

REPORT TO THE TWENTY-FOURTH LEGISLATURE
REGULAR SESSION OF 2008

IN RESPONSE TO ACT 159, SLH 2007
REQUIRING THE CHAIRPERSON OF THE BOARD OF AGRICULTURE TO REPORT
ON THE STATE'S PROGRESS TOWARD MEETING THE MILESTONES AND
OBJECTIVES OF THE ENERGY FEEDSTOCK PROGRAM

Prepared by:

THE STATE OF HAWAII
DEPARTMENT OF AGRICULTURE
HONOLULU, HAWAII

DECEMBER 2007

ENERGY FEEDSTOCK PROGRAM

Annual Report to Legislature for Calendar Year 2007

Legislative Background

In the Twenty-Fourth State Legislature, Regular Session of 2007, Act 159 was passed amending Chapter 141 to create an Energy Feedstock Program within the Hawaii Department of Agriculture (HDOA) which requests HDOA to,

1. Maintain cognizance of actions taken by industry and by federal, state, county, and private agencies 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;
6. 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.
7. 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.
8. Perform other functions and activities as may be assigned by law, including monitoring the compliance provisions under section 205-4.5(a)(15).

In addition, the Chairperson of the Board of Agriculture may employ temporary staff for the Energy Feedstock program, however, no funds were appropriated by the legislature for this program.

Development of Hawaii's Energy Feedstock Resources

In December 2006, the Hawaii Agricultural Research Center, under contract to HDOA, released a report entitled "Biodiesel Crop Implementation in Hawaii". The report identified 21 plants and algae that could be grown in Hawaii to replace fossil fuels currently imported. These included:

- Algae
- Avocado
- Castor bean
- Chinese tallow tree
- Coconut
- Diesel tree
- Flax seed
- Gorse
- Jatropha
- Jojoba
- Kukui nut
- Mole plant
- Neem tree
- Oil Tree
- Palm oil
- Peanut
- Petroleum nut
- Pongam tree
- Rape seed
- Soybean
- Sunflower

Both the Bioenergy Masterplan and the Biofuels Assessment, scheduled to be completed in 2008 and 2009 respectively, will provide Hawaii's farmers, landowners, regulators, and decision-makers with a greater understanding of the opportunities, infrastructure, and resource requirements needed to produce energy crops and biofuels, either as primary crops or as co-products.

HDOA has a role to play in ensuring that the interests of the Hawaii agriculture industry are represented as the State moves away from fossil-fuel dependence and towards renewable energy. As both food and fuel production are important to the State, HDOA does not support one taking precedence over the other. We do not believe that existing food producers should be displaced in favor of prospective fuel production plans.

The Energy Feedstock program's primary role during this start-up period is to provide the information necessary for potential producers of locally grown feedstock to make informed decisions. HDOA's role is differentiated from that of the Department of

Business, Economic Development and Tourism (DBEDT) in that DBEDT is primarily focused on the diversification of Hawaii's energy sources. Both HDOA and DBEDT share a common goal of local production of energy and fuels.

Reportable Activities for the period of July 1, 2007-December 31, 2007.

Actions Taken by Industry and Government Agencies

- In December 2007, Royal Dutch Shell PLC said it will establish a 6 acre demonstration project on the Kona coast to grow and test algae as a source for biofuel. Shell is forming a joint venture with HR Biopetroleum, Inc. to conduct the project. If the project is successful, a 250 acre project would be undertaken to determine commercial viability.
- In July 2007, Gay & Robinson, Hawaii's second-largest and second-oldest sugar producer, and Vancouver, British Columbia-based ethanol producer and marketer Pacific West Energy LLC announced a partnership, Gay & Robinson Ag-Energy LLC, to develop an ethanol plant. The plant will be located in Gay & Robinson's sugar fields on the west side of Kauai. The ethanol plant is designed to produce 12 million gallons annually, which would meet approximately 30% percent of the state's current needs for the fuel. The project will use sugar juice and molasses as primary feedstocks.

