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Governor

JOSH GREEN
Lt. Governor

SCOTT E. ENRIGHT
Chairperson, Board of Agriculture

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December 27, 2018

The Honorable Ronald D. Kouchi,
President and Member of the Senate
Thirtieth State Legislature
State Capitol, Room 409
Honolulu, HI 96813

The Honorable Scott K. Saiki,
Speaker and Member of the House of Representatives
Thirtieth State Legislature
State Capitol, Room 431
Honolulu, HI 96813

Dear President Kouchi, Speaker Saiki, and Members of the Legislature:

For your information and consideration, I am transmitting a copy of the Report on the State's Progress Toward Meeting the Milestones and Objectives of the Energy Feedstock Program as required by Act 159, SLH 2007. In accordance with Section 93-16, Hawaii Revised Statutes, I am also informing you that the report may be viewed electronically at http://hdoa.hawaii.gov/.

Sincerely,

Scott E. Enright, Chairperson
Board of Agriculture

Enclosures

REPORT TO THE THIRTIETH LEGISLATURE
2019 REGULAR SESSION
STATE OF HAWAII

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

ACT 159, SESSION LAWS OF HAWAII 2007

Prepared by:

THE STATE OF HAWAII
DEPARTMENT OF AGRICULTURE

DECEMBER 2018

ENERGY FEEDSTOCK PROGRAM

Annual Report to the Legislature for Calendar Year 2017

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, 2017-December 31, 2017.

While we currently import approximately 90% of our fuel, we also import approximately the same percentage of food. Renewable energy development in the form of energy feedstock production is essential to Hawaii's energy security, but it should be promoted in a manner that protects the prime agricultural land that is fundamental to agricultural production and food security. Farmers in general will benefit when a locally produced fuel source is available so that

they are less subject to fluctuation of world oil prices and the impact it has on petroleum-based inputs.

It is also important to note that special use permits for solar energy facilities on land designated as “agriculture” have been increasing over the past several years. While not considered “energy feedstock” solar energy facilities serve a similar purpose; however, solar energy facilities cannot easily be converted to food production. For the purposes of this report, solar energy legislation will also be included as a part of the discussion.

It is critical that all of agriculture work together. We have common interests in seeing agricultural lands protected and particularly lands designated as 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 programs in public and private schools, and in addressing the challenging issue of farm labor.

This report is in five sections. Part 1 of the report discusses relevant legislative measures related to energy feedstock production. Part 2 discusses related research in the field of energy feedstock production. Part 3 discusses the dissemination of energy feedstock production to potential producers. Part 4 discusses actions taken by the government and industry that affects energy feedstock production. Part 5 discusses program limitations.

1. Related Legislative Measures Enacted in 2017.

Act 5. On or before January 1, 2020, requires the PUC to establish performance incentive and penalty mechanisms that directly tie electric utility revenues to the utility's achievement on performance metrics. Exempts member-owned cooperative electric utilities. Effective 7/1/2018. (SB 29369 SD2)

Act 15. Renames the Carbon Farming Task Force established by Act 33, Session Laws of Hawaii 2017, as the Greenhouse Gas Sequestration Task Force and makes the task force and Hawaii Climate Change Mitigation and Adaptation Initiative permanent. Aligns the State's clean energy and carbon sequestration efforts with climate initiative goals. Amends membership and duties of the Task Force. Establishes a zero emissions clean economy target for the State. Makes an appropriation. (HB 2182 HD2 SD2 CD1)

Act 67. Authorizes the Hawaii Technology Development Corporation to provide fifty per cent matching grants to Hawaii awardees of alternative energy research grants from the United States Department of Defense, Office of Naval Research. Makes appropriations. (HB 2075 HD2 SD1 CD1)

Act 121. Creates a revolving line of credit sub-fund within the Hawaii green infrastructure special fund for a state agency to finance cost-effective energy-efficiency measures. (HB 1508 HD2 SD2 CD1)

Act 200. Directs the Public Utilities Commission to establish a microgrid services tariff to encourage and facilitate the development and use of energy resilient microgrids. Takes effect on 7/1/2018. (HB 2110 HD2 SD2)

2. Related Research.

Hawaii Department of Agriculture

HDOA's Aquaculture and Livestock Support Services branch is working with the Agribusiness Development Corporation (ADC), in collaboration with the United States Department of Agriculture, to identify waste streams that have feed or fertilizer potential.

