENEWABLE ELECTRICITY POTENTIAL AND DEMAND BY ISLAND, GIGAWATT-HOURS

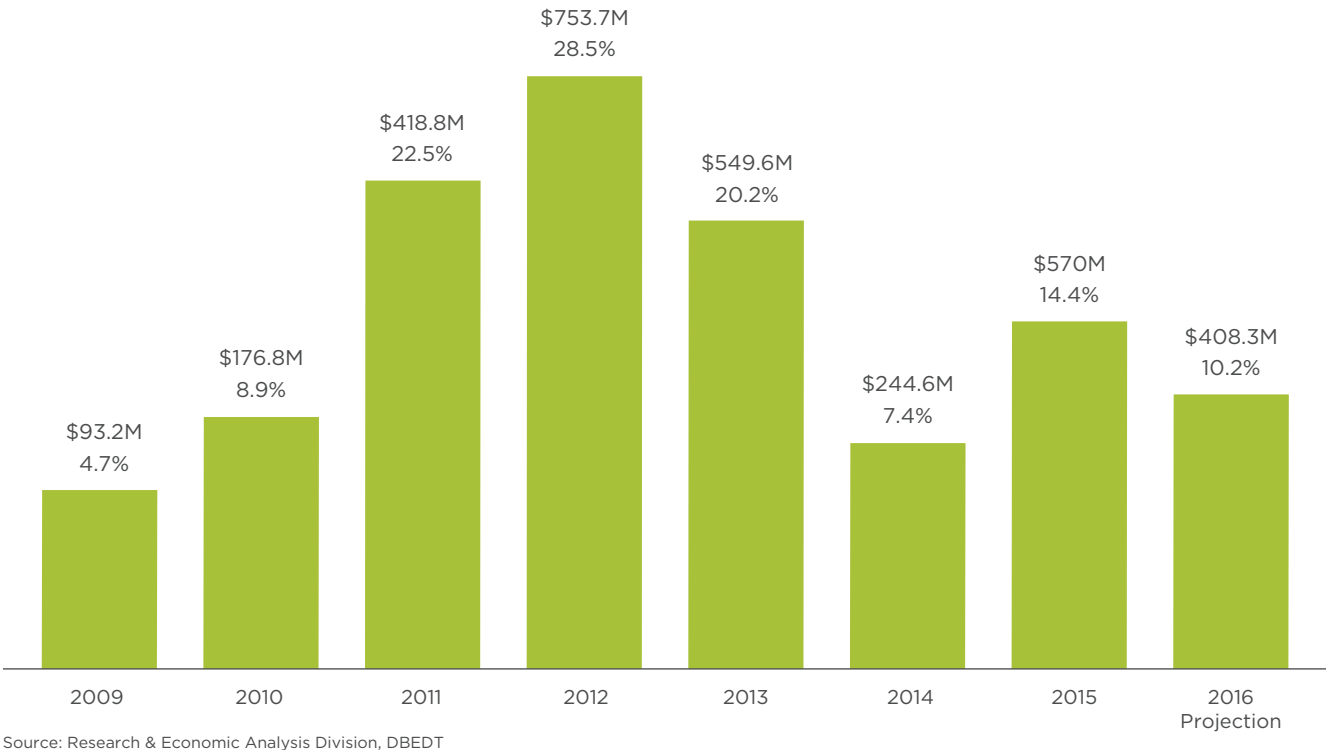


SUSTAINABLE SOLAR

Solar-Related Construction Expenditures

CONSTRUCTION SPENDING FROM SOLAR PV INSTALLATIONS HAS SLOWED FROM UNSUSTAINABLE LEVELS REACHED DURING THE PEAK OF HAWAII'S SOLAR BOOM IN 2012. NONETHELESS, THE SOLAR INDUSTRY IS STILL A SIGNIFICANT CONTRIBUTOR TO THE CONSTRUCTION SECTOR.

SOLAR PROJECTS (MILLION DOLLARS) AS % OF TOTAL BUILDING PERMIT VALUE

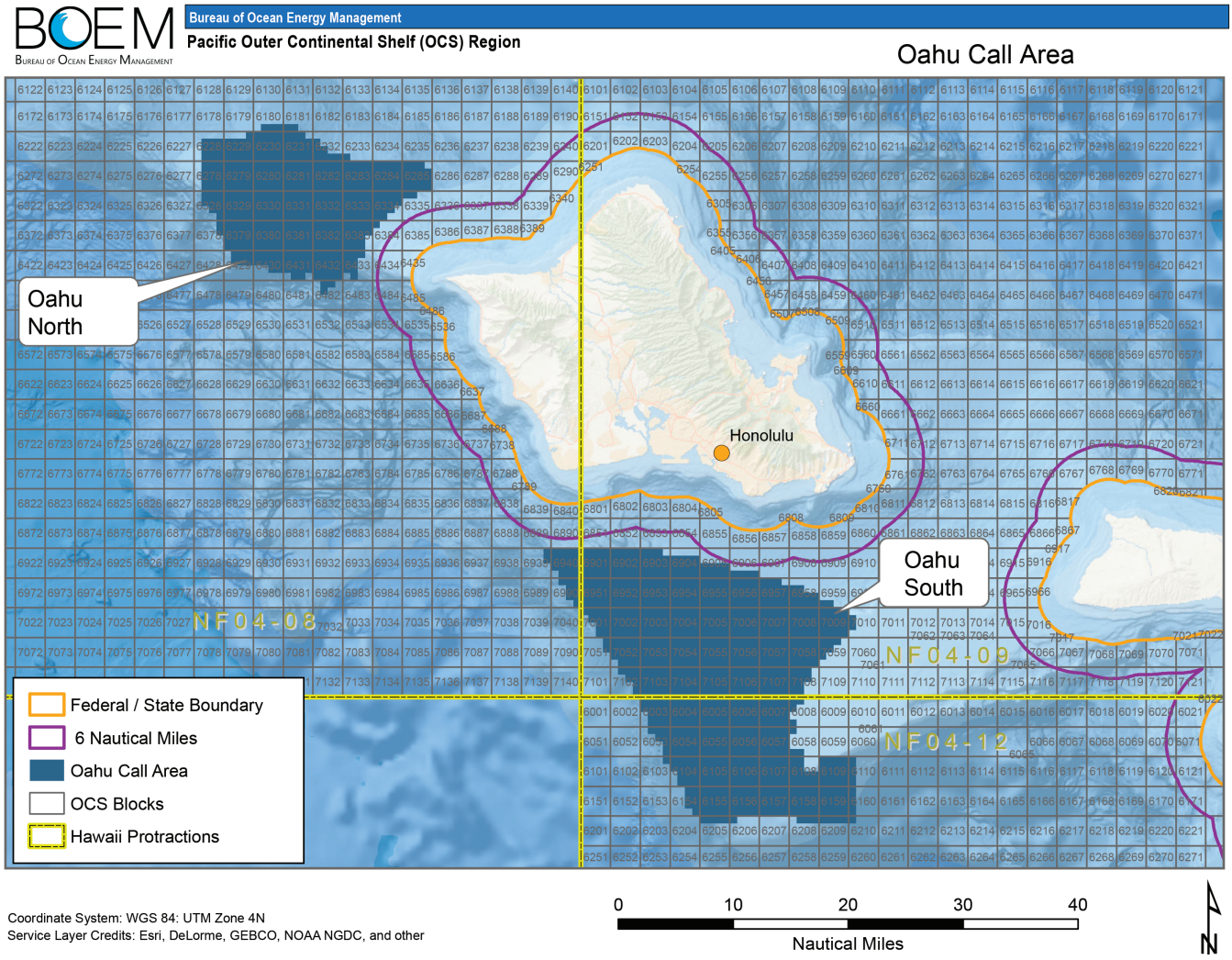


Source: Research & Economic Analysis Division, DBEDT

MEGA POTENTIAL

THREE OFF-SHORE WIND PROPOSALS – In 2015, the Bureau of Ocean Energy Management (BOEM) received unsolicited lease applications from two private developers proposing three offshore wind projects off Oahu (see map on next page), each with an approximate capacity of 200 MW. At the request of the state, BOEM established the BOEM/Hawaii Intergovernmental Renewable Energy Task Force in 2011 to promote planning and coordination, and to facilitate effective and efficient review of requests for commercial and research leases and right-of-way grants for power cables and other energy infrastructure on the outer continental shelf. In its April 1, 2016, Power Supply Improvement Plans Update Report, Hawaiian Electric Industries, Inc. (HEI) stated that Oahu appears to need additional resources beyond those available on island (e.g., offshore wind, biofuels, neighbor island renewables transmitted via interisland cable) to reach its 100 percent renewable energy target by 2045. HSEO agrees that these alternatives need to be studied further, with significant input from all stakeholders, to better understand their respective risks and relative costs.

In June 2016, BOEM issued notice seeking public comments on the two proposed project areas (Oahu North and Oahu South) and the potential environmental impacts associated with site assessment activities to determine the viability of these project areas. Once BOEM has received and processed all comments, if any or all of the identified areas can be leased for commercial offshore wind projects, it will begin with a temporary lease (with a maximum term of five years) to the applicants to conduct the necessary site assessment activities to determine overall project feasibility.



