

State of Hawaii – Hawaii State Energy Office

**STATUS AND PROGRESS OF CLEAN ENERGY INITIATIVES
AND
ANALYSIS OF THE ENVIRONMENTAL RESPONSE, ENERGY, AND
FOOD SECURITY TAX**

**REPORT TO THE
GOVERNOR AND THE LEGISLATURE
OF THE
STATE OF HAWAII**

Pursuant to
Act 73, Session Laws of Hawaii 2010



Submitted By The State of Hawaii
Department of Business, Economic Development and Tourism

January 3, 2012

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Executive Summary

The State is working towards its 2030 clean energy goals and its progress has achieved national recognition. Clean energy development is transforming the State into the test bed for Asia-Pacific clean energy research and innovation, bringing a number of clean energy investments, and contributing to economic development and green job creation. In 2010, 14.9% of total statewide construction spending came from the solar energy industry. See Figures 1-4 below.

Figure 1. Energy Savings Performance Contracting

Hawaii was ranked first in the nation for energy savings performance contracting by the Energy Services Coalition, with \$117.09 per capita in energy savings performance contracts. This is 3.7 times the national average of \$31.46 per capita.

**First in Nation
Energy Savings Performance Contracting Per Capita**

State	Dollars per Capita (\$)	Total Performance Contracting (\$)	Jobs Created (Job Year)
1. Hawaii	\$117.09	\$159,278,011	1,731
2. Kansas	\$90.81	\$259,094,503	2,816
3. Idaho	\$90.27	\$129,000,000	1,402
4. Massachusetts	\$71.53	\$457,696,106	4,975
5. Utah	\$66.89	\$165,195,000	1,796
National Average	\$31.46	\$130,846,670	1,379

Source: *Performance Contracting Impacts - State Comparison*, December 2011 (Energy Services Coalition)

Figure 2. Installed PV Capacity

Hawaii was ranked second in the nation in cumulative installed photovoltaic capacity per capita in 2010 by the Interstate Renewable Energy Council, with 32.9 WDC per capita installed at the end of 2010. The cumulative installations were 4.7 times the national average of 7.0 WDC per capita.

Second in the Nation
Cumulative Installed Photovoltaic Capacity per Capita

State	Cumulative Through 2010 (W _{DC} /person)	2010 Installations (W _{DC} /person)
1. Nevada	38.8	25.3
2. Hawaii	32.9	13.6
3. New Jersey	29.6	15.1
4. California	27.4	6.8
5. Colorado	24.1	12.3
National Average	7.0	2.9

Source: 2010 U.S. Solar Market Trends, July 2011 (IREC)

Figure 3. Clean Economy Job Growth

Hawaii was ranked third in the nation in clean economy job growth by the Brookings Institute with 6.52% in clean economy job growth from 2003 to 2010. It exceeded the national average clean economy job growth of 3.45%.

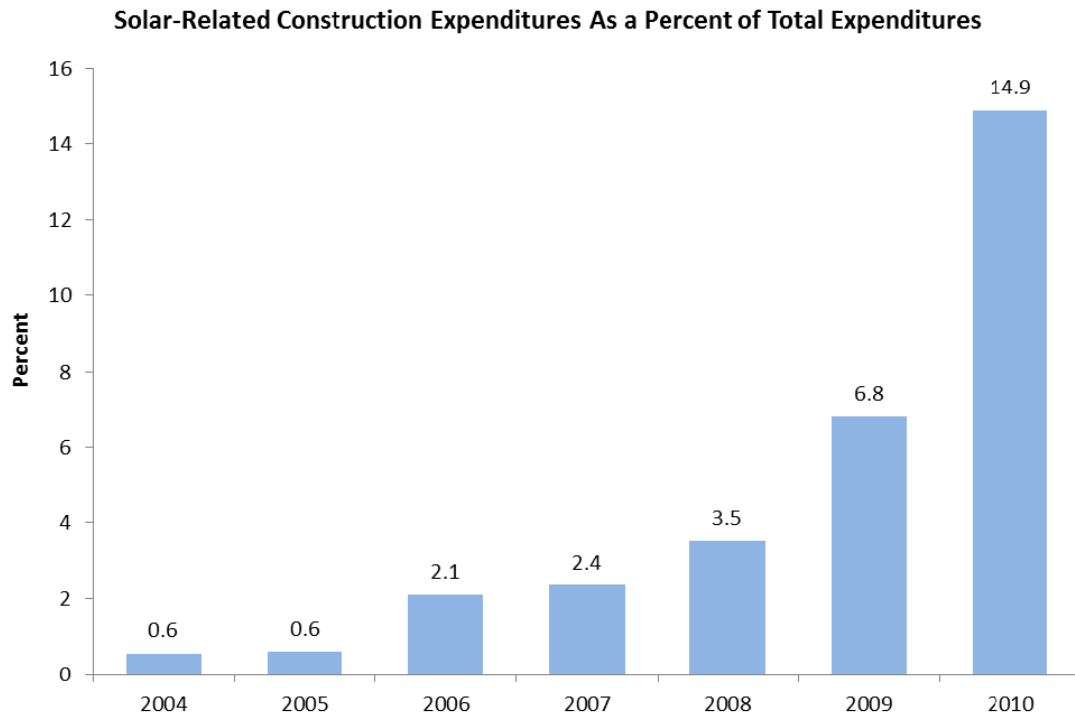
Third in Nation
Clean Economy Job Growth 2003-2010

