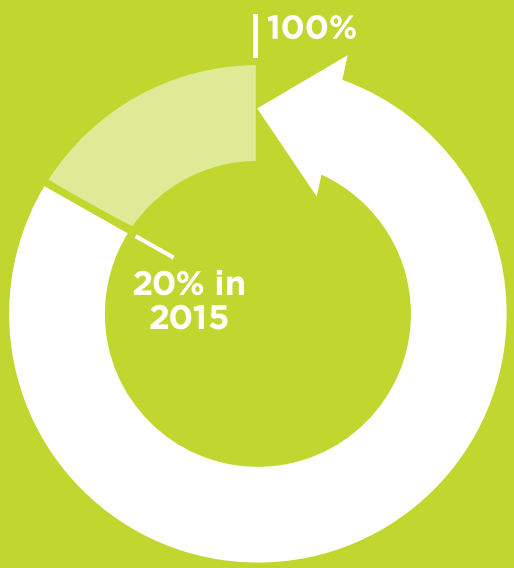
2045



State of Hawaii Energy Resources
Coordinator's Annual Report 2015

Special Message from Governor David Y. Ige

The 2015 Energy Resources Coordinator's Annual Report

October 10, 2015

The State of Hawai'i has a golden opportunity to take advantage of its ideal natural energy resources to meet all of its electricity needs.

The state is already leading the way as the first in the country to make the unprecedented commitment to achieve 100 percent renewable energy – directing the state's utilities to generate 100 percent of their electricity sales from renewable resources by 2045.

This makes sense. Hawai'i is the most oil dependent state in the nation because of our remote location. We spend roughly $5 billion a year overseas to buy foreign oil to support our state's energy needs. This represents a huge drain on our economy and our way of life here, which we simply cannot sustain.

Economically – achieving energy independence will stimulate economic growth in an innovation economy, elevating Hawai'i's job growth prospects and business opportunities, from the volatile carbon economy to the higher paying jobs in clean energy. Secondly, it directly reduces atmospheric carbon emissions which will benefit current and future generations and deliver cost-effective energy that is environmentally friendly.

However, the road to 100 percent renewable won't be easy. The state will need substantial outside investment, capital, financial and political resources and the partnership of our military neighbors as we offer Hawai'i as a test bed for what the utility future will look like. We need to attract even more companies to Hawai'i to pursue cutting edge clean energy projects with the dynamic nature of our energy landscape and isolation that makes the islands a perfect laboratory for new technologies. We want the world to know that Hawai'i supports innovation to solve the most pressing problems in the energy ecosystem.

We welcome solutions from around the world and look to ourselves to transform our own energy landscape. We have a long way to go, but with your energy and support, the 2045 version of this report will be a record of our success in leading the world to a 100 percent clean energy paradise.

With warmest regards,

DAVID Y. IGE
Governor, State of Hawai'i

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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 PROJECTS HAVE THE CAPACITY TO GENERATE AN ESTIMATED 150,537,333 KWH PER MONTH, WHICH IS ENOUGH TO POWER APPROXIMATELY 292,874 HAWAII HOMES A YEAR FOR THE NEXT 10 TO 20 YEARS.

7 BIOFUEL · 3 BIOMASS · 1 GEOTHERMAL · 19 HYDROELECTRIC · 2 OCEAN · 17 SOLAR · 2 WASTE-TO-ENERGY · 9 WIND

INTRODUCTION

The past year has been an extraordinary one for Hawaii's clean energy transformation. I'm proud to report that Hawaii's effort to reduce its dependence on fossil fuels is gaining momentum. This edition of the Energy Resources Coordinator's report documents the significant progress we've made both in increasing the share of electricity generated from renewable resources, and in reducing our electricity usage through conservation and efficiency measures. And, we have stepped up our commitment to Hawaii's clean energy future by passing the nation's first law calling for 100 percent of utility electricity sales to come from renewable sources by 2045.

Hawaii finds itself at the forefront of a growing national and global clean energy movement. Our State represents the transformational change that businesses and governments from around the world want to be a part of. Hawaii's isolated, islanded grids, high energy costs and well-defined 100 percent renewable portfolio standard in the electricity sector make it the perfect place to bring together innovators, policy makers and market leaders to develop the next-generation clean energy and climate solutions.

Pursuing energy independence in Hawaii achieves a dual purpose: delivering cost-effective electricity that is environmentally friendly, while stimulating research, development and deployment that offers the opportunity to create a new knowledge-based sector of the economy. Fortunately, both economic development and energy policy are among the responsibilities that fall under DBEDT's purview. With help from our State Energy Office, we will continue to provide bold leadership and collaboration to realize our clean energy vision.

This vision includes growing jobs, raising incomes and cultivating innovation. We see a clean energy sector as one that not only creates infrastructure in Hawaii, but also produces talent that commands high wages and attracts capital from around the globe, and improves the lives of all of Hawaii's people.

Sincerely,

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

EXECUTIVE SUMMARY

The past year marks a turning point in the history of energy in Hawaii. Since the establishment of the Hawaii Clean Energy Initiative in 2008, the state has been moving from fossil fuels to clean energy sources. Building on tremendous progress in recent years, in 2015 the state accelerated its commitment to an unprecedented level: 100 percent renewable energy in the electricity sector by 2045. This report details Hawaii's efforts to increase energy efficiency, renewable energy, and the regulatory, technical and practical efforts required to make this world's-first ambition possible.

Energy Efficiency – The most direct way to get all of the state's energy from renewable sources is to use less energy. Energy Efficiency Portfolio Standards (EEPS) tracks the amount of energy use offset by efficiency savings, with a goal of cutting electricity use by 4,300 gigawatt-hours by 2030, which equates to a 30 percent reduction. By the end of 2014 the state had reduced electricity consumption by about 1,500 gigawatt-hours, or 16.8 percent.

There are many ways to achieve energy efficiency savings – which also have a sizable impact on carbon emissions – utilizing new and retrofit technologies in residential and commercial buildings. The challenge is often financing, where Hawaii has made progress using federal dollars to extend credit and expanding energy performance contracting, which uses future energy savings to pay for efficiency upgrades. Other advances include progress at state agencies, businesses and in building codes to embrace greater energy efficiency.

Renewable Energy – An independent energy future is one powered by renewable sources of energy, all of which are present in Hawaii at the highest grade. Having met the previous milestone years ahead of schedule, Hawaii reset its Renewable Portfolio Standards (RPS) in 2015 to 100 percent by 2045. The state is just past one fifth of the way there based on the current RPS formula.

The challenge in reaching the 100 percent RPS is not only innovating ways to tap into Hawaii's plentiful natural, clean sources of power, but building the grids and interconnection infrastructure to make them accessible and affordable. Hawaii has become the world's foremost test bed for renewable energy advancements to figure this out.

Transportation and Planning – To guide the way forward, planning for implementation, energy assurance and integrating new energy sources and loads will be paramount. The area of greatest focus will be modeling the increasingly integrated energy eco-system where electric sector and electrification of the transportation sector create greater interdependencies and opportunities. Accordingly, HSEO is developing a model to capture the interdependencies of Hawaii's energy eco-system. To support energy independence in the transportation sector and enhance the analytics relative to the energy eco-system HSEO commissioned a Transportation Energy Analysis to identify tactics and enabling actions that reduce petroleum consumption in the transportation sector. Similar plans to boost the accessibility of community-based renewables, including distributed solar power and microgrid projects, are advancing apace.

Clean, Renewable Energy Policy – To encourage entrepreneurship and innovation and make progress towards energy independence in Hawaii, the proper regulatory framework must be in place. The state's ambitious 100 percent renewable goal is itself a statute that has catalyzed broad advancement at all levels. Subsequent policies and initiatives are spurring utilities to remove obstacles to progress, requiring public institutions like the University of Hawaii to transform their energy use, fostering innovation in distributed generation, hydrogen and other technologies, financing green energy upgrades and aligning efforts to reduce greenhouse gas emissions with renewable energy goals – all while ensuring responsible stewardship of the environment.

Deployment and Innovation – Even as the groundwork is laid, efforts to build and deploy tomorrow's clean energy systems must already be in development. The state is working with partners in Hawaii and globally to gather expertise and finance, test, implement and refine programs that will advance the state's clean energy vision.

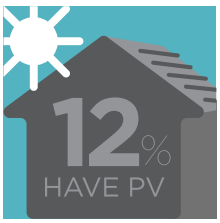
As the state continues to realize that vision, this report will track its progress on the way to energy independence. Serving as the Energy Resources Coordinator (ERC), the Director of the Department of Business, Economic Development, and Tourism (DBEDT) is responsible for planning, managing and monitoring Hawaii's energy program as mandated by the Hawaii Revised Statutes (HRS 196-4). The report satisfies the requirements of Act 95 of 2004 which added HRS 196-41(c) requiring that DBEDT submit a progress report biannually, starting in January 2006, to the governor and legislature on its: (1) progress in the development of a program to maximize the use of renewable energy and cost-effective conservation measures by state government agencies; and (2) work with federal agencies to develop as much research, development and demonstration funding and technical assistance as possible to support Hawaii in its efforts to achieve its renewable portfolio standards.

Under the leadership of the ERC, the Hawaii State Energy Office (HSEO) works to implement the state's clean energy vision to transform Hawaii's economy by growing the clean energy sector. To this end, HSEO deploys clean energy infrastructure as a catalyst for economic growth, energy innovation and test bed investments. HSEO aims to align its policies among government agencies and the private sector. It provides the framework and tools for energy developers and investors to pursue opportunities that further Hawaii's clean energy economy.

CLEAN ENERGY VISION

Going Green and Clean in Hawaii

New Way Forward - It's no accident that Hawaii leads the nation in a number of measures that gauge progress in the growing clean energy movement. Roughly 12 percent of Hawaii homes have a PV system, the state generates more solar energy on a per capita basis than any other state in the country, and Hawaii's efforts in energy performance contracting are unparalleled. Clean energy is an attractive proposition in Hawaii, thanks in part to an abundance of renewable energy resources and high prices for electricity from oil-fired power plants. However, it is widely acknowledged that the momentum behind clean energy in Hawaii is largely the result of strong public policies at every level of government.



Hawaii has been a pioneer in energy policy, showing its leadership most recently with the enactment of a law calling for Hawaii utilities to generate 100 percent of their electricity sales from renewable sources by 2045. Setting the bar high sends a message that Hawaii is committed to a future in which its energy needs are served primarily by indigenous, renewable resources. Ending Hawaii's dubious distinction of being the most oil dependent state in the country will result in greater energy, environmental and economic security for the state. Having a 100 percent renewable energy target for the electricity sector may seem lofty. But it is important to have goals that are aspirational, yet not out of touch with reality. The new 100 percent renewable portfolio standard (RPS) strikes this balance. The innovations transforming Hawaii's energy sector are solidifying its reputation as ground zero for next-generation energy issues. The state's clean energy transformation is setting the stage for a new, knowledge-based sector of the economy that has the potential to rival Hawaii's traditional economic engines of tourism and federal spending.

The opportunity to develop cutting-edge energy solutions is attracting some of the brightest minds in the clean energy and sustainability movements from around the world to Hawaii.

Guiding Principles - Hawaii's clean energy transformation is anchored in a set of five Energy Policy Directives that offer guidance and clarity for future policy, regulatory and financial actions necessary to fulfill Hawaii's energy transformation:

Under the policy directives, Hawaii's new energy ecosystem should consist of a diversified energy portfolio, anchored in indigenous renewable resources. Diversity has always been one of Hawaii's greatest assets, and its energy resources are no exception. The state is blessed with diverse resources such as marine, solar, wind, hydro, bioenergy and geothermal.

This new energy ecosystem will need to be supported by an integrated and interconnected energy infrastructure. A key element will be developing a robust communications network that enables the grid to operate more efficiently and accommodate greater amounts of intermittent renewable energy.

Clean energy development should balance economically and technologically sound solutions and Hawaii's unique environment and culture. Not all clean energy projects are created equal. To find the most beneficial long-term solutions, Hawaii must focus on projects that make the best use of land and resources.

Hawaii should also leverage its role as an emerging international clean energy test bed to attract innovation and investments in the new clean energy sector. Hawaii should not only demonstrate the future of clean energy, but should also help invent it. Finally, Hawaii's renewable future should not be pursued at any cost; energy efficiency and clean energy should prevail when they provide value superior to conventional energy sources and systems. This will create an efficient marketplace that benefits both producers and consumers.

HCEI MAX - Hawaii's 100 percent RPS target for the electricity sector, along with many of the state's other progressive clean energy policies, have their roots in the Hawaii Clean Energy Initiative (HCEI). Launched in 2008, through a partnership between USDOE and the State of Hawaii, HCEI pulled together an unprecedented partnership of energy stakeholders who collaborated to form a new policy agenda and road map for action. HCEI is credited with spawning the explosive growth in a broad portfolio of renewable energy and energy efficiency installations across Hawaii. The common themes running through HCEI are so universally embraced that the initiative has remained intact through three gubernatorial administrations. It has evolved into HCEI MAX, which reflects Hawaii's bold leadership in setting a 100 percent target for renewable energy in the electricity sector and staying ahead of the rapidly changing energy landscape in Hawaii.

When reconfirming the Memorandum of Understanding (MOU) in 2014, HCEI stakeholders launched an effort to update and re-energize the initiative so that it would continue to be relevant. A major focus of the effort to revamp HCEI was to take a fresh look at reducing petroleum use in Hawaii's transportation sector. While Hawaii has made great strides towards meeting its clean energy goals, there was a realization that more needed to be done in transportation, which accounts for about two-thirds of the state's energy use.

To address the transportation issue, HSEO commissioned a comprehensive, analytic review of the progress towards HCEI transportation goals and convened a broader group of stakeholders representing the diverse interests in the transportation sector. The International Council on Clean Transportation (ICCT) conducted the analysis, convened stakeholders, and developed a new set of actionable tactics to reduce petroleum-based fuels in the transportation sector. The next step is a collaboration of stakeholders to develop a transportation road map that will most certainly be a major focus of HCEI MAX for many years to come.

Modernizing The Grid - Meeting Hawaii's ambitious clean energy goals will require a concerted effort to both modernize the state's electrical grids and operate them more efficiently. Considering that Hawaii leads the nation in solar capacity per capita, the rates of renewable penetration are even more impressive because Hawaii's isolated grid cannot absorb the high percentage of renewables that can be interconnected in states that are attached to a regional grid. Consequently, often at the prodding of the Hawaii Public Utilities Commission (PUC), HSEO and other energy stakeholders, Hawaii's utilities have had to act in real time to propose, deploy and confirm solutions to integrate more renewables. Among the strategies deployed by HECO:

- Testing and working on specifications of fast trip inverter functionality to avoid transient over-voltage events.
- Computer modeling each individual distribution circuit to determine proactively the distributed energy resources hosting capacity of each circuit.
- Working with inverter manufacturers to bring to market advanced inverter functionality to manage voltage levels to customers.

These solutions are dramatically reducing the interconnection queues established by the utilities to manage the pace of distributed solar interconnections and protect system reliability and safety. They can be complemented by microgrids, which provide an emergency energy supply to homes and critical sites like hospitals, adding value and resiliency to Hawaii's investment in renewable and distributed energy systems.

Energy Ecosystem - As work continues under HCEI MAX, it has become clear that a crucial part of the effort will be modeling Hawaii's integrated energy ecosystem to pursue the most cost effective strategies. HSEO's Energy Systems and Planning Branch is engaging Hawaii's utilities in a collaborative and continuous joint planning process to ensure alignment with state energy policy and utility planning.

This holistic approach to planning in the energy ecosystem is critical.

HSEO is taking a holistic approach to optimize investments in the new energy ecosystem, considering the growing interdependencies between the electricity and transportation sectors. This is imperative as efforts are made to reduce petroleum use in transportation. Models show that a balanced portfolio of wind, solar and dispatchable renewables – such as biomass, geothermal or ocean thermal energy conversion – can reduce storage requirements relative to higher proportions of one or two renewable resources, which can result in significant cost savings for ratepayers.

Interplays in Hawaii's energy ecosystem could significantly increase demand on the electric system, such as converting ground transportation to electric drive (through either EVs or hydrogen). Electrifying ground transportation could reduce Hawaii's dependence on imported fossil fuels considerably. It could also double the amount of renewable generation that must be integrated onto the electric grid. Deliberate and thoughtful planning will be required to achieve this end.

ENERGY EFFICIENCY PORTFOLIO STANDARDS

POWER SAVING

Hawaii's Energy Efficiency Portfolio Standards

How do we reduce waste and use energy most cost-effectively with our existing infrastructure and buildings? Hawaii's answer is guided by its Energy Efficiency Portfolio Standards (EEPS), which call on energy service providers to offset a portion of their annual increase in electricity demand with energy efficiency savings. The overall HCEI MAX goal for EEPS is to achieve or exceed 4,300 gigawatt-hours (GWh) of energy reductions by 2030. Compared to our 2007 baseline, that's a 30 percent reduction in electricity use.

The state's approach to meet this goal includes shaping energy efficiency regulatory policy to complement clean energy goals, streamlining retrofits for inefficient commercial and residential buildings, strengthening building codes and construction requirements to favor energy efficiency and innovating new energy efficiency measures.

Advances in energy efficiency technologies, such as solar water heating, lighting and Energy Star-certified appliances have played a significant role in improving Hawaii's energy efficiency. To be optimally effective, these new technologies must be paired with evolving energy efficiency building codes and retrofits to buildings with existing inefficiencies in their electricity and water systems. These improvements require leadership and resources for financing and technical expertise, all of which the state has pursued aggressively to meet its energy efficiency goals.

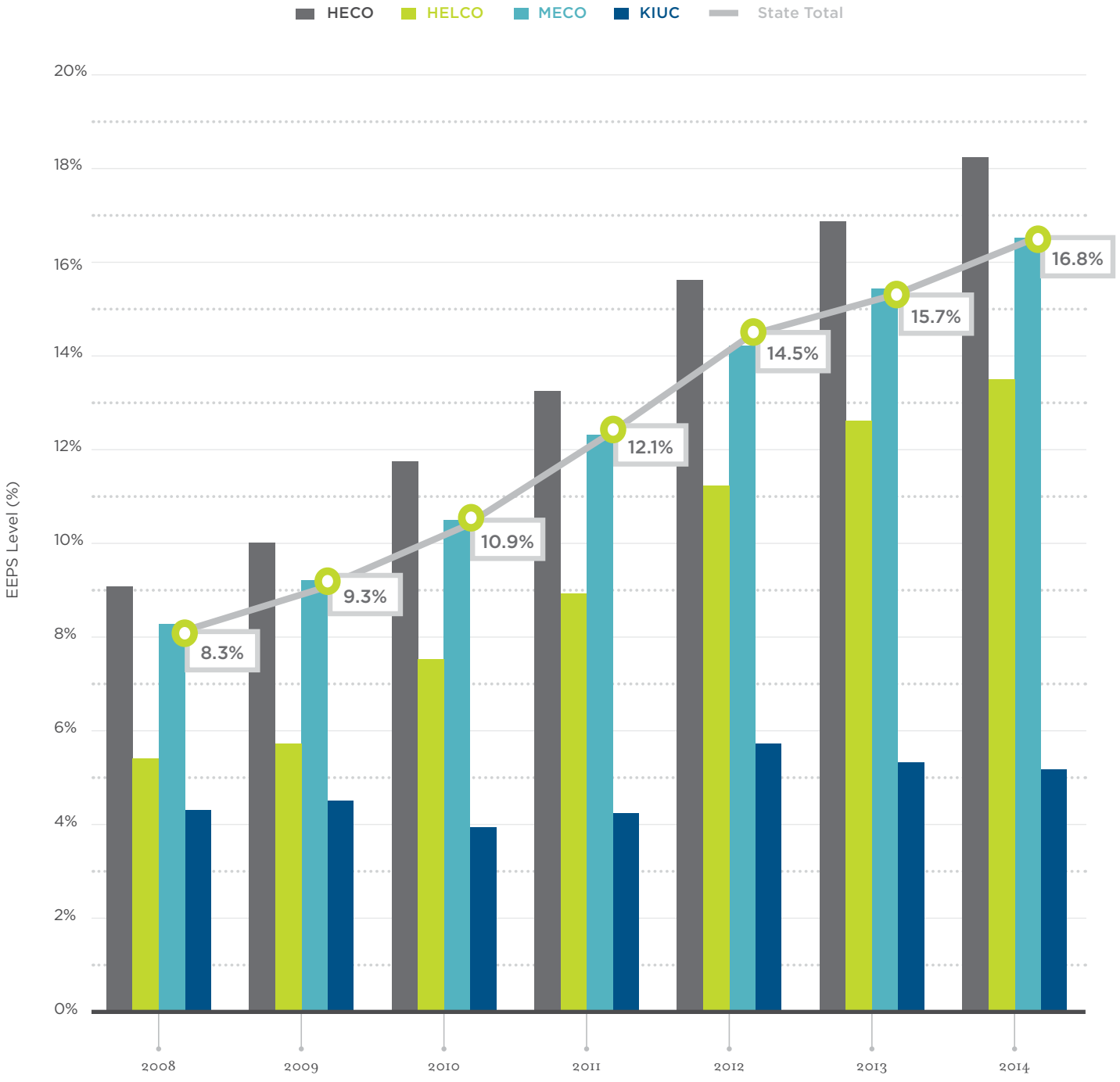
For example, the state recently exceeded its energy performance contracting (EPC) commitment to the Clinton Global Initiative. EPC lets building owners and private companies tap future costs savings to pay for energy and water efficiency retrofits. GreenSun Hawaii is another innovative funding mechanism to enhance credit opportunities to property owners making renewable and efficient energy retrofits. State agencies have successfully cut their electricity use year after year to lead by example, and over 100 businesses have saved a total of 14 million kilowatt-hours (kWh) of energy over the past six years with help from GreenSun Hawaii.

