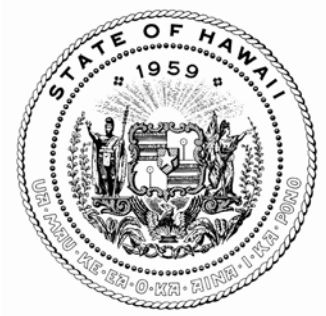


**REPORT TO THE TWENTY-FIFTH LEGISLATURE  
REGULAR SESSION OF 2009**

**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**



**DECEMBER 2008**

## ENERGY FEEDSTOCK PROGRAM

### Annual Report to the Legislature for Calendar Year 2008

#### 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 (revised): Reportable Activities for the period of January 1, 2008-December 31, 2008.**

##### **1. Support legislative measures;**

Act 090, (HB 3179): Amends the definition of "renewable energy producer" to include growers and producers of plant or animal materials used primarily for the production of biofuels or other fuels, so that they will be eligible for direct leases of public land.

Act 145 (SB2849): Permits the use of lands in agricultural land use districts to be used for agricultural-energy facilities provided that the primary activity of the agricultural-energy enterprise is agricultural activity.

Act 208 (HB2505): Establishes a full-time, temporary renewable energy facilitator position within the Department of Business, Economic Development, and Tourism and provides funding from the energy security special fund. Establishes the energy security special fund. Amends uses of the environmental response revolving fund to include deposits to the energy security special fund. Appropriates moneys to the energy security special fund for funding new personnel costs and designated energy program activities.

Act 209 (HB 2261): Provides for lower interest loans from the Department of Agriculture for farm and aquaculture projects that improves the operation's viability but are not directly tied to farm crop production. Projects may include but are not limited to photovoltaic energy, hydroelectric power, wind power generation, methane generation, food safety, product traceability, bio-diesel production, and ethanol production.

**2. Support related research;**

**Black and Veatch**

Black and Veatch was contracted by the Department of Business, Economic Development & Tourism (DBEDT) to prepare a statewide multi-fuel biofuels production assessment. The project is to be completed in mid-2009. The first phase focused on currently available biomass resources in Hawaii in the form of urban, wood, forest products, agricultural residues, and animal wastes. The tables below summarize phase 1 findings. Table 1 summarizes the amount in tons per year of current and potential biomass and biomass residue utilization by county.

**Table 1**

<b>Usage</b>	<b>Hawaii</b>	<b>Maui</b>	<b>Kauai</b>	<b>Honolulu</b>
Current	97,000	309,800	80,000	502,800
Potential	420,190	750,170	221,400	1,632,620

Table 2 summarizes the commercialization status of different fuel technologies.

**Table 2**

<b>Fuel</b>	<b>Conversion Pathway</b>	<b>Commercialization Status</b>
Ethanol	Conventional Fermentation	Commercial
Ethanol	Enzymatic Hydrolysis	Pre-Commercial
Ethanol	Thermo chemical	Pre-Commercial
Biodiesel	Transesterification	Commercial
Renewable Diesel	Fischer-Tropsch	Pre-Commercial
Hydrogen	Methane Reformation	Commercial
Hydrogen	Biomass Gasification	Pre-Commercial
Hydrogen	Microorganisms	Research & Development

Table 3 depicts the Hawaii potential for biofuel production using in-state supplies, assuming no waste is diverted from H-Power. For purposes of this projection, Black and Veatch used a middle number common to both thermo mechanical and biochemical conversion technologies.

**Table 3**

<b>Fuel</b>	<b>Feedstock</b>	<b>Hawaii Potential</b>
Ethanol	Cellulosic wastes	90 million gallons/yr.
Biodiesel	Waste oil	2.0-2.5 million gallons/yr.
Hydrogen	Landfill gas	19,000 m <sup>3</sup> /yr.

Subsequent reports will focus on the amount of biomass and biofuels that could be produced from dedicated energy crops grown in Hawaii.

**College of Tropical Agriculture and Human Resources (CTAHR) Bioenergy Projects**

CTAHR’s energy crop research focuses on oilseed crops for conversion into biodiesel and fiber crops, such as tropical grasses and trees, into ethanol and other transportation fuels. In addition, a team of scientists from CTAHR and the Hawaii Natural Energy Institute (HNEI) are investigating new approaches in feedstock pretreatment and biochemical and thermo chemical conversion of biomass into biofuels and bioproducts.

**Hawaii Agriculture Research Center (HARC)**

HARC continues to work as a sub-contractor on a previously funded project awarded to the University of Hawaii by the Hawaii Department of Agriculture (HDOA) to establish multiple oil crops across microclimate zones of the State. HARC is also expanding the scope of work from a private contract with HECO to further development of various crop species and their associated technologies. These projects are primarily focused on gathering data on useful potential crops and management strategies that may be employed for their wide scale adoption. Specifically, HARC has identified yield potentials for jatropha curcas in early stages of production based on origin of planting material and water usage in leeward sites on former sugarcane lands. HARC is also working to determine the viability of crops such as kukui and moringa for Hawaii lands.