State	Job Growth 2003-2010 (%)
1. Alaska	10.23%
2. North Dakota	6.71%
3. Hawaii	6.52%
4. Wyoming	6.31%
5. New Mexico	5.96%
National Average	3.45%

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

Figure 4. Solar Construction Expenditures

Clean energy is good for businesses. It provides a critical boost to our economy by attracting investments from companies around the globe while benefiting local entrepreneurs. The chart below illustrates the solar industry accounting for 15% of all construction expenditures in the State and has provided a stimulus for our construction industry which has been experiencing difficulties due to the downturn in real estate development.



Source: Department of Business, Economic Development and Tourism, 2011

Critical to this progress are the staff and program initiatives funded through the American Recovery and Reinvestment Act (**ARRA**), and Environmental Response, Energy, and Food Security Tax (**EREFST**). This report provides for an accounting of the progress achieved specifically through the State's investment of EREFST funds. The analysis of the fund finds that a heavier reliance will be shifted to the fund as ARRA monies expire, and cites the Hawaii Economic Development Task Force (**HEDTF**) urgency to fully support food and energy security goals.

For FY11, a total of \$20,343,352 was spent on the State's Hawaii Clean Energy Initiative, which consists of a combination of State Energy Program (**SEP**), ARRA and Energy Security Special Funds (**ESSF**). ESSF funds for FY11 amounted to \$385,960, or 2% of total spending. In FY12, HCEI spending will total \$24,430,485. ESSF spending is expected to increase to \$3,535,300, or 15% in FY12 with the ARRA programs set to end. In FY13, with little or no ARRA funding, ESSF funding at \$3,535,300 will approximately provide 55% of total HCEI spending, the other 45% utilizing carryover funds from continuing projects, and formula and competitive federal grants.

I. Introduction

This report is submitted to fulfill the requirement to report on the status and progress of clean energy initiatives, and to study and analyze the environmental response, energy, and food security tax, pursuant to Act 73, Session Laws of Hawaii 2010. The report is respectfully submitted by the State of Hawaii Department of Business, Economic Development and Tourism (DBEDT).

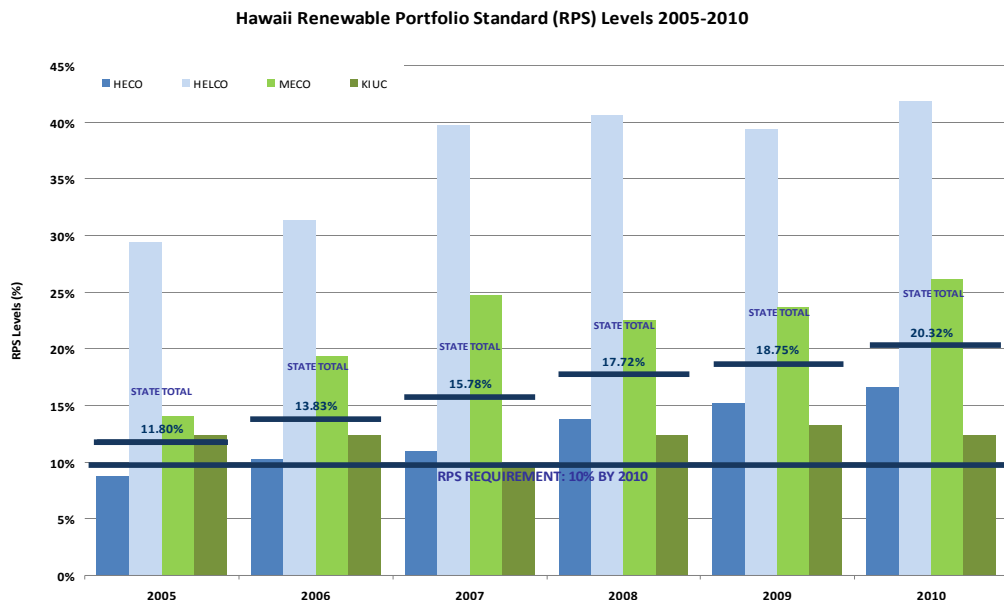
The Legislature in passing Act 73(10), determined that it is in the best interests of Hawaii's people to build the capacity needed to become self-sufficient in energy and food needs and to protect the health and function of the environment. Further, that Hawaii has all the necessary assets to significantly improve the State's energy and food sustainability and independence over the next twenty years if appropriate personnel resources and funding are wisely used. That to succeed the State must ensure a long-term strategy, which is well-resourced, coordinated, and focused.