These successes have created forward momentum, leading to advances that promise savings for businesses and households that can be reinvested in other areas to boost the economy and take us all closer to energy independence.

HALFWAY THERE

Hawaii Energy Efficiency Portfolio Standards (EEPS) Levels

SINCE THE START OF THE HAWAII CLEAN ENERGY INITIATIVE IN 2008, HAWAII EEPS LEVELS HAVE MORE THAN DOUBLED, FROM 8.3 PERCENT TO 16.8 PERCENT IN 2014. THE STATE MUST DOUBLE EEPS LEVELS AGAIN BY 2030 TO REACH THE GOAL OF A 30 PERCENT REDUCTION IN ENERGY CONSUMPTION THROUGH EFFICIENCY MEASURES.



RACE TO THE TOP

Energy Performance Contracting (EPC)

For the fourth year in a row, the Energy Services Coalition (ESC) ranked Hawaii first in the nation in energy performance contracting (EPC). Hawaii's investment of $295.82 per capita earned the state a fourth consecutive ESC Race to the Top award in 2015. 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, there have been a total of over $376M in performance contracts signed by state and local government agencies; these contracts will save in excess of an estimated $964M over the life of the contracts.

EPC Projects Pay For Themselves - EPC is an innovative way to pay for energy and water efficiency improvements with the energy savings they guarantee. 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.

For nearly 20 years, HSEO has been leading the state's award-winning EPC efforts, offering technical assistance – including analysis of energy savings measures, review of financing documents and advice on agency-specific issues – to 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

ENERGY SERVICES COALITION RANKING

STATE	POPULATION	PERFORMANCE CONTRACTING	DOLLARS PER CAPITA	JOB YEARS CREATED	SOURCE ENERGY SAVED (MILLION BTUS)	TONS CARBON AVOIDED
1. Hawaii	1,360,301	$402,400,424.00	$295.82	4,374	3,339,119	57,356
2. Kentucky	4,339,367	$750,000,000.00	$172.84	8,152	6,223,500	106,901
3. Delaware	897,934	$138,707,463.00	$154.47	1,508	1,150,994	19,771
4. Ohio	11,536,504	$1,252,683,627.00	$108.58	13,616	10,394,769	178,551
5. Kansas	2,853,118	$278,951,861.00	$97.77	3,032	2,314,742	39,760

EMPOWERING THE STATE & COUNTIES

HSEO Provides Technical Assistance to State & County Agencies Using Energy Performance Contracting

The chart illustrates the number of EPC projects conducted by state and county agencies from 1996 through 2015. Looking ahead, the state anticipates more investment through EPC. HSEO is working on additional projects within the University of Hawaii at Hilo-Phase 2 and the City and County of Honolulu Board of Water Supply. Economic impacts from energy savings achieved since 1996 include:

- $14.4M in state tax revenues
- $381.3M in income to households
- An average of 208 jobs generated or supported each year between 1996 and 2033

Note: Impacts are the net of increased government spending on non-energy categories and decreased electricity sales of utilities. The impact of construction and equipment installation is not included in this calculation, since complete data on financing the projects is not yet available.

HAWAII STATE & COUNTY ENERGY PERFORMANCE CONTRACTS

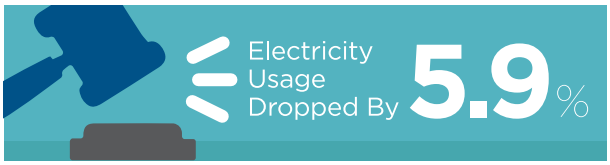
AGENCY	YEAR(S)	CONTRACT AMOUNT ($)	ESTIMATED SAVINGS OVER LIFE OF CONTRACT ($)
UH-Hilo	1996-2012	$6,402,695	$14,630,066
County of Hawaii	1997-2026	$2,215,546	$8,157,880
County of Kauai	1998-2012	$525,965	$1,205,990
C&C of Honolulu	2001-2025	$11,900,205	$36,066,761
Hawaii Health Systems Corporation	2002-2022	$21,936,997	$55,766,364
Judiciary	2003-2012	$1,474,406	$9,785,036
Dept. of Accounting & General Services Phase 1	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 of Honolulu	2013-2033	$6,054,178	$13,693,910
Dept. of Accounting & General Services Phase 2	2013-2033	$17,400,000	$28,000,000
Department of Transportation	2013-2036	$237,898,510	$655,516,231
Total		**$402,400,424**	**$989,614,117**

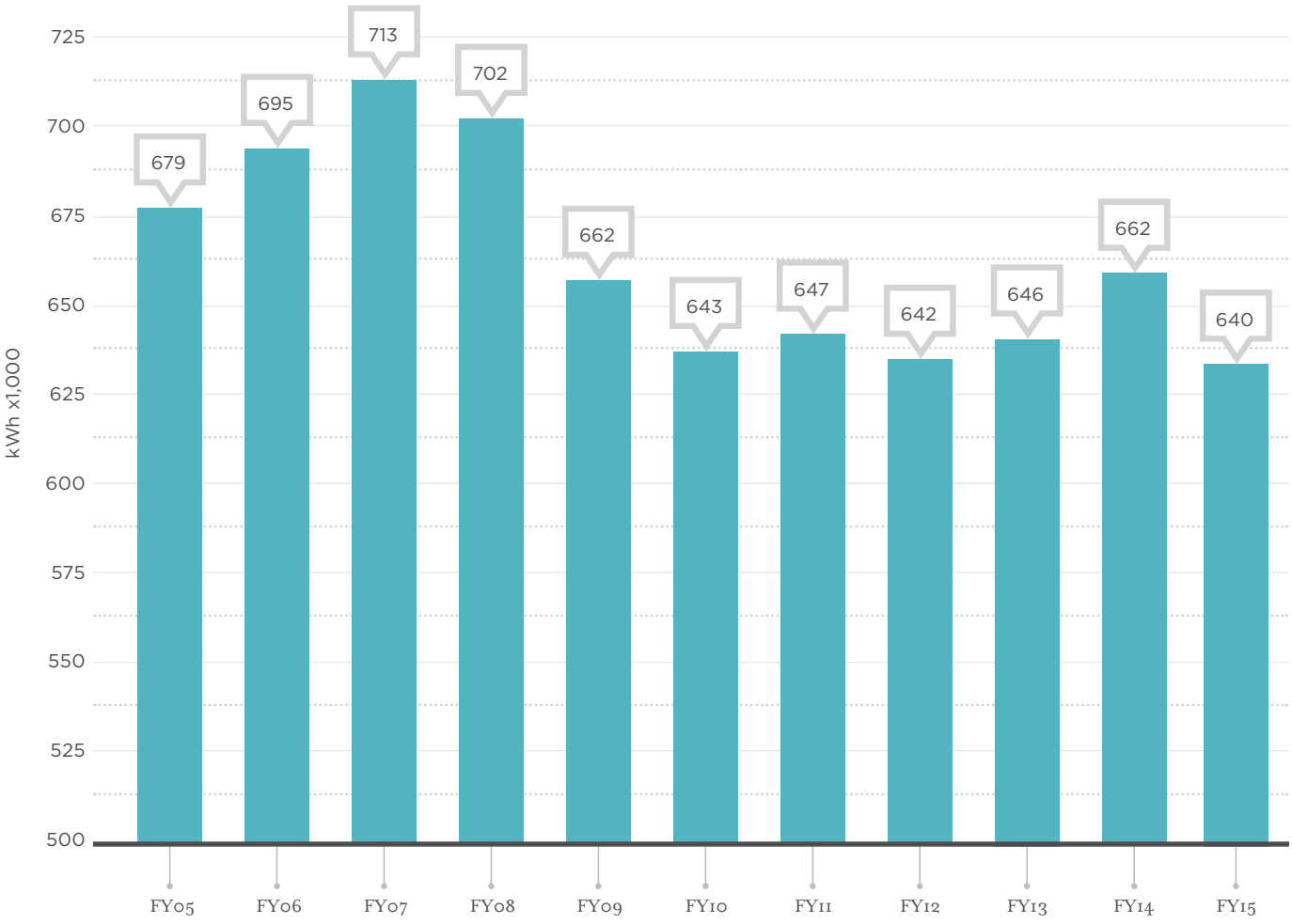
LEAD BY EXAMPLE

Electricity Consumption by State Agencies

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 2015 has declined 5.9 percent from 2005 (the baseline year).

Due to staff reductions, we will no longer provide a special report on LBE; we will, however, continue to track and report electricity use by state agencies.





Hawaii Green Business Program Government by itself can't make Hawaii energy independent – Hawaii's businesses must also strive to operate in an environmentally, culturally and socially responsible manner. To help them and recognize their successes in implementing energy and resource efficiency practices, the state set up the Hawaii Green Business Program as a partnership between the Hawaii Department of Health and the State Department of Business, Economic Development and Tourism (DBEDT); 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 2009-2015, over 100 business and government entities have benefited from the program, including sectors such as hospitality, commercial office, retail, restaurant, food services, grocery and green events. Here's what they saved:

- 14.212 million kWh of energy (equivalent to powering 1,925 homes for one year in Hawaii)
- 57.1 million gallons of water
- $3.632 million in energy costs

U.S. Department of Energy Competitive Award - The state submitted a winning proposal to a national competition conducted by the US Department of Energy (USDOE), 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

Working to Adopt International Energy Codes - 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.

DBEDT serves on the SBCC, which was established by statute to update building codes. With the unanimous adoption of the IECC 2015, HSEO will develop Hawaii Administrative Rules to codify the IECC 2015. HSEO will provide technical assistance and staff training, including training from private and public sector design professionals on the IECC 2015, to county building officials. As the various county councils hold hearings on the adoption of the IECC 2015, HSEO will testify in support.

Clinton Global Initiative Commitment Exceeded - In 2013, the state made a formal Commitment to Action to the Clinton Global Initiative. Between July 1, 2013, and June 30, 2015, the time frame for completion, the state more than doubled energy savings through more private sector partnerships in energy performance contracting (EPC) for state and county facilities, exceeding the goal of the initiative.

Extra Credit: GreenSun Hawaii - HSEO created GreenSun Hawaii to help Hawaii property owners make energy efficiency and renewable energy retrofits to their homes, apartment complexes and facilities. The credit enhancement program for owners of non-profit, commercial and single and multi-family residential properties is funded by a $4.38 million U.S. Department of Energy grant under the American Recovery and Reinvestment Act of 2009. Administered by the Hawaii Community Reinvestment Corporation (HCRC), the program effectively extended loan availability and more aggressive rates and terms to a larger pool of customers by lowering the risk for participating lenders, who gained access to a loan loss reserve (LLR) that covers up to 100 percent of their actual losses.

GreenSun Hawaii financed the following qualifying energy independence measures in residential and non-residential settings.

Residential
- ENERGY STAR® refrigerators and air conditioning systems, including insulation
- Solar thermal hot water systems, heat pumps and solar electric photovoltaic (PV) systems

Non-Residential
- Lighting and air conditioning retrofits and upgrades
- Solar thermal and PV systems
- Energy efficiency windows, cool roofs and other installations eligible for Hawaii Energy or Kauai Island Utility Corporation rebates
- Loan-related fees

GreenSun Hawaii's successes since 2011 include:
- 12 lenders and 42 authorized contractors participating statewide
- 194 loans, which aggregate to over $4.8 million in capital deployed
- Energy savings estimated at 1,461,121 kWh/year (29.2 million kWh over the life of the installations, enough to power 3,960 homes for a year)
- Annual electricity bill savings in excess of $648,000 ($12.9 million over the life of the systems)
- A C02 reduction of 2,196,000 lbs. per year (43.9 million lbs. over the life of the installations)

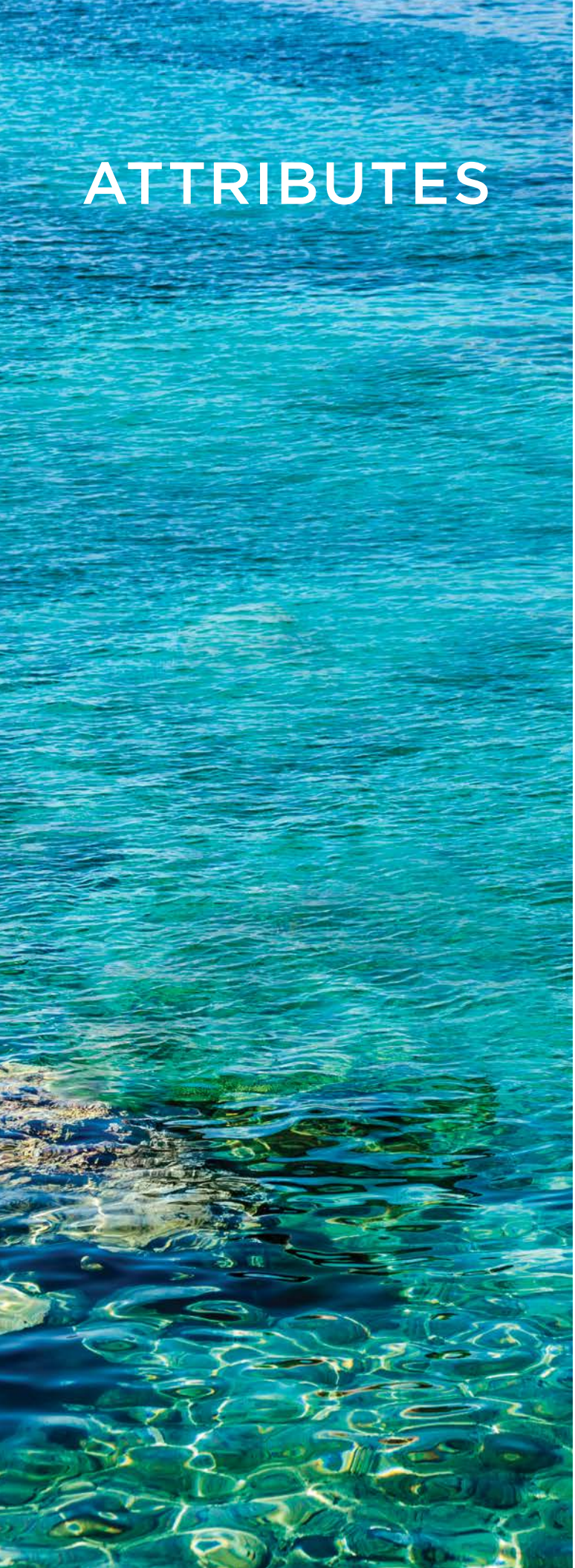
The program, now in a seven-year closeout period, is no longer accepting loan applications.

The Forefront of U.S. Energy Efficiency - Nationally, Hawaii ranks:

- 1st in Energy Performance Contracting, Energy Services Coalition
- 1st Lowest Average Energy Usage, Save on Energy
- 6th in LEED Green Building, U.S. Green Building Council's 2014 Top 10 States

#1

HAWAII RANKS
LOWEST AVERAGE
ENERGY USAGE AT
JUST 22.2 MILLION BTU
PER CAPITA



ATTRIBUTES

ENERGY EFFICIENCY PORTFOLIO STANDARDS SECTION

Inside Cover 60 Renewable Projects Map
Total energy output for all projects is estimated based on reports by Hawaii's electric utilities, National Renewable Energy Laboratory (NREL) and U.S. Department of Energy. Average residential energy use in Hawaii is 514 kWh per month (Hawaii State Energy Office, "Hawaii Energy Facts & Figures May 2015").

Page 9
Hawaii Energy Efficiency Portfolio Standards (EEPS)
Source: Renewable Portfolio Standards Status Reports, 2008-2014 (Hawaii Public Utilities Commission)

Page 10
Energy Services Coalition Ranking
Source: Energy Services Coalition, Race To The Top

Page 11
Hawaii State & County Performance Contracts
Source: DBEDT/HSEO

Page 12
Lead By Example
Source: FY 14 Lead By Example Report to the 2015 Hawaii State Legislature

RENEWABLE PORTFOLIO STANDARDS

WORLD-CLASS

Hawaii's Renewable Portfolio Standards

While Hawaii continues to make headway in energy efficiency efforts, they are supplemental to the advances demanded by the state's ambition to lead the world in renewable energy.

Hawaii is ground zero for renewable energy sources, which are crucial to HCEI MAX's vision of an independent energy future for Hawaii. Rich energy resources make it possible for the state to continually increase its ambitious Renewable Portfolio Standards (RPS), a regulatory requirement to increase production of energy from renewable resources. Having exceeded interim goals in recent years, the state has set a new, transformative RPS goal: 100 percent renewable electricity by 2045.

It is an audacious but achievable aim, and HSEO will continue to track the state's progress in meeting this new, world-class RPS. Some milestones:

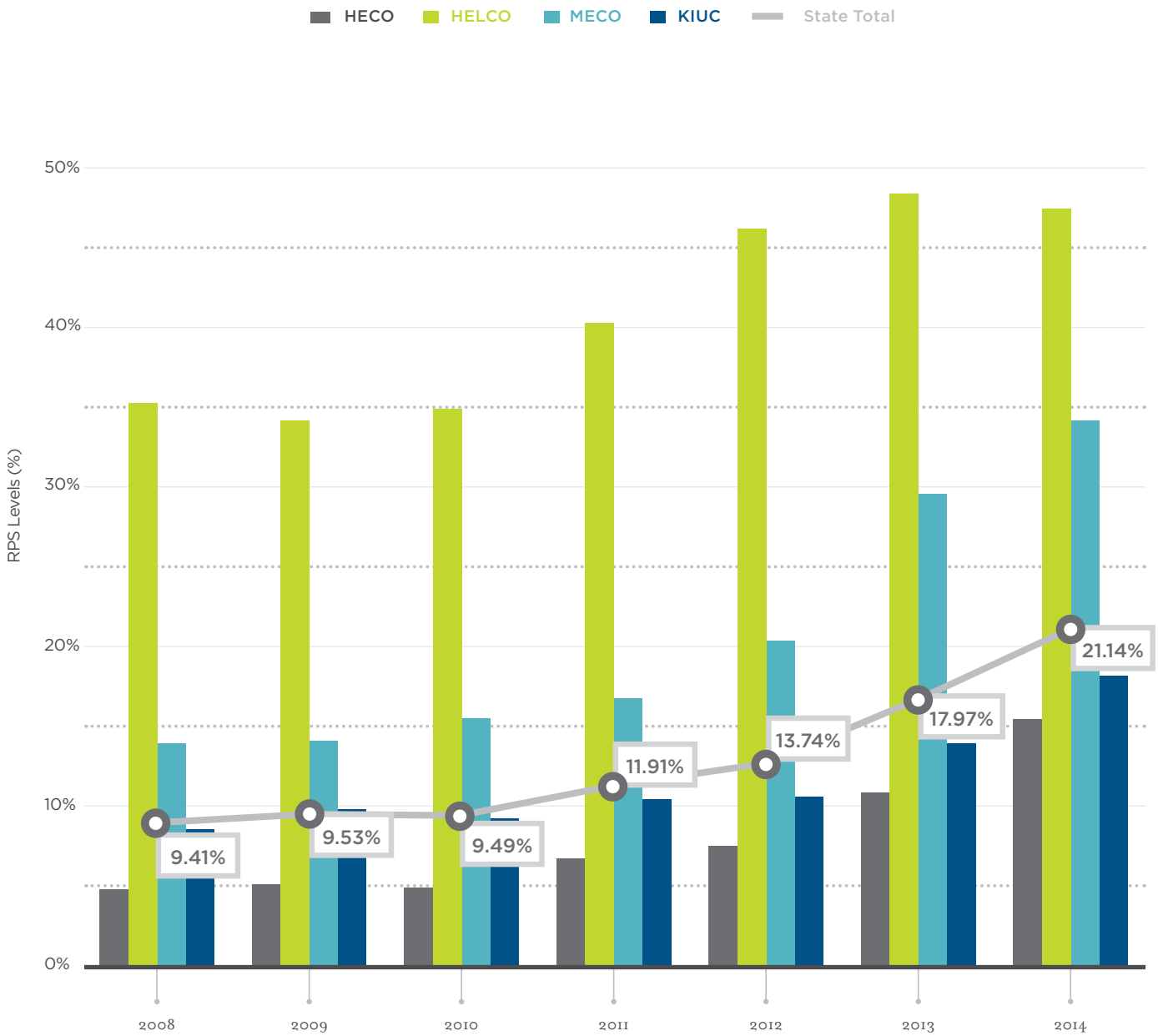
- Solar expenditures indicate sustainably robust growth.
- Act 100 (2015) lets Hawaii residents and businesses receive credit for the electricity they generate, and HSEO is now collaborating on a Community-Based Renewable Energy (CBRE) tariff proposal.
- Across Hawaii, over 20 MW of new renewable energy projects began unit-testing or became operational in 2015.

