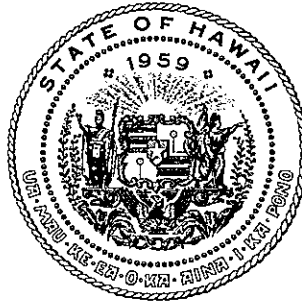


**REPORT TO THE TWENTY-SIXTH LEGISLATURE  
2011 REGULAR SESSION**

**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**

**NOVEMBER 2010**

## ENERGY FEEDSTOCK PROGRAM

### Annual Report to the Legislature for Calendar Year 2010

#### 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, 2010-December 31, 2010.**

The level of activity and interest in production of Hawaii grown energy feedstock crops increased significantly in 2010. Currently, we are aware of energy feedstock research and commercialization efforts taking place on Oahu (2), Kauai (2), Maui (2), and Hawaii (12).

Jatropha and algae appear to be the leading crop/feedstock being explored at this time. Studies point out that in order to meet HECO's need for 215 MG of biofuel per year, 1.1 million acres of land planted in jatropha would be required which is 358% of Hawaii cropland while algae's land needs range from 43,000 acres or 14% of Hawaii's cropland to 215,000 acres which represents 72% of the assumed 300,000 acres of Hawaii cropland. This does not include the U.S. Pacific Command's goal of 20 MG of locally produced biofuel to meet 25% of its jet fuel needs.

While we currently import approximately 90% of our fuel, we also import approximately the same percentage of food. It is critically important that we reduce the percentage of imports in both categories and the attraction of advanced biofuels is that they enhance the opportunity to do so while making better use of our land and water resources.

We are very encouraged by reports of companies using marginal lands and brackish water to grow algae as a feedstock. We are excited by the prospect of by products that can reduce our feed and fertilizer imports and help to reinvigorate our livestock industry and to give a boost to our expanding aquaculture industry. We are particularly attracted to the partnerships that at least some of the biofuel companies have proposed to share in the repair and maintenance costs of irrigation systems and to make available energy produced through renewable means to local farmers.

Farmers in general will benefit when a locally produced fuel source is available so that they are less subject to the fluctuation of world oil prices and the impact it has on all of the petroleum based inputs. For some, there will be an opportunity to form working relationships with the larger producers similar to those formed between farmers and the seed industry. For others, technological advances in small scale, appropriately sized alternative energy units will enable farmers to reduce costs and become more energy independent.

In 2010, dialogue continued between the food and fuel sectors though much remains to be done to demonstrate the benefits that the energy sector can bring to the operations of the existing farmers and ranchers. Allaying the fears over displacement of farmers and ranchers from leased lands and increased competition for water and labor must be high priorities for energy producers. The next few years must see a higher level of outreach and accelerated investment into the feed by-products which provide real incentive for the two sectors to cooperate.

It is absolutely critical that all of agriculture work together. We have common interests in seeing agricultural lands protected and particularly Important Agricultural Lands; in the fair and equitable use of water and to have this fairness reflected in the water code; in increasing the number and productivity of farmers by strengthening the agricultural education program in the public and private schools, and in addressing the challenging issue of farm labor.

## **1. Related Legislative Measures Enacted in 2010**

### SB2357 SD2 HD1

Requires gas utility companies to annually report to the public utilities commission information on the use of renewable energy resources. Defines feedstock, total feedstock, and non-petroleum feedstock.

### HB 2421, HD2, SD 2, CD 1

Establishes various initiatives to promote economic development for local food and energy businesses, ensures Hawaii is energy and food self-sufficient and sustainable to the maximum extent feasible, and helps Hawaii's natural resources and humankind adapt and be resilient to the inevitable challenges brought on by climate change. Increases and changes the name of the environmental response tax to the Environmental Response, Energy, and Food Security Tax, and repeals the tax on June 30, 2015 and reenacts portions of the Act.