The Hawaii Clean Energy Initiative (HCEI) was established to guide the State's transition to a clean energy economy.

- Hawaii's Renewable Portfolio Standard requires that by 2010 renewable electricity generation or energy conservation amount to 10% of electricity sold statewide. In 2005, the statewide RS level was 11.80%. By 2010, the RPS level rose to 20.32%, meeting the 10% requirement. (See figure 5).

Figure 5. Renewable Portfolio Standard (RPS) Levels

This chart shows Hawaii's Renewable Portfolio Standard (RPS) levels from 2005-2010. The RPS requires that by 2010 renewable electricity generation or energy conservation amount to 10% of electricity sold statewide. In 2005, the statewide RPS level was 11.80%. By 2010, the RPS level rose to 20.32%, meeting the 10% requirement.



II. HCEI Program Objectives

HCEI's objectives, as established by the Act, are to design, implement, and administer activities, to include:

1. Strategic partnerships for the research, development, testing, deployment, and permitting of clean and renewable technologies;
2. Engineering and economic evaluations of Hawaii's potential for near-term project opportunities for the state's renewable energy resources;
3. Electric grid reliability and security projects that will enable the integration of a substantial increase of electricity from renewable-energy resources;
4. A statewide clean energy public education and outreach plan to be developed in coordination with Hawaii's institutions of public education;
5. Promotion of Hawaii's clean and renewable resources to potential partners and investors;
6. A plan, to be implemented from 2011 to 2030, to transition the state to a clean energy economy; and
7. A plan, to be implemented from 2011 to 2030, to assist each county in transitioning to a clean energy economy.

III. DBEDT Reporting Pursuant to Act 73(10)

The Act specifies that DBEDT shall:

- Report the status and progress of new and existing clean energy initiatives, which includes:
 - a. The spending plan of HCEI;
 - b. All expenditures of the Energy Security Special Fund (**ESSF**) moneys; and
 - c. The targeted markets of the expenditures, including
 - i. Reasons for selecting those markets,
 - ii. The persons to be served,
 - iii. Specific objectives of the program, and
 - iv. Program expenditures, including measurable outcomes.
- 2. Study and analyze the environmental response, energy, and food security tax to include:
 - a. Its amount and allocation; and
 - b. Its effectiveness in accomplishing the goals and objectives of the Act.

IV. Status & Progress of Clean Energy Initiatives

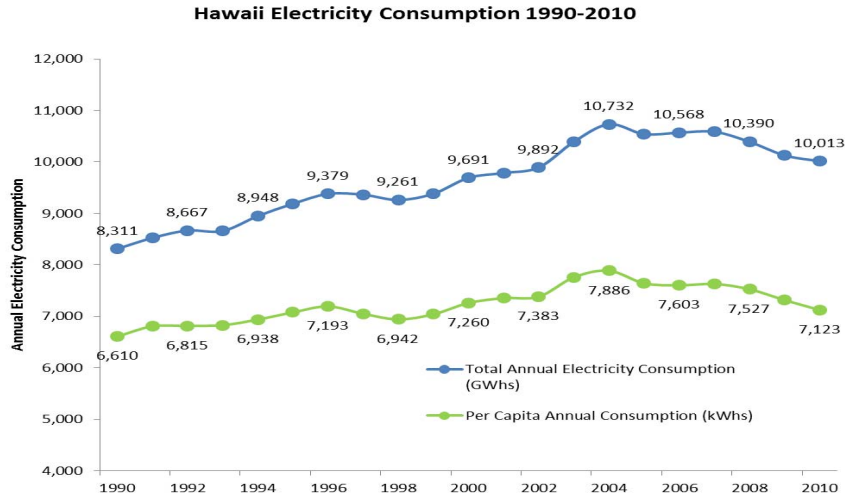
Key progress indicators and accomplishments for 2010 - 2011 under HCEI are as follows:

Energy Efficiency Accomplishments & Indicators

Energy efficiency measures will account for 30% of Hawaii’s 70% clean energy objective. To reach this goal, the state supports retrofitting residential and commercial buildings, strengthening new construction policies and building codes, and identifying non-building related energy efficiency measures.