COMING SOON TO A GRID NEAR YOU – The following utility-scale and pilot renewable energy projects became or are expected to become operational in 2016:

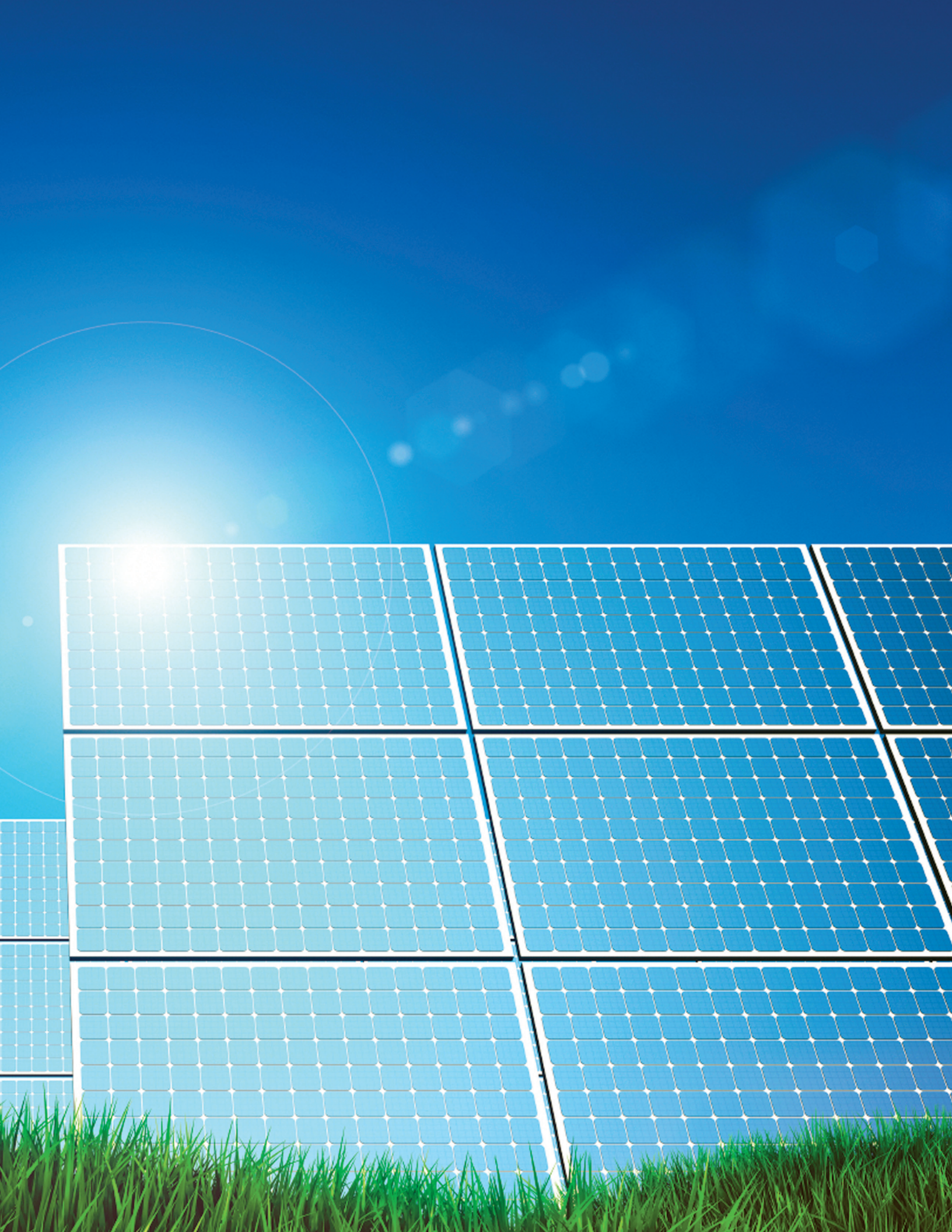
- Kuia Solar Project, Maui (2.87 MW)
- South Maui Renewable Resources Solar Project, Maui (2.87 MW)
- EE Waianae Solar, Oahu (27.6 MW)
- Hawaii American Water Wastewater Treatment Plant PV Array, Oahu (250 kW)
- Waihonu North Solar Farm, Oahu (5 MW)
- Waihonu South Solar Farm, Oahu (1.5 MW)
- Hawaii Air National Guard (HCATT) Demonstration Waste-to-Energy System, Oahu (200-300 kW)

HAWAII'S NATIONAL RANKING IN RENEWABLE ENERGY

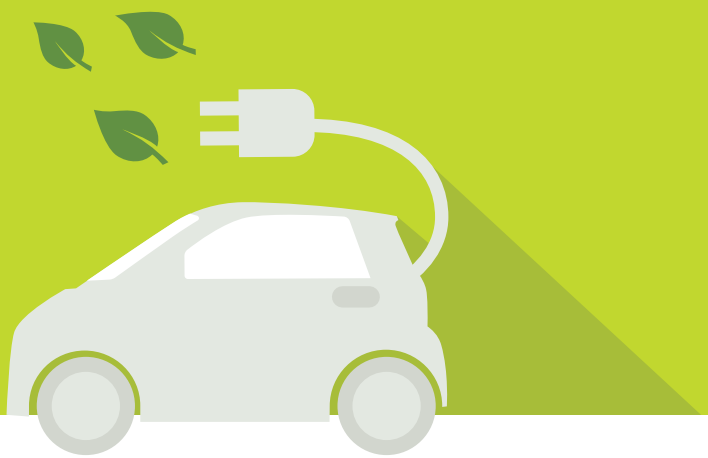
Honolulu #1 – The "Solar Stars" (cities with 50 or more watts of solar PV per person)
Shining Cities, 2016, Environmental America Research & Policy Center
Hawaii #2 – Total solar electricity generation
2016 U.S. Clean Tech Leadership Index, Clean Edge

#1

HONOLULU'S RANK AMONG THE "SOLAR STARS" - CITIES WITH 50 OR MORE WATTS OF SOLAR PV PER PERSON.



ENERGY PLANNING AND TRANSPORTATION SOLUTIONS



DESTINATION: ENERGY INDEPENDENCE

More Planning and Cleaner Transportation Will Get Us There

While hugely important, the state's 2045 deadline to reach 100 percent renewables in electricity sales left out something crucial: transportation. The energy used to drive vehicles – whether on land, sea or air – is by and large derived not from electricity but from petroleum. To truly achieve energy independence and break Hawaii's addiction to fossil fuels, the state must revolutionize the transportation sector.

To do that, and indeed to achieve the 100 percent by 2045 goal, Hawaii can't just strike out in any direction. The level of planning and coordination required to achieve such massive changes is unprecedented anywhere in the world. That's why the state is relying on advanced modeling to help experts find the best path forward while maintaining the flexibility to change course as needed to incorporate new information, take advantage of emerging opportunities and overcome challenges.

One major challenge associated with renewable energy is security – at present, renewable energy is less stable and reliable than fossil fuel generation, which is already vulnerable to widespread power outage in the event of a natural or man-made disaster. Emergency preparedness to maintain energy assurance is a vital part of the state's planning process in transitioning to energy independence.

THE WAY FORWARD

Planning and Modeling for Renewables

The electricity sector in Hawaii is currently undergoing an extensive planning effort. With the issues in the energy sector becoming increasingly complicated, interdependent and impactful to customers, it is critical that stakeholders are engaged and informed on the significant decisions that must be made to transform the energy sector. Understanding the economic, environmental and energy security impacts of the key decision points in various planning scenarios is essential for decision makers to have a comprehensive picture of the energy landscape.

As required by law, HSEO plays a central role, assisting the ERC with "comprehensive strategic planning towards achieving full use of Hawaii's energy resources and the most effective allocation of energy resources," according HRS §196. Duties include coordinating statewide industry and government energy interests and analyzing and evaluating energy resources, programs, systems and markets.

Modeling the energy sector – and its constituent integrated utility grids, pipelines, fuels, transportation and infrastructure – allows energy analysts to understand multifaceted issues. Crucially, modeling can illustrate how renewable energy penetration, energy efficiency measures, electricity demand and consumption, distributed energy resources, demand response programs and electricity generation interrelate in Hawaii's complex energy ecosystem and result in the diversification of Hawaii's energy mix.

HSEO utilizes modeling to inform statewide clean energy plans, policies and strategies for reducing petroleum use, to increase renewable penetration at lower costs to ratepayers, and to ensure energy security. HSEO has been intervening in dockets such as the Power Supply Improvement Plan (Docket No. 2014-0183) at the PUC and working closely with utility companies, other public agencies and the private sector to properly analyze and coordinate programs and efforts in the energy sector.

KEEPING THE LIGHTS ON

Energy Assurance and Security

Plans to achieve energy independence fail if they don't also achieve energy security. Calamitous events, such as Hurricanes Katrina and Sandy and the 2011 tsunami that struck Japan, make clear the critical value of disaster preparedness and energy resiliency. With the most isolated population concentration in the world, Hawaii's energy resiliency and disaster recovery concerns are rightly elevated.

HSEO COORDINATION - Ensuring a robust, secure and resilient energy infrastructure in the contemporary energy ecosystem is a primary function of the HSEO, in coordination with Hawaii Emergency Management Agency (HI-EMA) (formerly State Civil Defense), the U.S. Department of Energy, the Federal Emergency Management Agency (FEMA) County Civil Defense Agencies and dozens of government and energy industry emergency management and security partners.
Shared goals include:

- Stronger energy emergency preparedness and response actions and capabilities.
- Stakeholder education on energy sector interdependencies and challenges before, during and after any disruption.
- Effective incident communication and information sharing between key government representatives, energy industry representatives and the public.
- Protection of critical energy infrastructure and enhanced resilience.
- Energy assurance plans and procedures in line with existing federal, state and local governments' frameworks, structures and statutes.
- A capabilities-based approach to training staff and exercising that addresses a broad range of energy risks and vulnerabilities.

TROPICAL STORM DARBY RESPONSE - HSEO is the lead agency for Emergency Support Function #12 (ESF-12), which facilitates the restoration of damaged energy systems and components when activated by HI-EMA for incidents requiring a coordinated state response. In this capacity, HSEO assisted in the coordination of the state's energy preparations, response and recovery efforts for Tropical Storm Darby in July 2016 by:

- Deploying seven responders in rotating shifts to the State Emergency Operating Center to serve as energy advisors and liaisons for energy response and restoration efforts.
- Issuing reports providing situational awareness of impacts to the electricity, oil, and gas sectors.
- Coordinating with numerous emergency management stakeholders to eliminate roadblocks and identify choke points in power and fuel distribution systems.

BUILDING EMERGENCY RESPONSE EXPERTISE – To respond to Emergency Response challenges, HSEO staff are implementing a Multi-Year Training and Exercise Plan as a road map to:
1) Meet emergency management staff training requirements under the State Multi-Year Training and Exercise Plan
2) Develop staff capabilities to meet DBEDT's and the ERC's energy emergency management roles and responsibilities
3) Prepare key staff for effective participation in the 2018 statewide full-scale hurricane exercise.

A CLEANER JOURNEY

Revolutionizing Energy in the Transportation Sector

Getting to Hawaii and getting around within Hawaii are carbon-dependent undertakings. Planes, boats and, until recently, automobiles have been almost entirely powered by fossil fuels. To achieve a clean energy future, Hawaii must clean up the energy used to get around the islands.

HSEO is working towards the ultimate decarbonization of the transportation sector, consistent with the energy planning objective amended by Act 38, 2015 to HRS 226-18 (a) (2): "increased energy security and self-sufficiency through the reduction and ultimate elimination of Hawaii's dependence on imported fuels for electrical generation and ground transportation."