The following pages provide greater detail about these advancements that have energized the state's efforts to realize its potential as the world's foremost exemplar of clean energy achievement, revolutionizing our energy sources, economy, workforce and relationship to our environment and each other as a society.

RENEWABLES GOAL RENEWED

Hawaii Renewable Energy Portfolio Standards (RPS) Levels

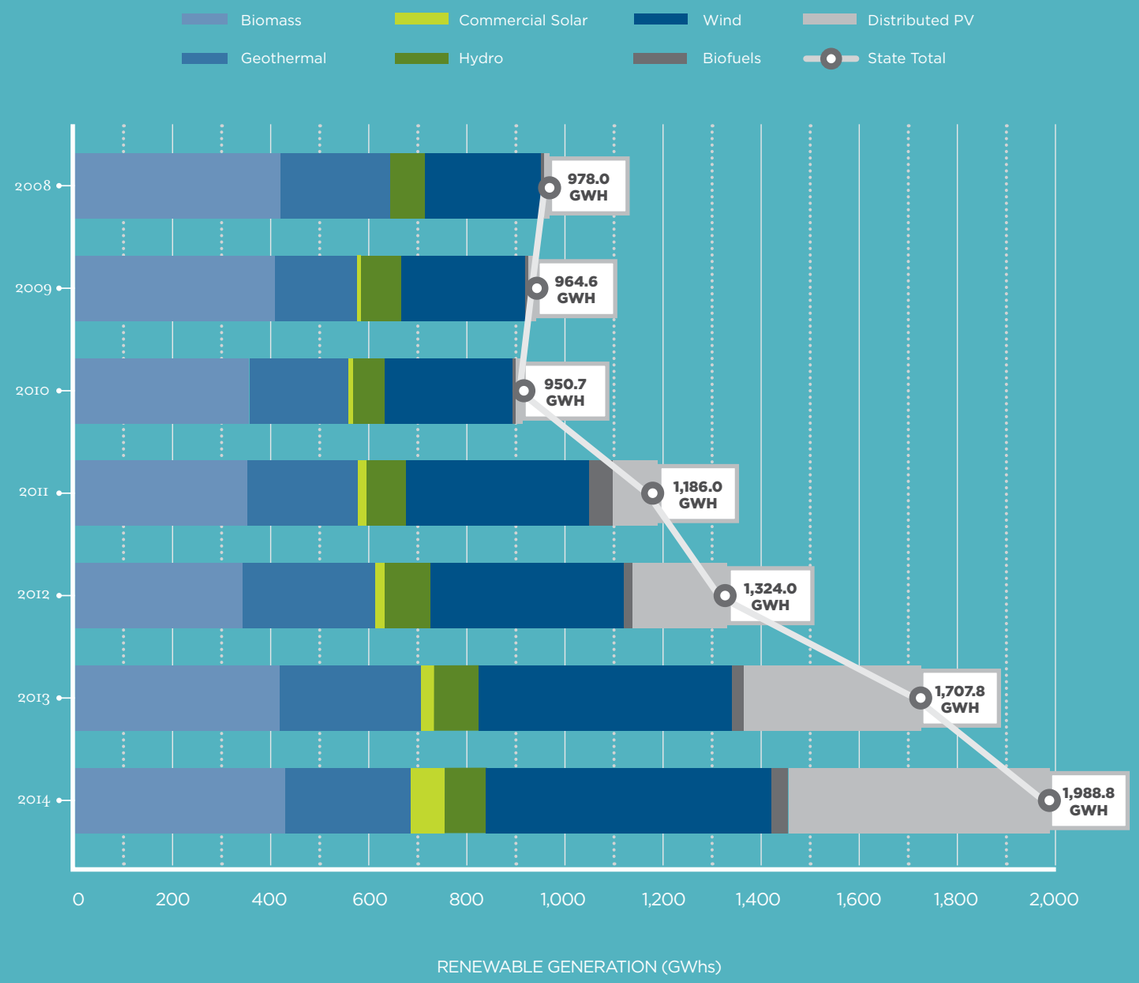
REDEFINING SUCCESS – SINCE HCEI WAS ESTABLISHED IN 2008, HAWAII HAS CONTINUED TO SURPASS RPS MANDATES AHEAD OF TIME, LEADING THE STATE TO REACH FOR MORE AMBITIOUS GOALS. THE PREVIOUS TARGET OF 15 PERCENT WAS EXCEEDED TWO YEARS EARLY, IN 2013, AND IN 2014 THE FIGURE PROGRESSED TO 21.1 PERCENT, JUST OVER A FIFTH OF THE WAY TO THE STATE'S NEW LANDMARK GOAL TO BE 100 PERCENT RENEWABLE BY 2045.



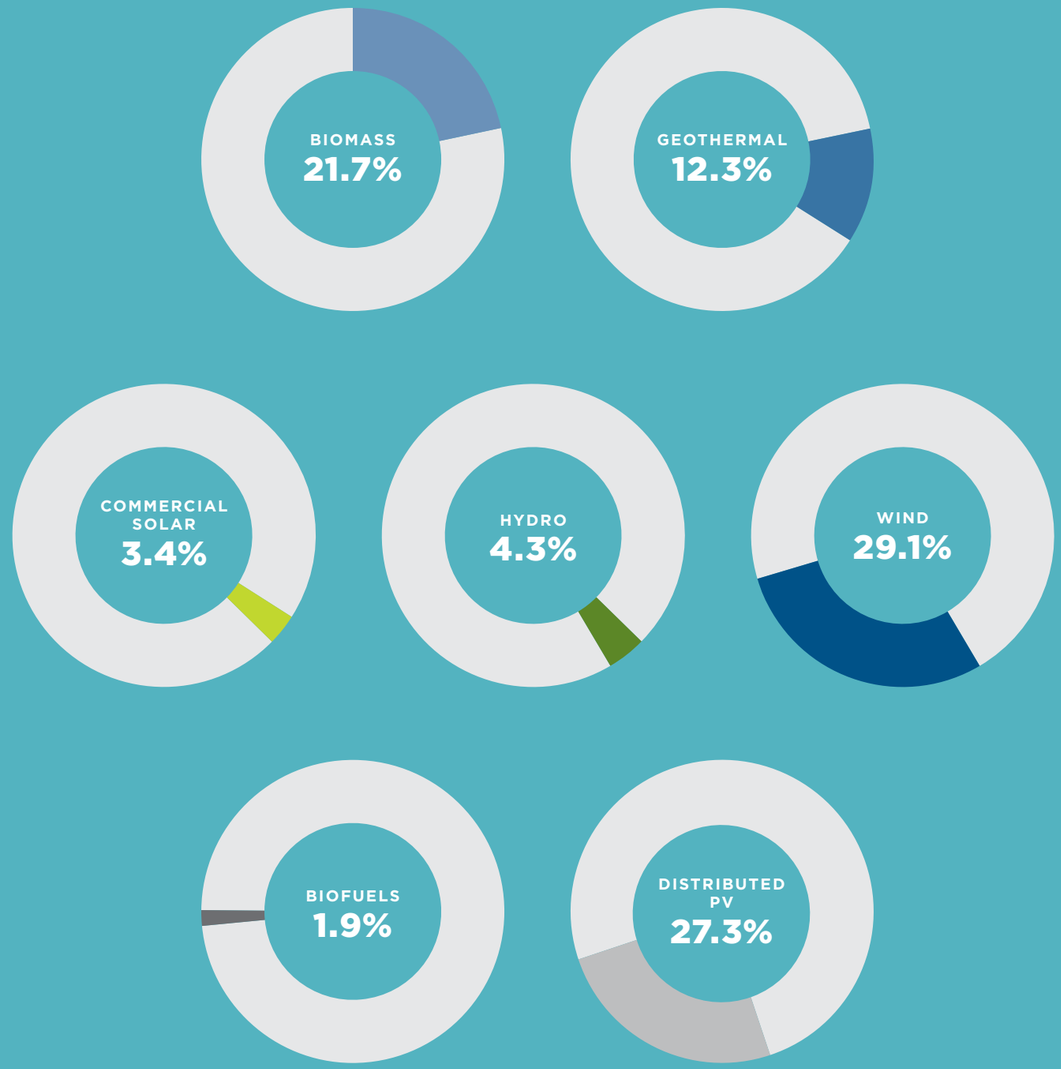
LOOK TO THE RESOURCE

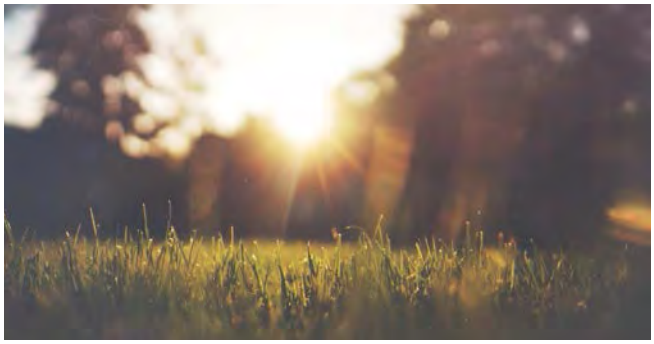
Renewable Energy Generation by Resource

THE STATE'S AMBITION TO LEAD THE WORLD IN RENEWABLE ENERGY IS ATTAINABLE BECAUSE IT'S ALSO A WORLD LEADER IN NATURAL RESOURCES THAT SUPPORT RENEWABLE ENERGY. IN 2014, HAWAII SAW RAPID GROWTH CAPACITY ESPECIALLY IN THE AREAS OF DISTRIBUTED PHOTOVOLTAICS (PV) AND COMMERCIAL SOLAR, STEADILY INCREASING CONTRIBUTIONS FROM BIOMASS, BIOFUELS AND WIND, AND CONTINUED OPPORTUNITY FOR MORE GEOTHERMAL AND HYDROPOWER SOURCES OF RENEWABLE ENERGY. IN 2014, FACILITIES THROUGHOUT THE STATE GENERATED 1,988.8 GIGAWATT-HOURS (GWH) OF RENEWABLE ENERGY; 21.1 PERCENT OF NET ELECTRICITY SALES.



PERCENTAGE OF 2014 RENEWABLE ENERGY GENERATION FROM EACH RESOURCE

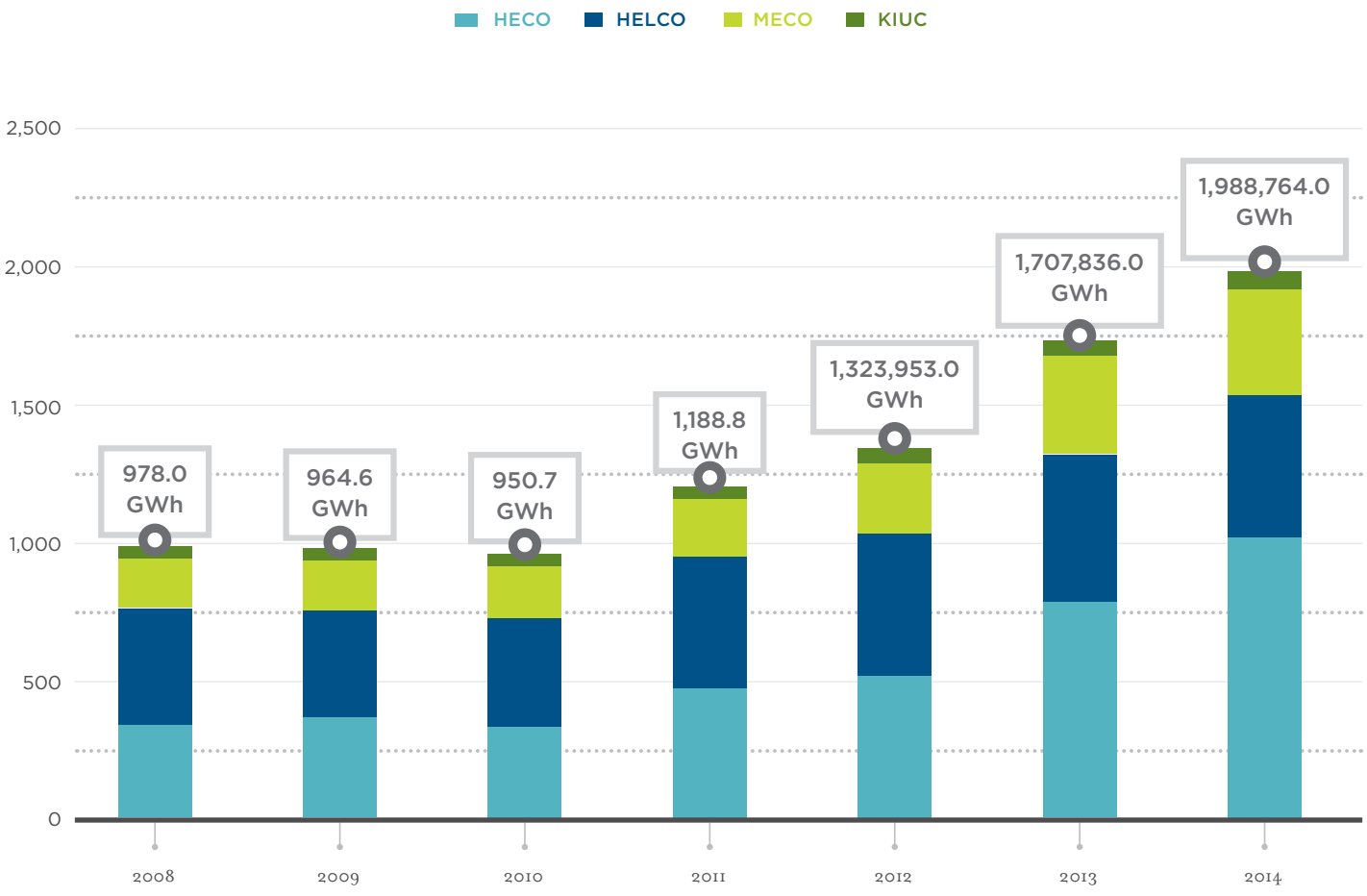




INCREASED UTILITY

Renewable Energy Generation By Utility

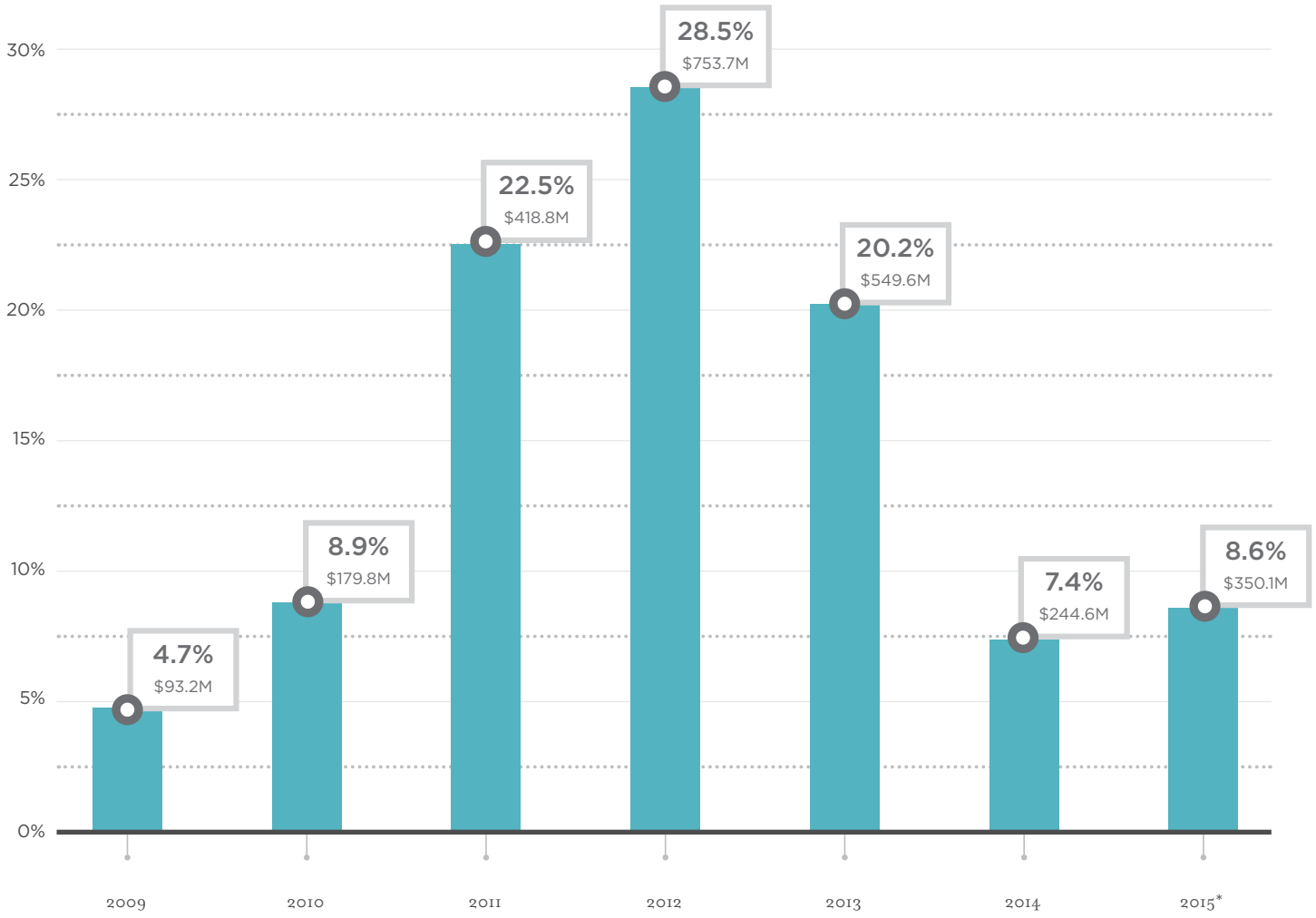
The Kauai Island Utility Cooperative (KIUC) and two of Hawaiian Electric Industries' (HEI's) three electric utilities, HECO and MECO, continued to ramp up renewable energy generation in 2014. HECO, with the largest base, saw the greatest improvement in 2014, generating 228,000 MWh more renewable energy than in 2013, a 28 percent jump. KIUC increased renewable generation by 27 percent and MECO achieved a 16 percent increase. HELCO saw a slight decrease in renewable generation in 2014, down 3 percent from 2013 levels.



THE VALUE OF SOLAR PROJECTS

Solar-Related Construction Expenditures

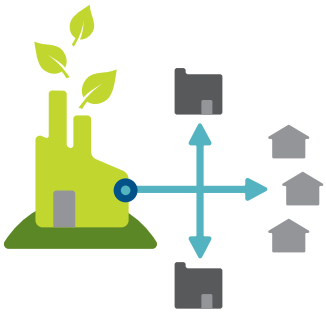
CONSTRUCTION SPENDING FROM SOLAR PV INSTALLATIONS HAS SLOWED FROM UNSUSTAINABLE LEVELS REACHED DURING THE PEAK OF HAWAII'S SOLAR BOOM IN 2012. NONETHELESS, THE SOLAR INDUSTRY IS STILL A SIGNIFICANT CONTRIBUTOR TO THE CONSTRUCTION SECTOR.



*projection

The Power Of Self-Generation - On June 8, 2015, Act 100, relating to the Community-Based Renewable Energy (CBRE) program, was signed into law by Governor David Ige. According to the 28th State of Hawaii Legislature, it is "in the public interest to promote broader participation in self-generation by Hawaii residents and business through the development of CBRE facilities [whereby]... participants are entitled to generate electricity and receive credit for that electricity on their utility bills."

In support of Act 100, HSEO continues to actively collaborate with the Hawaiian Electric Company and a host of stakeholders to create a CBRE tariff proposal that all parties can support for submission to the Hawaii Public Utilities Commission by October 1, 2015.



Microgrids - Using a combination of power electronics, solar PV and storage, Net Zero microgrid technology can enhance the reliability, stability and performance of the utilities' power systems while providing low cost, renewable power to end users. Microgrids will serve immediate needs in Hawaii, for Hawaiian Electric and for public schools seeking low-cost power from low-carbon and renewable sources. In the future, they will be of broader value to utilities and communities advancing towards Hawaii's clean energy goals, enabling a more resilient energy system statewide. HSEO is currently collaborating with local and national partners on the development of a demonstration Net Zero microgrid project, a first of its kind in the State of Hawaii.

