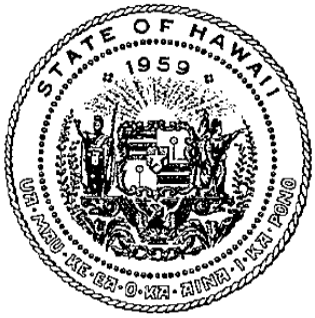
**REPORT TO THE THIRTY-FIRST LEGISLATURE**
**2021 REGULAR SESSION**
**STATE OF HAWAII**

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

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

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**THE STATE OF HAWAII**
**DEPARTMENT OF AGRICULTURE**

**DECEMBER 2020**

ENERGY FEEDSTOCK PROGRAM

Annual Report to the Legislature for Calendar Year 2020

**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, 2020-December 31, 2020.**

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 2020.**

Act 23. Prohibits, after 6/30/2020, the approval of a new or renewed power purchase agreement for electricity generated from coal. Prohibits, after 6/30/2020, the modification of a coal power purchase agreement that proposes to extend the term or increase the amount of generation that is allowed to be produced under the existing agreement. Prohibits, after 12/31/2022, the issuance or renewal of covered source air permits for coal-burning electricity generation facilities. (HD1)

Act 61. Amends the requirements for each solar energy system to claim the renewable energy technologies income tax credit. (SB2820 SD2 HD2)

**2. Related Research.**

<u>Hawaii Department of Agriculture</u>

HDOA's Aquaculture and Livestock Support Services branch continues to work 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 $4.5 million from the Legislature for a 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 would 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. Additional CIP funding was requested; however, no additional funding has been appropriated to date.

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 ensure 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.

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

HDOA and its attached agency, the Agribusiness Development Corporation, continue to meet with individuals and companies seeking information about state or privately owned agricultural-zoned lands, water, and agricultural labor. Additionally, 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 since 2008. 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 100% clean energy goal
- Developing strategies for overcoming the barriers.

Oceanic Institute Feed Mill

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.

Oceanic Institute is currently working with a non-profit organization on Hawaii Island to operate the feed mill and is interested in processing gorse (an invasive plant) into livestock feed. The nonprofit partner is awaiting a Right of Entry to harvest gorse from the slopes of Mauna Kea. If the Right of Entry is granted by the State, the feed mill plans to begin processing the gorse. The operational status of the feed mill has been impacted by COVID-19-related travel restrictions, but Oceanic Institute has plans to resume full operations in conjunction with the nonprofit partner when travel restrictions have been lifted.

Pacific Biodiesel

Pacific Biodiesel Technologies continued its agriculture operations in 2020, operated by the company's founders and focusing its farming on 115 acres in Maui's central valley. The primary crop was sunflower, which continues to show promising results from the agronomy aspect. Plantings for the 2020 harvest

season continued year-round, made more efficient by an above ground center pivot irrigation system installed last year (the nearly quarter-mile long system pivots on a center pole powered by the company's biodiesel generator, enabling irrigation of up to 75 acres compared to only 10+ acres previously utilizing reel gun irrigation). No herbicides or pesticides have been used on any of the crops. All farm equipment operates on 100% biodiesel, produced by Pacific Biodiesel, including electrical power.

The sunflower seeds are harvested on Maui then shipped to the company's crushing mill in Keaau, Hawaii Island. There, the seeds are carefully expeller pressed to maintain high quality, without chemical refining, and continue to be sold as cosmetic oil and food-grade oil in the Hawaii market. The wholesale market for the company's premium culinary oils stalled in 2020 with restaurant shutdowns, while cosmetic sales dropped due to hotel closures and the lack of tourism. Residual and off spec crop oil is being recycled for the production of biodiesel.

The sunflower crop in particular continues to generate public excitement when the sunflowers are in bloom; educational tours for customers and community groups interested in learning about Pacific Biodiesel and its sustainable farming, recycling, and clean fuel operation in Hawaii were severely curtailed in 2020 due to the pandemic.

Having received Maui's first HDOA state license to farm industrial hemp in 2019, the founders of Pacific Biodiesel continued to farm industrial hemp on 10 acres with much potential for its flexibility as fuel, food, fiber and other high-end co-products. Situated within the company's 115 acre farm site, the hemp farming operation initially focused on flower (resin) cultivars of industrial hemp (characterized by high cannabinoid content) for the production of full-spectrum hemp extract including CBD for sale as a natural ingredient to cosmetic producers in Hawaii and on the mainland. State rule uncertainty stalled most in-state marketing opportunities for 2020. The hemp plants are grown on soil remediated by sunflowers farmed on the site since 2017. The premium extract is produced using a supercritical CO2 extractor; the crude extract is blended (per FDA requirements not to exceed 0.3% THC) with macadamia and sunflower oils also produced by the company. Although the anticipated mainland market demand for premium hemp-derived CBD has collapsed due to overproduction and quality issues, the farming operation in 2020 has primarily focused on this new Maui-grown product.

Other crops planted in 2020 include cow peas (future swine feed opportunity), sunn hemp (crotalaria juncea), rye, buckwheat, daikon and clover.

**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.