TRANSPORTATION ENERGY ANALYSIS – in 2015, HSEO convened transportation stakeholders in a series of charrettes culminating in the HCEI Transportation Energy Analysis (HTEA) report. The report identified nearly 100 tactics that could reduce petroleum consumption in the transportation sector, analyzed 38 tactics and recommended 22 tactics for implementation. The report estimated that by 2030, the 22 recommended tactics could potentially reduce fossil fuel consumption by 72 million gallons a year. While these tactics are not all encompassing, they did identify the means by which petroleum consumption could be reduced based on economically feasible actions today. They also provided a framework to analyze and introduce new tactics.

The charrette presentations and summary are available online on the HCEI website at hawaiicleanenergyinitiative.org/charrettes/transportation-charrette/.

HSEO understands that planning and implementation to reduce petroleum consumption in the transportation sector requires state, local governments and private sector collaboration. To maintain momentum, HTEA's next step is reconvening stakeholders to develop an energy in transportation roadmap. The roadmap will highlight lead agency roles and responsibilities for each tactic identified in the HTEA report. The roadmap will also indicate the current status of projects, tactics and enabling actions as in progress or undergoing planning or future consideration.

GOING ELECTRIC - In July 2016, the number of passenger electric vehicles (EVs) in the state was 4,536, an increase of 938 vehicles (26.1 percent) from the same month last year, and an increase of 64 vehicles (1.4 percent) from June 2016. As of July 2016, there were 1,034,275 registered passenger vehicles in the state. EVs are nearly half a percent of all registered passenger vehicles.

This chart shows the number of registered plug-in EVs in Hawaii's four counties, as well as the number of publicly available charging stations statewide.

REGISTERED EVS & PUBLICLY AVAILABLE CHARGING STATIONS IN HAWAII

Island	Oahu	Maui	Hawaii	Kauai	**Total**
EVs	3,451	721	207	157	**4,536**
Level 2 Charging Ports	313	80	42	37	**472**
Fast Charging Ports	13	41	4	1	**59**
Total EV Charging Ports	**326**	**121**	**46**	**38**	**531**

Hawaii Sustainable Transportation Forum - In support of the state's clean energy goals and in response to the HTEA in 2015, the DOT initiated the Hawaii Sustainable Transportation Forum. The quarterly meeting of stakeholders in the transportation sectors provides tactical discussion and commitment opportunities, ensuring that environment, social and economic considerations are factored into decisions affecting transportation activities. Topics discussed include statewide transportation goals, mode shift and integrating land-use and transportation planning to support a complete, multi-modal system.

MUD Working Group - An estimated thirty eight percent of Hawaii's housing units are multi-unit dwellings (MUDs), including condominiums, cooperative housing, and community associations. Increasing the availability of EV charging systems located at MUDs could enable roughly one third of households to own EVs.

The 2015 Hawaii State Legislature passed Act 164, established a Working Group within DBEDT to address the installation of EV charging systems at MUDs. In December 2015, the final report was published. Key findings included:

1. Each installation is unique, with challenges that require flexibility in any installation solution.
2. A statewide incentive program complete with education and outreach, perhaps funded by the public benefits fee, would help address cost challenges associated with upgrading electric power infrastructure and installing charging systems.
3. Innovative utility programs, such as sub-meters, could encourage EV adoption when appropriate.
4. Market forces, future building codes and customer demands are adequate to address EV installations in new MUD construction, and encourage developers to consider incorporating EV charging infrastructure.

The final report can be viewed at energy.hawaii.gov/testbeds-initiatives/ev-ready-program/laws-incentives.

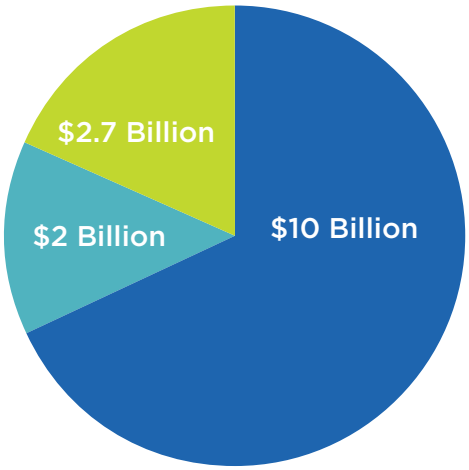
Electric Vehicle Charging Corridors - With the launch of the Fixing America's Surface Transportation (FAST) Act, the Obama administration has created a nomination process for a national network of alternative fuel facilities in designated EV charging, hydrogen, propane and natural gas fueling corridors.

HSEO is developing proposals to nominate EV charging corridors on Oahu and Maui, followed by all islands in subsequent updates. Although no funding is associated with a designation, the Federal Highway Administration (FHWA) can provide additional support, such as signage, and there are Federal grants and funding that give preference to designated corridors.

Nominating alternative fuel corridors demonstrates planning for the future by focusing resources on energy in transportation tactics and greenhouse gas reductions, sending a strong signal that Hawaii intends to support long-term growth in EV infrastructure and looks to build on progress to date, including the Maui JUMPSmart project and the Hawaiian Electric Companies Commercial Public Electric Vehicle Charging Service Pilot. The FHWA has indicated corridor nominations will be accepted on a rolling basis, allowing Hawaii future opportunities to designate corridors that may not be included in the initial proposal.

VOLKSWAGEN EMISSIONS SETTLEMENT - In two related settlements, German automaker Volkswagen AG has agreed to spend up to $14.7 billion to settle allegations of cheating emissions tests and deceiving customers. Under the program, the automaker will spend up to $10.03 billion to compensate consumers and $4.7 billion to mitigate the pollution from these cars and invest in clean vehicle technology. There are a number of potential funding and input opportunities for HSEO and partners that may require action in the near future.

Of the $4.7 billion mitigation and investment allocation, $2.7 billion will be set aside for an Environmental Mitigation Trust Agreement, which will be allocated among states, territories and tribes, with $7.5 million in Initial Mitigation Trust Allocations for Hawaii. The remaining $2 billion will be spent on a nation-wide Zero Emission Vehicle Investment Commitment and investments in California. Over the next ten years, $2.7 billion from the settlement will fund environmental mitigation projects that reduce emissions of nitrogen oxides (NOx). $1.2 billion from the settlement will support increased use of ZEV technology in the U.S., and $800 million will be used to support ZEV technology in California.



VOLKSWAGEN SETTLEMENT BREAKDOWN

- Vehicle buyback and modification (consumers)
- Environmental Migration Trust (states)
- Zero Emission Vehicle investment (national and CA)

POTENTIAL FUNDING AND INPUT OPPORTUNITIES FOR HAWAII STATE ENERGY OFFICE

- Estimated 900 vehicles owned/leased in Hawaii
- $7.5M Initial Mitigation Trust Allocations for Hawaii
- Opportunity to compete for Zero Emission Vehicle investment funds

HAWAII'S NATIONAL RANKING IN TRANSPORTATION

Hawaii #2 – Electric Vehicles Registered
Hawaii #5 – Hybrid Electric Vehicles Registered
2016 U.S. Clean Tech Leadership Index, Clean Edge

#2

HAWAII'S NATIONAL RANKING IN ELECTRIC VEHICLES REGISTERED

POLICY AND REGULATORY ADVANCEMENTS

BEHIND THE SCENES

Building a Policy and Regulatory Framework

With the rare exception, like last year's landmark 100 percent RPS by 2045 legislation, policy and regulation are rarely the stars of the show. They advance not in the headlines but in laborious meetings, hard-earned compromise, political expertise, relationship-building and hard work. But without the policy framework of HCEI and its many regulatory supports, the darling of the clean energy movement, Hawaii's journey to energy independence, would never get off the ground.

DBEDT/HSEO and other state agencies have been working behind the scenes, continuing to solidify the foundation-work of HCEI, on which energy independence will be built. Their efforts ensure that Hawaii will continue unabated its monumental progress to lead the world to a clean energy future.

POWERFUL STEPS FORWARD

2016 Legislative Energy Updates

In 2016, HSEO helped lead the following policy advancements.

2016 LEGISLATIVE SESSION - The following bills were signed into law by Gov. David Ige:

- HB1170 (Act 220) RELATING TO LAND RESOURCES. Provides for the lease of public lands for geothermal development without public auction as provided for other types of renewable energy.
- HB2353 (Act 079) RELATING TO EXEMPTIONS FOR CIVIL SERVICE. Created permanent exemptions from civil service for all Energy Program Managers, Energy Program Specialists, Energy Program Assistants and Energy Analysts.
- HB2416 (Act 027) RELATING TO RENEWABLE ENERGY. Repealed HRS 201N and related sections pertaining to the Renewable Energy Facility Siting Process (REFSP). Despite HSEO's efforts to implement the process dating back to its establishment in 2008, no renewable energy project has completed the REFSP, and HSEO agreed that the repeal of Chapter 201N was appropriate.
- HB2569 (Act 176) RELATING TO ENERGY. Established a Net-Zero energy goal for public school facilities.
- SB2652 (Act 202) RELATING TO TAXATION. Established a 5-year renewable fuels production tax credit, with an aggregate cap of $3 million per year, to be administered by DBEDT and applicable to taxable years beginning after December 31, 2016. It also repealed the ethanol tax credit.
- SB3126 (Act 047) RELATING TO PUBLIC SCHOOLS. Appropriated $100 million in general funds for air conditioning public schools.

$1.2 MILLION UTILITY MODEL ANALYSIS (HB1700) - For fiscal year 2017, Act 124, SLH 2016 provided $1.2 million for a study to evaluate utility and regulatory models, including cooperative, municipal, and independent distribution system operators, and the ability of each model to: (1) achieve state energy goals; (2) maximize consumer cost savings; (3) enable a competitive distribution system in which independent agents can trade and combine evolving services to meet customer needs; and (4) eliminate or reduce conflicts of interest in energy resource planning delivery, and regulation. The study is to include a long-term cost-benefit analysis of each model and the steps required to carry out each scenario for each county. HSEO plans to issue a Request for Proposals and award a contract for the study. DBEDT has allocated a portion of its budgetary contingency restriction to the $1.2 million general fund appropriation, resulting in an allotment of $1 million for the study.

REGULATORY REVOLUTIONS

HSEO's Interventions to Make Energy Cleaner

HSEO has intervened in several crucial regulatory proceedings, in collaboration with various energy stakeholders, to advance Hawaii's clean energy goals. The following descriptions of important energy-related dockets detail HSEO's observations and recommendations.

MERGER DOCKET (NO. 2015-0022) - On December 4, 2014, NextEra Energy, Inc. (NextEra) announced a definitive agreement to acquire Hawaiian Electric Industries, Inc. (HEI) for $4.3 billion. The merger proposed the first potential change in ownership of HEI since its founding in 1891, with substantial, wide-ranging impacts to Hawaii's ratepayers, communities, economy and energy ambitions.