HB 2450, HD 1, SD 2, CD1

Clarifies that the exemption from subdivision requirements for leases and easements for renewable energy facilities applies to renewable energy facilities on agricultural land approved by the Land Use Commission and county planning commissions, and renewable energy facilities on conservation land permitted by the Board of Land and Natural Resources.

SB 2563, SD 1, HD 2, CD1

Authorizes the director of business, economic development, and tourism to impose and collect fees for the administration of the solar water heater system variances. Sets the goal of using alternative fuels to meet 30 per cent of highway fuel demand by 2030.

**2. Related research (representative examples)**

<b>Company</b>	<b>Feedstock Interest</b>
Big Island Biodiesel	Jatropha
Big Island Carbon	Mac nut shells as carbon filter and oils;
Cellana	Animal feed as a by-product of marine algae;
ClearFuels	Jatropha;
Fuels Alternatives Pacific	Jatropha;
HARC	Jatropha, moringa, soy beans, local palm, kukui nut;
Hawaii BioEnergy	Sugarcane, woody biomass, algae;
Hawaii Pure Plant Oil	Jatropha;
HC&S	Algae, sugar cane, sweet sorghum, and jatropha;
HR Biopetroleum	Algal oils and using the biomass-by product as fish food;
Kauai Farm Fuel Biodiesel	Waste vegetable oil;
Oceanic Institute	Animal and fish feed from Hawaii-grown crops and algae production systems;
Pacific Biodiesel	Jatropha, sunflower;
Phycal	Algae biomass by-product for animal feed. Cultivation of sweet potatoes for use as feedstock for algae;
USDA Pacific Basin	Feedstock from Hamakua coast to develop biofuels, Agriculture Research Center feed, and fertilizers;

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

HDOA and its attached agency, the Agribusiness Development Corporation, continues to provide information about state or privately owned agriculture-zoned lands, water, and agricultural labor to individuals and companies. During 2010, more than 35 energy-related companies have made enquires to the department. Much of the increase can be attributed to the interest generated by the HECO RFP and the Defense Logistics Agency-Energy (DLA) RFI which sought to identify quantities and types of renewable fuels meeting HECO and DLA specifications.

In addition to questions about land and water, the department also receives questions about types of fuel crops that are allowed to be imported into Hawaii for cultivation. The following response to a company inquiring about impact restrictions for jatropha is illustrative of the factors the department has to consider in order to protect Hawaii agriculture:

“Thank you for your inquiry regarding the development of a *Jatropha* plantation in Hawaii. I assume you are referring to *Jatropha curcas*, which is the species that is commonly grown for biofuel.

The Hawaii Department of Agriculture restricts the entry of plants that are listed in our Plant Import Rules (Chapter 4-70, Hawaii Administrative Rules) or those listed as noxious weeds in our Noxious Weed Rules (Chapter 4-68, Hawaii Administrative Rules). *Jatropha curcas* is not currently listed in either chapter and therefore is not restricted or regulated by the Hawaii Department of Agriculture. As long as imported plant material meets our entry requirements for pests, soil contaminants, etc., we would not have a regulatory role in the establishment of this plantation. This species is also not listed on the Federal Noxious Weed List.

However, *Jatropha curcas* is considered an invasive species in many places throughout the world and is considered a noxious weed in “A Global Compendium of Weeds”. The potential invasiveness of this species has been assessed by the University of Hawaii in a Weed Risk Analysis that they developed. They determined it to have a high risk of being an invasive species. As such, there are differences of opinion in Hawaii on the risk imposed by growing this plant in the State. If this species should ever become prohibited by rule or statute in the future because of its noxious tendencies, regulatory actions would be dependent on the language of the future rule or statute.”

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

In January, USDA Secretary Thomas Vilsack and Secretary of the Navy Ray Mabus signed an MOU to jointly support the development of domestically produced biomass and biofuels that would be used to lessen dependence on foreign sources and demonstrate that Navy and Marine Corps ships and aircraft could be powered by non-fossil fuels by 2016. The USDA would support this effort by making research and business incentives available while the Navy and other branches of the military would provide a demand for up to 80 million gallons of biofuel per year.