The ADC received a total of $4.5 million from the Legislature for the zero-waste conversion project in Keaau, Hawaii to develop a demonstration facility where researchers will use heterotrophic algae/fungi to convert papaya waste into oil and feed products. It is estimated that the Hawaii papaya industry produces approximately 15 million pounds of papaya annually that cannot be sold as fresh produce because of blemishes and other deformities and insect infestations.

Upon completion, this facility will provide farmers with the opportunity to earn additional income from the waste portions of their crops in the form of feedstock, which can be converted into oil for fuel and high protein feed for livestock. More importantly, the research on the zero-waste concept will be able to continue and could potentially be applied to other fruit and vegetable crops across the state.

To expedite the development and research, ADC entered in a Memorandum of Understanding with Pacific Biodiesel Technologies ("PBT") to establish a temporary demonstration facility at PBT's Big Island Biodiesel site where the specialized equipment is currently being modified and assembled. To date, the ADC has begun preliminary test trials on the equipment at the Big Island Biodiesel site. A total of $3 million was expended to purchase the equipment; acquire a 1.5-acre parcel of land in the W.H. Shipman Business Park and complete the plans and design of the Zero Waste Facility. The ADC put out a solicitation on the State Procurement Office's HIePRO website for the construction phase and was unable to obtain any bids. As a result, the remaining $1.5 million that was allotted for the construction of the Zero Waste Facility lapsed on June 30, 2018.

On Kauai, Green Energy Team (GET) continues operating its 7.5MWe biomass to energy facility. GET has harvested over 2,400 acres of invasive Albizia trees on land managed by the Agribusiness Development Corporation in Kalepa, Kauai and on other privately held lands and planted 2,000 acres of non-invasive hardwoods on the Kalepa and other lands to insure its long-term fuel supply. GET leases 1,123 acres on Kalepa. GET has a 20 + 10-year power sales

agreement with the Kauai Island Utility Cooperative (KIUC), KIUC purchases Firm, Dispatchable Capacity and energy from GET to cover 12% of the Kauai's base load.

College of Tropical Agriculture and Human Resource

Project 1: Nutritional Evaluation of Forages and Other Fiber Sources

The project was financially supported by the Daniel K. Inouye U.S. Pacific Basin Agricultural Research Center of USDA (Hilo, Hawaii).

Dr. Rajesh Jha of the College of Tropical Agriculture and Human Resources, University of Hawaii at Manoa