Projects In Development, 2015 - The following utility-scale and pilot renewable energy projects became operational or began unit-testing in 2015:

- Anahola Solar Farm, Kauai (12 MW)
- Honolulu International Airport Dispatchable Standby Generation Project, Oahu (8-10 MW)
- Green Energy Biomass-to-Energy Facility, Kauai (6-7 MW)
- Wave Energy Test Site (WETS), Azura Wave Buoy, Oahu (Pilot)

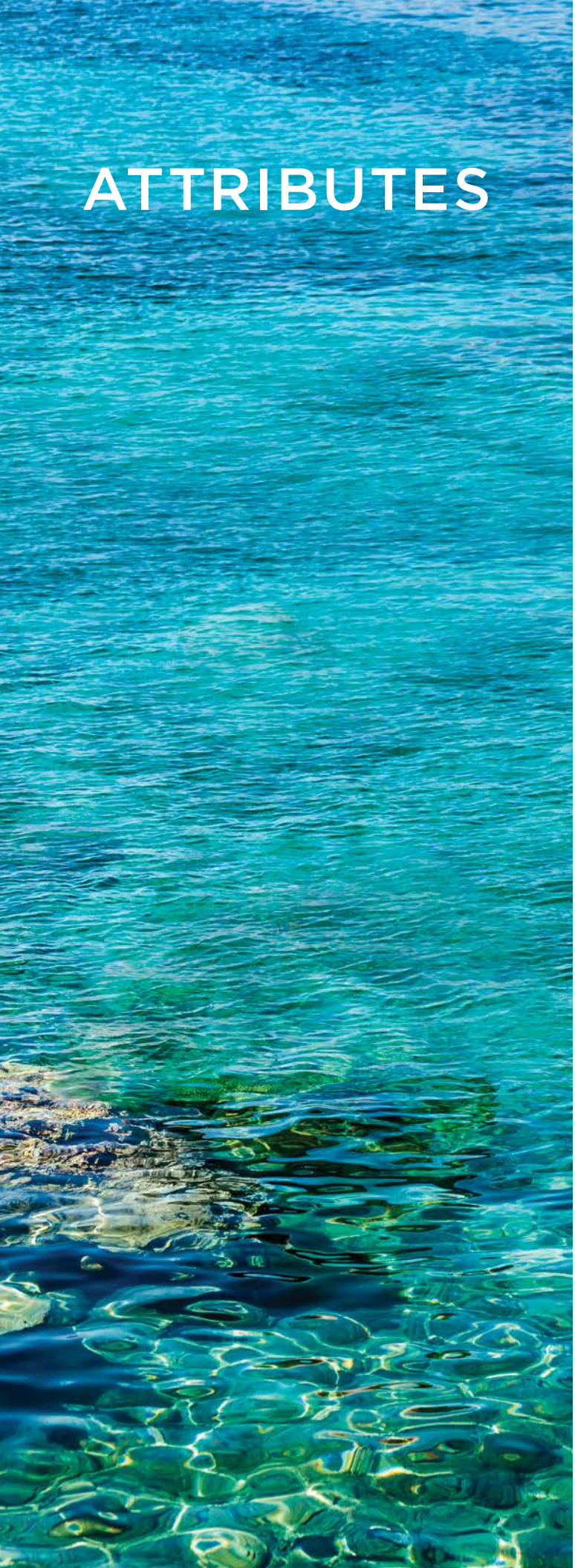
Solar Soars – Nationally, Hawaii Ranks:

- 1st (Honolulu) Solar Stars City, Environment America Research & Policy Center, Shining Cities Report
- 1st in solar capacity per capita at 312 watts per Hawaii resident, Environment America Research Policy Center, Lighting The Way Report
- 10th U.S. Clean Tech Leadership Index, CleanEdge

HAWAII: 1ST IN SOLAR CAPACITY AT 312 WATTS PER RESIDENT

100%

ELECTRICITY
SALES FROM RENEWABLE
SOURCES BY 2045



ATTRIBUTES

RENEWABLE PORTFOLIO STANDARDS SECTION

Page 19
Hawaii Renewable Portfolio Standards (RPS)
Source: Renewable Portfolio Standards Status Reports, 2008-2014 (Hawaii Public Utilities Commission)

Page 20
Renewable Energy Generation by Resource
Source: Renewable Portfolio Standards Status Reports, 2008-2014 (Hawaii Public Utilities Commission)

Page 22
Renewable Energy Generation by Utility
Source: Renewable Portfolio Standards Status Reports, 2008-2014 (Hawaii Public Utilities Commission)

Page 23
Solar-Related Construction Expenditures
Source: Research and Economic Analysis Division, DBEDT

ENERGY PLANNING AND TRANSPORTATION SOLUTIONS

GETTING THERE

Planning For Emergencies in the Future and Electric Vehicles Today

Most of the energy consumed in Hawaii is used to get around. By road, sea or air, the state's clean energy future can only be secured with a sea change in the way Hawaii fuels its vehicles.

At this early stage, planning is crucial. Advanced modeling capabilities are helping the state envision the path to energy independence before we get there – indeed, they will allow experts to consider the best of available options, make course corrections and incorporate new data and opportunities along the way. That's crucial to successfully integrate renewable fuel vehicles into the transportation sector, which the state is well on the way to accomplishing with a wide array of initiatives, programs and collaborations, including:

- Using energy efficiency and renewable energy as Clean Air Act compliance mechanisms.
- Forming partnerships with experts on fossil fuel reductions.
- Developing and supporting policies and programs that advance adoption of electric drive vehicles.
- Exploring hydrogen fuel options.

Planning also means being prepared for the worst. Planning for emergencies and having contingencies in place before a crisis can help mitigate the increased risk of disaster-induced power outages Hawaii faces as the most isolated population cluster in the world. The state has expended tremendous effort to consult experts and obtain robust plans for energy assurance as it transitions to renewable power.

ENERGY RESOURCES

Planning & Modeling

The Energy Systems and Planning (ESP) branch's expertise and collaboration with local and national experts in integrated utility grids, pipelines, fuels and infrastructure helps HSEO design and implement the state's comprehensive energy ecosystem and energy assurance plans. With insights about the growing interconnected nature of energy consumption, ESP is developing a model that will help guide comprehensive and cohesive energy policy to achieve energy independence for Hawaii.

Integrated utility grids, pipelines, fuels and infrastructure helps HSEO design and implement the state's comprehensive energy ecosystem and energy assurance plans.

Ultimately the value of indigenous renewable fuels in Hawaii is enhanced when those fuels can offset petroleum consumption in transportation. As Hawaii's portfolio of renewable energy sources grows, how will they work together to most efficiently and cost-effectively meet consumer demand? The modeling and analysis conducted by ESP lets the state develop and analyze scenarios to answer that question, considering fundamental changes in customer needs and varying energy demands and resources, with a particular focus on indigenous renewable resources. There are many paths to more renewable energy.

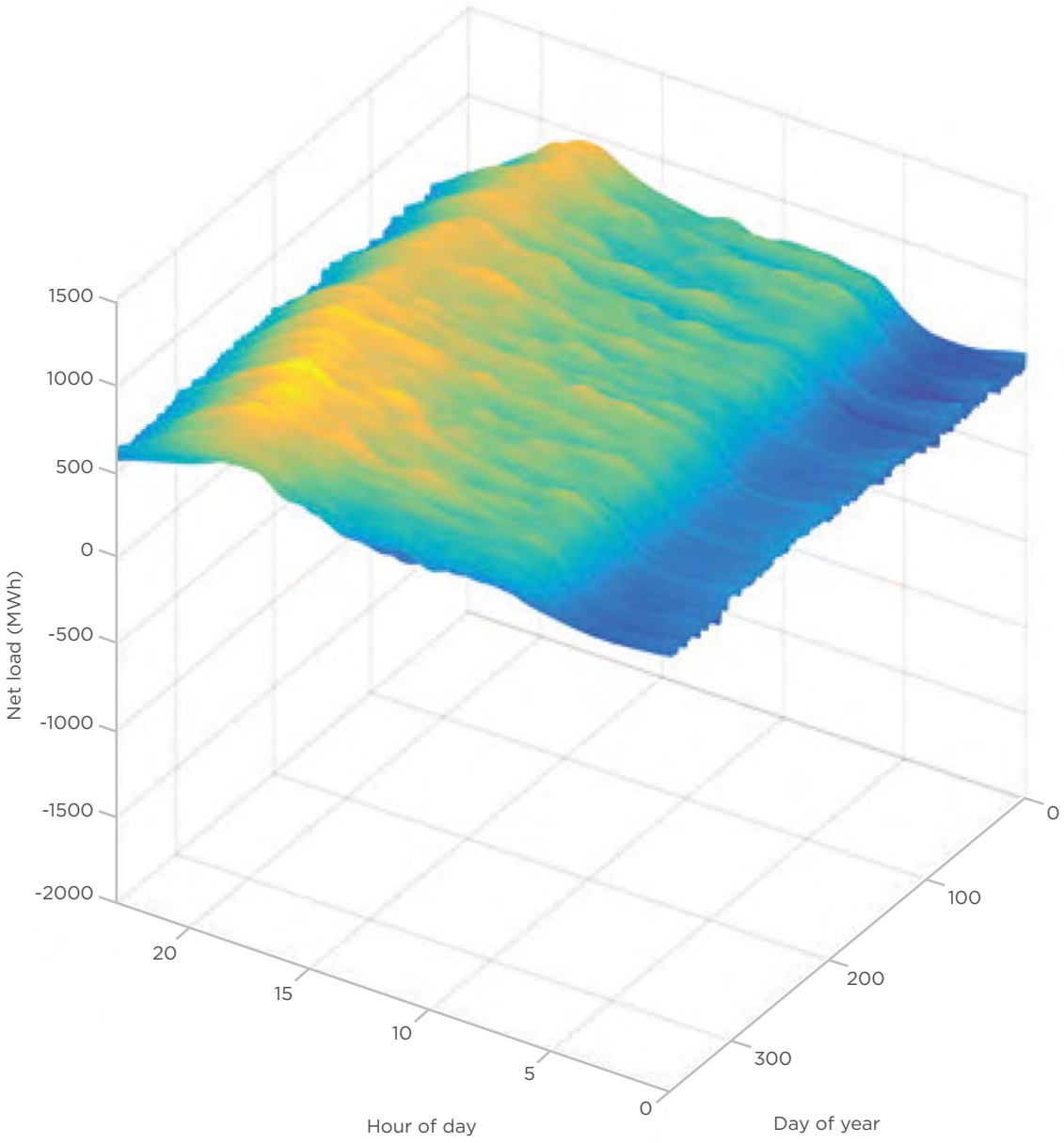
The question isn't can we achieve energy independence, but rather what is the best way to get there?

For example, when customers better manage their energy consumption to match energy supply, there is the potential for substantial cost savings. To capture those savings, we can use the model to analyze different mixes of indigenous renewable resources across a variety of future demand scenarios as well as the opportunities for and benefits of customer-sided energy management and supply resources. By considering all energy sectors, HSEO will better understand the impact, challenges and opportunities of various energy independence strategies.

The following 3D charts depict the hourly load over the year under different scenarios. On the X-axis, the hours of the day are represented. The Y-axis contains the days of the year. The Z-axis represents the customer demand net of renewable generation (net load). The highest net load values are yellow and the lowest values are blue. Looking at the peaks and valleys provides insight in grid needs to meet peak demand and energy storage.

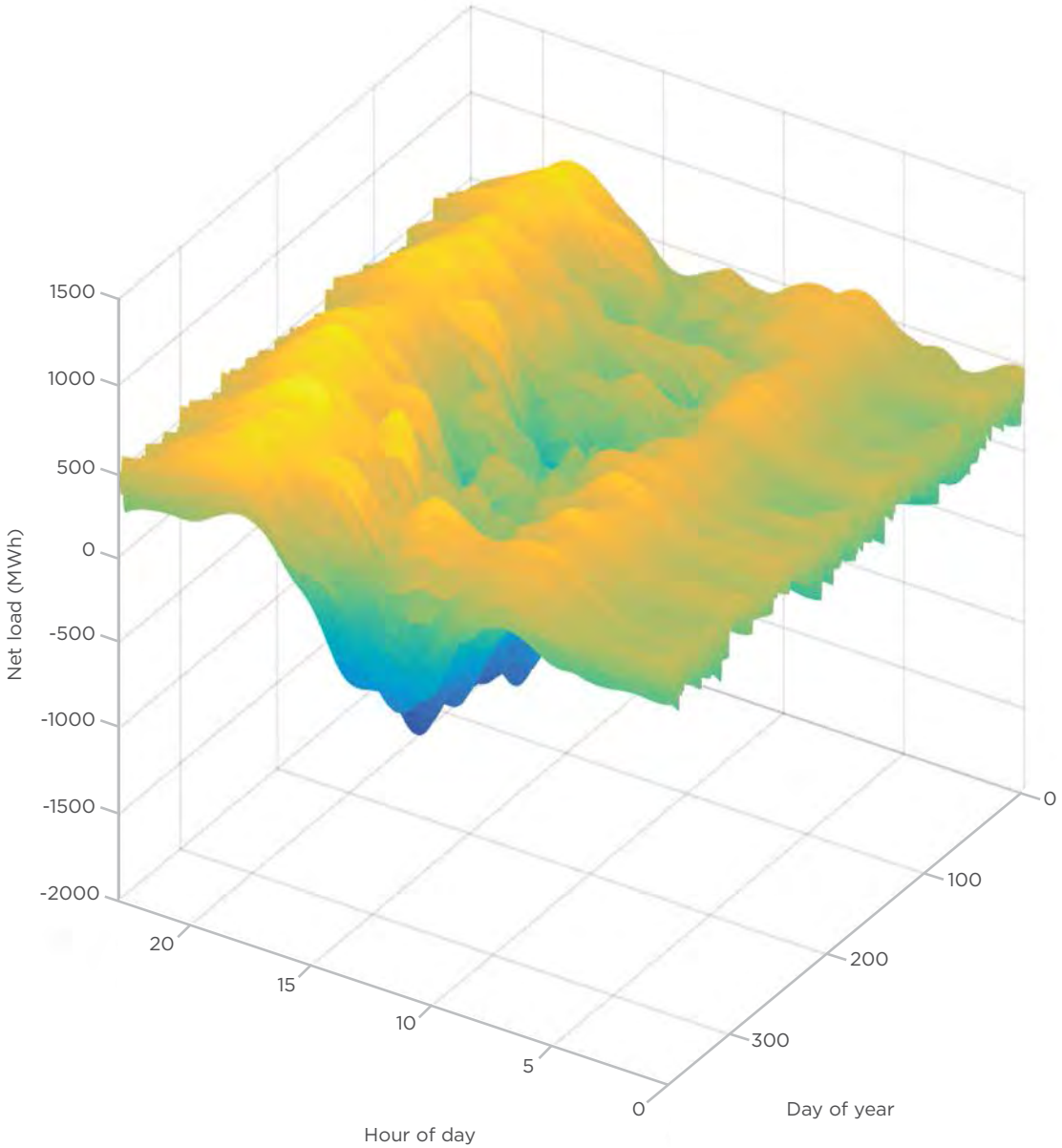
20 PERCENT RENEWABLE

THE COMPLEXITIES OF INTEGRATING 20 PERCENT RENEWABLE ENERGY TODAY ARE RELATIVELY MINOR COMPARED TO THE LEVELS REQUIRED TO ACHIEVE HAWAII'S ENERGY-INDEPENDENT ASPIRATIONS.



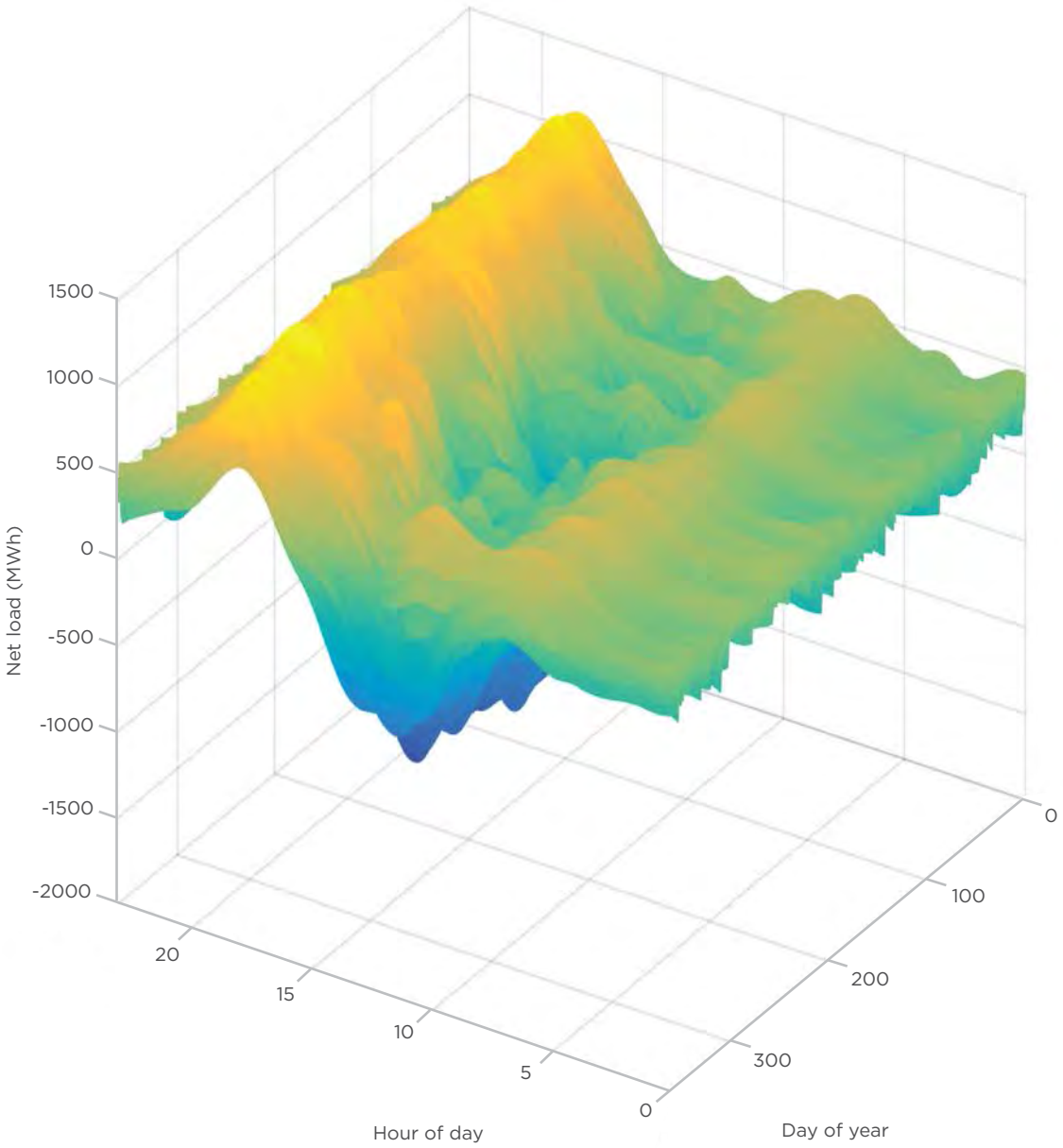
70 PERCENT RENEWABLE

AT 70 PERCENT RENEWABLE, THE NET LOAD ON HAWAII'S ELECTRIC GRID WILL LOOK FAR DIFFERENT THAN IT DOES TODAY. THE MIX OF RENEWABLE ENERGY RESOURCES WILL PLAY A DETERMINATIVE ROLE IN THE RELATIVE COST OF THE BENEFITS THAT RENEWABLE ENERGY PROVIDES.