Figure 6. Hawaii Electricity Consumption Down Trend

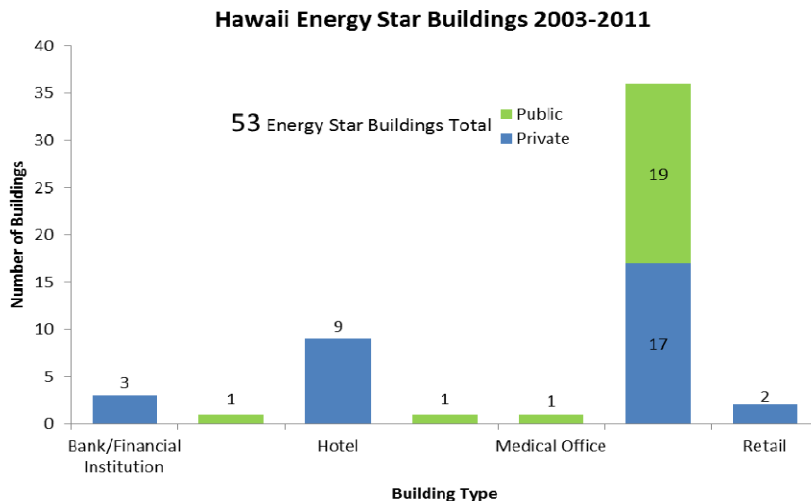
Hawaii’s 2010 annual electricity consumption per capita of 7,123 kWh is below consumption levels reached since 2000, when per capita consumption was 7,260 kWh.



Source: State Energy Data System: Hawaii, December 2011 (Energy Information Administration)

Figure 7. Hawaii Energy Efficient Building Certifications

Agencies can benchmark buildings to compare energy usage with other buildings in their portfolio or similar buildings nationally to identify investment priorities. If a building’s ENERGY STAR score ranks in the top 25% of all buildings of its type, it can be certified as an ENERGY STAR building. Since 2003, 53 Hawaii buildings have received the ENERGY STAR certification. They include 22 public and 31 private buildings.



Source: Energy Star.gov, December 2011 (US Environmental Protection Agency & US Department of Energy)

Energy Test-bed Agreements & Alliances

High energy costs, a rich diversity of renewables and progressive clean energy policies have positioned Hawaii as a unique test bed for renewables on a remote grid. In 2011 Hawaii emerged as the "Test Bed of the Asia Pacific Region" for the clean energy innovation sector. International agreements were signed with:

- Japan's New Energy and Industrial Technology Development Organization (NEDO) regarding a smart grid demonstration in Maui.
- The China Council for the Promotion of International Trade (CCPIT) regarding collaboration on clean energy development to be defined further in a Memorandum of Agreement to be jointly development by the end of the first quarter of 2012.

The State and South Korea's Ministry of Knowledge Economy are circulating a draft agreement to promote clean energy innovation.

The annual Asia Pacific Clean Energy Summit and Expo attracted companies and representatives from 12 nations furthering the energy test-bed positioning. The ultimate goal is to foster the development of an innovation economy as the key to creating a sustainable clean energy industry. A number of State and private sector organizations and entities are collaborating on developing this innovation sector, including: High Technology Development Corporation, Hawaii Strategic Development Corporation, Hawaii Renewable Energy Development Venture, the National Energy Laboratory of Hawaii Authority and the University of Hawaii's Hawaii Natural Energy Institute.

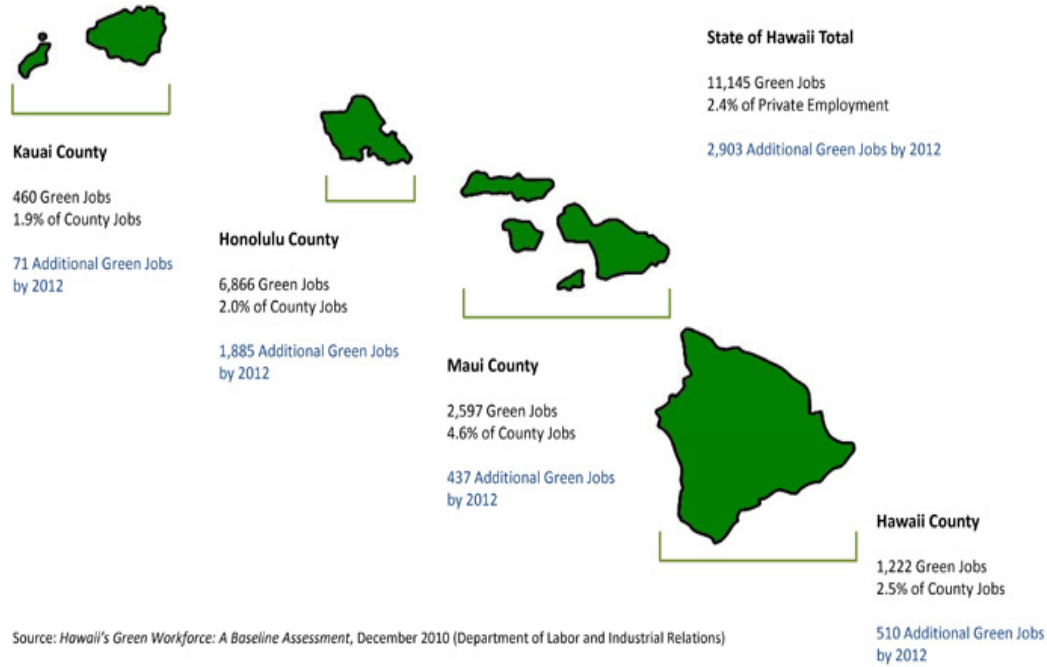
Clean Energy Investment & Job Growth

Clean energy is supercharging Hawaii's economy by attracting green business and creating a workforce for the future. Currently, Hawaii leads the nation in clean economy job growth and the clean energy sector is serving to support the state's economic recovery and overall growth.

