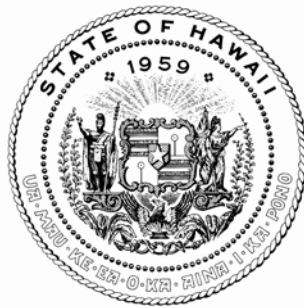


**REPORT TO THE TWENTY-FIFTH LEGISLATURE  
2010 REGULAR SESSION**

**REPORT ON THE STATE'S PROGRESS TOWARD MEETING THE MILESTONES  
AND OBJECTIVES OF THE ENERGY FEEDSTOCK PROGRAM**

**IN RESPONSE TO ACT 159, SESSION LAWS OF HAWAII 2007**



**Prepared by:**

**THE STATE OF HAWAII  
DEPARTMENT OF AGRICULTURE**

**DECEMBER 2009**

## ENERGY FEEDSTOCK PROGRAM

### Annual Report to the Legislature for Calendar Year 2009

#### Legislative Background

Section 141-9, Hawaii Revised Statutes, enacted pursuant to Act 159, Session Laws of Hawaii 2007, provides in full as follows:

**[§141-9] Energy feedstock program.** (a) There is established within the department of agriculture an energy feedstock program that shall:

- (1) Maintain cognizance of actions taken by industry and by federal, state, county, and private agencies in activities relating to the production of energy feedstock, and promote and support worthwhile energy feedstock production activities in the State;
- (2) Serve as an information clearinghouse for energy feedstock production activities;
- (3) Coordinate development projects to investigate and solve biological and technical problems involved in raising selected species with commercial energy generating potential;
- (4) Actively seek federal funding for energy feedstock production activities;
- (5) Undertake activities required to develop and expand the energy feedstock production industry; and
- (6) Perform other functions and activities as may be assigned by law, including monitoring the compliance provisions under section 205-4.5(a) (15).

(b) The chairperson of the board of agriculture shall consult and coordinate with the energy resources coordinator under chapter 196 to establish milestones and objectives for the production of energy feedstock that is grown in the State. The chairperson and the coordinator shall report the State's progress toward meeting such milestones and objectives annually to the legislature.

(c) The chairperson of the board of agriculture shall also consult and coordinate with research programs and activities at the University of Hawaii that will assist in the further growth and promotion of the energy feedstock production industry in Hawaii.

(d) The chairperson of the board of agriculture may employ temporary staff exempt from chapters 76 and 89. The board may adopt rules pursuant to chapter 91 to effectuate the purposes of this section. [L 2007, c 159, §5]

#### **Energy Feedstock Program Milestones and Objectives: Reportable Activities for the period of January 1, 2009-December 31, 2009.**

##### **1. Related Legislative Measures Enacted in 2009**

Act 19 (SD1, HD2, CD1). Sets terms and conditions for leases of public lands to renewable energy producers, including requiring a public hearing, project completion, design, and financing documentation, and limitations on terminating or altering existing leases of public lands affected.

Act 50, (HB 1270 SD2). The purpose of this Act is to refocus the regulatory standard to a methodology that is just and reasonable by significantly reducing any linkages between the volatile prices of fossil fuels and the rate for nonfossil fuel generated electricity. This Act also potentially enables utility customers to share in the benefits of price stability and fuel cost savings resulting from the use of nonfossil fuel generated electricity.

Act 153 (SB868 SD2, HD2, CD1). Addresses deficiencies in Hawaii's energy resources coordination statutes. Provides policy guidance to ensure adequate detail on the nature and relationship of the energy data analysis functions of the state energy resources coordinator and energy program.

Act 154 (SB464, SD2, HD2, CD2). Amends the renewable energy technologies income tax credit to encourage use of solar and wind energy systems and to permit a portion of the excess of the credit over payments due to be refunded to the taxpayer in certain circumstances. Reduces the tax credit for certain energy systems used to meet substitute renewable energy technology requirements for single-family residential properties.

Act 155 (HB 1464 HD 3, SD2, CD 1). Provides for and encourages renewable energy use and development, and energy efficiency, including increasing requirements for renewable energy portfolio standard, expanding duties of the energy resources coordinator, establishing energy efficiency portfolio standards, requiring energy-efficient state buildings, requiring sellers to provide electricity-cost information, and appropriating funds from the Renewable Energy Facility Siting Special Fund.