A change in control at the utility should advance the state's efforts to achieve its energy policy goals and directives.

The PUC opened Docket 2015-0022 to consider the application for change of control. The PUC approved a group of 28 interveners, including DBEDT (and HSEO). HSEO has actively participated in these proceedings, issuing Information Request to the Applicants (NextEra/HEI), responding to information requests from the applicants, reviewing other interveners and responses about the proposed acquisition and providing written and verbal testimony to the PUC. HSEO Administrator Mark Glick testified on behalf of HSEO and DBEDT that the application was not in accord with DBEDT's view that a change in control at the utility should advance the state's efforts to achieve its energy policy goals and directives. As an overarching issue, DBEDT was concerned with NextEra's inability to cite any concrete plan to support its claims about strengthening and accelerating HEI's clean energy transformation, the impact a merger would have on HSEO's mission, energy directives and goals, or the implications for the state as a whole.

On July 15, 2016, the PUC dismissed without prejudice the proposed merger between HEI and NextEra. In arriving at this decision, according to its Release Supplement of July 14, 2016, the PUC "concluded that while NextEra is fit, willing, and able to step into the shoes of the HECO Companies without a loss in performance, the Application for the proposed Change of Control is not in the public interest. In reaching this decision, the PUC considered the ninety-five (95) specific commitments proposed by the Applicants, as well as the evidentiary record as a whole. The PUC concluded that the Applicants had not shown the Application to be reasonable and in the public interest with respect to five fundamental areas of concern: (1) benefits to ratepayers; (2) risks to ratepayers posed by NextEra's complex corporate structure; (3) Applicants' clean energy commitments; (4) the proposed Change of Control's effect on local governance; and (5) the proposed Change of Control's effect on competition in local energy markets."

POWER SUPPLY IMPROVEMENT PLAN (PSIP) DOCKET (NO. 2014-0183) – On April 1, 2016, the Hawaiian Electric Companies submitted their Updated PSIP to the PUC. Following the PUC's decision to reject the merger the PUC issued Order No. 33877 on August 16, 2016 requiring a revised PSIP to be submitted on December 1, 2016. The updated PSIP is to include additional analysis on inter-island cable, system security, customer

exit economics and capital investment risks among other supplemental analysis. Statements of Positions on the revised PSIPs are due on January 13, 2017 with Reply Statement of Positions due on January 27, 2017.

DISTRIBUTED ENERGY RESOURCES (DER) DOCKET (NO. 2014-0192) – Preliminary issues to be addressed in Phase 2 of this docket include: hosting capacity analysis, opportunities to enhance the value of DER to the grid, the Hawaiian Electric Companies' Integrated Interconnection Queue and revisions to applicable interconnection standards to enable advanced DER capabilities and improve the interconnection process, communications protocols between utilities and DER, advanced inverter functions and DER rate design and program structure. Currently there are two working groups – the Smart Inverter Technical Working Group and the DER Stakeholder Working Group – comprised of members from the Hawaiian Electric Companies, the state and the private industry and they are meeting regularly to address these issues.

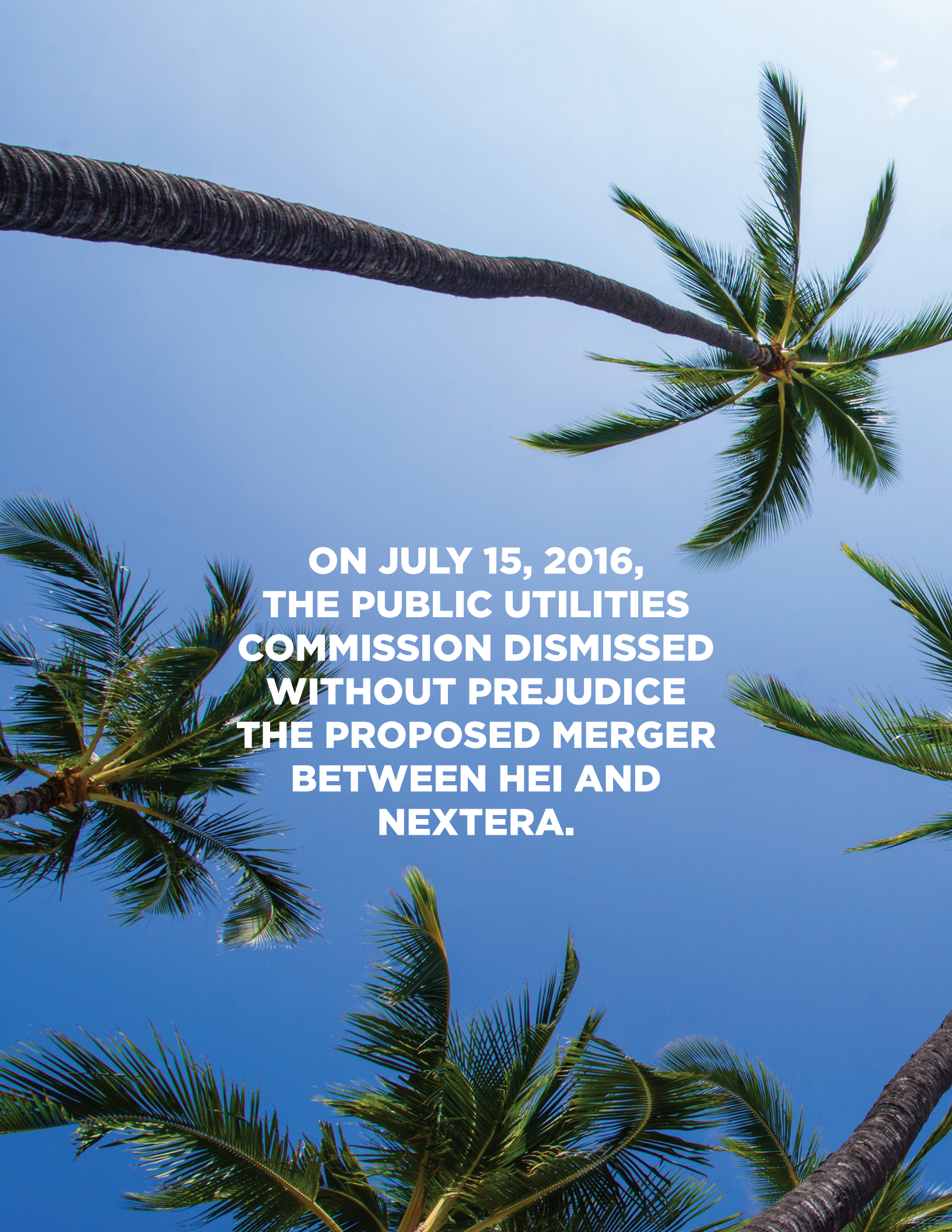
DEMAND RESPONSE (DR) DOCKET (NO. 2015-0412) – On December 30, 2015, the Hawaiian Electric Companies filed an application requesting approval for their demand response program portfolio structure, reporting schedule, and program cost recovery through the demand-side management surcharge. On July 28, 2016, the PUC filed an order announcing that they would hold a conference to receive feedback in determining a schedule for addressing the various issues.

SMART GRID FOUNDATION PROJECT (NO. 2016-0087) – On March 31, 2016, the Hawaiian Electric Companies proposed a $340 million Smart Grid Foundation Project, which includes the installation of Advanced Metering Infrastructure (AMI) across the three companies. On June 28, 2016, this docket was suspended until further order of the PUC.

A viable community-based renewable program will let the state extend the benefits of clean energy to underserved residents and allow for greater system penetration of renewable energy in support of RPS goals.

COMMUNITY-BASED RENEWABLE ENERGY (CBRE) TARIFF – SB1050 (Act 100, SLH 2015) required the electric utilities to file a CBRE tariff with the PUC by October 1, 2015. DBEDT views the CBRE tariff as an attractive means to advance Hawaii's clean energy policy. A viable community-based renewable program will let the state extend the benefits of clean energy to underserved residents and allow for greater system penetration of renewable energy in support of RPS goals.

On June 7, 2016, under Docket 2015-0389, the PUC issued Order No. 33751 that invited interveners to file comments to its CBRE Staff Proposal. DBEDT filed its comments to the PUC on June 30, 2016, and provided feedback in the areas of program structure, compensation, developer requirements and customer requirements. The CBRE tariff and related stakeholder comments are under PUC's review.



ON JULY 15, 2016, THE PUBLIC UTILITIES COMMISSION DISMISSED WITHOUT PREJUDICE THE PROPOSED MERGER BETWEEN HEI AND NEXTERA.

DEPLOYMENT

EMPOWERING CLEANER POWER

Renewable Energy Deployment

What do clean energy projects need to get off the ground? Expertise, resources and funding. HSEO and partner entities have helped to secure all three in Hawaii, working to make them more easily accessible for the entrepreneurs, developers, policymakers and clean energy leaders who will create the programs and projects to realize Hawaii's clean energy future. Descriptions of the resources deployed on the following pages show the important steps Hawaii has taken to encourage high-impact, clean energy solutions.

INNOVATIVE ENDEAVOURS

Pilot Projects

GEMS

Green Energy Market Securitization (GEMS) is an innovative, sustainable green financing initiative designed by HSEO to make clean energy improvements more affordable and accessible for Hawaii consumers. A 2015 DOE report on state and local governments driving clean energy investment praised GEMS as an innovative clean energy financing program that engages capital markets to facilitate clean energy financing.

HSEO administers and supports the needs of the GEMS Bonds 2014 Series A (Taxable) issuance and the Green Infrastructure Fee, which is collected by the Hawaiian Electric Companies on behalf of DBEDT to pay bondholders. The sale of the GEMS Bonds provided low-cost capital to the GEMS Program run by Hawaii Green Infrastructure Authority. During fiscal year 2016, GEMS Bonds have maintained their Aaa, AAA and AAA ratings by Moody's Investors Service, Standard and Poor's and Fitch Ratings, respectively.

A 2015 DOE report on state and local governments driving clean energy investment praised GEMS Bonds as an innovative clean energy financing program that engages capital markets to facilitate clean energy financing.

As part of its annual maintenance and reporting, HSEO assisted in:

- Ensuring payment of bondholders and ongoing costs on the semiannual payment dates of January 1 and July 1.
- Completing the two required Green Infrastructure Fee filings setting the rate at an appropriate amount to ensure bondholders and ongoing costs are paid.
- Filing semi-annual reports to rating agencies.
- Filing an annual certification with the Municipal Securities Rulemaking Board
- Completing a fiscal audit for FY16 in accordance with the indenture and continuing disclosure requirements of the bonds.
- General oversight of the bonds and their relationship to the GEMS Program
- Any other needs related to the maintenance or new issuances of the GEMS Bonds

During FY16, HSEO has also procured and contracted for the services that support the ongoing maintenance of the GEMS bonds including:

- A Financial Auditor, N&K CPAs, Inc.
- A Financial Advisor, Hilltop Securities, Inc.