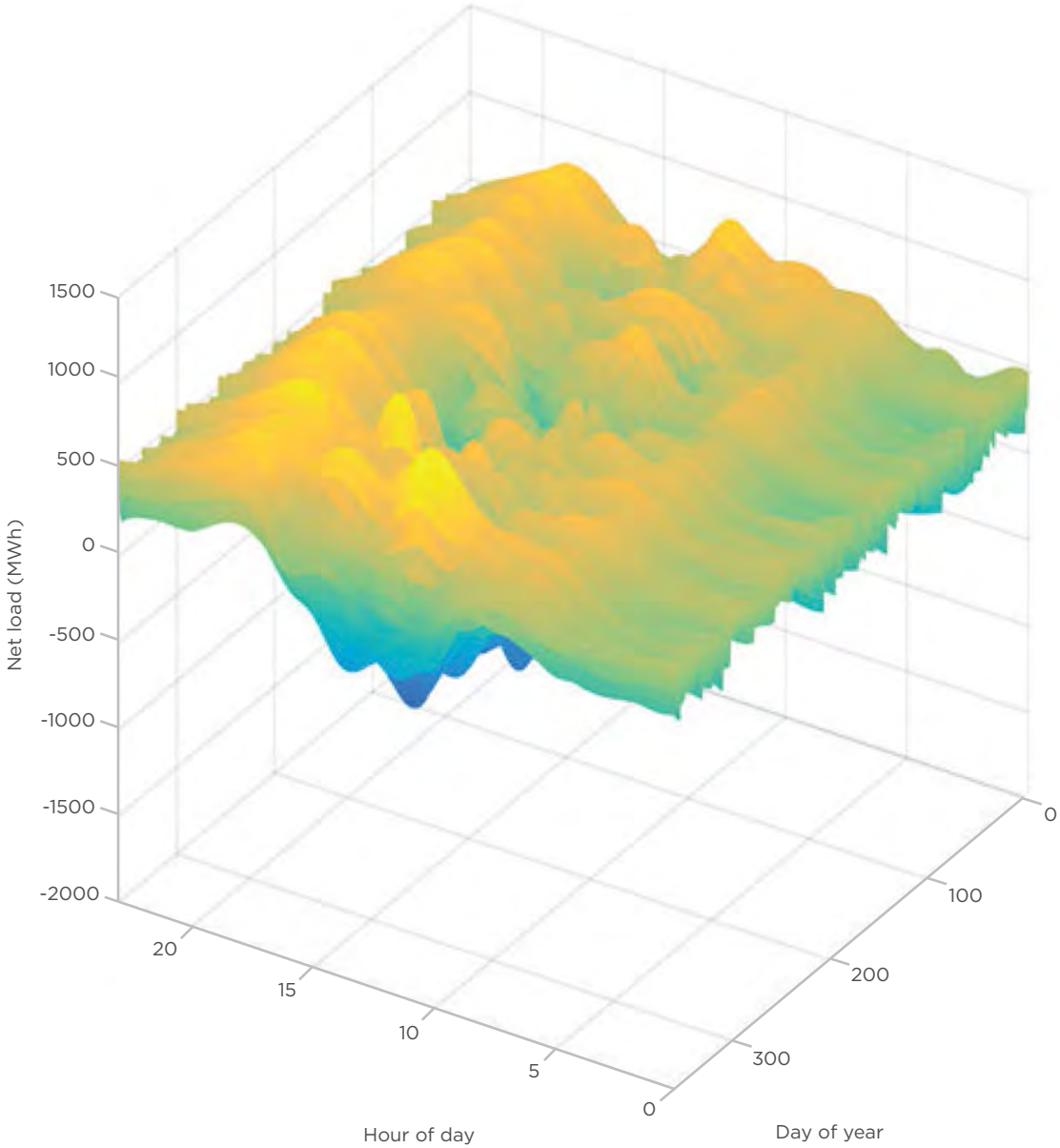
EVs COULD POTENTIALLY SPIKE DEMAND

IF HAWAII IS SUCCESSFUL IN ACHIEVING ENERGY INDEPENDENCE IN THE ELECTRIC SECTOR, ELECTRIC DRIVE VEHICLES COULD POTENTIALLY ADD SIGNIFICANTLY TO PEAK DEMAND, NECESSITATING AN INCREASE IN THE AMOUNT AND ULTIMATE COST OF ENERGY STORAGE REQUIRED TO BALANCE CUSTOMER NEEDS WITH ENERGY SUPPLIES.



EVs MANAGED SMARTLY

WHEN MANAGED SMARTLY, ELECTRIC VEHICLES CAN BOOST ELECTRIC CONSUMPTION WHILE DECREASING GREENHOUSE GAS EMISSIONS AND SUPPORTING THE ELECTRIC GRID FOR A LOWER TOTAL COST. AS THE NUMBER OF ELECTRIC VEHICLES GROW SMART CHARGING OF ELECTRIC VEHICLES HAS THE POTENTIAL TO BE A VALUABLE TOOL IN ACHIEVING HIGHER PENETRATION OF RENEWABLE ENERGY SUPPORTING THE STATE'S 100 PERCENT RPS GOAL BY REDUCING THE AMOUNT OF ENERGY STORAGE REQUIRED.



PLANNING FOR EMERGENCIES

Energy Security

Energy independence doesn't just require renewable energy resources – it also demands energy security. HSEO leads the state's efforts to ensure a robust, secure and resilient energy infrastructure in the contemporary energy ecosystem. HSEO works closely 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 to:

- Strengthen energy emergency preparedness and response actions and capabilities.
- Educate stakeholder groups on energy sector interdependencies and challenges prior to, during and after any disruption.
- Facilitate effective incident communication and information sharing between key government representatives, energy industry representatives and the public.
- Address the need to protect critical energy infrastructure and enhance its resilience.
- Develop and maintain energy assurance plans and procedures in line with existing federal, state and local governments' frameworks, structures and statutes.

Catastrophic recent events, such as Hurricanes Katrina and Sandy and the 2011 Japan tsunami, have reminded the nation of the critical value of disaster preparedness and energy resiliency. As Hawaii is home to the most isolated population concentration in the world, energy resiliency and disaster recovery concerns are amplified here.

Microgrids, which integrate renewable energy and distributed energy resource investments, have the added virtue of providing an emergency energy supply that could be a lifeline to homes, emergency response centers and hospitals during a crisis. Below are some highlights of Hawaii's progress in advancing towards greater energy assurance.

Given Hawaii's precarious location, the state is a prime candidate to develop resilient energy systems alongside the transformation of its energy sector.

Energy Assurance Learning Lab - Hawaii was one of six sponsored participants selected to receive tailored technical assistance at the Learning Lab on Enhancing State Energy Assurance Coordination hosted by the National Governors Association's Center for Best Practices. HSEO was central in coordinating Hawaii's team, which was led by a designee from Governor Ige's office and officers from HI-EMA and the City & County of Honolulu's Department of Emergency Management.

The learning lab showcased state and local best practices and insights from public and private sector experts, information which has proved valuable as Hawaii assesses and improves its energy assurance and energy resilience efforts. In addition, learnings from the event have helped HSEO identify priority updates to its energy assurance plan, enhance its relationships among emergency management agencies, understand tools for responding to catastrophic events and catalog the types of energy infrastructure investments that can build greater system resilience.

Hurricane Planning - HSEO helped develop the 2015 Hawaii Catastrophic Hurricane Plan, which was signed on August 7, 2015, by Karen Armes, the acting regional administrator for FEMA Region IX, Major General Arthur J. Logan, director of HI-EMA, and Governor Ige. The Catastrophic Hurricane Plan details strategies for joint state and federal actions before, during and after a catastrophic event, including the primary objectives of restoring power and delivering fuel to support essential services. The two-year planning process puts Hawaii in a great position to collaborate with federal partners, state and county agencies, non-profits, the private sector and local communities to minimize the impact of a catastrophic hurricane.

Energy Assurance Plan Updates - HSEO completed a 10-month project to update key components of the State of Hawaii Energy Assurance Plan. HSEO updated important documents related to the state's overall program, plans and policies as well as the Hawaii energy ecosystem's vulnerability to risks, current challenges and the potential adverse effects on Hawaii's citizens and economy due to "all hazards" petroleum supply incidents. The project included detailed work on prioritized and integrated methods to assess the consequences and severity of Hawaii petroleum supply energy emergencies and subsequent energy recovery tracking.

GETTING AHEAD OF GHG

Reducing Emissions

As a representative of the Energy Resources Coordinator, one of HSEO's core functions is to facilitate discussions and initiatives to resolve Hawaii's greatest energy challenges, including critical initiatives to reduce green house gas (GHG) emissions. HSEO's leadership in collaborative efforts across federal and state agencies and the governor's office has helped Hawaii adopt rules to effectuate Act 234 Relating to Greenhouse Gas Emissions. Due to these efforts, Hawaii is well ahead of the rest of the nation in efforts to positively affect climate change policy.

- On June 30, 2014, the Clean Air Branch of the Hawaii Department of Health (DOH) finalized and promulgated Hawaii Administrative Rules, Chapter 11-60.1, which was amended to implement GHG emissions reductions in the state to 1990 levels or below by 2020. Leading up to the completion of these rules, HSEO worked closely with the DOH, the governor's office and other stakeholders to create rules that rely on renewable energy and energy efficiency measures as cost-effective primary compliance mechanisms, which is a system-based, outside the fence line approach to GHG emissions reductions. This approach was coupled with emissions reductions at the facility level – or within the fence line – as a viable backstop.

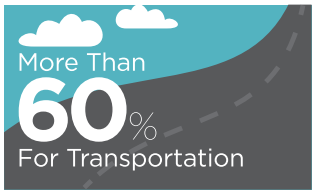
HAR, Chapter 11-60.1 implements GHG emissions reductions in the state to 1990 levels or below.

- In November 2014, HSEO partnered with the DOH, the Public Utilities Commission (PUC) and the Division of Consumer Advocacy to comment on the U.S. Environmental Protection Agency's (EPA's) draft rules on the Clean Power Plan (CPP) for existing Electric Generating Units under Section 111(d) of the Clean Air Act. HSEO's comments affirmed "support [for] the proposed Plan with its system-based, flexible and cost-effective approach to reducing GHG emissions from the nation's power fleet. Specifically, we appreciate and agree with EPA's recognition of the efficacy of energy efficiency and renewable energy (EE/RE) as emissions reductions strategies."

- On August 3, 2015, the EPA published its final rules on the CPP. Hawaii, Alaska, Guam and Puerto Rico have been deferred from submitting plans on the schedule required by the final rule, as the EPA does not possess the information or analytical tools it requires to set final emissions goals for these states and territories. The EPA intends to determine the requirements of section 111(d) with respect to these jurisdictions at a later time and plans to reach out to Hawaii before the end of 2015. Hence, HSEO will continue to dialogue with the EPA, other state agencies and the Governor's office to provide guidance on the development and promulgation of the EPA's final plan for Hawaii.

ENDING HAWAII'S OIL ADDICTION

HCEI Transportation Charrette & Transportation Energy Analysis



Transportation accounts for more than 60 percent of the energy consumed in Hawaii, and while air transportation accounts for the largest portion — nearly 40 percent — ground transportation, including trucks, buses and cars consumes roughly 20 percent. From November 2014 through June 2015, HSEO convened energy and transportation stakeholders, known as the HCEI transportation charrette, to assess and recommend transportation energy industry strategies and tactics. The charrette was a collaborative quantitative and qualitative planning effort to reduce the consumption of petroleum-based fuels in the transportation sector (ground, marine and air).

The charrette culminated in a report, the HCEI Transportation Energy Analysis, contracted out to the International Council on Clean Transportation (ICCT), an organization that deploys the collective expertise of a global network of specialists to promote policies for clean, efficient transportation. The ICCT held a series of stakeholder consultations to produce assessments, analysis, recommendations and stakeholder engagement. The chief outcome of these efforts is a new set of transportation options and recommendations to reduce petroleum reliance in transportation.

After compiling a master list of nearly 100 tactics, the ICCT produced a short list of 38 tactics for further review by transportation stakeholders and inclusion in an updated HCEI energy in transportation road map. Based on current conditions, ICCT evaluated the short list of tactics according to their benefits, costs, social acceptability and likelihood of implementation, as well as several additional indicators.

The evaluated tactics were presented and refined in a series of webinars and in-person meetings, with participation from over 100 stakeholders from Hawaii and other U.S. states, and then ranked using a rigid framework to ensure transparency in the ICCT's reasoning for making recommendations primary or secondary. Of the 38 tactics evaluated, 22 tactics are recommended with either primary or secondary priority.

In total, the recommended tactics could reduce petroleum use by 62 to 72 MGY by 2030. Tactics to reduce vehicle miles traveled and improve vehicle efficiency account for most of this potential; tactics targeting aviation and marine transport account for 7 percent and 5 percent, respectively. The HCEI Transportation Energy Analysis's recommended petroleum reduction tactics are flexible, to periodically accommodate new and updated tactics as conditions change and the criteria for selection are reexamined.

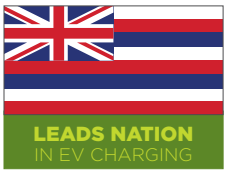
With the conclusion of the HCEI Transportation Energy Analysis, transportation and energy stakeholders will collaborate on an action plan and commit to enacting it. HSEO plans to oversee the drafting of an implementation framework for the identified tactics, in collaboration with relevant government agencies and stakeholders. The charrette presentations and summary are available online on the HCEI website at http://www.Hawaiicleanenergyinitiative.org/charrettes/transportation-charrette/.

Department of Transportation Partnership – During the HCEI transportation charrette stakeholder meeting on June 17, 2015, HSEO announced plans to establish and participate in inclusive strike teams to move individual or complementary tactics toward implementation. In response, the Hawaii Department of Transportation invited participants to take part in a forum to discuss and implement a suite of coordinated tactics to achieve Hawaii's clean energy goals.

ON THE MOVE

Getting Hawaii Into Electric Vehicles

More EVs On The Road – In September 2015, the number of passenger electric vehicles in the state was 3,750, an increase of 829 (28.4%) from the same month last year, and an increase of 61 vehicles (1.7%) from August 2015. As of September 2015, there were 1,035,653 passenger vehicles in the state. EVs make up 0.36 percent of all passenger vehicles.



Already, a growing number of Hawaii's drivers have adopted EVs as their primary mode of transportation. Hawaii leads the nation in the number of EV charging locations per capita, according to data from the U.S. Department of Energy and Census Bureau. As additional renewable electricity is added to Hawaii's grids, the state will have the capacity to power the widespread deployment of EVs. EVs have the potential to dramatically reduce fossil fuel dependency and help Hawaii attain a more stable, modern electrical grid.

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

REGISTERED ELECTRIC VEHICLES AND PUBLICLY AVAILABLE CHARGING STATIONS IN HAWAII

COUNTY	ELECTRIC VEHICLES	LEVEL 2 CHARGING PORTS*	LEVEL 3 CHARGING PORTS**	TOTAL PORTS
Oahu	2824	244	6	250
Maui	633	68	22	90
Hawaii	164	51	2	53
Kauai	129	32	1	33
Total Statewide	3750	395	31	426

* Level 2 charging is at 240 volts. All EVs are equipped for this type of charging. A charger can have one or more ports. The number of ports depends on how many vehicles each charger can service at one time. One port can service one vehicle.

** Level 3, also known as fast charging, can provide an 80 percent charge for some vehicles in less than 30 minutes, depending on the vehicle and charger specifications. Not all vehicles can use fast charging.

Tactics To Lower Electric Vehicle Costs - The electricity rates charged by utilities determine the amount of money EV drivers can save compared to conventionally fueled vehicles. Tactics that lower the cost of electricity for EVs include: innovative demand-responsive technologies that automatically charge when electricity is cheapest; vehicle-to-grid models that provide a financial return to EV owners in exchange for using their vehicles as a grid resource[1]; price signals from utilities in the form of differentiated time-of-use (TOU) rates; and combining EVs with renewable electricity generation, such as solar PV.

In August 2015, the Hawaiian Electric Companies asked the Hawaii Public Utilities Commission to approve discounted EV charging rates in a new TOU program. The new rates aim to promote EV adoption by taking advantage of available renewable energy produced during the middle of the day, such as electricity generated by rooftop solar systems. HSEO participated in the Public Utilities Commission's proceeding by supporting Hawaiian Electric Companies proposal noting the proposal as a positive step in the road towards more pricing alternatives. Subsequently, the Public Utilities Commission has suspended the request. HSEO will continue to collaborate with stakeholders and the Commission to advance rate options that allow customers to more efficiently interact with the grid.

EV Charging Map App – In 2013, HSEO launched EV Stations Hawaii, a mobile application designed to help drivers locate publicly available EV charging stations statewide. The EV Stations Hawaii mobile app user interface includes color-coded icons allowing users to quickly identify free (green) and fee-based (blue) charging. The user interface also allows users to have more screen space with a sliding menu. The free mobile app is available on Google Play and iTunes. A desktop version is also available on energy.Hawaii.gov.

The app finds the nearest charging station, giving drivers confidence that they can recharge while they're on the road.

Hydrogen Fuel Cell and Battery Electric Vehicle Stakeholder Charrette – In January 2015, HSEO convened a charrette to generate a feasible path for hydrogen fuel cell and battery electric vehicles to support the state's clean energy goals. Over 100 representatives attended, representing federal, state and local government, military, industry, academia and civil society, including out-of-state experts who received funding from the Hawaii Strategic Development Corporation to attend.

The charrette produced actionable steps, policies and regulations for state and county governments to encourage hydrogen fuel cell and electric vehicle sales, support hydrogen fueling and charging infrastructure development, remove market barriers and accelerate adoption of these technologies. The proceedings and outcomes of the event were summarized in a February 2015 publication available online at http://www.Hawaiicleanenergyinitiative.org/wp-content/uploads/2015/02/E-driveCharretteSummary_2.27.2015.pdf.

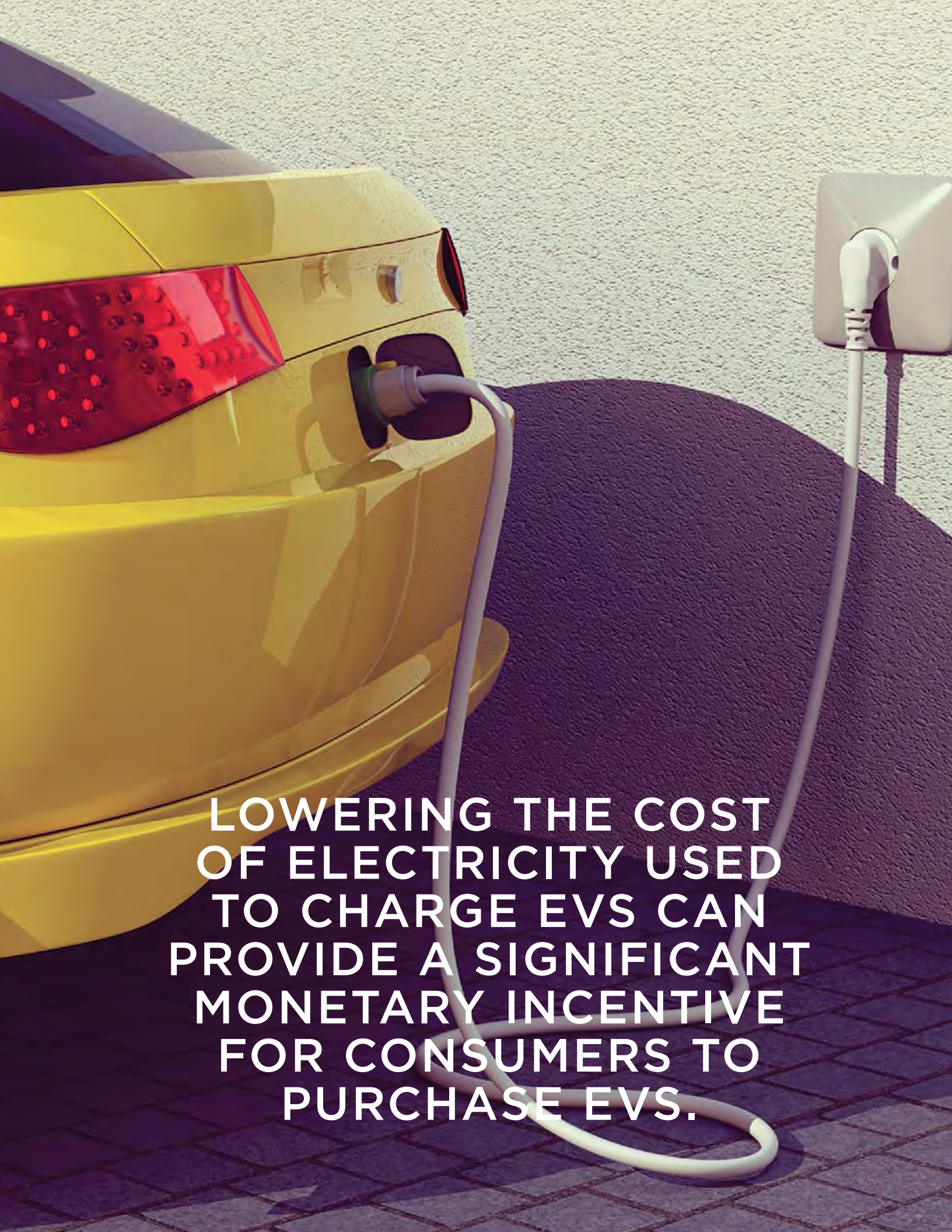
The proceedings and outcomes of the event were summarized in a February 2015 publication available online at http://www.Hawaii-cleanenergyinitiative.org/wp-content/uploads/2015/02/E-drive-CharretteSummary_2.27.2015.pdf.

Hydrogen Power Park Project – The Hawaii Natural Energy Institute (HNEI) works closely with HSEO on a variety of renewable energy projects, including coordination on the Hydrogen Power Park Project (Power Park). The Power Park was funded in part by the U.S. Department of Energy (USDOE) and the Hawaii Hydrogen Investment Capital Special Fund (Act 240, 2006) through DBEDT. All initial funds have been dispersed, but the special fund vehicle remains in place and is now managed by the Hawaii Strategic Development Corporation.

The Power Park supports the USDOE's Technology Validation Program and is funded by the USDOE through HSEO, with HNEI as the implementing partner. The project validates the engineering and economic feasibility of pre-commercial hydrogen technologies and increases public awareness about hydrogen's potential for a variety of transportation applications.

In Hawaii, the project is validating two efforts on Hawaii Island: the MCBH Fast-Fill Hydrogen Station and the Hawaii Volcanoes National Park (HAVO) hydrogen shuttle bus project, two hydrogen-hybrid shuttle buses for tours of the park. The results of the validation will help identify areas for further research, development and evaluation. After expansions to the project scope to support additional hydrogen projects across Hawaii, particularly on Oahu, and extended delays due to difficulties with the original project sites, the Power Park is now scheduled to be sited at the Natural Energy Laboratory Hawaii Authority (NELHA), in Kailua-Kona on the west side of Hawaii Island. Hydrogen will be delivered to HAVO via hydrogen transport trailers from the NELHA site.