Act 156 (SB 1202, SD2, HD2, CD1). Establishes the development of non-fossil fuel transportation as a state policy goal. Requires the designation of parking spaces for electric vehicles and provides penalties for parking a non-electric vehicle in reserved spaces. Requires State and county agencies to follow a priority list when purchasing energy-efficient vehicles, including electric vehicles. Includes requirements for developing an electric vehicle infrastructure. Establishes the Transportation Energy Transformation Grant Fund Program.

Act 157 (SB1065, SD2, HD1, CD1). Exempts, under certain conditions, sales of electricity generated by NELHA from renewable energy sources from regulation by the public utilities commission when those sales are made to users located on adjacent property that is leased from the State.

Act 173 (HB589, HD1, SD2, CD1). Exempts leases and easements for renewable energy projects from subdivision requirements; defines "subdivision requirements"; requires agencies to accept instruments for recording and filing. Sunsets 7/1/2013.

Act 185 (HB591, HD1, SD2). Authorizes preferential rates for the purchase of renewable energy produced in conjunction with agricultural activities.

## **2. Related research**

### **Biofuels Production Assessment**

Black and Veatch was contracted by the Department of Business, Economic Development & Tourism (DBEDT) to prepare a statewide multi-fuel biofuels production assessment.

The final report concludes that at this time, Banagrass and Eucalyptus offer the most potential in terms of economic and yield basis. Algae and sweet sorghum are promising options. Black and Veatch recognize the concern over food and fuel conflicts and mention alley cropping as a means to increase yields and mitigate the conflicts. They also acknowledge that "Hawaii's geography and infrastructure provide further challenges to economic feasibility since it may be difficult for processes to achieve economies of scale which make them commercially viable."

They mention that pyrolysis or syngas fermentation or facilities that can produce food, fuel, electricity and high value products may be a way to overcome the scale problem.

## **Bioenergy Master Plan**

The Bioenergy Master Plan was developed through a contract between the Department of Business, Economic Development, and Tourism, and the Hawaii Natural Energy Institute located at the University of Hawaii, Manoa. As stated in Act 253, Part III, "The primary objective of the bioenergy master plan shall [be to] develop a Hawaii renewable biofuels program to manage the State's transition to energy self-sufficiency based in part on biofuels for power generation and transportation."

The preliminary draft of the Bioenergy Master Plan was sent to stakeholders for review in November. Comments will be compiled and the report finalized at a future time to be determined. The following summary of the plan is based on the preliminary draft and may change, subject to the stakeholders' comments.

The Bioenergy Master Plan addresses the following issues:

- Specific objectives and timelines;
- Water resources;
- Land resources;
- Distribution infrastructure for both marine and land;
- Labor resources and issues;
- Technology to develop bioenergy feedstock and biofuels;
- Permitting;
- Financial incentives and barriers and other funding;
- Business partnering;
- Policy requirements necessary for implementation of the master plan; and
- Identification and analysis of the impacts of transitioning to a bioenergy economy while considering applicable environmental concerns."

### **Preliminary Outcomes**

**Outcome I - Does Hawaii Have the Potential to Rely On Biofuels as a Significant Renewable Energy Resource?**

The plan concludes that Hawaii does have the potential to meet the production scenario goal of 20% displacement of 2007 Hawaii fuel consumption.

### **Outcome II - Recommendations in Priority Order**

1. Establish a bioenergy program
2. Establish a bioenergy technical advisory group
3. Develop clear and consistent policy for use of State lands
4. Develop methodology for evaluation of bioenergy projects
5. Require Life Cycle Analysis for use of State lands or funding support
6. Provide a tax credit for irrigation systems
7. Provide a tax credit for infrastructure systems
8. Appropriate funds for a research position

Outcome III - Strategic Partnerships for the Research, Development, Testing, and Deployment of Renewable Biofuel Technologies and Production of Biomass Crops

HCEI, the Hawaii Renewable Energy Development Venture, the Hawaii State Energy Office, University of Hawaii, Hawaii Agriculture Research Center, were mentioned as examples of institutions that contribute to partnership building.