- Clean energy will do more than improve the environment. Seventy-five (75) renewable energy projects are currently in progress and more are in development, thus proving that Hawaii is the ideal laboratory for clean energy development and investment.
- Clean energy is good for businesses. It provides a critical boost to our economy by attracting investments from companies around the globe while benefitting local entrepreneurs. The solar industry accounting for 15% of all construction expenditures in the State and has provided a stimulus for our construction industry which has been experiencing difficulties due to the downturn in real estate development.

Figure 8. Hawaii Green Job Island Map

Clean energy is powering Hawaii's economy by attracting green business and creating a workforce for the future. The chart below illustrates a state total of 11,145 private sector green jobs with an additional 2,903 by 2012. This demonstrates Hawaii's clean energy economy serves as a model for the U.S. and the world.

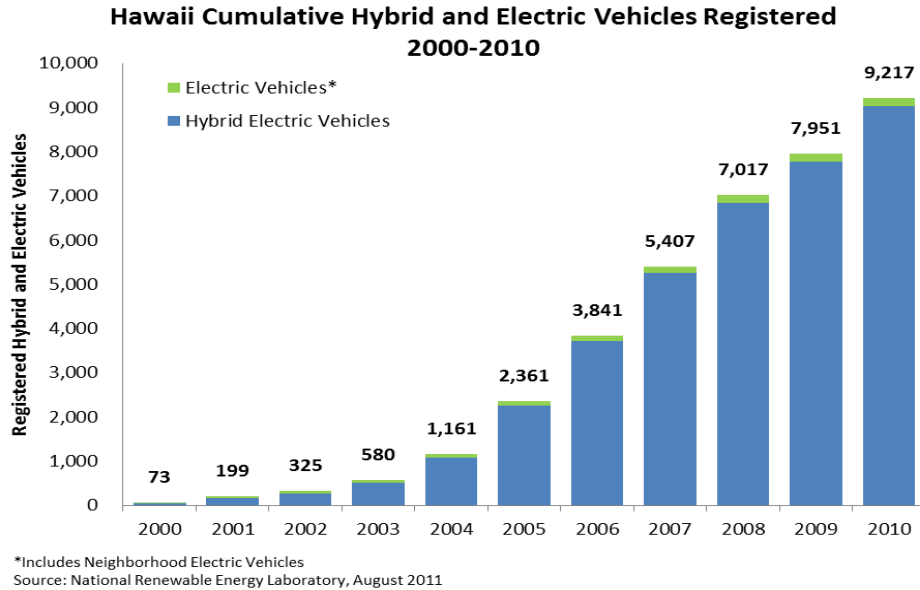


Alternative Transportation Indicator

The State Energy Office is dedicated to establishing a sustainable alternative-fuel strategy to help reduce Hawaii's dependence on imported oil. A primary goal is to reduce the consumption of petroleum in ground transportation.

Figure 9. Developing Alternative Transportation Usage

This chart shows an upward trend in the cumulative number of hybrid and electric vehicles registered in the State of Hawaii. From 2000 to 2010, hybrid and electric vehicles cumulatively increased from 73 to 9,217.