Hawaii livestock industry is facing a big challenge to sustain due to very high feed cost as it is not suitable to grow conventional feedstuffs in Hawaii. Thus, it has to depend on imported feed which adds extra burden of shipment cost. To address this critical problem, efforts have been made to evaluate local feedstuffs/byproducts as potential alternative feedstuffs for animal feeding in Hawaii. As a part of the program. Different local feedstuffs (Macadamia nut cake, cassava roots, chips and silage, moringa leaves, bread fruit and microalgae) were evaluated for their different nutritional properties in different animals. The information generated form the project has provided detailed nutrient profile (dry matter, ash, crude protein, crude fat, acid detergent fiber, neutral detergent fiber, non-starch polysaccharides, amino acids and starch content) of the feedstuffs. Also, we were able to determine the in vitro digestibility of nutrients in swine and AME of the feedstuffs (macadamia nut cake and cassava chips) in broiler chicken. These data have provided sufficient information to utilize these local feedstuffs in animal ration formulation. Utilizing these information, a growth performance trial of broiler chicken was conducted. Which further confirmed that macadamia nut cake and cassava root chips can be fed to broiler chicken up to 15% and 25%, respectively without any adverse effect on growth performance of chicken. On the other hand, the macadamia nut cake which was being shifted to landfill can be used in animal feeding program, will reduce environmental burden which is another big concern in this Island state. Also, the study with tilapia fed cassava root chips indicated that cassava chips can be fed up to 26.5% to tilapia fish without any detrimental effects. Similarly, a growth performance trail with microalgae as replacement of fish meal and fish oil was conducted. Preliminary results from the study shows that micro algae can replace up to 75% fish meal and fish oil without any negative effects on growth performance of tilapia. Also, the cassava chips and micro algae inclusion in tilapia diets affects the gut microbiota positively. Utilizing the local agricultural products and byproducts will certainly help in reducing the feed cost directly and growing healthy animals.

Four seminars were presented to farmers and stakeholders in Hawaii (Oahu and Big Island) to share the outcomes of the studies. Also, information was shared with farmers over phone and via HNFAS Extension Agents. As a result, some farmers have started using some of the local feedstuffs in their animal feeding program. As a part of information dissemination, we presented the findings in different national/ international meetings. One poster was presented in the 18th International Symposium on Fish Nutrition and Feeding held in Las Palmas de Gran Canaria, Spain, from June 3 to 7, 2018. Two poster presentations were made in the Annual Meeting of Poultry Science Association (July 23-26, 2018, San Antonio, TX). Two poster presentations were made in the Annual Meeting of Poultry Science Association (July 17-20, 2017, Orlando, FL). An oral presentation was made in International Symposium on Fish Nutrition and Feeding (June 5-10, 2016, Sun Valley, ID) and 4 oral and poster presentations was made in the Annual Meeting of Poultry Science Association (July 11-14, 2016, New Orleans, LO) and Joint Annual meeting of ASAS-ADSA-CSAS-WSASAS (July 19-23, 2016, Salt Lake City, UT).

Project 2: High-yielding Bioenergy Feedstock Production, Characterization and Pretreatment for Bioenergy Production

The project was financially supported by the Daniel K. Inouye U.S. Pacific Basin Agricultural Research Center of USDA (Hilo, Hawaii).

Dr. Samir Khanal of the College of Tropical Agriculture and Human Resources, University of Hawaii at Manoa

This study successfully yielded valuable insights on efficient use of high-yielding tropical energy crop for producing biofuel and biobased products with much broader applications to the U.S. agriculture sector and beyond. The hydrothermal pretreatment of the biomass was optimized for enhanced anaerobic digestibility and ultimately enhanced biomethane yield. Anaerobic digestion of the pretreated biomass was optimized for the organic loading rate for enhanced biomethane yield and bioreactor stability. A model high-yielding tropical energy crop, Napier grass (*Pennisetum purpuream*), was characterized for its composition including ash, neutral detergent fiber (NDF), acid detergent fiber (ADF), acid detergent lignin (ADL), cellulose, hemicellulose and ash-free extractives.

Project 3: Waste Papaya Seed Oil as Emerging Feedstock for Producing Animal Feed and Biofuel

The project was financially supported by the Daniel K. Inouye U.S. Pacific Basin Agricultural Research Center of USDA (Hilo, Hawaii).

Dr. Winston Su of the College of Tropical Agriculture and Human Resources, University of Hawaii at Manoa

This project identifies waste papaya seed oil, an abundant and largely untapped regional agricultural byproduct, as a promising carbon feedstock, and seeks to develop a technology to biologically convert this regional agro-waste, using a unique oleaginous yeast, into high-value products, in an effort to valorize papaya culls.