In 2008, HARC worked with Sandia National Laboratory to develop a production model for multiple oil crops for each island in response to the Department of Defense’ DARPA program announcement seeking to develop military grade jet-fuel (JP-8) from bio-sources. This model isolated multiple land areas on each island and assigned production potentials based on infrastructure in place, historic yields (where possible), climate zones, attitudes of land owners, and other factors that could enhance or limit long-term productivity. By integrating GIS datasets and Systems Dynamics models, the Sandia team has pieced together multi-faceted programs that can show the inter-relationships between government-sponsored policies and incentives, development of co-product markets, volatility in world petroleum and vegetable oil markets, and other macro- and micro-economic issues to develop a multi-variable program to assess the ability of Hawaii to produce a portion of its own jet-fuel (and possibly green diesel).

### **3. Disseminate energy feedstock information to potential producers through HDOA website and networking;**

- The Hawaii Department of Agriculture has established a placement on its departmental website ([www.hawaii.gov/hdoa](http://www.hawaii.gov/hdoa)) that includes a link to DBEDT's State Energy Office and copies of its annual energy feedstock reports.
- DBEDT continues to refer individuals and companies seeking information about state or privately owned agricultural-zoned lands, water, and agricultural labor to HDOA. With the increased interest in public lands for energy crop production, some of which are currently leased to food producers, there is a need for DBEDT to more clearly inform the referrals of the value of working with the Department of Land and Natural Resources to contact any affected parties in the early stages of their enquiries about specific, currently leased, public lands.

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

- On January 31, 2008, Governor Lingle signed a Memorandum of Understanding with The U.S. Department of Energy the Hawaii-DOE Clean Energy Initiative. The goal is to decrease energy demand and accelerate use of renewable, indigenous energy resources in Hawaii in residential, building, industrial, utility, and transportation end-use sectors, so that efficient and renewable, i.e. "clean" energy resources will be sufficient to meet 70% of Hawaii's energy demand by 2030.

As part of this initiative, technical working groups were formed around the topics of Transportation, Electric Generation, End Use Efficiency, and Energy Delivery. HDOA is participating in the Transportation working group, which also has biofuel production within its scope. In addition to HDOA and DBEDT, the Transportation working group is comprised of Aloha Petroleum, Hawaiian Commercial and Sugar Co., Gay & Robinson Sugar Co., Pacific Biodiesel, Imperium Renewables Hawaii, Oahu Metropolitan Planning Organization, Kamehameha Schools, Maui Electric Co., Hawaii Agriculture Research Center and Mid Pac Petroleum. The Hawaii Clean Energy Initiative working groups have been assisted by the Washington D.C. office of Booz Allen Hamilton which has analyzed various scenarios for their effectiveness in moving Hawaii towards the objective of 70% clean energy. The legislative measures proposed for consideration during the 2009 Legislative session focus primarily on the electricity sector, with some energy diversification, fuel flexibility, infrastructure, and planning measures in the transportation sector.

Potential policies in the biofuels and bioenergy production area will be evaluated further during 2009 in conjunction with the bioenergy master plan effort, and proposed for consideration in the 2010 legislative session.

- In February 2008, Hamakua Biomass Energy LLC was formed to use the 13,000 acres of eucalyptus trees planted in the 1990's to generate up to 30 megawatts of power to sell to Hawaii Electric Light Co. Some of the wood will be used to produce veneer. The company expects to be operational by the end of 2010 or early 2011.
- The kickoff Meeting for the Development of the Bioenergy Master Plan (created by Act 253, SLH 2007) was held in the State Capitol Auditorium on May 21, 2008. The event was open to the public; over 200 attended. Proceedings are available on-line: <http://hawaii.gov/dbedt/info/energy/renewable/bioenergy/kickoff>. The Bioenergy Master Plan is to be completed by December 2009.

- In May 2008 the Board of Land and Natural Resources approved the use of 1,000 acres of land in Kalepa, Kauai by Green Energy Hawaii under a co-existence plan with State permittees. The Kaua'i-based company will use gasification technology to convert albizia and other wood chips grown on these and other lands into as much as 6.4 megawatts of power that will be sold to HELCO.
- In May 2008 groundbreaking for a new 110 MW simple cycle combustion turbine generating unit at Campbell Industrial Park was held. Plans are for the 100% biofueled unit to be operational in 2009.
- In July 2008, HR BioPetroleum, Alexander & Baldwin, Hawaiian Electric and Maui Electric announced that they will jointly develop an algae facility for production of biodiesel and other products, such as animal feed, on Maui. The first phase of the commercial facility could be in operation by 2011.
- In August 2008, Imperium Renewables announced that it will be closing its Honolulu office. Due to the uncertain economic climate, Imperium had cancelled a planned initial public offering which was intended to raise capital for projects in Hawaii and elsewhere.
- In August 2008, Hu Honua announced plans to construct a 24-megawatt biomass power plant on the Big Island at the former location of the Hilo Coast Processing Company sugar mill.
- In August 2008, the Hawaii County Economic Opportunity Council announced that it plans to use research from a recently completed 10-month project as the basis for a new company to mass-produce and sell jatropha plant seedlings; a patent is pending.