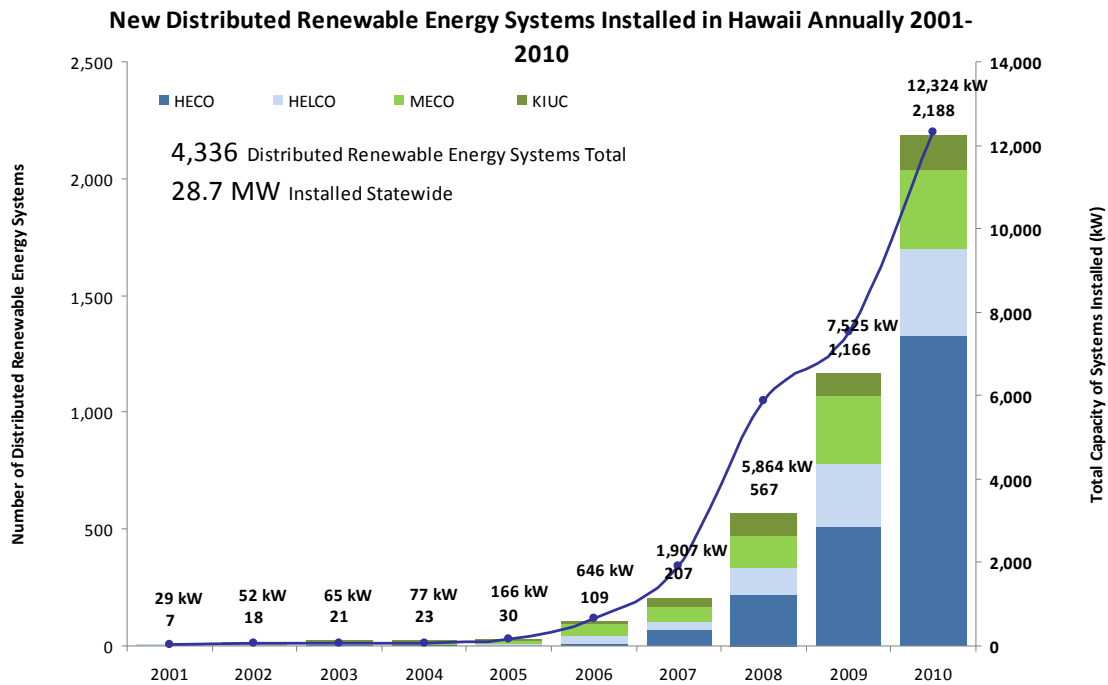
Renewable Energy Potential & Accomplishments

Most of our electricity demand is on Oahu while most of the renewable energy sources are on Hawaii, Maui, Lanai, Molokai and Kauai. For this reason we plan to construct an undersea cable to connect our islands into an integrated grid for both energy and broadband. With this cable, we can capitalize on our rich diversity of renewable resources and achieve economies of scale. This project is already receiving worldwide interest from investors who would like to fund the project because of the diversity of resources that it can accommodate.

- Since 2006, Hawaii's renewable electricity generation as a percentage of total generation has been on average 1.8% above that of the U.S.
- Of the electricity generated from renewable resources, those that are generated from biomass/waste-to-energy, geothermal and wind are most abundant. In 2010, over 87% of all electricity from renewable generation came from the aforementioned resources.
- A total of 28 renewable energy generation facilities totaling 322.7 MWs in nameplate capacity currently exist on the islands of Hawaii, Kauai, Lanai, Maui and Oahu.
- By 2010, 4,336 distributed renewable energy systems with a total capacity of 28.7 MWs were installed statewide under the utilities' Net Energy Metering and Schedule Q programs. Since 2006, distributed generation system installations have increased rapidly. Whereas only 30 systems with a total capacity of 166 kW were installed in 2005, 2,188 systems were installed statewide with a total capacity of 12.3 MWs in 2010 alone. (See figure 10).

Figure 10. New Distributed Renewable Energy Systems

By 2010, 4,336 distributed renewable energy systems with a total capacity of 28.7 MWs were installed statewide under the utilities’ Net Energy Metering and Schedule Q programs. Since 2006, distributed generation system installations have increased rapidly. Whereas only 30 systems with a total capacity of 166 kW were installed in 2005, 2,188 systems were installed statewide with a total capacity of 12.3 MWs in 2010 alone.



Source: Net Energy Metering Status Reports , 2010 (Public Utilities Commission)

The project status of existing clean energy initiatives, primarily using federal funds (American Recovery and Reinvestment Act funds and Energy Efficiency and Conservation Block Grant funds) is that they are scheduled to comply with federal deadlines for project completion (expiring respectively April 30, 2012 and September 20, 2012).

The overarching spend plan for HCEI utilizing all currently available sources of funding for the State Energy Program is shown in **Figure 11**.

Figure 11. HCEI Expenditure Schedule

For the Two Fiscal Years Ending June 30, 2011 and 2012

Description	MOF	2011	2012
Personnel	B	<u>171,661</u>	<u>1,784,013</u>
Total Other Operating Expenses	B	<u>214,299</u>	<u>2,361,991</u>
Total	B	<u><u>385,960</u></u>	<u><u>4,146,004</u></u>
Personnel	N	<u>1,337,506</u>	<u>209,218</u>
Total Other Operating Expenses	N	<u>612,816</u>	<u>2,130,261</u>
Total	N	<u><u>1,950,322</u></u>	<u><u>2,339,479</u></u>
Personnel	V	<u>1,769,672</u>	<u>1,500,000</u>
Total Other Operating Expenses	V	<u>16,237,398</u>	<u>16,445,002</u>
Total	V	<u><u>18,007,070</u></u>	<u><u>17,945,002</u></u>
TOTAL SPENDING		20,343,352	24,430,485

Funding sources:

Method of Funding: B - Energy Security Special Funds

Method of Funding: N - Other federal funds (State Energy Program)

Method of Funding: V - American Recovery and Reinvestment Act

Funding for new and on-going clean energy initiatives are now primarily funded by the Environmental Response, Energy, and Food Security Tax (**EREFST**) monies through the ESSF, or by awards from federal formula or competitive grants. The HCEI ESSF expenditures are shown in **Figure 12**.