For more information about the Green Infrastructure Fee, visit energy.hawaii.gov/green-infrastructure-fee
For more information about the GEMS program, visit gems.hawaii.gov

JUMPsmartmaui
SMART ENERGY. SMART CARS. SMART GRID.

JUMPSMART MAUI NET ZERO MICROGRID – The JUMPSmart Maui project aims to improve distributed energy resource integration and prepare the electric system for widespread adoption of EVs. With an island-wide EV management system that increases the use of renewable energy, enables energy efficiency and creates a more stable energy infrastructure, the project will demonstrate that Smart Grid technology does not negatively impact daily life. As a collaboration between Japan and the United States, the project also improves government relations and promotes knowledge exchange between nations.

SPIDERS JCTD – The Smart Power Infrastructure Demonstration for Energy Reliability and Security (SPIDERS) Joint Capability Technology Demonstration (JCTD) program increases cyber security and energy efficiency for U.S. military installations and transfers that expertise to non-military critical infrastructure. SPIDERS concluded a single-circuit demonstration of a cyber-secure microgrid for waste water treatment at Joint Base Pearl Harbor-Hickam and implemented the Department of Defense's first installation-wide microgrid with cyber attack defenses at Camp Smith, which allows full operation of the base during an extended electrical outage.

KALAELOA COMMUNITY DISTRICT DEVELOPMENT – The Hawaii Community Development Authority (HCDA) is responsible for redeveloping the Kalaeloa Community District. After the Navy's Base Realignment and Closure (BRAC) process, the area's electrical infrastructure deteriorated, causing frequent blackouts.

The U.S. Department of Energy (USDOE) Office of Energy Efficiency and Renewable Energy has teamed with DBEDT, HSEO, HCDA, the U.S. Navy, and Sandia National Laboratories (Sandia) to present a four-day workshop and stakeholder meetings to identify ways to improve energy reliability and resiliency for Kalaeloa tenants and energy consumers. This workshop will be held as a part of the HCDA's annual Kalaeloa Landowners Summit, an existing outreach effort of HCDA to seek perspectives and recommendations from landowners and key stakeholders within the district. With input from this workshop and meetings with tenants in Kalaeloa, Sandia will evaluate the potential of using microgrid technology and renewable energy to provide reliable power in Kalaeloa.

Sandia's findings will be documented in a subsequent publicly available report that will include the conceptual energy system designs and their rough (+/- 30%) cost estimates. These findings can be used as a basis by landowners and other stakeholders in order to:

- Create a Request for Information and/or a Request for Proposal for a microgrid,
- Request funding for electrical infrastructure improvements, or
- Pursue other efforts to provide reliable energy for the District.

HCATT/JBPHH – The Air Force Research Lab and the Hawaii Center for Advanced Transportation Technologies (HCATT) signed an agreement to develop a military microgrid at Joint Base Pearl Harbor-Hickam that will directly support the 154th Wing of the Hawaii Air National Guard. Developed by the Air Force, the microgrid will have electricity provided from renewable energy projects planned for the site and an existing Air Force-HCATT hydrogen fuel cell source.

A NETWORK OF RENEWABLES

Online Clean Energy Resources

DEVELOPER & INVESTOR CENTER AND SELF-HELP ENERGY SUITE – The Developer & Investor Center is a resource guide for renewable energy projects in Hawaii. See HSEO Programs & Initiatives on pages 60-61 for more information.

The number of permits processed via e-Permitting has continued to increase markedly each year since its launch in 2012.

HAWAII DEPARTMENT OF HEALTH ENVIRONMENTAL PERMITS – The Developer & Investor Center links to the DOH e-Permitting Portal's environmental permits, such as those relating to air quality and water quality, for online processing and approval. The Portal lends transparency and efficiency to DOH permitting processes. According to DOH, which can now manage permitting forms and databases online, the number of permits processed via e-Permitting has continued to increase markedly each year since its launch in 2012. e-Permitting has been implemented in other states and serves as a model for other agencies considering electronic permit management. HSEO provided funds for the initial development of the e-Permitting Portal, given the importance of environmental permitting for renewable energy projects. The portal can be found at eha-cloud.doh.hawaii.gov/epermit/.

HAWAII DEPARTMENT OF LAND AND NATURAL RESOURCES ONLINE PERMITTING AND ASSET MANAGEMENT – In partnership with the Department of Land and Natural Resources (DLNR), HSEO funded the development of a new, off-the-shelf electronic permitting and asset management system for three DLNR programs potentially involved in the permitting of renewable energy projects: Dams Safety, Geothermal and Native Invertebrates. When deployed, these new systems will enable DLNR to electronically receive, process and catalogue permits for these programs, as well as electronically inventory and manage assets under their supervision (i.e., dams, reservoirs, native invertebrates). These new tools are scheduled for deployment in the fall of 2016.

LEADING THE WAY

HSEO Programs & Initiatives

DEVELOPER & INVESTOR CENTER

The Developer & Investor Center informs users about contemporary issues and potential solutions when developing renewable energy in Hawaii today. HSEO received input and guidance from many local, federal, state and county agencies to improve the accuracy and usefulness of these resources, available online at energy.hawaii.gov/developer-investor.

The Center provides guidance on project permitting, local utility interconnection, Hawaii business registration, project financing and local incentives, local permitting consultants and site acquisition in Hawaii. It hosts the Guide to Renewable Energy Facility Permits in Hawaii and offers permit packets full of useful information about more than 160 federal, state and county permits, including process steps, estimated timelines and costs, agency contacts and relevant laws and references. Though developers and investors feature prominently in its name, the Center provides resources that are helpful to a wide range of stakeholders, including communities, the general public, regulatory agencies, policymakers, landowners and others interested in clean energy developments.

SELF-HELP ENERGY SUITE

HSEO created the Self-Help Energy Suite, available on the Developer & Investor Center's homepage, to advance impactful clean energy alternatives. The Suite's tools and resources for responsible project siting and design can help reduce project development soft costs and ultimately decrease local electricity costs and community impacts. Visitors can find important technical assistance, permitting tools and local connections to accelerate progress to the marketplace, expediting scalable benefits for the entire state. Highlights of the Suite include:

- **Renewable EnerGIS Map** (energy.hawaii.gov/resources/renewable-energis-map) – Pulling from the Hawaii Statewide Geographic Information Systems (GIS) Program database, the EnerGIS map helps landowners, developers and policy makers consider the renewable energy potential of sites across the state and view location-specific siting and permitting requirements (e.g., slope, zoning, sensitive areas, other site restrictions, etc.). EnerGIS was developed in partnership with the Hawaii Office of Planning and the Hawaii Statewide GIS Program. HSEO is currently seeking to convert EnerGIS from Silverlight to a more contemporary platform (e.g., HTML5 JavaScript).

- **Renewable Energy Permitting Wizard** (wizard.hawaiicleanenergyinitiative.org) – Understanding the permits required helps developers better site and plan their renewable energy projects. It also provides other stakeholders (regulatory agencies, general public, policy makers, landowners, etc.) a bigger picture of all the approvals required for a given energy project. The Wizard covers prerequisites and processes for any county, state or federal permits that may be required for an individual project. Updated with current permitting requirements in 2015 with support from the DOE and local agencies, the Wizard is now available in an open source software environment with improved user functions.

- **Renewable Energy Projects Directory** (energy.ehawaii.gov/epd/public/energy-projects-map.html) – The Hawaii Renewable Energy Projects Directory is an interactive map of existing and proposed renewable energy projects statewide, showcasing the variety of renewable energy resources that are moving the state closer to reaching energy independence. The Directory also serves to inform all stakeholders of planned and existing renewable energy projects of interest.

HAWAII GREEN BUSINESS PROGRAM

The Hawaii Green Business Program assists and recognizes businesses that strive to operate in an environmentally, culturally and socially responsible manner. As a partnership between the state's Department of Business, Economic Development, and Tourism's Hawaii State Energy Office; the Department of Health; the Board of Water Supply; the Hawaii Lodging & Tourism Association and the support of the Chamber of Commerce of Hawaii, the program recognizes businesses that are committed to going green by implementing energy and resource efficiency practices. Not only does energy efficiency keep utility costs down and create a more sustainable environment, the

businesses are also collectively contributing to Hawaii's energy efficiency goal. For more information, visit energy.hawaii.gov/green-business-program.

VERGE HAWAII: ASIA PACIFIC CLEAN ENERGY SUMMIT

HSEO contracted with the GreenBiz Group to bring its annual VERGE event series to Hawaii. VERGE Hawaii was created to motivate and engage the stakeholder alliance that's driving the renewable energy and energy efficiency agenda forward.

In June, more than 750 business, military, government and nonprofit leaders convened in Honolulu for the first annual VERGE Hawaii: Asia Pacific Clean Energy Summit. The event laid the groundwork for the implementation of the state's mandate to reach 100 percent renewable power in the electricity sector by 2045.

Approximately 140 dynamic speakers participated across 70 inspiring sessions, focusing on topics such as transitioning entrenched utility business models, scaling renewable energy deployment and securing a resilient, distributed energy grid.

The summit featured a 100 percent renewably powered microgrid built and interconnected on-site to demonstrate the real potential of distributed energy using existing technologies. A biomass gasifier, solar panels and a biodiesel generator powered the microgrid, which helped provide energy for the event and charged several electric vehicles—including Hawaii's first Tesla and a BMW i8.

Gov. David Ige loads the microgrid biomass gasifier.

VERGE Hawaii will return to Honolulu next year, June 20-22, 2017.

EV STATIONS HAWAII MOBILE/WEB APP

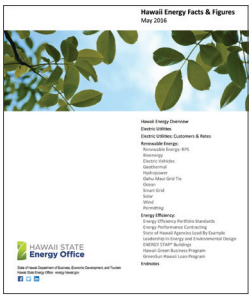
This mobile application helps EV drivers locate publicly available charging stations statewide, giving them the confidence that they can recharge while they're on the road. Visit energy.hawaii.gov/testbeds-initiatives/ev-ready-program/ev-stations-hawaii-mobile-app.