Outcome IV - Biofuels Demonstration Projects

Field plantings

Farmer operated/managed feedstock demonstrations

Feedstock production combined with technology demonstrations

Oil crop production

Pyrolysis of biomass

Gasification

Controlled storage of biofuels

Conversion of private cars/buses to operate on biofuels

Larger marine vessel conversion to renewable diesel

Outcome V - Promotion of Hawaii's Renewable Biofuels Resources

Legislative actions to reduce regulatory burden and create financial incentives

Maintenance of the Bioenergy Master Plan website

On-going participation in conferences and workshops

Keeping the State energy office staff engaged and informed about the bioenergy environment

Questions for Additional Study:

What feedstocks have the highest yields on non-prime agriculture land under various Climatic conditions and management practices?

Can energy crops be grown sustainably and economically?

To what degree should agricultural land be dedicated to biofuel crops?

What biofuel products make the most sense for Hawaii's future needs?

Are the conversion technologies for these biofuels commercially available?

How do we reduce the economic and technology risks inherent with new technologies?

What will be the cost to modify Hawaii's distribution infrastructure to accommodate the various biofuel options?

What are the appropriate incentives to encourage the production of energy feedstocks?

### **Cooperative Research Center for Bioenergy Research and Development**

The University of Hawaii is a member of the multi-university Industry/University Cooperative Research Center (I/UCRC) for Bioenergy Research and Development (CBERD) of the National Science Foundation.

CBERD's mission is to assist the National Science Foundation in achieving the National priority goal of augmenting the petroleum-based economy with renewable energy, chemicals and biomaterials.

Universities participating in the center have identified six research foci, and each of these focus areas are addressed through numerous research projects. The focus of the center

will be on activities that support and extend recent advances made by industrial partners. Additional focus areas will be added as the need for broadening center activities arises.

- Feedstock agronomy and supply
- Feedstock breeding and genomics
- Bioprocessing microbes and enzymes
- Biomass processing
- New platform technologies
- Modeling and Process lifecycle analysis

### **Oceanic Institute and the University of Hawaii**

Work on animal and fish feed is being undertaken by Oceanic Institute and the University of Hawaii. Researchers, with industry partners, are studying food, feed, and other co-products from Hawaii-grown crops and algae production systems.

### **Science Applications International Corporation**

Science Applications International Corp. received a \$25 million contract from the U.S. Department of Defense's Defense Advanced Research Projects Agency (DARPA) for all phases of an algae development program involving industrial and academic organizations from Georgia, Florida, Hawaii and Texas. The project aims to develop a scalable process for the cost-effective, large-scale production of algae oil to be processed into a JP-8 jet fuel surrogate.

### **HR Biopetroleum**

HR Biopetroleum has been working with the Center of Excellence for Research in Ocean Sciences (CEROS), based at the University of Hawaii at Manoa to find microalgae strains that can be used for power generation and also for biodiesel and ground transportation. In 2009, CEROS has expanded HR Biopetroleum's contract to include federal funds from DARPA to research making fuel from microalgae to run military aircraft.

## **3. Dissemination of Energy Feedstock Information to Potential Producers**

HDOA and its attached agency, the Agribusiness Development Corporation, continues to meet with individuals and companies seeking information about state or privately owned agricultural-zoned lands, water, and agricultural labor. During 2009, we have met with seven companies. We have met with 4 of these companies multiple times. DBEDT's Energy Office has been instrumental in initiating these meetings and frequently sends a representative to participate in the meeting.

## **4. Maintain Cognizance of Actions Taken by Government and Industry**

- HDOA is a member of the Hawaii Clean Energy Initiative (HCEI) which is a partnership between the Department of Energy and the State of Hawaii, and is part of the Fuels working group. In addition to the Fuels group, there are three other working groups addressing End-Use Efficiency, Electricity, and Transportation. These groups have met separately and together throughout the year. Collectively, these four groups are tasked with:
  - Benchmarking the current state of clean energy in Hawai'i

- Identifying information gaps
- Identifying structural and technical barriers to reaching the 70% clean energy goal
- Developing strategies for overcoming the barriers.