During the initial phase of this project, we showed that soaking papaya seeds in ethanol for 4 days prior to oil extraction was effective in lowering toxic metabolite benzyl isothiocyanate (BITC) levels in extracted oil and allowed the oil to be used for culturing oleaginous yeast Yarrowia lipolytica. This detoxification approach was aimed at destroying the enzyme myrosinase in the seeds to block BITC formation. As the time it takes to detoxify the seeds by soaking in ethanol is quite long, we researched additional ways to produce papaya seed oil with low BITC. Importantly, we discovered that by avoiding freezing the papaya seeds prior to drying and oil extraction, the oil extracted contained essentially no toxic BITC. We believe the formation of large ice crystals during the freezing process alters the internal membrane compartmentalization of the papaya seeds and brings about considerable tissue disruption in the seeds, bringing together benzyl glucosinolate (BG) and myrosinase to generate BITC. Afterwards, as BITC was confined in the seeds, it could not efficiently evaporate during drying, and being lipophilic it ended up in the oil extracted from the seeds. To test this hypothesis, oil was prepared by extracting seeds that were not previously frozen, but rather refrigerated at 4°C during storage. These seeds were then dried at either 40° or 50°C for 24 or 48 hours in a gravity convection oven. For the refrigerated seeds, drying at 40°C for 48 hours, or at 50°C for 24 hours was sufficient to bring the seed oil BITC concentration below 1 mM. In culture media supplemented with 4% oil, the BITC concentration per culture media would be less than 0.04 mM which should allow active growth of Y. lipolytica, based on BITC toxicity data collected earlier. This was then confirmed based on three-day grow-out experiments. Therefore, a key to prevent high levels of BITC in the extracted seed oil is to avoid damages to seed internal cellular structures which can cause otherwise segregated BG and myrosinase to react and generate BITC. To this end, freezing of fresh seeds prior to drying should be avoided. By simply not freezing the seeds prior to drying, we can produce papaya seed oil with essentially no BITC

in it. There is no need to rely on costly means (such as thermal deactivation) to deactivate the myrosinase enzyme in the seeds prior to milling and oil extraction, or to detoxify the seed oil by chemical, physical, or biological methods, as reported in other studies. This dramatically simplifies the papaya seed pretreatment.

In order to utilize the seed oil from papaya fruit waste, it is necessary to establish a practical solution for efficient and cost-effective separation of papaya seed, peel, and puree with a sufficiently high throughput to afford scalable operations. In doing so, it is essential not to crush/damage the papaya seeds during the fractionation because otherwise unwanted BITC may form as a result. To this aim, we have established and evaluated a process by repurposing simple, off-the-shelf, fruit processing equipment traditionally used in wine/cider making (consisting of a fruit crusher and a fruit press), along with a drying oven and a sieving system to achieve efficient fractionation of whole papaya culls into juice pulp, peel, and undamaged seeds. We first chopped ripe papaya fruits using a fruit crusher, followed by extracting (pressing out) the juice from the chopped ripe fruits using a hydraulic fruit press. The remaining seeds and peel pieces were then separated by sieving using perforated sieve plates with an aperture size that allowed the seeds to pass through while leaving behind most of the peel pieces. Due to the large gaps between the crushing blades in the fruit crusher, seeds are not damaged (and hence no release of the antimicrobial substance such as BITC into the juice) while the whole fruits can be efficiently chopped into chunky pulps. When processed using the hydraulic press, the presence of peel pieces dampened the force exerted on the seeds from the press and prevented damages to the seeds.