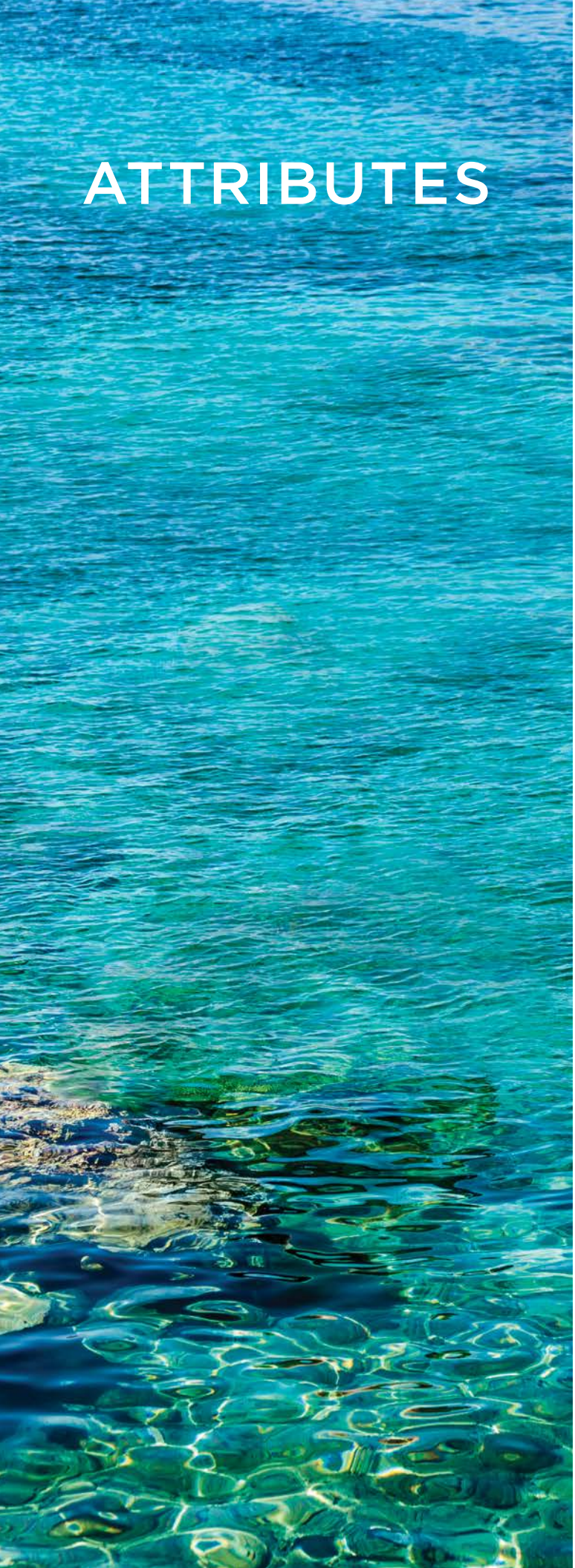
The USDOE component of the project's contract ended on December 31, 2014, before all Power Park objectives could be completed. Hawaii, via HNEI support, continues to manage the project with state funding to accomplish the remaining major objectives. The final project report can be found online at http://www.osti.gov/scitech/servlets/purl/1176962.



LOWERING THE COST OF ELECTRICITY USED TO CHARGE EVS CAN PROVIDE A SIGNIFICANT MONETARY INCENTIVE FOR CONSUMERS TO PURCHASE EVS.

5TH

HAWAII'S
NATIONAL RANKING
IN TRANSPORTATION EV
FRIENDLY METROPOLITAN
AREA, CHARGE POINT



ATTRIBUTES

ENERGY PLANNING & TRANSPORTATION SOLUTIONS SECTION

Page 32-35
20 Percent Renewable, 70 Percent Renewable, EVs Could Potentially Spike Demand, EVs Managed Smartly
Source: DBEDT

Page 39
Registered Electric Vehicles and Publicly Available Charging Stations in Hawaii
Source: DBEDT

Page 40
Tactics To Lower Electric Vehicle Costs
[1]Corey D. White, K. Max Zhang (2011). Using vehicle-to-grid technology for frequency regulation and peak-load reduction. Journal of Power Sources. Volume 196, Issue 8, 15 April 2011, Pages 3972-3980, ISSN 0378-7753, http://dx.doi.org/10.1016/j.jpowsour.2010.11.010

POLICY & REGULATORY ADVANCEMENTS

LANDMARK LEGISLATION AND REFORM

Moving Hawaii Forward

A vision for a clean energy future is not enough to make it happen – it must be paired with a resolute push for policies and regulations that counteract inertia, encourage progress and eliminate obstacles. The state's profound ambition for energy independence deserves the global attention it received, but it is the state's steady, determined efforts to work with the utilities and regulatory bodies to reshape energy policy that will turn vision into reality.

In addition to the epochal 100 percent RPS legislation that is driving all of Hawaii's clean energy efforts, HSEO, DBEDT and other state agencies worked in the areas of policy and regulation to:

- Make it easier for residents to take advantage of clean energy.
- Establish energy equilibrium at state bodies like the University of Hawaii, which will generate as much or more energy as they use.
- Encourage Hawaii's utilities to plan effectively for a clean energy future, modernize grids, integrate renewable energy and attain sustainable and secure generation and distribution.
- Enable hydrogen-based energy.
- Advance the feasibility of owning and operating an electric vehicle (EV).

These and many more achievements have thrust the state into the forefront of global clean energy leaders and drawn the attention of national energy policymakers, who are looking to Hawaii to show America the way to a clean energy future.

A WATERSHED YEAR

2015 Legislature Energy Update

2015 was a stellar year for renewable energy policy development as HSEO helped to spearhead landmark legislation, including:

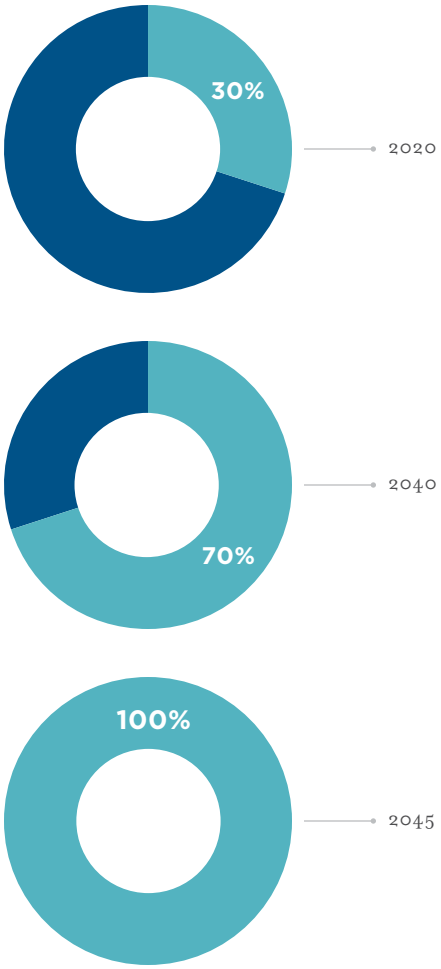
- 100 Percent RPS – HB 623 (Act 97) increases Hawaii's interim renewable portfolio standards (RPS) from 25 percent by 2020 to 30 percent by 2020. This aggressive new goal will help the state reach 70 percent by 2040 and 100 percent by 2045. The law will drive an energy transformation that will create a multitude of new jobs in the state, greatly reduce its dependence on fossil fuels, deliver energy cost savings and achieve measurable environmental and public health benefits for the state and its citizens. Hawaii is the first state in the nation to pursue a 100 percent clean energy future and it is imperative that all necessary and interested parties and agencies work collaboratively to achieve this laudable mandate.

Hawaii is the first state in the nation to pursue a 100 percent clean energy future and it is imperative that all necessary and interested parties and agencies work collaboratively to achieve this laudable mandate.

- Community-Based Renewable Energy (CBRE) Tariff – SB1050 (Act 100) requires utilities to file a CBRE tariff with the Public Utilities Commission 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. In addition, it could become an effective mechanism for deploying Green Energy Market Securitization (GEMS) funds.

- University of Hawaii Net Zero Goal – HB 1509 (Act 099) requires the University of Hawaii to establish a collective goal of becoming a net zero user of energy, producing as much energy as the system consumes across all campuses, by January 1, 2035.

RENEWABLE ENERGY GOALS



UTILITY REFORM

Making Transformation Possible

Hawaii is often lauded for its progressive clean energy policies and regulations that are paving the way for modernized electric grids and utility business models. Working side by side with other energy stakeholders and representing the best interests of the state, HSEO has been an active intervener in a multitude of crucial regulatory proceedings. This section provides the chronology of critical regulatory events and proceedings and HSEO's principal observations and recommendations.

Getting The Most Out Of The Grids - Shortly after Mark Glick became HSEO's administrator, on September 8, 2011, the PUC opened the Reliability Standards Working Group (RSWG) proceeding in Docket No. 2011-0206. The RSWG proceeding was opened to facilitate the interconnection of maximal renewable generation in each of the HECO companies' island grids while preserving grid reliability. DBEDT actively participated in that proceeding, including in the various subgroups that were formed to identify, analyze and assess reliability and curtailment concerns and to develop recommendations for improving renewable integration and grid reliability.

The RSWG concluded its work in January 2013. The RSWG provided final work products pertaining to reliability standards, new generation interconnection, system operational flexibility and renewable generation curtailments for the PUC's consideration. The PUC issued a final decision in the RSWG docket on April 28, 2014.

In parallel with the RSWG proceeding, on March 1, 2012, the PUC issued an order initiating the Integrated Resource Planning (IRP) cycle for each of the HECO companies in Docket No. 2012-0036. The proceeding was established to examine the IRP Report and Action Plan, which HECO was required to submit according to the PUC's Revised Framework for Integrated Resource Planning (2011). DBEDT was an intervener and member of the Advisory Group in that proceeding.

Integrating Renewable Resources - Among the issues the IRP Report and Action Plan addressed were:

1. Strategies to replace the existing fossil fuel-based electricity generating plants with renewable energy resources.
2. Transmission of firm or intermittent electricity between islands, including plans to develop undersea electricity transmission cables.
3. Identifying resources and actions to meet the IRP planning objectives five years in advance to account for uncertainties.

On April 28, 2014, the PUC, in Order No. 32052, rejected HECO's IRP Report and Action Plan as non-compliant and inconsistent with the framework established for the IRP process. Some of the PUC's findings:

- HECO failed to include sufficient meaningful analysis.
- HECO employed inappropriate and inadequate modeling tools and analysis techniques.
- HECO failed to rank or prioritize the resource plans according to established criteria.
- HECO failed to adequately incorporate an evaluation of the benefits and costs (including rate impacts) of several other critical elements of the action plans, including smart grid investments, inter-island or inter-utility transmission, modifications to existing generation units for improved flexibility and efficiency and the retirement and possible replacement of existing generation.

The PUC noted proceedings that would address HECO's future plans and operations, including the Power Supply Portfolio Reviews and an investigatory docket in which the PUC will review each of the HECO Companies' individual Power Supply Improvement Plans (PSIPs). The PSIPs, which are pending further PUC order in Docket 2014-0183, were to include actionable strategies to expeditiously retire older, less-efficient fossil generation and make other improvements in operational efficiencies.

Planning For A Sustainable Distributed Generation Market – The Distributed Generation Interconnection Plan (DGIP)/ Distributed Energy Resources (DER) proceedings also provide relevant context. In its April 28, 2014, IRP order filed in Docket 2007-0341, the PUC stated that it would take various actions to address critical technical, economic and policy issues associated with distributed renewable resources. Other DER-related dockets and actions mentioned by the PUC included the HECO DGIP in Docket No. 2011-0206 (which was subsequently reassigned to Docket No. 2014-0192 pertaining to DER Policies), Feed-in-Tariff

The PUC directed HECO to develop and file a DGIP, including strategies and implementation plans for distribution system upgrades and utilization of advanced inverter technical functionality to increase distribution circuit solar photo-voltaic penetrations over time in a safe and reliable manner.

Re-Examination (Docket No. 2013-0194), Demand Response Policy Statement in Docket No. 2007-0341 and the DER Review.

As alluded to above, a significant aspect of the PUC's April 28, 2014, IRP order was the issuance of the Commission's Inclination on the Future of Hawaii's Electric Utilities, which found insufficient evidence of progress towards developing and implementing a sustainable business model for HECO. The PUC offered its perspectives on the vision, business strategies and regulatory policy changes required to align HECO's business model with customers' interests and the state's public policy goals. The PUC provided guidance for future business strategy, energy resource planning and project review in three major areas:

AREA 1. Creating a 21st century generation system—the need to move with urgency to modernize the generation system on each island grid to integrate clean energy resources that cost less than today's oil-fired generation.

AREA 2. Building modern transmission and distribution grids—outlining priorities in order to transform each island's transmission and distribution grids into modern, advanced electrical networks that are capable of integrating greater quantities of customer-sited distributed energy resources and expand the array of energy options for customers to manage their energy usage.

AREA 3. Policy and regulatory reforms – including rate structure reforms needed to achieve Hawaii's clean energy future.

HECO And Hawaii's Clean Energy Future – In 2014, DBEDT submitted comments in the PSIP, DGIP and other proceedings pertinent to the direction of HECO and Hawaii's clean energy future. DBEDT's comments in the PSIP and DGIP proceedings were guided in significant part by the Inclinations and the state's clean energy policy and directives. While the PSIPs were an improvement on the IRP submission, DBEDT was not able to support them as an optimal mechanism for achieving the state's clean energy goals and directives. This conclusion was due in part to the lack of supporting data and analyses and also to elements in the PSIPs that were inconsistent with or contrary to the state's clean energy policy. As mentioned above, the PSIPs remain pending before the PUC in Docket No. 2014-0183.

As for the DGIP, DBEDT commented that HECO's strategies and plans focused on the limitations of their systems and available technologies, proposing only small and incremental steps that fail to align with the state's ambitious energy policy directives. The DBEDT comments were filed in Docket No. 2014-0192, Instituting a Proceeding to Investigate Distributed Energy Resource Policies.

On March 31, 2015, the PUC issued Order 32737 that established a statement of issues and a procedural schedule to govern the investigation on distributed energy resource policies. The order attached a PUC staff report, which found that the DGIP was not sufficiently responsive to the PUC's requirements and that HECO compiled a list of potential technical interconnection and integration challenges but did not prioritize mitigation solutions to allow DER deployment to continue in a timely manner.

On June 29, 2015, DBEDT filed its Final Statement of Position with the PUC pursuant to Order No. 32737. Key elements of DBEDT's position include:

1. Support of the parties' joint Stipulation Setting Forth Proposed Revisions to Rule 14H.
2. Support for hosting capacity in concept while recognizing the need for greater disclosure and ongoing transparency for its full endorsement.
3. Conceptual support for advanced inverter functionality and the implementation of self-supply systems under a fast track interconnection path.
4. A belief that a structure similar to HECO's proposed transitional distributed generation tariff for grid-supply system best meets the PUC's directive.
5. A proposal for a time of use (TOU) pilot study leading to optional, default or mandatory TOU rate structure from the utilities for the entire population of customers.

Interventions in Proceedings on the NextEra/HEI Merger Application - On December 4, 2014, NextEra Energy, Inc. (NEE) announced a definitive agreement to acquire Hawaiian Electric Industries, Inc. (HEI) for $4.3 billion dollars. This announcement marked the first potential change in ownership of HEI since it was founded in 1891 and presented broad and material implications for the state's ratepayers, community, economy and future energy goals.

The PUC opened Docket 2015-0022 to consider the application for change of control. The PUC approved a group of 28 interveners, including HSEO through DBEDT. HSEO has actively participated in these proceedings, issuing Information Request to the Applicants (NEE/HEI), responding to information requests from the applicants, reviewing other interveners and responses about the proposed acquisition and providing testimony to the PUC. HSEO Administrator Mark Glick testified on behalf of HSEO and DBEDT in July 2015 that the application and responses of the applicant did not support 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's concern at the time centered on 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. HSEO will remain actively engaged throughout this process.

THE ROAD TO CLEANER COMMUTES

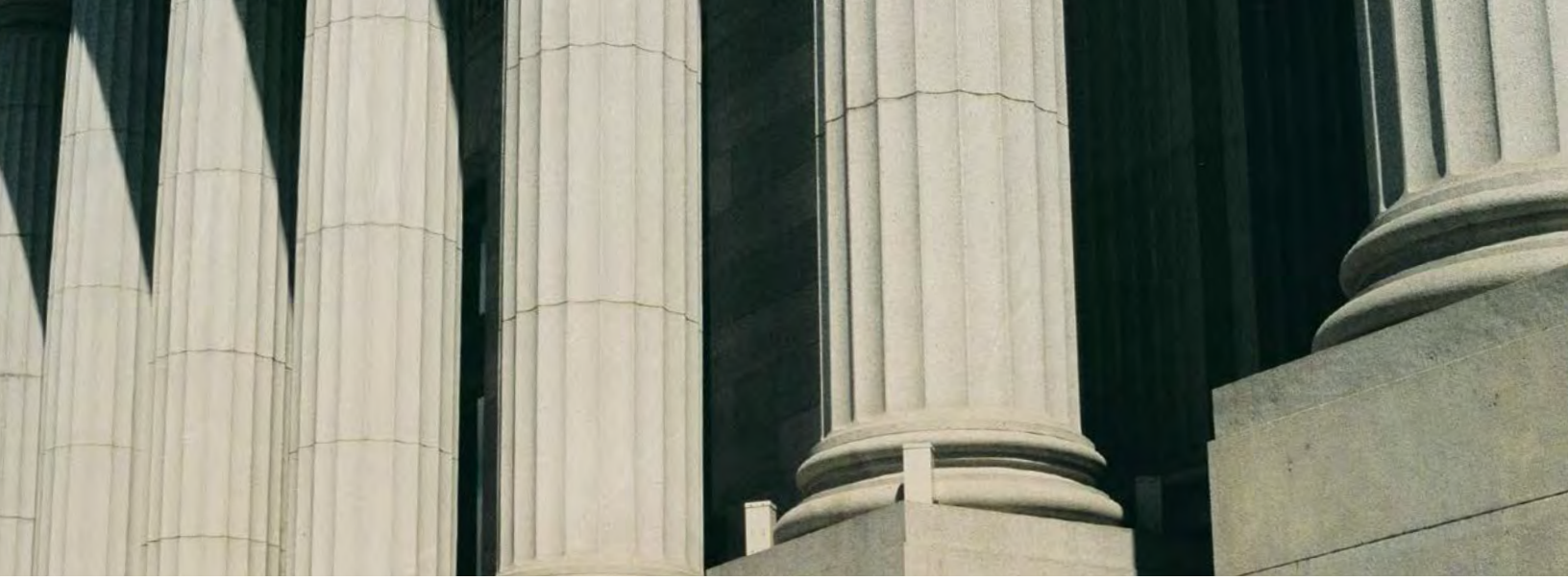
Transportation Energy Policy

Hydrogen Energy Infrastructure – Act 89 – In 2015, the Hawaii State Legislature passed Act 89, 2015 designating the director of the Hawaii Center for Advanced Transportation Technologies (HCATT) as the state hydrogen implementation coordinator responsible for facilitating the establishment of infrastructure across state agencies to promote the expansion of hydrogen-based energy in Hawaii, under the authority of the Energy Resource Coordinator. Act 89 also established the hydrogen implementation working group to study the expansion of hydrogen-based energy in Hawaii. The working group will be convened by the state hydrogen implementation coordinator and attached to the high technology development corporation.

Ethanol Repeal – Act 161 – The Hawaii State Legislature passed, and Governor Ige signed into law, this Act which removes the state mandate that required transportation fuels sold in the state to include ethanol. While the Hawaii mandate will end on December 31, 2015, petroleum producers will still be required to blend renewable fuel into gasoline and diesel under the federal Renewable Fuel Standard program. The original idea behind the 2006 state mandate was to support alternative energy and boost local agriculture through ethanol production. However, sufficient local production of ethanol has not developed, so Hawaii fuel distributors have been importing a vast majority of the ethanol needed to meet the mandate.

Charging Multi-Unit Dwellings – Act 164 – Multi-unit dwellings (MUDs), which include condominiums, cooperative housing and community associations, need policy guidance if they are to support charging infrastructure. An estimated 38 percent of Hawaii's housing units are in MUDs. Without regulations and fiscal incentives, MUDs pose challenges to EV charging because of permitting requirements, assigned parking spaces, cost allocation for installing and operating charging facilities, and the need for coordination with building managers and homeowners associations.

To turn these challenges into a clean energy opportunity, the 2015 Legislature passed Act 164, which establishes a working group to "examine the issues regarding requests to the board of directors of an association of apartment owners, condominium association, cooperative housing corporation, or planned community association for the installation of electric vehicle charging system." The working group will explore barriers and opportunities and produce a report of their findings and recommendations for legislation that could best promote EV adoption in Hawaii by improving charging infrastructure in MUDs.