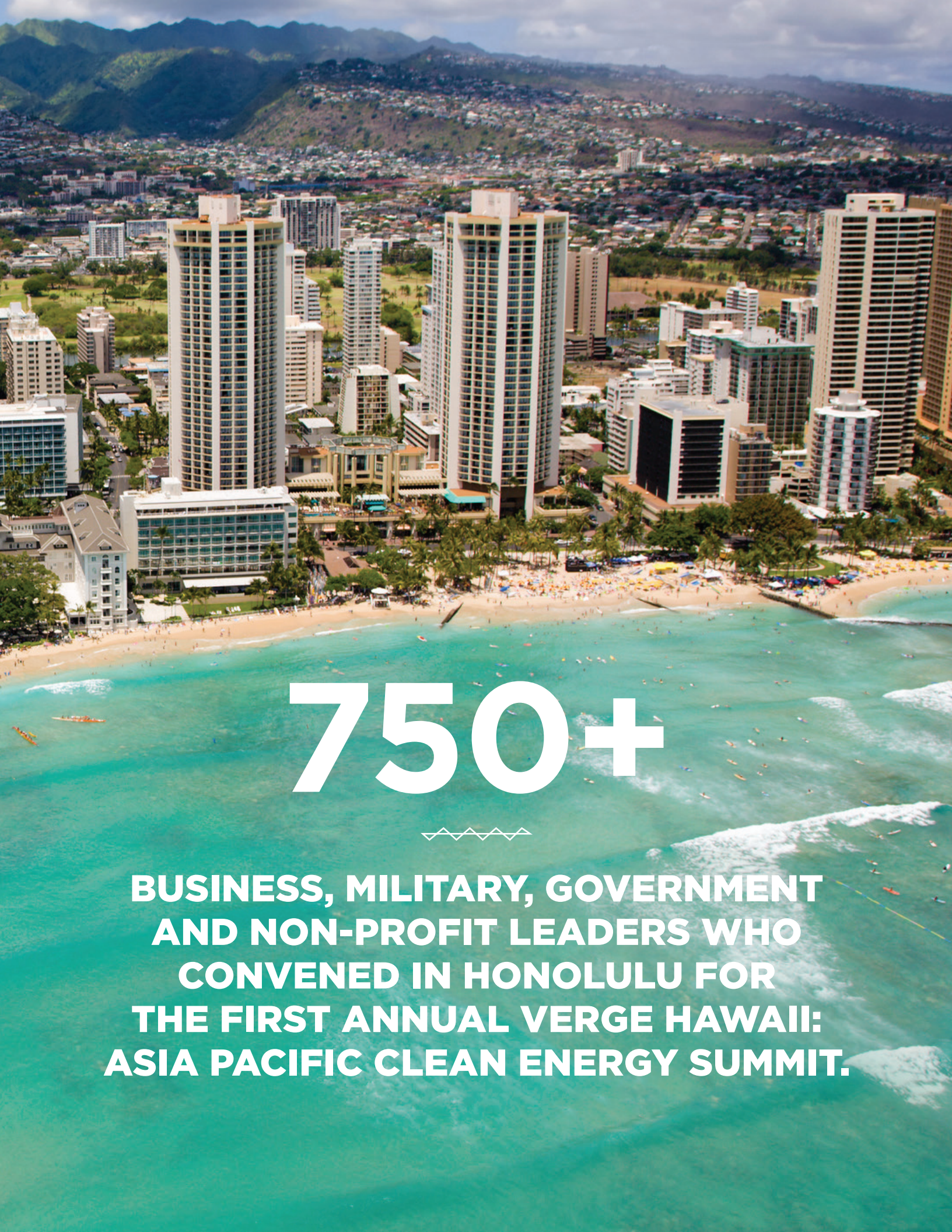
HAWAII STATE ENERGY OFFICE E-NEWSLETTER

The Current, HSEO's quarterly e-newsletter, provides updates to Hawaii's businesses and policy makers on HSEO's clean energy activities and achievements so they can make informed decisions about clean energy investments and policy. Current and past editions are available online at energy.hawaii.gov/resources/Hawaii-state-energy-office-publications.

HAWAII ENERGY FACTS & FIGURES

This semi-annual report is a comprehensive collection of data on Hawaii's energy landscape, including electric utilities, renewable energy and energy efficiency. Current and previous reports are available online at energy.hawaii.gov/resources/hawaii-state-energy-office-publications.





750+

BUSINESS, MILITARY, GOVERNMENT AND NON-PROFIT LEADERS WHO CONVENED IN HONOLULU FOR THE FIRST ANNUAL VERGE HAWAII: ASIA PACIFIC CLEAN ENERGY SUMMIT.

INNOVATION INITIATIVES

THE POWER TO TRANSFORM

Innovating Hawaii's Way to Independence

One of the fundamental characteristics of the modern world is the power of innovation to transform the world. Beyond supporting Hawaii's clean energy goals, clean energy innovation has the potential to drive long-term economic prosperity by cultivating a world-class clean energy sector in Hawaii that develops new technologies and services. These developments are essential to the modernization of energy-related infrastructure and to allow customers to have more options and programs that affect their energy usage. It is through clean energy innovations that Hawaii will transform fossil fuel dependence into energy independence.

INNOVATION CAPITOL

Putting Hawaii at the Center of Global Initiatives

HAWAII INNOVATION CENTER - In an effort to foster clean energy innovation, HSEO is making plans to develop an energy innovation center – a green, state-of-the art facility for major clean energy innovation stakeholders who will be instrumental in meeting the state's ambitious renewable energy and energy efficiency goals. In January 2016, HSEO contracted with the architecture firm Perkins + Will, Inc., to deliver conceptual plans for the center. Their work includes an assessment of space needs, a conceptual mock-up of the facility and preliminary budget estimations. HSEO also contracted with Cascadia Consulting Group, Inc., to develop a strategic plan for clean energy innovation. To create this plan, Cascadia will assess the clean energy ecosystem in Hawaii through research and stakeholder engagement and identify how HSEO and an energy innovation center can meet the needs of the clean energy ecosystem.

HSEO is making plans to develop an energy innovation center — a green, state-of-the art facility for major clean energy innovation.

Though awaiting results from Cascadia, HSEO's current vision is an innovation center that:

- Brings together energy innovation partners and entities in a central location to create synergies and stimulate connections that will grow energy innovation.
- Bridges gaps in the clean energy innovation ecosystem and between distinct innovation sectors.
- Coordinates access to markets, capital and talent for energy innovation stakeholders.
- Promotes and showcases clean energy innovation technologies.

Furthermore, to encourage entrepreneurship in energy innovation, HSEO continues to provide the Energy Excelerator with funding throughout 2016 to support a training program, mentorship, outreach and connecting Energy Excelerator companies with Silicon Valley.

ADVANCED VISUALIZATION AND COLLABORATION ABILITIES - HSEO has been developing a visualization and collaboration platform that will:

- Allow for HSEO to analyze and communicate the impacts of complex energy data sets.
- Serve as part-time collaborative workstations for HSEO energy modeling.
- Display modeling and energy ecosystem visualizations to energy stakeholders.
- Empower collaboration with other advanced visualization technologies at national labs, universities, utilities, etc.

HSEO is exploring a partnership with the Laboratory for Advanced Visualization and Applications at the University of Hawaii to develop this platform.

INTERNATIONAL AGREEMENTS - As an acknowledged world leader in clean energy innovation, Hawaii enjoys many fruitful collaborations with other nations and foreign organizations aligned with the state's goals to reduce fossil fuels' chokehold on the planet while developing clean energy technologies.

HAWAII-OKINAWA CLEAN AND EFFICIENT ENERGY COOPERATION - With the support of the DOE and Japan's Ministry of Economy, Trade and Industry, a series of task force meetings identified three areas of joint cooperation between Hawaii and Okinawa: (1) continuation of the Ocean Energy Workshops with Kumejima Ocean Energy Consortium and Hawaii to advance Ocean Thermal Energy Conversion, (2) cooperation with Hawaiian Electric Company and Okinawa Enetech Company on promoting power systems technical exchange and surveying renewable expansion and solutions, and (3) collaboration between Hawaii's Pacific International Center for High Technology and Japan International Cooperation Agency to consider the possibility of overseas business expansion for Hawaii and Okinawa.

ADVANCING THE DBEDT-KETEP PARTNERSHIP – In May 2016, DBEDT staff and the Hawaii Korean Chamber of Commerce accompanied Hawaii legislators on a trade mission to Korea to meet with officials from the Korea Institute of Energy Technology Evaluation and Planning (KETEP). Participants identified several areas of cooperation to pursue under the 2015 Memorandum of Understanding (MOU) between Hawaii and KETEP, with an agreement to continue regular policy dialogues through conferences and seminars to raise awareness by engaging a wide range of stakeholders. Hawaii and KETEP will continue to cooperate in pursuing new energy technologies and smart grid projects by partnering with key local institutes, including Hawaii Natural Energy Institute, Energy Excelerator and Seoul National University's Center for Energy and Environmental Law and Policy. Hawaii and KETEP also collaborated to develop future energy leaders by providing student exchanges and internships. This summer, HSEO hosted two interns from Seoul National University.

DBEDT Korea Trade Mission delegation

MILITARY ALLIANCE - The military continues to be a vital contributor to the economic health of Hawaii. As the most isolated population center on earth, both the state and the military are committed to energy security, reliability, and the maximum use of Hawaii's abundant indigenous resources to achieve energy independence. As one of the largest employers in Hawaii and the top energy user, the military shares Hawaii's responsibility to preserve the values of Hawaii while providing a secure, clean energy industry for future generations.

MEMORANDUM OF UNDERSTANDING WITH THE NAVY - On June 21, 2016, Gov. Ige and the Assistant Secretary of the Navy, Energy, Installations, and Environment, the Honorable Dennis McGinn, signed an MOU agreeing to collaborate on energy-related issues that support the aggressive clean energy directives of both parties. This MOU extends through December 31, 2020. The MOU initially establishes the following working groups.

- **Alternative Fuels in Ground Transportation**
  Task: Develop and implement a strategy integrating alternative-fueled vehicles and fuel-saving technologies to cultivate an environment encouraging employees and organizations to adopt clean energy transportation solutions. Align with Hawaii statutes and federal and Department of Navy fossil fuel reduction goals.

- **Renewable Energy Project Development**
  Task: Develop and sustain a collaborative team to accelerate renewable energy goals.

- **Grid Safety, Resiliency and Reliability**
  Task: Develop a collaborative team to identify Marine Corps Base Hawaii, Navy Region Hawaii and HSEO interests, plans and actions to promote energy resiliency for their respective installations, facilities and jurisdictions. Ensure a secure and reliable energy supply to support operating forces, their families and local communities by hosting critical infrastructure through the prudent development and management of efficient energy resources and infrastructure.