We demonstrated that culled papaya fruit waste could be fractionated and processed, without needing any complex mechanized operation, into multiple streams of value-added products. Importantly, by not requiring specialized processing equipment, and with its marked simplicity, the papaya fractionation process can be established at a very low cost and is hence highly amenable to implementation even in resource-constrained communities. Logistically, it is envisaged that by using the processing technology developed in this project, small producers can fractionate the papaya culls into puree and unbroken seeds at low cost. The juice/sugars from puree can be concentrated to reduce volume by simple cooking. The concentrated juice and seeds are densified compared with whole culled fruits and hence easier to transport and store. These materials are then sent off to a centralized processing facility (biorefinery) to extract seed-derived value-added products including crude myrosinase, BG, BG-free seed meal, and seed oil, while juice and seed oil are further converted into high-value yeast biomass and specialty products. This technology provides a sustainable pathway to valorize papaya waste while addressing issues associated with waste disposal.

Secondly, by establishing papaya seed oil as a viable carbon substrate for microbial fermentation, application of the technology could be extended to other microbes (besides Yarrowia yeast) that utilize lipids or fatty acids as a carbon source, or as a co-substrate to boost product formation, leading to production of an even wider array of useful products. It is highly valuable to identify new alternative renewable carbon substrates one can utilize, besides lignocellulosics, to generate useful bio-based products in a sustainable manner.

A provisional patent application entitled "Processing of fruit waste for value-added products" has been filed by the University of Hawaii (Application number 62/693,249, filed 07/02/2018). In this provisional patent application, the novel papaya cull processing technology developed in this study is described. According to a recent news report from the Associated Press in April 2018, Hawaii State Agribusiness Development Corp. proposed to build a pilot facility at the Shipman Business Park in Hilo, Hawaii, to culture algae using juice of culled papaya fruits, based on research developed at the Pacific Basin Agricultural Research Center, and use the algae for animal feed or biofuel. Our technology should be highly useful to this effort, and to other parties with a similar interest, by providing a cost-effective technology to fractionate the culled papaya fruits and utilize both juice and seed lipid for culturing microorganisms for feed, biofuel, and other bio-based products. Importantly, as we found in our study, microbial biomass more than doubled per papaya fruit when both juice and seed lipids are used as carbon source, compared with using juice alone. The oleaginous yeast Y. lipolytica is an attractive alternative to algae, since the yeast grows faster and accumulates more cell mass. In addition, Y. lipolytica is a GRAS organism with a favorable nutrition profile. Furthermore, useful natural products (secondary metabolites such as gucosinolates and isothiocyanates) and enzymes (especially myrosinase) are abundant in papaya seed waste and can be recovered for use as active ingredients in soil fumigants or antimicrobial food packaging.

Hawaii Agricultural Research Center

Current trials at the Hawaii Agriculture Research Center (HARC) are focused on various high biomass grasses for biofuel feedstock including sugarcane, energycane, Banagrass, and sterile hybrid grasses which resemble Banagrass/Napiergrass (PMB).

HARC's most advanced energycanes have been tested in multiple trials over several years and have shown to have high biomass, disease resistance, and suitability for mechanical harvest. Several of the clones also have a high sugar content, therefore increasing the processing efficiency for biofuel production as compared to fiber alone.

A seed production system for the hybrid PMB grasses has proven effective, efforts are still in progress to scale up. This will allow farmers to plant these grasses by true seed rather than by billets, as is used in sugarcane production, using existing farm equipment such as grain drills.

PMB hybrids can be made to resemble both a short grass that is suited to animal feed production, or taller Banagrass/Napiergrass in terms of yield, management and composition but are seed sterile with much less risk of invasiveness associated with Napier grasses. They can be managed as a no-till crop due to their ability to be ratooned many times, thereby reducing carbon emissions associated with tillage and annual cropping systems. The seeds are planted as a genetic family, rather than clones, thereby increasing their tolerance to potential disease and pest pressure. The larger plants can be managed as a dual-purpose crop as they may also be harvested at shorter intervals and used as animal feed.

HARC is also maintaining a germplasm collection of several hundred Jatropha selections from around the world, as well as maintaining other oilseed tree crops for future research.

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 2018, HDOA has met with several companies and individuals interested in producing feedstock.