INFLUENCING NATIONAL ENERGY POLICY

Looking to Hawaii

On July 14, 2015, HSEO Administrator Mark Glick was invited to testify before the U.S. Senate Committee on Energy and Natural Resources' Hearing on Islanded Energy Systems focusing on Hawaii, Alaska and U.S. Territories. Mr. Glick provided comments on Hawaii's energy ecosystem and the challenges and opportunities inherent in islanded energy systems in the Hawaiian archipelago.

Excerpts from Mr. Glick's testimony:

"While there are distinctions between islanded and interconnected systems, many of the solutions Hawaii has explored, and in some cases has pioneered, may be broadly applicable to all energy systems and accordingly inform future policies and expenditures at the federal level.

Many of the solutions Hawaii has explored, and in some cases has pioneered, may be broadly applicable to all energy systems.

Hawaii's geographic isolation has played a central role in the evolution of the state's energy system. Even with the recent rapid growth of renewable energy in our electricity sector, more than 80 percent of Hawaii's energy still comes from petroleum, making us the most oil-dependent state in the nation. Today, Hawaii spends about $5 billion a year to buy foreign oil to support its energy needs. As a result, Hawaii has the highest energy costs among the fifty states. This represents a tax on growth in Hawaii that imposes a significant burden on its residents and businesses."

Hawaii's transition to clean energy has not been without its share of technical challenges and costs associated with incorporating increasingly large percentages of intermittent renewable energy, which was most recently experienced by the rapid growth of distributed solar. Three examples of how Hawaii is dealing with these challenges include the interconnection of intermittent power, integrated resource planning, and the growing integration of the electricity and transportation sectors.

Hawaii has been able to leverage its isolation and the challenges faced in the arena of clean energy to great advantage. Hawaii has been able to attract international investment from governments and corporations that see Hawaii as a bellwether for renewable energy, and a place where the next generation of energy solutions will be born. This success prompted both the administration of Governor Ige and the Hawaii Legislature to rethink the potential of Hawaii's clean energy transformation. The upshot was the passage of Act 97 -- signed by Governor Ige in June of this year -- calling for Hawaii's electric utilities to accelerate the 2020 interim RPS target for renewables from 25 percent to 30 percent. Hawaii's continual refinement of its RPS targets assists in resource optimization, prevents costly overbuilds and sets a clear, unambiguous goal of generating one 100 percent of electricity sales from its renewable sources by 2045. Hawaii's approach of setting targets for its utilities is a practical approach to further the state's energy policies.

Closing comment by Sen. Lisa Murkowski (R-Alaska), Chairman, Senate Energy and Natural Resources Committee:

"Mr. Glick, you have a high standard up there to achieve. And reaching Hawaii's renewable energy goals and how you will be dealing with distributed generation aspect of it, the integration of all the renewable — many in the country are looking at (Hawaii) for the example and the leadership (Hawaii) is pioneering — we wish you well and are eager to know how we can be helpful and be of assistance."

THE NEXTERA-HEI MERGER ANNOUNCEMENT MARKED THE FIRST POTENTIAL CHANGE IN OWNERSHIP OF HEI SINCE IT WAS FOUNDED IN 1891 AND PRESENTED BROAD AND MATERIAL IMPLICATIONS FOR THE STATE'S RATEPAYERS, COMMUNITY, ECONOMY AND FUTURE ENERGY GOALS.

DEPLOYMENT

THE FUTURE IS NOW

Deploying Clean Energy Expertise

Hawaii's journey to 100 percent renewable energy is already in progress. Yesterday's successes, including completed projects, established programs, lessons learned and best practices catalogued, can serve as resources for future projects already planned and not yet conceived.

HSEO and partner entities have curated those resources, making them widely available for the investors, developers, policymakers and other clean energy stakeholders who will build tomorrow's energy independent Hawaii. The expertise assembled will:

- Help Hawaii residents, non-profits and small businesses finance green energy improvements.
- Guide analysis of the environmental impacts of future clean energy projects and inform federal clean energy funding decisions.
- Provide online resources for clean energy technology developers and investors to understand potential issues and solutions associated with permitting, interconnection, registration, financing and siting.
- Let online users design, find and track renewable projects online.
- Locate the nearest charging station for EV drivers.

These resources will continue to grow in number and usefulness as Hawaii's clean energy journey advances. By making them accessible, user-friendly and adaptable, HSEO and partner agencies will build an unrivaled knowledge base worthy of Hawaii's place at the epicenter of the global clean energy movement.

AFFORDABLE, ACCESSIBLE

Green Energy Market Securitization (GEMS) Program

The Hawaii Green Infrastructure Authority's (HGIA) GEMS program brings clean energy improvements to consumers and organizations across Hawaii. The GEMS program funds were raised through DBEDT's $150 million bond issuance in November 2014. The 2014 Series A GEMS Bond issuance was rated AAA by Standard & Poor's Ratings Services, Moody's Investors Service, and Fitch Ratings. It is the first AAA rated issuance by the State of Hawaii and is the lowest cost-capital accessible by the state in the bond markets at the time of issuance.

The bond issuance has received national and international recognition through the following awards:

- 2014 Council of Development Finance Agencies, Excellence in Energy Finance Award
- 2014 International Financing Review, North America Structured Finance Issue of the Year Award
- 2014 International Financing Review Americas, U.S. Structured Finance Issue of the Year Award

HSEO is responsible for maintaining DBEDT's compliance with the bond covenants and requirements. In 2015, this involved:

- Semi-annual true up filings in May 2015 and November 2015 to ensure the appropriate Green Infrastructure Fee is assessed.
- On-time debt service payment to bondholders on July 1, 2015.
- Semi-annual reporting to ratings agencies in August 2015.
- Procurement of a financial advisor, First Southwest Company, in September 2015.
- Audits of financial statements in December 2015.

In 2015, the GEMS program has focused on the necessary development to provide a financial product for underserved markets: non-profit organizations, homeowners that lack access to capital, and renters. HGIA has developed processes, procedures and contractual obligations with qualified origination and loan servicers, solar installers and other service providers to make financing available for PV through loans to targeted GEMS customers. The loan products currently offered by the GEMS program are for two groups of customers: non-profit organizations, which opened for applications on March 27, 2015; and the consumer product, which opened for applications on June 30, 2015

The GEMS program has also been approved to finance PV for small businesses and expanded the technologies eligible for GEMS financing to include energy efficiency equipment for commercial use by nonprofits and small businesses. Both of these products are still under development by the HGIA. To make commercial energy efficiency feasible, the program is partnering with qualified capital partners that blend GEMS capital with private capital to finance energy efficiency installations for GEMS customers who sign efficiency services agreements with qualified energy services companies and contractors. These agreements guarantee the performance of the equipment and ensure savings for GEMS efficiency customers.

HGIA is also continuing to work on the development of loan products for renters to gain access to lower cost electricity. To do this, it has been assisting with the Public Utilities Commission's development of an on-bill program and following the developments of HECO's community based renewable energy tariffs.

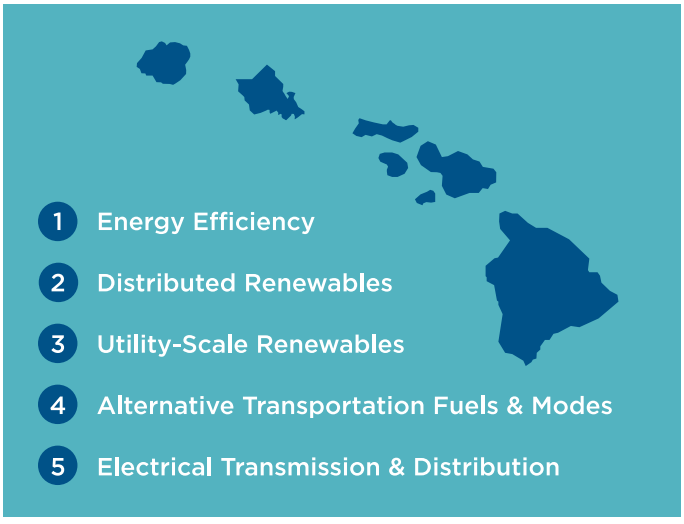
The next iteration of GEMS is to explore financing of additional PUC-approved technologies, including energy storage, utility grid modernization technologies, utility renewable integration technologies, technologies that incorporate a water-energy nexus, air conditioning and related systems, and LED systems.

For more information about the performance of the GEMS program, please see the HGIA's annual plan and quarterly reports available on the HGIA website at gems.hawaii.gov.

GOOD STEWARDSHIP

Hawaii Clean Energy Programmatic Environmental Impact Statement (PEIS) Final Report

The U.S. Department of Energy's (USDOE's) Hawaii Clean Energy Programmatic Environmental Impact Statement (PEIS) analyzes, at a programmatic level, the possible environmental impacts from clean energy activities and technologies with potential for near-term development or application in Hawaii. The PEIS looks at clean energy activities and technologies in the following five categories:



Prepared in accordance with the federal National Environmental Policy Act, the PEIS serves two of the state's energy principles: diversifying our energy portfolio and helping to balance technical, economic, environmental and cultural considerations. It will help guide future USDOE funding decisions and actions in support of Hawaii's clean energy goals. It will be a useful reference when preparing or reviewing environmental documents for individual clean energy projects proposed in Hawaii. And it informs the public, community groups, non-profit organizations, educational institutions, policymakers, regulatory agencies, utilities, developers, investors, landowners and other vested stakeholders who want to help achieve Hawaii's clean energy future.

The PEIS serves two of the state's energy principles: diversifying our energy portfolio and helping to balance technical, economic, environmental and cultural considerations.

The state, through DBEDT, supported the preparation and distribution of the PEIS. The Draft PEIS was presented for public comment in the second quarter of 2014, and the USDOE conducted eight public meetings on six of the main Hawaiian Islands between May 12 and May 22, 2014. Stakeholders and the general public were invited to submit comments on the draft documents orally at the meetings, in writing or electronically through the Hawaii Clean Energy PEIS website. The Final PEIS was published in September 2015. More information on the PEIS, including all documentation, can be found at http://energy.hawaii.gov/testbeds-initiatives/hawaii-clean-energy-peis

GET CONNECTED

Online Resources

Developer & Investor Center – The Developer & Investor Center is a dynamic online resource, regularly updated by HSEO, to inform 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.

National and international developers and investors are discovering Hawaii as the ideal location for deploying clean energy technologies.

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. In 2015, with support from USDOE and other local agencies, HSEO continues to update these resources to communicate current agency processes and preferences about permitting and siting renewable energy projects in Hawaii. Notwithstanding its name, the Center provides resources that are helpful to a wide range of stakeholders, including communities, general public, regulatory agencies, policymakers, landowners, and others interested in clean energy developments.

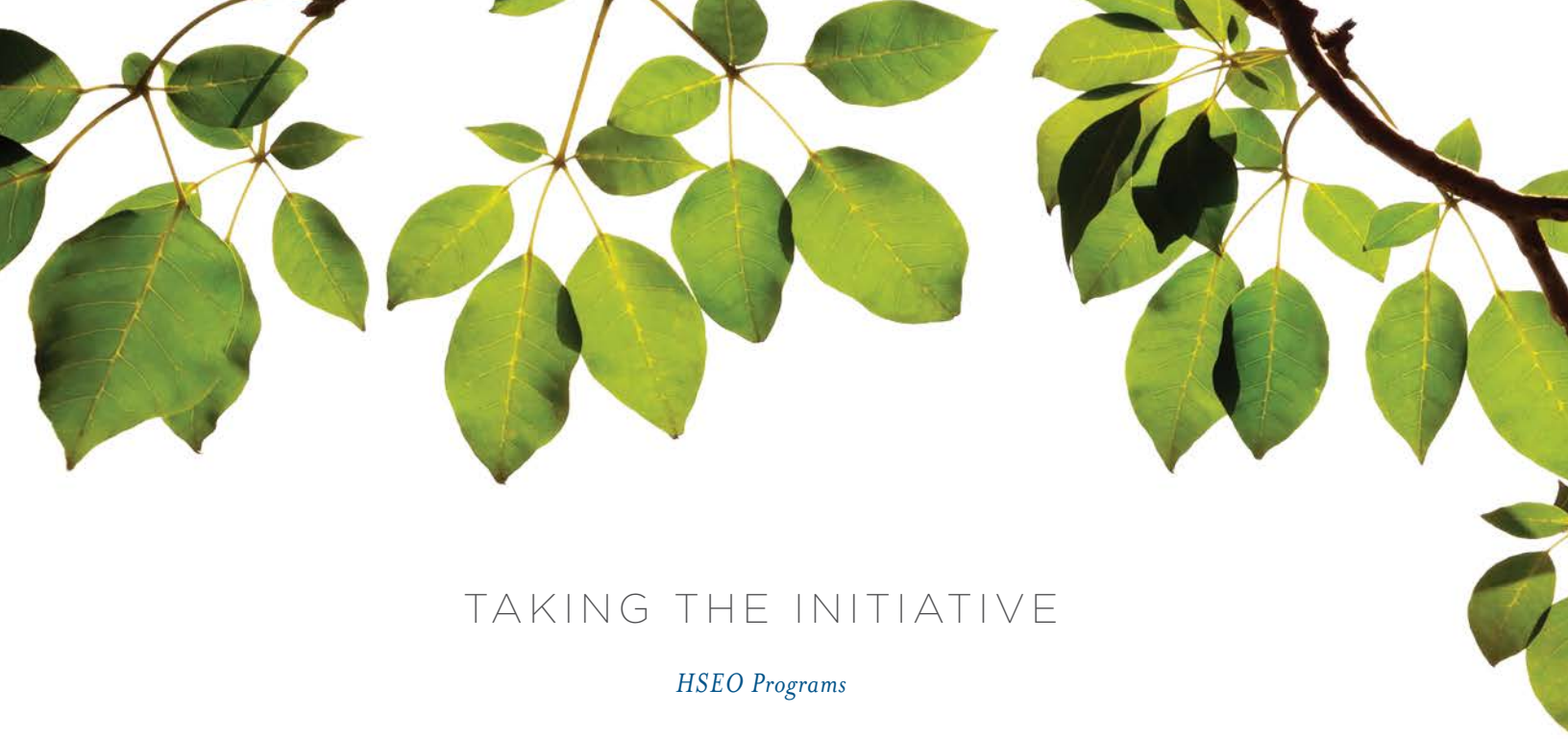
Environmental Permits – The Center links to the Hawaii Department of Health (DOH) e-Permitting Portal's environmental permits, such as those relating to air quality and water quality, for online processing and approval. The Portal lends transparency and efficiency to DOH permitting processes. According 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. See https://eha-cloud.doh.hawaii.gov/epermit/.

Self-Help Energy Suite – HSEO created the Self-Help Energy Suite, available on the Center's homepage, to advance high-impact, clean energy alternatives. The Suite's tools and resources for responsible project siting and design can help lower project development soft costs and ultimately decrease local electricity costs and community impacts. Stakeholders can find important technical assistance, permitting tools and local connections to accelerate progress to the marketplace, expediting scalable benefits for the entire state.

- 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 and is available at energy.hawaii.gov/resources/renewable-energis-map.

- Renewable Energy Permitting Wizard – 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 Renewable Energy Permitting Wizard covers prerequisites and processes for any county, state and federal permits that may be required for an individual project. Updated with current permitting requirements in 2015 with support from the U.S. Department of Energy and other local agencies, the Wizard is now available in an open source software environment with improved user functions at wizard.hawaiicleanenergyinitiative.org.

- Renewable Energy Projects Directory – 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. It can be found online at energy.eHawaii.gov/epd/public/energy-projects-map.html.



TAKING THE INITIATIVE

HSEO Programs

To power Hawaii's commitment to clean energy, HSEO has embraced bold solutions that will help make the state a leader in the clean energy race. To lead the charge, HSEO is overseeing and managing programs and partnerships that are turning Hawaii into the world's proving ground for clean energy technologies and accelerating the transformation to a clean energy economy.

HAWAII STATE Energy Office

HCEI MAX – Commitment To Clean Transportation
(hawaiicleanenergyinitiative.org/charrettes/transportation-charrette)
With transportation accounting to two-thirds of Hawaii's oil consumptions, the Hawaii Clean Energy Initiative charrettes program made transportation issues a top priority. The International Council on Clean Transportation (ICCT) was contracted to provide assessments, analysis, recommendations, and facilitate stakeholder engagement to support the development of a clean transportation plan. This plan is to guide stakeholders in strategies and tactics to reduce the consumption of petroleum products in Hawaii's transportation sector.

The HCEI draft Transportation Energy Analysis Report includes nearly two dozen tactics to be pursued now as well as enabling actions and further analysis to develop a larger pipeline of petroleum reducing tactics to be pursued in the long term. The next step will feature a reconvening of stakeholders to collaborate on development of a transportation road map that will most certainly be a major focus of HCEI for many years to come.

GEMS

GEMS Financing Program
(gems.hawaii.gov)
The Green Energy Market Securitization (GEMS) program is an innovative, sustainable green financing initiative designed to make clean energy improvements more affordable and accessible for Hawaii consumers. The program provides low-cost capital to finance solar photovoltaic systems and other clean energy improvements for those who may otherwise have difficulty obtaining financing for these projects.

Developer & Investor Center - (energy.hawaii.gov/develop-investor) HSEO has taken important steps to encourage high-impact, clean energy solutions and inform all stakeholders with its online Developer & Investor Center. The Center provides resources for starting a clean energy venture in Hawaii:

- Project Permitting Assistance and Resources
- Financing and Incentives for Renewable Energy Projects
- Land Resources for Renewable Energy Projects
- Utility Resources
- Business Registration Resources

Self-Help Energy Suite – The Suite provides resources for users to inform themselves on specific and general renewable energy projects and initiatives. It includes:

- **Renewable Energy Permitting Wizard**
  (wizard.hawaiicleanenergyinitiative.org)
  This tool helps users identify and understand the county, state, and federal permitting requirements and processes for a given renewable energy project.

- **Renewable EnerGIS Map**
  (energy.hawaii.gov/resources/renewable-energis-map)
  This online mapping tool provides renewable energy resource and site information for specific Hawaii locations. It helps users assess the renewable energy potential and feasibility of sites statewide.

- **Hawaii Renewable Energy Projects Directory**
  (energy.eHawaii.gov/epd/public/energy-projects-map.html)
  This interactive online directory provides information on renewable energy projects in Hawaii, both operational and those in development.

HAWAII GREEN BUSINESS PROGRAM

Hawaii Green Business Program
(energy.hawaii.gov/green-business-program)
The Hawaii Green Business Program assists and recognizes businesses that strive to operate in an environmentally and socially responsible manner. A partnership between Hawaii's Department of Health; Department of Business, Economic Development, and Tourism; and the Chamber of Commerce of Hawaii, this program highlights businesses that are dedicated to creating a sustainable Hawaii.

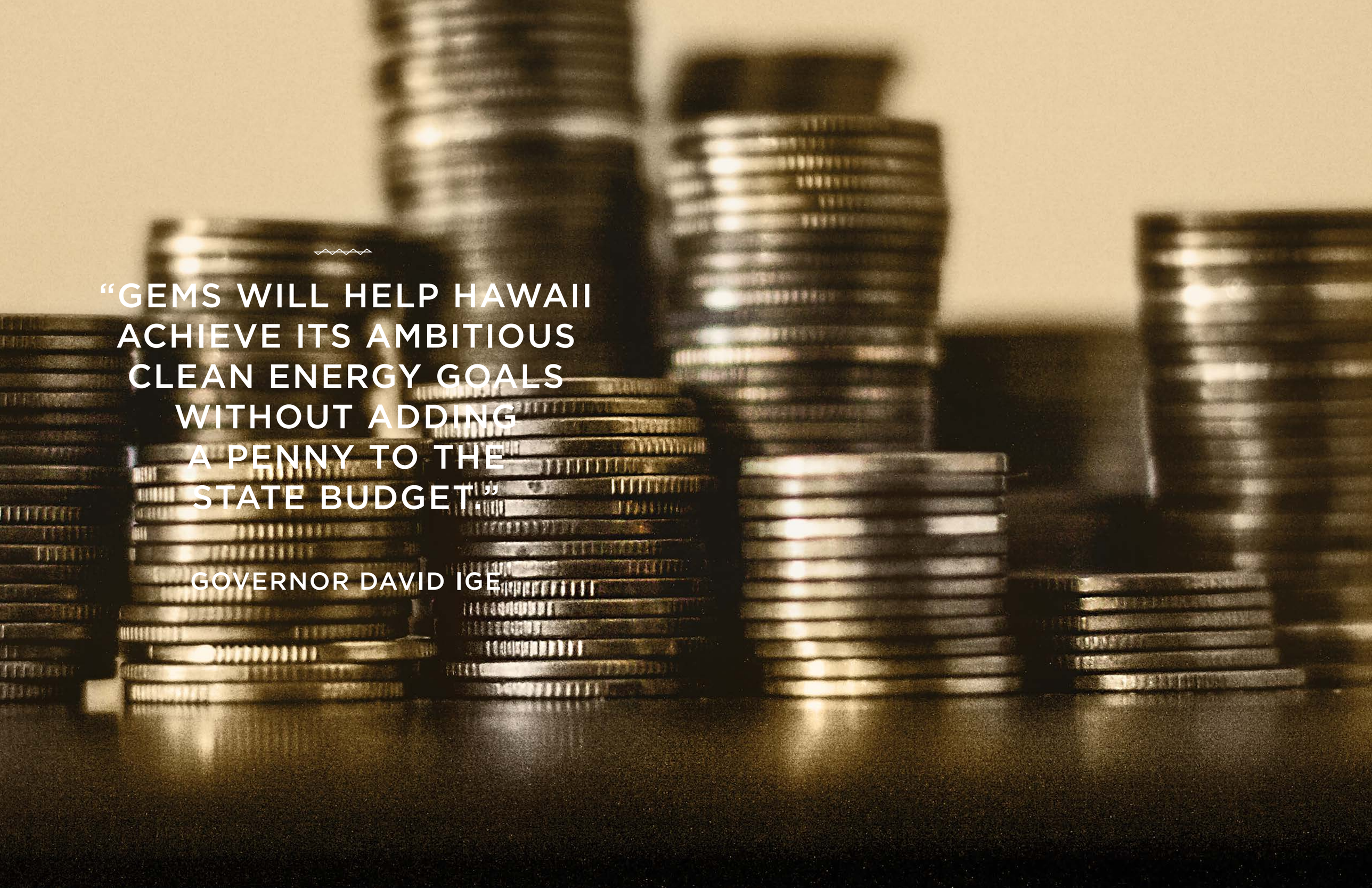
EV Stations Hawaii Mobile / Web App
(energy.hawaii.gov/testbeds-initiatives/ev-ready-program/ev-stations-Hawaii-mobile-app). This mobile application is designed to help drivers locate publicly available electric vehicle (EV) charging stations statewide. The app helps EV drivers locate the nearest charging station giving them the confidence that they can recharge while they're on the road.