Gov. David Ige and the Assistant Secretary of the Navy, Dennis McGinn.

U.S. PACIFIC COMMAND - Dialog is ongoing with U.S. Pacific Command (PACOM) regarding mutual areas of concern like energy security, energy management, disaster preparedness and response/ recovery. Critical infrastructure planning is imperative and collaboration with PACOM allows Hawaii to leverage expertise and resources to ensure energy security and rapid response to incidents. PACOM also remains an active participant in HCEI.

HSEO partnered with Maui Electric and Hawaiian Electric to plan for the attainment of 100 percent renewable energy generation for the island of Molokai by 2030.

U.S. ARMY - HSEO has met with energy leadership from U.S. Garrison Hawaii to discuss collaboration on renewable energy projects. Both parties have agreed to continue open dialog around generation projects and lessons learned as Hawaii strives to achieve mutual clean energy goals.

2016 CLINTON GLOBAL INITIATIVE COMMITMENT - In 2016, HSEO partnered with Maui Electric and Hawaiian Electric to plan for the attainment of 100 percent renewable energy generation for the island of Molokai by 2030, 15 years ahead of the state's statutory requirement.

Currently, the partners have committed to:

- Deploy distributed, grid-connected energy storage and a grid-scale, fast response energy storage system on Molokai by December 2016. The deployment will increase levels of distributed, customer-sited photovoltaic systems, improve grid reliability and lower reliance on traditional fossil fuel generation.
- Develop visualization tools to evaluate PSIPs for Molokai and updates or additions to the Molokai 5-year action plan by December 2017.

JUMPSMART MAUI

JUMPSmart Maui (described on page 58) shows how innovative technologies can create a more efficient, reliable clean energy grid that can be applied not only to Maui, but to the entire state and beyond.

A TERRIFIC START
JUMPSMART MAUI PROJECT ACCOMPLISHMENTS

Number of volunteers
Phase 1 (EV): 200
Phase 1 (home): 30
Phase 2 (EV): 80
Number of fast charging stations
13
Number of battery storage
2 li-ion batteries
1 lead acid battery

Key partners include New Energy and Industrial Technology Development Organization (NEDO), DBEDT, Maui County, Hitachi Ltd., Maui Electric Company, HECO, Maui Economic Development Board, Hawaii Natural Energy Institute, University of Hawaii Maui College, the U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, Advanced Energy Company USA and HNU Energy. For more information on the project, visit jumpsmartmaui.com.

15 YEARS AHEAD

MOLOKAI WILL REACH 100% RPS 15 YEARS AHEAD STATUTORY REQUIREMENT THANKS TO THE 2016 CGI COMMITMENT.

STAKEHOLDER ENGAGEMENT

PEOPLE POWERED

Staying Connected with Energy Stakeholders

HSEO maintains strong communication and outreach to industry stakeholders and the public. HSEO reaches policymakers, government agencies, the private sector and the public by serving as a central clearinghouse for reporting on the status of Hawaii's clean energy goals.

HAWAII CLEAN ENERGY INITIATIVE

A Letter From Dawn Lippert

Dear Friends in Energy,

2016 has been and will continue to be a year of enormous change around the globe, which makes it a good time to reflect on how far we've come in Hawaii and where we need to double down for 2017 and beyond.

How far have we come? As a state, we have made incredible strides in renewable energy, energy efficiency, and transportation. You can learn about our progress in this report.

Where do we double down? A leader in Hawaii's business community recently told me that three ingredients are needed for transformative change:

1. Work at an island and/or world scale (not just at the neighborhood scale)
2. Impact a major societal function or more than one
3. Work on leverage points that can transform a system (not just reform legacy systems or follow existing patterns)

Looking at the Hawaii Clean Energy Initiative as a part of the policy analytics team with Booz Allen and U.S. Department of Energy in 2008 and now, eight years later as Chair of the Advisory Board, I have seen that we absolutely check the boxes on number one and number two. We are working at the state scale with the goal and blueprint to be a model for the world. We are also impacting a major societal function, which at its core is energy, but quickly impacts transportation, water, land use, security and beyond.

That leads us to number three and the quest for leverage points in our system that can speed and impact our transformation. Today I'm offering a couple of ideas about what those could be; these are just to open the conversation and I welcome your feedback and input as we continue to find and act upon leverage points.

Leverage Point 1: Empathy as fuel for effective collaboration. In June, we partnered with the Hawaii State Energy Office to experiment with one way to do this by taking people out of their everyday roles and engaging them in play through a game called Newtonian Shift. A group of 25 utility executives, nonprofit directors, private industry representatives, and policy makers stepped into someone else's shoes for eight hours. Representative Chris Lee played the CEO of a utility and Jeff Mikulina, of Blue Planet Foundation, played a CEO of a shale oil company. It was an unusual format for an advisory board meeting, but as Plato said, "you can discover more about a person in an hour of play than in a year of conversation." Will this kind of effort build long-term empathy that supports better collaboration? I think it's a start, and we will continue to experiment and prototype new ideas with this goal in mind.

Leverage Point 2: Welcoming and developing people that can help with this transformation. As HCEI Board Member Pono Shim reminded us in the short film Aloha Connects, Hawaii has historically been a place that thrives on welcoming and integrating people from all places and backgrounds. I recently spoke with a bright woman graduating with a degree in engineering who wants to move to Hawaii to start her career. I asked her why Hawaii and she said because of our 100 percent renewable energy goal and that she wants to be on the front lines of innovation, which warmed my heart because this is a focus of our work at Energy Excelerator. What a statement about the power of a compelling vision – 100 percent renewable energy – to bring people together who share our commitment for a better future.

Here's my ask of you – think of ways that you can impact these two leverage points in your role and articulate leverage points rooted in your own experience. It will take all of us to achieve energy transformation. So in the spirit of the Summer Olympics, let's dive in, sprint toward the finish line, and go for gold!

Aloha,

Dawn Lippert
Chair, Hawaii Clean Energy Initiative Advisory Board
Director, Energy Excelerator | energyexcelerator.com

DBEDT Director, Luis Salaveria, welcomes the attendees to VERGE Hawaii.

VERGE HAWAII – Asia Pacific Clean Energy Summit - HSEO contracted with California-based GreenBiz Group to bring its annual VERGE event series to Hawaii in 2016 and 2017 for VERGE Hawaii – Asia Pacific Clean Energy Summit. For details about the 2016 event, see page 61.

"VERGE Hawaii gives Hawaii a unique opportunity to leverage its role as an energy innovation leader and international test bed. We are excited about the opportunity to bring together some of the brightest minds in the clean energy and sustainability movements."

— Luis Salaveria, DBEDT Director

PUBLIC OUTREACH - Through presentations, forums and other speaking engagements, HSEO reaches out to engage with industry stakeholders and the public. These efforts position HSEO as the lead agency for developing Hawaii's clean energy sector. Noteworthy outreach events include:

- Pacific Business News' Economic Forecast Panel
- Maui Energy Conference
- Hawaii Energy Policy Forum's Legislative Energy Briefing
- East-West Center Jefferson Fellowships
- Bureau of Ocean Energy Management's Hawaii Intergovernmental Renewable Energy Task Force Community meetings
- WiRE's Leading the Charge – State of Hawaii's EV Transportation Policies and Trends Panel
- Renewable Energy Institute's 5th Anniversary International Symposium

HAWAII ENERGY POLICY FORUM - The Hawaii Energy Policy Forum (HEPF) was established in 2002 with stakeholders from government, academia, utilities, business and the community to find solutions to Hawaii's energy challenges. Over 40 members contribute to HEPF's mission of sharing ideas and information, recommending policy and initiatives and fostering actionable solutions for a clean and sustainable Hawaii.

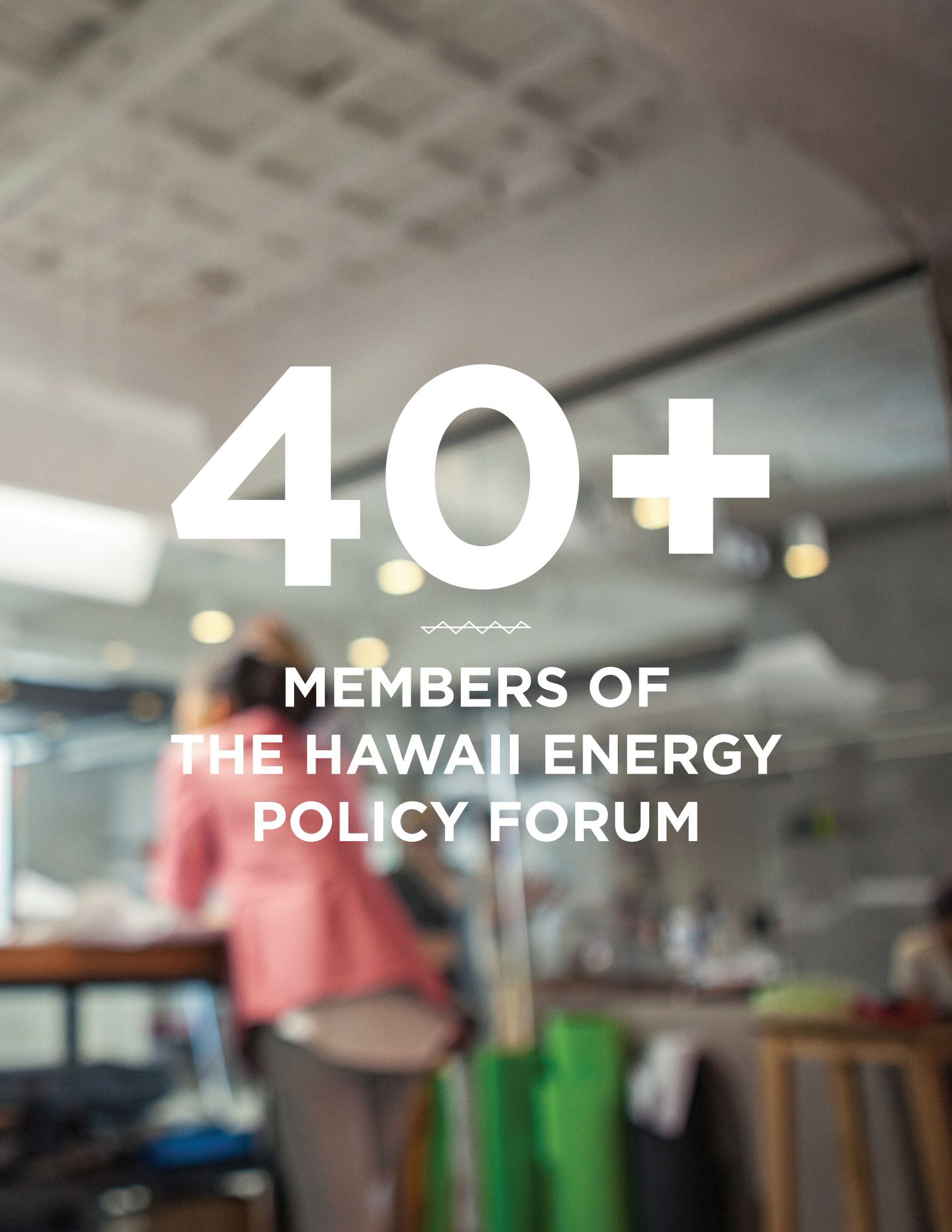
Energy Administrator Mark Glick is HSEO's representative on the HEPF. He and other HSEO leaders have participated in HEPF energy briefings, Hawaii Clean Energy Day conferences and other events.