In February, Big Island Biodiesel, LLC, was selected to receive a \$5,000,000 loan guarantee through First Hawaiian Bank in Kahului to construct a \$10 million, 2.64 million gallon per year biodiesel production plant in Keaau. The feedstock for this biodiesel plant will primarily be used cooking oil, and potentially jatropha and algae. More than one million gallons of used cooking oil and grease-trap oil will be diverted from Maui, Oahu, and Hawaii County landfills to produce the biodiesel.

In March, HDOA was briefed by Pacific Command Green Initiative for Fuels Transition (PACOM GIFTPAC) which has the following objectives:

- 1) Long-term contract by DLA-Energy for multi-year stable-price supply of locally-produced *non-fossil sustainable* MILSPEC fuel to displace at least 25% of DOD *petroleum-based fuel in Hawaii*; corresponding purchase contracts of renewable/green electricity derived from co-products of fuel process.
- 2) Enterprise model inclusive of the local energy market that incorporates the agricultural, energy, environmental, government, industrial, and commercial sustainability objectives.
- 3) End state with sustainable ongoing competition between multiple commercial entities at multiple levels.

The Department of Defense in Hawaii uses approximately 78 MGY of JP8 and 7 MGY of JP5 and 42 MGY of marine diesel. The GIFTPAC biofuels project was formed to reduce security vulnerabilities by providing fuel from shorter and more diverse supply lines. GIFTPAC intends to also use the opportunity of establishing a new industry to develop more predictable fuel prices for the Department of Defense operating budget. GIFTPAC has a goal of 25% of the Navy's jet fuel needs in Hawaii being met by 3<sup>rd</sup> generation drop-in replacement fuels produced in Hawaii (20 MGY).

In April, the Hawaii Renewable Energy and Biofuel Industry Forum was held at Kaneohe Marine Corps Base. The Forum attracted approximately 300 people including the HDOA Chairperson and Deputy and other senior managers, other state, federal and county government officials, biofuel company scientists and executives, environmentalists, legislators, researchers, and representatives of sectors of the agriculture industry. Kathleen Merrigan, U.S.D.A. Deputy Secretary attended the conference as did Jackalynne Pfannenstiel, Assistant Secretary of the Navy for Energy, Installations, and Environment.

In April, HC&S received notice that they will be the beneficiary of at least \$4 million to support research on energy crop development and conversion technologies to be conducted by CTAHR and crop and technology assessments directed by the USDA. The funding will be provided by the Department of Energy and the Office of Naval Research.

In April, Hawaiian Electric Company (HECO) issued a Request for Proposal which they expected will lead to a long-term supply of biofuels made from feedstocks grown and processed within Hawaii. HECO's clean energy goals are:

- 70% clean energy by 2030
- 10% of net electricity sales by 2010
- 15% of net electricity sales by 2015

25% of net electricity sales by 2020  
40% of net electricity sales by 2030

- Energy security
- Independence from fossil fuels

In June, DLA issued their Request for Information seeking vendors that were interested in working with DOD to achieve a 25% renewable fuel goal in Hawaii.

In July, Phycal Hawaii announced that they have been awarded a grant from the U.S. Department of Energy in the amount of \$24,243,509 to design and build a CO<sub>2</sub>-to-algae-to-biofuels facility near Wahiawa.