#### Working Group Achievements:

##### Fuels

- Reviewing results of Black & Veatch biofuels assessment (July 2009)
- Reviewing the results of the bioenergy master plan (July 2009)
- Analyzing and discuss the need for bioenergy legislation
- Participating in a stakeholders workshop (Q3)
- Reviewing the final bioenergy master plan being submitted by DBEDT
- Building strategic partnerships for the research, development, testing, and deployment of renewable biofuels technologies and production of biomass crops
- Staging biofuels demonstration projects, including infrastructure for production, storage, and transport of biofuels
- Evaluating the potential for electricity co-production with biofuel production as a means of reducing project revenue fluctuations
- Communicating the impacts and benefits of a viable agricultural sector for producing food and fuel
- Promoting Hawaii's renewable biofuels resources to potential partners and investors for development in Hawai'i as well as for export
- Working with refiners and refineries to transition from fossil fuels to biofuels.

##### End-Use Efficiency

- Contracted with Booz Allen Hamilton and the National Renewable Energy Laboratory to perform an analysis of new and existing residential buildings and new and existing commercial buildings to determine where the greatest potential for savings exists;
- Launched a new Hawai'i Energy Efficiency Program when newly enacted legislation allowed the Hawai'i Public Utilities Commission to appoint a third-party administrator (who assumed authority in July 2009) to oversee the energy-efficiency programs previously administered by the utility companies.

##### Electricity

- Explore potential for new regulations that support goals and objectives.
- Research and draft legislation.
- Support DBEDT and DOE initiatives and projects.
- Define the purpose of a "smart grid"
- Establish a framework for renewable energy zones, in cooperation with the utilities
- Prepare a master plan which will identify critical activities and projects, and what is required to implement them successfully.

##### Transportation

In May 2009, the Transportation working group submitted a proposal in response to DOE's Clean Cities Solicitation for cost-shared projects that expand the use of

alternative-fuel vehicles and fueling infrastructure as well as advanced technology vehicles. Partners include:

- State of Hawai'i Energy Office (project management, data collection, reporting)
- Honolulu Clean Cities (training and outreach)
- City and County of Honolulu (hybrid bus acquisition)
- Hawaiian Electric (PHEV conversion)
- Maui Electric (PHEV conversion)
- Better Place (electric vehicle charging).

In addition, there is an Integration working group, which is tasked with:

- Reviewing the work of the four technical working groups
  - Identifying areas of overlap or conflict among the recommendations of the groups
  - Combining symbiotic elements to create practical scenarios for moving forward with the work to be done
  - Providing input into a strategy for building broad public support for the Hawai'i Clean Energy Initiative.
- Through Act 110 (HB1628, HD1, SD2, CD1), the Department of Budget and Finance, with the approval of the governor, is authorized to issue special purpose revenue bonds in a total amount not to exceed \$100,000,000, in one or more series, for the purpose of assisting BioEnergy Hawaii, LLC, a Hawaii limited liability company, or a partnership in which BioEnergy Hawaii, LLC, is a general partner, for the establishment of a cogeneration facility and related energy production facilities. BioEnergy Hawaii, LLC, is engaged in the development of a cogeneration facility project that will sell the electric energy it produces to electric utilities serving the public, by processing non-fossil fuel feedstock to produce electricity, and selling thermal fluid from the process of generating electricity to private entrepreneurs.
  - Through Act 111 (HB427, CD1), the Department of Budget and Finance, with the approval of the governor, is authorized to issue special purpose revenue bonds in a total amount not to exceed \$40,000,000, in one or more series, to assist One Planet Pacific Energy, LLC, with the planning, designing, constructing, and equipping of, and the acquisition of lands for, a gasification facility adjoining the construction and demolition material solid waste landfill located in Nanakuli, Oahu, Hawaii.
  - Through Act 112 (HB 1627, CD1), the Department of Budget and Finance, with the approval of the governor, is authorized to issue special purpose revenue bonds in a total amount not to exceed \$40,000,000, in one or more series, for the purpose of assisting Carbon Diversion Inc., or a partnership in which Carbon Diversion Inc., is a general partner, with the establishment of cogeneration and related energy-production facilities at various locations in the state. Carbon Diversion Inc. is engaged in the development of cogeneration facilities that will sell electricity in this manner by processing non-fossil fuel feedstock, using a material reduction process by pressurized pyrolysis and gasification, for direct production of energy-related carbon products and fuels and an indirect production of electricity.