Figure 12. Energy Security Special Fund
Expenditure and Encumbrance Budget Plan
For the Two Fiscal Years Ending June 30, 2011 and 2012

INITIATIVE	2011	2012
Hawaii State Energy Office – Personnel Costs	178,299	1,784,013
Agricultural Business Plan Competition - Kauai EDB		37,500
Agriculture Web Portal Expansion - Hawaii County EDB		35,000
Biopower System Evaluation - Kauai EDB		37,500
Clean Energy Analysis / Studies – State Energy Office		60,000
Clean Energy E-initiative - Hawaii County EDB		40,000
Community Engagement Meetings - Enterprise Honolulu (Oahu EDB)		75,000
County of Hawaii – County specific focus, but in congruence with the State	70,920	
DLNR Permitting – State Energy Office		11,000
DOH On-line Permitting – State Energy Office	150,000	
Energy Education / Outreach – State Energy Office		208,236
Interisland Cable Specifications – State Energy Office	500,000	
Kauai County – County specific focus, but in congruence with the State	72,269	
NREL / OP GIS Layers for REZ – State Energy Office		100,000
Represent Energy Community Interests & Expand Services - C&C Honolulu		75,000
Represent Energy Community Interests & Expand Services - County of Maui		71,811
Renewable Energy Resource Center – Maui EDB		50,000
State Matching Funds to Federal Grants – State Energy Office		96,600
WaterStory Outreach – Maui EDB		25,000
Energy Efficiency Programs		431,359
Rebuild Hawaii		6,000
Program Support – State Energy Office	7,561	86,194
Special Fund Assessments	167,615	247,200
TOTAL	1,146,664	3,477,413

The HCEI projects enabled through the above spend plans relate to both HCEI program goals and areas targeted for achievement. Greater detail on these projects is highlighted in **Attachments 1 and 2**.

V. **Environmental Response, Energy, and Food Security Tax Analysis**

The current amount and allocation of the EREFST is detailed in the chart below:

	Current
Environmental Response, Energy, and Food Security Tax	\$ 1.05
Environmental response fund	0.05
Energy security special fund	0.15
Energy systems development special fund	0.10
Agricultural development and food security special fund	0.15
Total	\$ 0.45
Balance to general fund	0.60

Under the Act three new funds were established:

- 1 **Energy Security Special Fund** – to be expended by DBEDT
- 2 **Energy Systems Development Special Fund** – to be expended by HNEI¹
- 3 **Agricultural Development and Food Security Special Fund** – to be expended by HDOA²

The allowable activities for funding from each fund (specified within the Act) are as follows:

a. **Energy Security Special Fund**

- Subject to appropriation, moneys from the fund may be expended by DBEDT for the following purposes and used for no other purposes, except:
 - To support HCEI and the Energy Division, including staffing positions
 - To fund the Renewable Energy Facilitator
 - To fund, to the extent possible, the Greenhouse Gas Emissions Reduction Task Force, climate change task force, grant-in-aids (§42F) to the economic development boards and economic development agencies of each county to meet the stated objectives of HCEI.

b. **Energy Systems Development Special Fund**

- Obtaining matching funds from federal and private sources for research, development, and demonstration of renewable energy sources;
- Awarding contracts or grants to develop and deploy technologies that will reduce Hawaii's dependence on imported energy resources and imported oil. Projects may be commissioned that:
 - Balance the risk, benefits, and time horizons of the investment to ensure tangible benefits to the Hawaii consumer, with priority given to short- term technology development;

¹ HNEI – Hawaii Natural Energy Institute of the University of Hawaii

² HDOA – Hawaii Department of Agriculture

- Emphasize innovative and renewable energy supply and energy efficient end use technologies focusing on environmental attributes, reliability, and affordability;
- Enhance transmission and distribution capabilities of renewable energy supply for electricity;
- Enhance reliability and storage capabilities of renewable energy for electricity;
- Ensure that research, deployment, and demonstration efforts build on existing programs and resources and are not duplicated;
- Address critical technical and scientific barriers to achieving energy self-sufficiency by reducing dependence on imported oil and imported energy resources;
- Ensure that technology used and developed for renewable energy production and distribution will be commercially viable; and
- Give priority to resources that are indigenous and unique to Hawaii; and
- Managing the portfolio of projects commissioned under this subsection.

c. Agricultural Development and Food Security Special Fund

- Subject to appropriation, Ag Dev & Food Security Special Fund can fund:
- Grants to farmers for agricultural production or processing activity;
- Acquisition of real property for agricultural production or processing activity;
- Improvement of real property, irrigation systems, and transportation networks necessary to promote agricultural production or processing activity;
- Purchase of equipment necessary for agricultural production or processing activity;
- Research on and testing of agricultural products and markets;
- Funding of agricultural inspector positions within the department of agriculture;
- Promotion and marketing of agricultural products grown or raised in the state; and
- Any other activity intended to increase agricultural production or processing that may lead to reduced importation of food, fodder, or feed from outside the state.