In August, the second-annual Asia Pacific Clean Energy Summit and Expo was convened at the Hawaii Convention Center. Approximately 1,200 people including staff from HDOA participated in the 3-day event. Bioenergy sessions were well attended and representatives of companies and research organizations provided updates and insights into recent technological and commercial developments. Companies/organizations represented on session panels included:

- HC&S
- Cellana,
- US PACOM GIFTPAC
- Hawaii Bioenergy LLC
- Phycal
- ClearFuels
- Pacific Biodiesel
- Kuehnle Agrosystems, Inc.
- UOP, Honeywell

In September, the Agribusiness Development Corporation agreed to lease approximately 1,200 acres in Kekaha, Kauai to Pacific Light and Power (PLP). PLP plans to develop three power generation facilities on Kauai; a hydroelectric project, a 10 MW solar-thermal project and a biogas-fired power plant which will be located on the ADC lands. The bio-gas will be produced in an anaerobic biodigester using wild and cultivated grasses and pig slurry. The project addresses a long-standing problem of pig waste and as a result has encouraged plans for expansion of swine production on Kauai. There is a great deal of interest in a permanent or mobile slaughterhouse on Kauai and the biodigester provides a means to utilize slaughterhouse waste which is a major consideration of government regulatory agencies as well as slaughterhouse operators.

In September, the Hawaii Agriculture Conference featured a number of sessions throughout the entire second day of the conference discussing the emergence of the Hawaii biomass/bioenergy industry and its relevance to the agriculture industry. Organizations that sent representatives to present remarks during the sessions included:

- USDA Farm Service Agency
- USDA Rural Development
- Department of Agriculture
- Hawaii State Senate
- Office of Planning
- Ed Olson Trust

- Department of the Navy
- Department of Business, Economic Development, and Tourism
- Hawaiian Electric Co.
- College of Tropical Agriculture and Human Resources
- Hawaii Department of Agriculture
- HC&S
- Hawaii Bioenergy, LLC
- USDA Pacific Basin Agriculture Research Center
- USDA Natural Resource Conservation Service
- U.S. Department of Energy

In September, Big Island Carbon announced that it will receive a \$5 million loan guarantee to enable it to complete construction of a \$25 million manufacturing plant located in Kawaihae. The plant will convert 10,000 tons of macadamia nut shells annually into granular activated carbon which is used in hybrid car power units and by the chemical and pharmaceutical industries.

HDOA is a member of the Hawaii Clean Energy Initiative (HCEI) 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.

HCEI is in the process of refining its 2010-2030 Roadmap. In the period of 2010-2015, the Fuels group has preliminarily identified the following agriculture-related items as part of the critical path:

- Conduct key food/feedstock pilots to determine optimal mix of crops vs. bi-products, as well as optimal business model to lower costs as much as possible;
- Evaluate logistics and infrastructure costs and structures, focusing on generating economies of scale at the feedstock production, transport, and pre-processing stages of the supply chain;
- Identify and preserve as many important agricultural (or potential algae) lands as possible, along with any relevant water rights for future feedstock production;
- Train and develop workforce to handle feedstock production and supply chain logistics.

In the period of 2016-2020, the Fuels group has preliminarily identified the following agriculture-related item as part of the critical path:

- Ramp up biocrop production on domestic agriculture lands. Target is to produce feedstock for at least 150 MGY of domestically produced green drop-in replacement fuels.



## 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 Office, working with the U.S. Navy and U.S.D.A. as they implement their MOU to jointly develop biofuels, and actively participating in various conferences and meetings held in 2010 to advance biofuel production in Hawaii. The HDOA Deputy and Planner are the primary staff working on the Feedstock Program. The Chairperson continues to meet with various companies interested in using state agricultural lands and water resources for biofuel production and serves on the Hawaii Clean Energy Initiative Steering Committee and the Hawaii Economic Task Force, which focuses on Food and Energy Security. HDOA is especially interested in developments in by-products from biofuel production that can be used to replace imported animal and fish feed and fertilizer.

The department expects to seek funding through the Agricultural Development and Food Security Special Fund to engage a senior-level agriculture resource planner to take primary responsibility for addressing issues that are of common interest to both food and fuel producers, (i.e. land and water), grant writing, funding research to accelerate the development and commercialization of feed and fertilizers from biofuel production, and monitoring the compliance provisions under section 205-4.5(a)(15).

### Grant Writing:

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