The initial \$80 million phase of capital investment will include installation of a new biomass boiler and turbine generator to produce renewable electricity. Design and engineering work has begun, and an air permit for the ethanol plant has been secured. Future business plans call for additional stages of energy production, including biodiesel production, a methane recovery system, the processing of municipal solid waste, hydro power, the conversion of biomass into liquid fuels and solar energy production. Start-up of the project is expected in mid-2009 or later and may create up to 100 new positions.

- BlueEarth Maui Biodiesel LLC plans to begin producing 40 million gallons of biodiesel per year by 2009 and create 50 jobs. The plant will rely on imported palm oil until Hawaii-grown feedstock becomes available. BlueEarth expects to expand and produce 120 million gallons per year by 2011. Plant production would be used in Maui Electric's 215 megawatt Maalaea power plant.
- Imperium Renewables, Inc. has announced plans for a 100 million gallon per year biodiesel plant to be located at Kalaeloa Harbor on Oahu. Biodiesel would be produced from imported vegetable oils or Hawaii-grown products when available. Production is expected to begin in 2009. In October 2007, HECO announced that Imperium Services LLC, an affiliated company of Imperium Renewables, Inc. would supply between 5-12 million gallons of biodiesel per year through 2011 to power its new 110 megawatt power plant to be located in Campbell Industrial Park.

- Hawaii Bioenergy is a consortium comprised of Maui Land and Pineapple, Kamehameha Schools, Grove Farm, Tarpon Investimentos, Brasil Bioenergia, Finistere Ventures LLC, Stephen M. Case, and Vinod Khosla. Hawaii BioEnergy will identify potential fuel crops, processing techniques, and distribution channels for biofuels within the state. The consortium will explore a variety of new enzymatic and advanced processing technologies that allow ethanol to be refined from switchgrass, pineapple byproducts and other crops in addition to sugarcane.

Information Clearinghouse

- The Hawaii Department of Agriculture (HDOA) will establish a placement on its departmental website (www.hawaii.gov/hdoa) that will include information about the energy feedstock program and links to related departments, programs, and events.
- HDOA's Energy Feedstock program and DBEDT will share and jointly disseminate information about biofuels and related subjects, including available federal funding.

Development Projects

- Biofuels Assessment: A 2-year project managed by Black & Veatch Corporation, to "conduct a statewide multi-fuel biofuels production assessment of potential feedstocks and technologies, the economics of the various renewable fuels pathways, and the potential for ethanol, biodiesel, and renewable hydrogen production to contribute to Hawaii's near-, mid-, and long-term energy needs" kicked off in July, 2007. Funding for the project was appropriated by Act 240 of 2006 and will be completed by July 2009.
- Bioenergy Master Plan: Act 159 of 2007 appropriated funds for a bioenergy master plan for the following outcomes: (1) strategic partnerships for the research, development, testing, and deployment of renewable biofuels technologies and production of biomass crops; (2) evaluation of Hawaii's potential to rely on biofuels as a significant renewable energy resource; (3) biofuels demonstration projects, including infrastructure for production, storage, and transportation of biofuels; (4) promotion of Hawaii's renewable biofuels resources to potential partners and investors for development in Hawaii as well as for export purposes; and (5) a plan or roadmap to implement commercially viable biofuels development. The plan is to address: (1) specific objectives and timelines; (2) water resources; (3) land resources; (4) distribution infrastructure for both marine and land; (5) labor resources and issues; (6) technology to develop bioenergy feedstock and biofuels; (7) permitting; (8) financial incentives and barriers and other funding; (9) business partnering; (10) policy requirements necessary for implementation of the master plan; and (11) identification and analysis of the impacts of transitioning to a bioenergy economy while considering applicable environmental concerns. The Request for Proposal for the plan has been developed by DBEDT and will be released in January 2008.