- In March 2009, HDOA participated in a meeting with the Hawaii Cattlemen’s Council and DBEDT to discuss ways in which the State’s food and energy needs can be balanced and which do not create a preference of one over the other in the leasing of State lands. The concern over State leasing practices led to the passage of Act 19 in the 2009 session.
- In May 2009, the Hawaii Biofuels Foundation was registered in Hawaii as a non-profit organization “...to help reduce the consumption, environmental impact, and economic impact of petroleum fuels in the State of Hawaii by stimulating the development of local and sustainable biofuel production. The Corporation will fund, and obtain grants toward the funding of, various initiatives, assessments, research and development projects, and demonstration projects that will support local feedstock production, processing, and use; development and testing of biofuels sustainability standards, and the conservation and restoration of ecosystems affected by biofuel feedstock production.” The Board of Directors is comprised of representatives from HECO, University of Hawaii, Nature Conservancy, Natural Resources Defense Council, the agricultural sector, and a Native Hawaiian cultural practitioner.
- In July 2009, the Department of Business, Economic Development and Tourism in collaboration with the National Renewable Energy Laboratory (NREL) launched a new website – [www.hawaiicleanenergyinitiative.org](http://www.hawaiicleanenergyinitiative.org) – to provide Hawai’i residents and businesses with information on how they can help achieve energy independence for the state.
- In October 2009, Kauai Island Utility Cooperative (KIUC) signed an agreement with Pacific West Energy, LLC (PacWest) for a 20-Megawatt Biomass-to-Energy project to come online by April 2012. The project is to be operated by PacWest, will provide renewable sourced energy for approximately 30 percent of Kauai’s annual electrical use. The next step in the process is a Power Purchase Agreement (PPA), which will require approval by KIUC’s and PacWest’s Boards of Directors and will then be submitted to the Hawai’i Public Utilities Commission. Pacific West Energy still needs to acquire significant acreage for the project.
- In November 2009, Valerie Reed of the U.S. DOE’s Office of Energy Efficiency and Renewable Energy talked about the direction the DOE is taking to accelerate the development of algae-based biofuels at the Pacific Rim Summit on Industrial Biotechnology and Bioenergy held in Honolulu, Hawaii. She said the agency intends to develop advanced biofuels—hydrocarbons and other high-density fuels that can be drop in replacements for diesel and gasoline—in a more accelerated fashion than cellulosic ethanol.

The DOE released a solicitation through the American Recovery and Reinvestment Act of 2009 where \$35 million was dedicated to advanced biofuels and \$50 million to algal biofuels, Reed pointed out.

On the advanced biofuels scale, Reed said the DOE is hoping to accelerate development of hydrocarbons to a five-year time frame to pilot scale demonstration. “For algae, we believe this might be a 10-year time frame, but we’re dedicating real funds to developing these consortia to kick-start our research program,” she said. “The proposals are in our hands, being evaluated by experts, and selections will be announced at the end of December.”

- In December 2009, the U.S. Department of Energy announced that UOP LLC, and Clear Fuels Technology will receive \$25 million and \$23 million respectively to help build plants that convert woody biomass, algae, and agriculture waste into diesel, jet fuel and gasoline. UOP LLC will test biomass feed stocks at the Tesoro refinery in Kapolei while Clear Fuels, a Hawaii based company, will establish a test project in Colorado and conduct some work in Hawaii. In addition to the federal funds, the Clear Fuels project will include a \$13.4 million match in non-federal funds.
- Green Energy Hawaii's project to grow eucalyptus and sweet sorghum and harvest albizia on Kauai for conversion into 6.4 net MW of energy is still proceeding with financing and acquisition of additional land as the major outstanding issues. Once operational, the project is expected to reduce importation of fuel by 3,000,000 gallons of fossil fuel annually and create 39 agricultural jobs.

## **5. Program Limitations**

### Monitoring

Expertise in biofuel processing facilities and appurtenances is not currently available within the department. Without funds to hire staff or to contract for services, HDOA will be unable to monitor the compliance provisions under section 205-4.5(a) (15).

### Staffing

While the Energy Feedstock Program was authorized to employ temporary staff, the Legislature did not provide any funding for the positions in FY 08 or subsequent years. As a result, the Hawaii Department of Agriculture (HDOA) has focused its efforts on maintaining an awareness of actions taken by government and industry and supporting the efforts and activities of the Department of Business, Economic Development and Tourism Energy Resources Coordinator. The HDOA Deputy and Planner are the primary staff working on the Feedstock Program.

### Grant Writing

No federal grants were sought during the reporting period due to lack of funding for staff.