All eyes are on Hawaii to see how we perform in meeting our bold target of 100 percent renewables by 2045. We know the pathway is not easy, but the Hawaii Energy Policy Forum, with its more than 40 member organizations and individuals, is committed to collaboration and steady progress. Yes, there are conflicts and distractions, but, with the leadership of the Governor and federal and local authorities working together on all fronts — technology, transportation and infrastructure -- we know we can do this!

— Sharon Moriwaki & Mike Hamnett
Co-chairs, Hawaii Energy Policy Forum

PUBLICATIONS – To educate and update stakeholders on Hawaii's constantly changing energy landscape, HSEO distributes *The Current*, a quarterly e-newsletter, and Hawaii Energy Facts & Figures, a semi-annual report on Hawaii's energy data, as detailed on page 61.

Renewable Energy Institute's 5th Anniversary International Symposium panel (L to R): Hiroshi Takahashi, Professor, Tsuru University; David Suzuki, Co-Founder, David Suzuki Foundation; Masayoshi Son, Founder & Chairperson, Renewable Energy Institute, Chairman & CEO, SoftBank Group; Mark Glick, Hawaii State Energy Administrator; Kamon Iizumi, Governor of Tokushima Prefecture, Daisaku Kadokawa, Mayor of Kyoto City


40+
MEMBERS OF
THE HAWAII ENERGY
POLICY FORUM

ENERGY PROGRAM FUNDING

A CLEAN INVESTMENT

The Energy Security Special Fund (ESSF), established under Section 201-12.8, HRS, is HSEO's primary source of funding. The ESSF derives revenue from the Environmental Response, Energy, and Food Security Tax. In the fiscal year ending June 30, 2016, the ESSF revenues from the tax were $3,863,897, up 4.2 percent from $3,708,195 in the preceding fiscal year. HSEO's allocation of the Environmental Response, Energy, and Food Security Tax to the ESSF is critical for supporting HCEI and its profoundly important ramifications for nearly every effort to achieve energy independence for Hawaii.

Federal funding from the DOE and other federal agencies supplements the HSEO's ESSF funding. The DOE's State Energy Program provides an annual formula allocation of approximately $280,000 for increasing market transformation of energy efficiency and renewable energy technologies through policies, strategies and public-private partnerships that facilitate their adoption and implementation. The formula grant may also be used for state-based activities, such as: financing mechanisms for institutional retrofit programs; loan program and management; energy savings performance contracting; comprehensive residential programs for homeowners; transportation programs that accelerate use of alternative fuels; and renewable programs that remove barriers and support supply side and distributed renewable energy. HSEO also actively pursues federal funding opportunities that align with its objectives.

In fiscal year 2016, HSEO was responsible for a grant award pursuant to the provisions of Section 42F-103, HRS in the amount of $211,825 to the Hawaii Community Action Program (HCAP). This grant is for HCAP to reduce energy consumption and costs through energy education and installation of energy-efficient devises and appliances in low- to moderate-income households through its Residential Energy Solutions Initiative program.

The Hawaii Green Infrastructure Bond Fund is a special fund outside the state Treasury into which all proceeds of the Green Infrastructure Fee established pursuant to section 269-166 HRS, and any other proceeds of Green Infrastructure Property, are paid. Money in the Green Infrastructure Bond Fund is for securing the payment of bonds, amounts payable to financing parties and bondholders, amounts payable under any ancillary agreement and other financing costs.

HSEO Budget

FY2016 ACTUAL			
	Personal Services	**Other Current Expenses**	**Total**
Energy Security Special Fund	$3,660,083	$811,784	$4,471,867
Hawaii Green Infrastructure Special Fund	$1,625	$442,905	$444,530
Hawaii Green Infrastructure Bond Fund (O/S S/T)	$-	$16,039,989	$16,039,989
Hawaii Green Infrastructure Special Fund (O/S S/T)	$-	$524,437	$524,437
Federal & Other Funds	$117,984	$682,855	$800,839
TOTAL	**$3,779,692**	**$18,501,970**	**$22,281,661**

FY2017 BUDGETED			
	Personal Services	**Other Current Expenses**	**Total**
Energy Security Special Fund	$3,983,953	$1,431,826	$5,415,779
Hawaii Green Infrastructure Special Fund (O/S S/T)	$-	$50,000,000	$50,000,000
General Funds	$-	$1,200,000	$1,200,000
Federal Funds	$-	$-	$-
TOTAL	**$3,983,953**	**$52,631,826**	**$56,615,779**

HSEO Federal Grants

Funding Agency	Award Title	Award Amount	Grant Objective	Partners
USDOE - EERE	State Energy Program (SEP) Formula (2010, 2011, 2012, 2013, 2014)	$1,212,899.00	To design and carry out the Hawaii State Energy Office's energy efficiency and renewable energy programs. Term: Jul 2010 - Jun 2016.	Various
USDOE - EERE	State Energy Program (SEP) Formula (2015, 2016)	$565,780.00	To design and carry out the Hawaii State Energy Office's energy efficiency and renewable energy programs. Term: Jul 2015 - Jun 2017	Various
USDOE - EERE	Advancing Energy Efficiency in Hawaii Public Facilities	$350,000.00	To strengthen , enhance, and expand the State's existing energy efficiency program by using Energy Star Portfolio Manager (PM) to benchmark appropriate State Executive Branch facilities and use the results to encourage state agencies to bundle facilities to pursue energy efficiency through energy savings performance contracts or other financing mechanisms. Term: Sep 2012 - Mar 2017.	Hawaii Public Benefits Fee Administrator (SAIC/RW Beck) Hawaii Dept. of Accounting & General Services - Public Works Division Hawaii Energy

HSEO Revenues and Expenditures

Source	Revenues	Expenditures	
		Personnel	Operating Expenses (e.g., Travel, Equipment, Supplies, Contracts)
Energy Security Special Fund*	$3,894,794	$3,660,083	$811,784
USDOE State Energy Program Formula Grant (PY2010-2014)	$376,339	$117,984	$376,339
USDOE State Energy Program Formula Grant (PY2015)	$163,983	$-	$163,983
USDOE Advancing Energy Efficiency In Hawaii Public Buildings Grant	$141,308	$-	$141,308
USEPA Hawaii Going Green Intern Development	$1,224	$-	$1,224
PVE - Stripper Well Funds	$89	$-	$-
PVE - Exxon Funds	$183	$-	$-
PVE - Chevron Funds	$119,333	$-	$-
Hawaii Green Infrastructure Special Fund	$-	$1,625	$442,905
Hawaii Green Infrastructure Bond Fund (O/S S/T)	$14,406,069	$-	$14,346,631
Hawaii Green Infrastructure Special Fund (O/S S/T)	$97,940	$-	$524,437
Total	**$19,201,263**	**$3,779,692**	**$16,808,612**

*ESSF Revenue From Environmental Response, Energy, And Food Security Tax: $3,863,897.37.

FINAL MESSAGE

A recent Ernst & Young (EY) report ranking the United States as the world's most attractive market for renewable energy investment provides insight into how energy investors might view Hawaii as a place to park their funds. EY's Renewable Energy Country Attractiveness Index gives the U.S. high marks for things like policy enablement, support for renewables and the presence of a long-term energy strategy. In speaking with one of the authors, the specific policy drivers that set the U.S. apart were the Obama administration's Clean Power Plan and the renewable portfolio standards that are set at the state level. Without a doubt, Hawaii's high rate of renewable deployment and policy leadership in establishing the nation's first 100 percent RPS, were factors that contributed to the number one ranking. This is heartening because investor confidence is critical for attracting the necessary deployment and innovation capital investment to achieve Hawaii's ambitious energy transformation agenda.

The 2016 edition of the Energy Resources Coordinator's report provides the details on Hawaii's progress on energy transformation and the specific activities of the past year by HSEO, a division of DBEDT. In our leadership role for HCEI, HSEO has proactively engaged a wide array of energy stakeholders to keep the momentum going, ranging from the electric utilities to environmental groups to private industry.

Hawaii has been fortunate to have near universal support for its clean energy agenda, and this is a blessing no one should take for granted.

The path forward will undoubtedly become more challenging as renewable energy penetration steadily increases. As clean energy approaches critical mass worldwide, the resulting innovation is driving down the cost of renewables everywhere, including Hawaii. Yet, we are faced with considerable barriers to higher rates of renewable penetration -- interconnection of distributed intermittent resources, equitable rate structures, stranded cost assets and long term contracts for fossil fuels, to name a few. These vexing problems require deeper analysis and a bold resolve to find solutions to achieve our policy objectives of clean energy that is cheaper than the status quo, reliable and locally produced.

One way we hope to improve energy system design and decision making is through a highly advanced visualization tool that provides 3D illustrations of the most complex data sets and scenarios for investments and resources necessary to reach 100 percent renewable energy in the electricity sector. The tool, which we are calling Hawaii Advanced Visualization Energy Nexus, or HAVEN, is being developed in partnership with the University of Hawaii's state-of-the-art LAVA visualization project. We are also pleased that Hawaiian Electric Co. is a collaborating partner to provide data to feed the high-resolution imagery and large-scale simulation models underlying the visualization tool. Our goal is for HAVEN to present understandable comparisons of the investment choices that policy makers, utilities and other energy stakeholders can compare and contrast in an open and participatory visual environment. It's a new way of doing business – and we intend for Hawaii to lead the way.

Hawaii has been fortunate to have near universal support for its clean energy agenda, and this is a blessing no one should take for granted. It's the source of Hawaii's success to date and the resolve and passion of Hawaii's broad energy stakeholder alliance shall certainly keep us on course to meet our ambitious goals.

Sincerely,

Mark B. Glick
State Energy Administrator, Hawaii State Energy Office

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