HDOA remains in contact with Pacific Biodiesel. Pacific Biodiesel manages biodiesel plants in Hawaii and Oregon. Pacific Biodiesel provides engineering, equipment, contracting, and laboratory services needed for profitable community-based production of quality biodiesel from various feedstocks.

4. Maintain Cognizance of Actions Taken by Government and Industry

<u>Hawaii Clean Energy Initiative</u>

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

<u>Oceanic Institute Feed Mill</u>

On February 1, 2013, HDOA entered into a contract with Oceanic Institute (OI) to construct a pilot production scale research feed mill. Guided by Act 122, Session Laws of Hawaii 2013, HDOA set aside $450,000 in special funds and general revenues for OI to plan, design, and

construct a feed mill laboratory. The feed mill laboratory will house a Wenger X-20 extruder, an Insta Pro model 2500 dry extruder, and a CPM model 1100 pellet mill.

The objectives behind the pilot research feed mill are to:

- Construct a pilot production scale research feed mill to support allied research and development programs at OI and other U.S. aquaculture and terrestrial entities.
- Develop research feeds in cooperation with allied research and development programs at the Institute that effectively and efficiently meet all animal nutritional requirements and research objectives.
- Offer large-scale defined test feeds for genetic and nutritional improvement research programs, pharmaceutical testing for commercial viability and efficacy, equipment testing, and efficiency of different manufacturing processes.
- Provide research feed products and technical assistance to support large-scale research farm grow-out trials with shrimp and finfish that simulate commercial production conditions.
- Demonstrate, promote, and display U.S. feed milling technology, goods, and services—such as those developed by members of the American Feed Industry Association—to the countries of the Pacific Basin.
- Assist in market development and increasing the demand for American feed commodities, manufacturing equipment, computer software, and other products that support aquatic feeds production.
- Initiate an international training program that offers short courses in aquaculture feed processing technology by working in cooperation with universities, private research organizations, and commercial companies. A Memorandum of Understanding is already in place with University of Hawai`i at Hilo for educational activities with terrestrial animals. OI would like to develop a similar partnership with Hawai`i Pacific University for aquatic animals.
- Transfer feed mill processing technologies to the commercial sector once they are proven effective and commercially viable.

As of December 2018, the feed mill is operational.

<u>Pacific Biodiesel</u>

With the end of HC&S operations, Pacific Biodiesel Technologies (PBT) moved agriculture operations from Hawaii Island to Maui at the beginning of 2017 where they are farming oilseed crops on two plots of land near Waikapu totaling 266 acres. The first plantings included black oil sunflower with early, promising results from the agronomy aspect and from the public excitement over these crops.

Plantings for the 2018 harvest season began in December with both irrigated and non-irrigated trials. No herbicides or pesticides have been used on any of the crops and beekeepers were brought in to set up their "hives" near the sunflowers. The seeds were harvested on Maui then shipped to the PBT crushing mill in Keaau, Hawaii Island. There, the seeds were carefully pressed to maintain high quality, without chemical refining, and are now being sold as cosmetic oil and food-grade oil in the Hawaii market. Residual and off spec crop oil Is being recycled for the production of biodiesel. Other crops planned for the 2019 season are safflower, chickpeas, cover crop trials, and industrial hemp (subject to HDOA licensing). Hemp can be planted most efficiently in the first quarter while the rain is still prevalent and is a preferred crop for its flexibility as fuel, food, fiber and other high-end co-products.

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) (16).

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, HDOA has focused its efforts on maintaining an awareness of actions taken by government and industry and supporting the efforts and activities of DBEDT, working with the U.S. Navy and U.S.D.A. as they implement their memorandum of understanding to jointly develop biofuels, and actively participating in discussions and conferences held in 2014 to advance biofuel production in Hawaii. The Chairperson continues to meet with various companies interested in using state agricultural lands and water resources for biofuel production. 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. Pacific Biodiesel has been extremely helpful and collaborative in this area.

Grant Writing

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