The program's (DBEDT, HNEI, HDOA) effectiveness in accomplishing the goals and objectives of the Act during the initial fiscal year (FY10-11) was modest due to the need to obtain spending authority, setup fiscal mechanisms (accounts), and perform procurement procedures for utilizing the funds.

The activities of each fund follows:

- **Energy Security Special Fund**

Hawaii's State Energy Program has made significant progress towards achieving Hawaii's clean energy goals as evidenced by its national recognition and articulated in its "HCEI Road Map." However, the State's leveraging of \$37 million in federal funds through the American Recovery and Reinvestment Act will be fully expended by September 30, 2012. At that time, the State will be primarily dependent upon 'Energy Security Special Funds' to enable retaining the capacity in staff resources and project funding to continue critical initiatives. This progressive reliance on ESSF funds is documented for FY11 and FY12, in Attachment 2. In FY13, when ARRA funds are completely gone; it is projected that staffing costs alone will amount to or exceed the current expenditure ceiling of \$3.5 million. Also the large disparity in the amount of federal funds (\$37 million) set to expire and the ceiling of funds received from the ESSF, within the fiscal year (\$3.5 million) will cause difficult choices pitting energy program funding against retaining personnel unless the spending ceiling is raised.

An accounting of expenditures in FY11 from the ESSF follows:

- In-line with the intent of the Act, the Hawaii State Energy Office (**HSEO**) was able to immediately fund five (5) staff positions within the Division (\$178,299), in which Petroleum Violation Exxon funds needed to be replaced due to depletion. The fund also provided HSEO program support of its activities (\$7,561).
- HSEO provided grants to the county economic development agencies on the islands of Hawaii and Kauai to meet the stated objectives of HCEI and continue an on-going relationship to develop and implement appropriate energy measures. The grants utilizing the fund were respectively for \$70,920 and \$72,269.
- The fund was also used to support HCEI through HSEO initiatives to develop an on-line permitting process for environmental permits (\$150,000) issued by the Hawaii Department of Health, and its initiative to determine specifications for an interisland cable (\$500,000).
- Lastly, the fund was assessed by the Legislature 'special fund fees' (revenue and administrative use) of \$167,615.

- **Energy Systems Development Special Fund**

HNEI was unable to expend their FY10-11 allocation due to their expend authorization and citation needing to be re-directed from DBEDT to the University of Hawaii. See HNEI attached report, **Attachment 3**.

- **Agricultural Development and Food Security Special Fund**

Due to an Attorney General opinion, the Department of Agriculture was unable to spend FY10-11's allocation to the Agricultural Development and Food Security Special Fund. However, the funds have been carried forward to the upcoming year and have been apportioned to provide support for programs and operations ranging from bio-security, irrigation, food safety, and neighbor island support, all of which will be beneficial programs that will help the State reach its goal of food self-sufficiency and security.

Program	2012 Expenditure
Bio-Security Program	2,000,000
Irrigation Program Operations	725,000
East Kauai Irrigation O&M	75,000
UH-Food Safety Research	500,000
Planner/Neighbor Island Support	136,175
TOTAL	3,436,175

Recommendations:

The Hawaii Economic Development Task Force report is recommending that EREFST funds going to the general fund be retained for food and energy security, as originally intended (table below), or to increase the tax to fully support food and energy security goals.

	Current	Proposed
Barrel Tax	\$ 1.05	\$ 1.05
Environmental response fund	0.05	0.05
Energy security special fund	0.15	0.45
Energy systems development special fund	0.10	0.10
Agricultural development and food security special fund	0.15	0.45
Total	\$ 0.45	\$ 1.05
Balance to general fund	0.60	0.00

The HEDTF further recommends that the spending caps for the Energy Security Special Fund and Agricultural Development and Food Security Special Fund be increased.

Conclusion:

It is clear that the expiration of ARRA funds will significantly impact the rate and progress of HCEI advancement due to the large disparity in the amount of funding expiring and the amount of replacement funds being made available through the ESSF. Also, HEDTF discussions and informational presentations reinforce that the requests for funding food and energy security projects far outweigh the available funding currently in place.

Consequently, equilibrium investment in counter-balancing the loss of ARRA funding to HCEI, its Roadmap initiatives, and State Energy Office staffing is imperative if program advancement is to continue to provide positive contributions to economic development and jobs, and advance and achieve the State's energy goals.