The organization does not have a timeline in place to launch the spinoff venture, but is meeting with potential investors. The Hilo research project found 40 strains of jatropha that could produce four to five times more seeds than average plants. The group's cloning process would be used to target these high-yield strains. The project was funded in part through two federal grants totaling approximately \$1.4 million.

- In September 2008, Hawaii Bioenergy announced intentions to develop a variety of renewable energy projects, including an integrated biorefinery to incorporate new processes and novel feedstocks to produce a range of high value products for the Hawaii market.
- In September 2008, DBEDT and HDOA partnered with the U.S. Department of Energy, Hawaii Natural Energy Institute, College of Tropical Agriculture and Human Resources, and the Hawaii Agriculture Research Center to present a workshop, in conjunction with the Hawaii Agriculture Conference, on the Hawaii Bioenergy Master Plan, which was created by Act 253, SLH 2007.
- In September 2008, Hawaiian Electric Company filed its Integrated Resources Plan for 2009-2028 with the Public Utilities Commission. The Preferred Plan proposes that all future generation on Oahu be renewable, and that existing Hawaiian Electric-owned generating units shall co-fire biofuel.
- In October 2008, the Transportation Working Group met with representatives of Booz Allen Hamilton to discuss recommendations for future legislation.

- In October 2008, Tradewinds Forest Products received an air permit for a wood products and 3.3 megawatt power production facility on the Big Island.
- In October 2008, Governor Linda Lingle announced a comprehensive agreement bringing together the Department of Business, Economic Development and Tourism, the State Consumer Advocate, and the Hawaiian Electric companies to move Hawai'i toward having 70 percent of its energy use come from clean energy sources by 2030.

Major highlights of the agreement relating to feedstock include:

- Hawaii Electric Utilities has made a commitment to convert existing fossil fuel generators to renewable biofuels;
  - Hawaii Electric Utilities will procure sustainably-produced biofuels in accordance with its NRDC environmental sourcing policy. The parties agree in principle that paying a reasonable cost premium to ensure sustainability is acceptable;
  - Hawaiian Electric Utilities will preferentially purchase biofuels that are locally grown and produced in Hawaii. The parties agree in principle that paying a reasonable cost premium for locally-produced biofuels is acceptable.
- In November 2008, SunFuels Hawaii LLC announced that it is seeking leases of up to 37,000 acres of state and private land on the Big Island to grow eucalyptus or other biomass in order to annually produce 11-13 million gallons of biodiesel. The project would require the building of a refinery on 25-30 acres and employ 120-130 people with another 60 people involved in the planting and harvesting of trees. The company owns the conversion technology and claims that the refinery will be capable of producing diesel as well as jet aviation fuel in eight to ten years if the lands are secured.
  - The Defense Advanced Research Projects Agency is funding several research projects on the production of jet fuel from algae and oilseeds available in Hawaii. Participating Hawaii companies and research organizations include Hawaii BioEnergy, Hawaii Agriculture Research Center, and SAIC.
  - HDOA will be working closely with DLNR and DBEDT in the future to ensure a balance between food and energy producers. Applicants for state lands for energy purposes that have appeared before the Board of Land and Natural Resources in 2008 have failed to consult with the current users of the lands, primarily ranchers. This has caused uncertainty, anger, and fear among the current lessees and in the long-run, needlessly complicates matters for the applicants.

### **On-Going Biofuel-Related Projects**

- Cellana, a joint venture formed by Royal Dutch Shell and HR Biopetroleum, is constructing a demonstration algae production facility at the Natural Energy Laboratory of Hawaii. The algae will be used for the production of biofuels and other valuable products.
- Honua Waste-to-energy, 6 MW, at Campbell Industrial Park website: <http://www.honuatech.com/>.
- City & County of Honolulu waste-to-energy, 21 MW at Campbell Industrial Park. In January 2008, the City and County announced plans to build a new waste-to-energy facility and instead decided to add a third boiler by 2011.

- Pulehu, Maui 5.5 MW biomass project involves the gasification of dead and fallen timber into burnable gas in a downdraft gasifier.
- MECO and Hawaiian Commercial and Sugar Company (HC&S) continue their year-to-year agreement whereby HC&S provides bagasse and hydroelectric generated energy to Maui's electrical grid.

## **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.