VERGE HAWAII
(greenbiz.com/events/verge/honolulu/2016)
HSEO and the GreenBiz Group will bring the VERGE event series to Hawaii in 2016 and 2017. Long regarded as ground-zero for next-generation energy issues, Hawaii will host the best minds in energy to identify and advance next-generation practices for sustainable energy solutions in Hawaii and beyond.

HSEO E-Newsletter
The Current, HSEO's quarterly e-newsletter, updates 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 online at energy.hawaii.gov/resources/Hawaii-state-energy-office-publications.

Hawaii Energy Facts & Figures (Bi-Annual Report)

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 online at energy.hawaii.gov/resources/hawaii-state-energy-office-publications.



“GEMS WILL HELP HAWAII ACHIEVE ITS AMBITIOUS CLEAN ENERGY GOALS WITHOUT ADDING A PENNY TO THE STATE BUDGET.”

GOVERNOR DAVID IGE

TEST BED AND INNOVATION INITIATIVES

NURTURING INNOVATION

Hawaii's Clean Energy Future

What technologies will power Hawaii in 2045? While there may be a few good guesses, the only thing known for certain is that they will be clean and renewable. Many of them will spring from the seeds HSEO and its partners are planting today in the test bed of renewable energy innovations.

Efforts currently underway include:

- A high-tech hub for energy innovators to call home, fostering collaboration and creativity among forward-thinking enterprises.
- Myriad international agreements and partnerships, demonstrating both Hawaii's prominence as a clean energy player on the global stage and the desire of advanced economies to be on the ground floor of innovations coming to the islands.
- Start-up programs that are spinning off successful initiatives at an incredible pace.
- Programs to find and train the workers who will make tomorrow's energy economy go.
- Planning for a world-class exposition of clean energy expertise and innovation.

What form these and other initiatives will take, what new innovations they will lead to, is impossible to say. All that can be said with certainty is that by constantly encouraging new approaches, fostering collaboration and taking advantage of every opportunity, HSEO will best be able to help the state go from 20 percent to 100 percent renewable, and beyond, in the next 30 years.

CLEAN ENERGY LABORATORY

Building Capacity for Tomorrow's Solution

HCEI MAX – The Hawaii Clean Energy Initiative (HCEI) began as a groundbreaking partnership between the state of Hawaii, the U.S. Department of Energy, the military and the private sector. The next phase, HCEI MAX is stimulating innovation in Hawaii's emerging clean energy sector to help achieve Hawaii's RPS goals of 30 percent by 2020 and 100 percent by 2045. These aggressive goals will drive investment in clean energy infrastructure and serves as a catalyst for economic growth, investments in innovation and entrepreneurship.

HI Energy Core – 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.

In an effort to foster clean energy innovation, HSEO is making plans to develop the HI Energy CORE—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.

The HI Energy CORE will:

- Bring together energy innovation partners and entities in a central location to create synergies and stimulate connections that will grow energy innovation.
- Bridge gaps in the clean energy innovation ecosystem and between distinct innovation sectors.
- Coordinate access to markets, capital and talent for energy innovation stakeholders.
- Promote and showcase clean energy innovation technologies.

The contract for the HI Energy CORE will include an assessment to identify and meet the technical and non-technical needs of the influential energy innovation stakeholders in Hawaii that will use the facility. The results of the needs assessment will guide the location and design of the HI Energy CORE.

GOING GLOBAL

Hawaii's International Agreements

As a global clean energy leader, Hawaii continues to work with other nations and organizations around the world that share an interest in reducing fossil fuel dependency and advancing clean energy technology. International agreements already in place have proven that by working together, Hawaii and its partners across the Pacific can make great progress that will mutually benefit their citizens and the rest of the world.

Hawaii-Okinawa Clean Energy Cooperation

On July 10, 2015, dignitaries from Japan and Hawaii met to discuss strategies to be pursued under a five-year extension of the Hawaii-Okinawa Memorandum of Cooperation (MOC) for Clean and Efficient Energy Development and Deployment. The signatories to the MOC were the State of Hawaii, the Okinawa Prefectural Government, the U.S. Department of Energy, and Japan's Ministry of Economy, Trade and Industry (METI), representatives from Japan's Department of Commerce, Industry and Labor, HECO, and research institutions from Japan and Hawaii.

The Hawaii-Okinawa MOC for Clean and Efficient Energy Development and Deployment was established June 17, 2010, to expand on existing collaborations in technology research and development. Hawaii and Okinawa extended the MOC through June 2020 with a focus on advancing emerging and innovative clean energy technologies and developing them for the market.

The EV As Power Plant: JUMPSmart Maui – JUMPSmart Maui is a clean energy test bed project that incorporates smart grid, renewable energy and electric vehicle (EV) technologies on Maui to increase renewable penetration, improve utility operations and help customers optimize their energy usage and make smarter energy choices. The project is a collaboration between Hawaii and Japan funded by a $30 million investment from Japan's largest public research and development management organization, New Energy and Industrial Technology Development Organization (NEDO). With the potential to create new technology and business models for next-generation grids that would have applications in other island states and power grids around the world, this project reaffirms Hawaii's status as one of the leading energy test beds in the Asia Pacific.

Key partners include 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.

As part of the project, nine level-three fast chargers have been in operation on Maui to support project volunteers, with plans for an additional 11 fast chargers. Maui Electric continues to install equipment – such as batteries, micro DMSs and section switches – and gather preliminary data in homes that volunteer to join the project.

With the completion of Phase 1, recruitment and data evaluation of Maui EV and residential volunteers, JUMPSmartMaui is advancing to Phase 2, managing EVs as a daily source of smart power that can conveniently supply clean energy to a range of devices and home appliances. The long-term goal is to use EVs to create a virtual power plant that will integrate and manage distributed energy resources, like EV batteries and photovoltaics within the electric grid, for the benefit of the community.

For more information on the project, please visit JumpSmart Maui's website at jumpsmartmaui.com.

Green Energy Tech Partnership - DBEDT And Korea Institute Of Energy Technology Evaluation And Planning MOU – On August 24, 2015, business leaders, clean energy advocates and government officials from Korea and Hawaii stood by as DBEDT Director Luis P. Salaveria and Korea Institute of Energy Technology Evaluation and Planning (KETEP) President Dr. Whang Jintaek signed a Memorandum of Understanding (MOU). The MOU initiates cooperation in green energy technology research and development for applications in Hawaii in the areas of energy efficiency, new and renewable energy, smart grid and energy storage systems.

ENERGY EXCELLENCE ACCELERATES

Hawaii and Energy Excelerator

Energy Excelerator is a startup program helping the world solve its energy challenges, starting in Hawaii. It is a dual-track program that takes the best from tech accelerators, government grant programs and investors to help innovative companies succeed with funding, strategic relationships and a vibrant ecosystem. The program is primarily funded by the U.S Department of Defense's Office of Naval Research, the USDOE, the state of Hawaii and corporate partners.

In late 2014, the State of Hawaii and Energy Excelerator formalized their partnership with funding from HSEO; Energy Excelerator also partners with the state, particularly HSEO and DBEDT, in deploying demonstration projects and identifying problems that innovation can solve. The funding supports Energy Excelerator's core program: growing Hawaii's next generation of innovators and building a strong pipeline of companies, investors and corporates to Hawaii.

"It's important for our ecosystem to be aligned if we are going to reach our aggressive energy goals. The State of Hawaii has been an invaluable partner for us and our companies. They have helped to create an environment for innovators to collaborate in solving our biggest energy challenges, while growing our innovation econo-my and validating their technologies at the same time."

— Dawn Lippert, Director of Energy Excelerator

Success to Date - Energy Excelerator has awarded over $10 million to 32 portfolio companies. These companies have gone on to raise $207 million in follow-on funding. Here are projects from a few companies Energy Excelerator is working with:

- Stem, Inc. is deploying 1 MW of grid-connected, distributed energy storage with HECO; Stem also raised a $100 million project finance fund in 2014.
- Shifted Energy is installing more than 100 grid-interactive water heaters in homes and small businesses on Oahu and Maui.
- TerViva is planting a 175-acre biofuel farm on Oahu's North Shore.
- Ridescout is launching Ridescout Hub, a customized mobile app that aggregates all transportation options for Honolulu and gives decision-makers valuable data. Ridescout was acquired by Daimler in 2014 and purchased mobile ticketing app Globe Sherpa in June 2015.
- Ibis Networks is installing energy management systems and over 1,200 Intelisockets on three University of Hawaii campuses.

Energy Excelerator Interactive brings together EEx's newest cohort of companies and its network of investors, corporates and other strategic partners.

CONVENING THE BEST AND BRIGHTEST

Bringing Clean Energy Talent to Hawaii

2015 Clinton Global Initiative Commitment – Commitment to Action by the State of Hawaii: Hawaii Statewide Modern Grid-Workforce Training Deployment

In 2015, the State of Hawaii committed to the Hawaii Statewide Modern Grid-Workforce Training Deployment, a collaboration between the University of Hawaii, Honolulu Community College, Hawaii Natural Energy Institute, Hawaiian Electric Industries, and the Blue Planet Foundation. The 3-year, $300,000 commitment will build a coordinated statewide curriculum and training program for the next generation of skilled smart grid technicians, electrical engineers and managers. They will possess the technical skills the state needs to implement advanced metering infrastructure by 2020 and to achieve 100 percent renewable energy by 2045.

This effort will bring the university and community colleges, energy research organizations, utilities and non-profits together with the state to recruit and train students, initially under a scalable pilot program, with a new curriculum drawing its core content from established engineering streams as well as relevant courses from the partner university's system knowledge base. New students, practicing engineers, technicians, trades, crafts and utility employees will learn to build and operate the modern electrical grid as contractors and consultants to the utilities and firms supporting advanced metering infrastructure (AMI) installations and developing technologies associated with renewable energy resources, demand response, storage options and electric drive transportation.

VERGE HAWAII asia pacific clean energy summit

2016 VERGE HAWAII – HSEO selected California-based GreenBiz Group to bring its annual VERGE event series to Hawaii. Long regarded as ground-zero for next-generation energy issues, Hawaii will serve as host in 2016 and 2017 as the best minds in energy identify and advance next-generation practices for sustainable energy solutions in Hawaii and beyond.

The recent passage of three ambitious energy bills have made Hawaii the first state to adopt a 100 percent renewable energy portfolio standard and have cemented it at the forefront of global renewable energy efforts. Offering a real-world glimpse into the future as a more resilient world, the VERGE Hawaii: Asia Pacific Clean Energy Summit will gather influencers from the world's largest corporations, as well as entrepreneurs, utility executives, public officials and representatives of nonprofits and academia.

For more information on VERGE Hawaii, visit greenbiz.com/events/verge/honolulu/2016.

“WITH A WELL-DEFINED GOAL OF ACCELERATING RENEWABLE ENERGY TO 100 PERCENT, HAWAII IS THE PERFECT PLACE FOR BRINGING TOGETHER INNOVATORS, POLICYMAKERS AND MARKET LEADERS FOR NEXT-GENERATION CLIMATE SOLUTIONS. WE SEE VERGE HAWAII PLAYING AN INSTRUMENTAL ROLE IN PROVIDING THE PLATFORM FOR IDEATING AND SHARING BEST PRACTICES THAT OTHERS CAN REPLICATE.”

ERIC FAUROT
CEO, GREENBIZ GROUP

ENERGY PROGRAM FUNDING

HAWAII STATE ENERGY OFFICE FUNDING SOURCES

Supporting Clean Energy

HSEO is supported primarily by the Energy Security Special Fund (ESSF), established under Section 201-12.8, HRS. The ESSF receives 15 cents of the tax on each barrel of petroleum product sold by a distributor to any retail dealer or end user of petroleum products, other than a refiner. In the fiscal year ended June 30, 2015, the ESSF revenues were $3,708,195, down from $3,719,218 in the preceding fiscal year.

To address the reduced revenues from the Environmental Response, Energy, and Food Security Tax over the last several years, Act 185, SLH 2015 imposed the tax on fossil fuel in addition to the tax on petroleum products. The ESSF will receive 14.3 percent of the tax on fossil fuel sold by a distributor to any retail dealer or end user, other than a refiner.

The allocation of the Environmental Response, Energy, and Food Security Tax to the ESSF is critical for supporting the Hawaii Clean Energy Initiative, given Hawaii's aggressive goal to reach 100 percent renewable energy by 2045.

Federal funding from the USDOE and other federal agencies supplements the HSEO's ESSF funding. The USDOE's State Energy Program provides an annual formula allocation of approximately $280,000. HSEO actively researches and pursues federal funding opportunities that align with its objectives.

In fiscal year 2015, DBEDT issued $150 million in Green Energy Market Securitization Bonds 2014 Series A. They are designated as Green Bonds because the proceeds fund renewable energy and energy efficiency projects. Proceeds were deposited into the Hawaii Green Infrastructure Special Fund, which was administered by HSEO through June 30, 2015. As of July 1, 2015, this special fund is administered by the Hawaii Green Infrastructure Authority.

HAWAII STATE ENERGY OFFICE BUDGET			
	FY2015 ACTUAL		
	PERSONAL SERVICES	OTHER CURRENT EXPENSES	TOTAL
Energy Security Special Fund	$3,375,833	$1,236,006	$4,611,839
Hawaii Green Infrastructure Special Fund	$192,627	$143,705,712	$143,898,339
Hawaii Green Infrastructure Bond Fund	$0	$1,693,357	$1,693,357
Federal & Other Funds	$0	$1,618,905	$1,618,905
Total	**$3,568,460**	**$148,253,980**	**$151,822,440**
	FY2016 BUDGETED		
	PERSONAL SERVICES	OTHER CURRENT EXPENSES	TOTAL
Energy Security Special Fund	$3,852,677	$1,689,780	$5,542,457
Hawaii Green Infrastructure Bond Fund	$0	$50,000,000	$50,000,000
General Funds		$222,974	$222,974
Federal Funds	$0	$1,500,000	$1,500,000
Total	**$3,852,677**	**$53,412,754**	**$57,265,431**

HAWAII STATE ENERGY OFFICE – REVENUE AND EXPENSE SUMMARY

SOURCE	REVENUES	EXPENDITURES	
		PERSONNEL	OPERATING EXPENSES (E.G., TRAVEL, EQUIPMENT, SUPPLIES, CONTRACTS)
Energy Security Special Fund *	$3,806,283	$3,375,833	$1,236,006
USDOE – State Energy Program Formula Grant (PY2010-2014)	$409,654	$0	$390,860
USDOE – Energy Efficiency Recovery Act Grant	$226,084	$0	$226,084
USDOE – Hydrogen Power Park Grant	$479,535	$0	$506,344
USDOE – Hawaii's Clean Energy Transformation and Grid Connection Grant	$253,455	$0	$253,455
USDOE – Advancing Energy Efficiency in Hawaii Public Buildings Grant	$95,757	$0	$95,757
USDOE – SEP Initiatives	$0	$0	$2,328
USDA – Energy Audits & Renewable Energy Development Assistance	$43,352	$0	$43,352
USEPA – Hawaii Going Green Intern Development	$35,833	$0	$35,833
PVE – Stripper Well Funds	$63	$0	$0
PVE – Exxon Funds	$130	$0	$58,992
PVE – Chevron Funds	$844	$0	$0
Energy Audits Recipients' Share of Cost	$2,400	$0	$5,900
Hawaii Green Infrastructure Special Fund	$146,640,154	$192,627	$143,705,712
Hawaii Green Infrastructure Bond Fund	$9,796,754	$0	$1,693,357
Total	**$161,790,300**	**$3,568,460**	**$148,253,980**

* ESSF revenue from Environmental Response, Energy, and Food Security Tax: $3,708,195.22

HAWAII STATE ENERGY OFFICE – FEDERAL GRANTS				
FUNDING AGENCY	AWARD TITLE	AWARD AMOUNT	GRANT OBJECTIVE	PARTNERS
USDA - Rural Development	Hawaii Energy Audit Program for Eligible Rural Small Businesses and Farmers in Oahu, Maui, Hawaii and Kauai	$100,000.00	To prepare Investment Grade Energy Audits (IGA) for rural small businesses and farmers. Term: Feb 2012 - Feb 2015.	GDS Associates Hawaii Energy County of Maui County of Hawaii
USEPA	Hawaii Growing Green Intern Development and Pollution Prevention Project	$50,000.00	To establish an intern program that leverages the support and expertise of partners across the state with the purpose of expanding the Hawaii Green Business Program and Lead By Example Resource Efficiency Checklist Program, which focus on waste reduction, pollution prevention and resource conservation. Term: Oct 2013 - Sep 2015.	Hawaii Dept. of Health City and County of Honolulu - Honolulu Board of Water Supply City and County of Honolulu - Refuse Division The Chamber of Commerce of Hawaii
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)	$283,110.00	To design and carry out the Hawaii State Energy Office's energy efficiency and renewable energy programs. Term: Jul 2015 - Jun 2016.	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 - Sep 2016.	Hawaii Public Benefits Fee Administrator (SAIC/RW Beck) Hawaii Dept. of Accounting & General Services - Public Works Division Hawaii Energy

FINAL MESSAGE

When the Solar Impulse 2 completed its historic five-day flight from Japan to Hawaii last summer powered by only the sun's rays, the world took notice. Such feats of endurance capture the human imagination and provide an inspiring vision of what is possible. For Hawaii, the Solar Impulse 2 demonstrated something perhaps even more important: the power of innovation. From its lightweight carbon fiber structure to the highly efficient flexible solar cells covering its wings, the Solar Impulse 2 illustrated how innovative solutions emerge in the face of daunting challenges. It is a reminder that as Hawaii presses ahead to achieve a 100 percent renewable portfolio standard (RPS) in the electricity sector by 2045, innovation will be key.

This edition of the Energy Resources Coordinator's annual report highlights how Hawaii's clean energy transformation – like the groundbreaking work being done by the Solar Impulse 2 team, HCEI MAX – is attracting innovation and investment from around the world. To be sure, Hawaii's transition to clean energy is not without its share of technical challenges and costs. But it is the search for solutions that is helping fuel the growth of innovation that will allow Hawaii to maintain its position as a clean energy leader.

Meeting 100 percent of Hawaii's electricity demand with renewables will take a new approach to energy system planning that is structurally different than the current model. Accordingly, under HCEI MAX, the Energy Office is focusing on utility resource planning, rate design and price signals to inform Hawaii's electric utilities and the Public Utilities Commission on optimal configurations to accommodate a growing portfolio of renewable resources, as well as to achieve equitable rates of compensation for installed systems. The goal is simple: working towards 100 percent renewables in a manner that achieves the greatest value for the lowest total cost to all consumers.

Additionally, we are looking beyond the electricity sector by expanding our focus to transportation, which accounts for nearly two-thirds of the state's energy mix. Hawaii has just completed a comprehensive analysis on tactics that can be implemented to materially reduce fuel consumption in Hawaii, and has developed an energy-transportation stakeholder's alliance to collaborate on an energy road map that takes into consideration the growing interdependencies between the transportation and electricity sectors.

Together, we can make sure that Hawaii's energy transformation is comprehensive, inclusive and successful.

Sincerely,

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

Department of Business,
Economic Development and Tourism
235 S. Beretania Street, No. 502
Honolulu, Hawaii 96813