Federal Funding

- The Energy Feedstock program will primarily be a referral source for information about federal funding opportunities.

Development and Expansion of the Industry; Events

- In June, 2007, the Hawaii Island Chamber of Commerce presented an Agriculture & Energy Conference and an Agricultural & Energy Tradeshow on the Big Island.
- In September, 2007, the Pacific Coast Electrical Association held its biennial meeting on Maui. Local experts spoke on the keynote topic of “Biofuels: Homegrown Energy for Hawaii Energy Independence.”
- In November, 2007, the International Energy Agency’s (IEA) Advanced Motor Fuel (AMF) Executive Committee held its annual meeting in Honolulu, and invited Hawaii speakers to discuss advancements and plans in the area of biofuels.

Choren Industries, a Germany based company with Shell, Daimler, and Volkswagen as minority shareholders, made a presentation to attendees about their expertise and proprietary technology in biomass gasification. During their presentation they spoke about the opportunity to pursue fast rotation energy crop development in Hawaii.

- Also in November, 2007, the Pacific Rim Summit on Industrial Biotechnology & Bioenergy (<http://www.bio.org/pacrim/about/>), held in Honolulu, featured presentations about biofuels and bioenergy, including discussions of research, development, demonstration, and potential projects in Hawaii.

Research Programs

- HDOA has funded University of Hawaii, College of Tropical Agriculture and Human Resources UH-CTAHR) and the Hawaii Agricultural Research Center (HARC) to conduct research on potential oilcrops for use in the manufacturing of biodiesel. Research will focus on jatropha, oil palm, pongamia, kukui, tung-oil tree, ben-oil tree and other herbaceous annuals and woody perennials. Field trials will be established at four locations across the state to gather data on yield and growing conditions.
- The Honolulu Clean Cities Coalition received a grant from the U.S. EPA for the Biodiesel Fuel from Crops Project. Coalition partners include the University of Hawaii at Hilo, HARC, Grace Pacific, Pacific Biodiesel, and the Oceanic Institute. The purpose of the research is to identify the biodiesel potential of coconuts, kukui nuts and jatropha. Results are expected in 2008.¹

¹ <http://www.epa.gov/region09/waste/biodiesel/hawaii.html>

- The Hawaii County Economic Opportunity Council received a Federal grant for research on jatropha for biodiesel.²
- In a 2007 state-wide survey on the topic of “sustainability,” Hawaii participants ranked renewable energy as quite important (number 2 out of 18 topics).³
- HR Biopetroleum, Inc. has received funding from the National Defense Center of Excellence for Research in Ocean Sciences. The research will study the genetic adaptation of marine algae to improve the yield of biodiesel.
- The Renewable Resources Research Laboratory, part of the Hawaii Natural Energy Institute at the University of Hawaii at Manoa, is studying the use of charcoal as a fuel for electric power generation. Researchers believe that they can produce charcoal from existing stocks of biofuels such as macadamia nut shells and husks, green wastes including tree trimmings, wood logs, coconut shells and husks, gorse wood, strawberry guava and other invasive species, as well as from by-products from Hawaii’s seed corn industry.
- Two studies on the energy needs, infrastructure, and potential of the Big Island were completed in 2007:
 - *Hawaii Distributed Energy Resource Technologies for Energy Security*, a federally-funded project including the Hawaii Natural Energy Institute, GE Global Research, and stakeholder groups.⁴
 - *Analysis and Recommendations for the Hawaii County Energy Sustainability Plan*,⁵ a project of the Yale School of Forestry and Environmental Studies conducted for The Kohala Center, Kamuela, Hawaii; the Hawaii County Department of Research and Development; and the Hawaii County Council.
- South Point Propagation was founded in 2004. The company is moving its nursery and research operations to a leased parcel of land in Pahala, Kau, Hawaii. They are focusing their research on *Jatropha Curcas*. They have also leased a 20-acre parcel of land to conduct field studies a few miles from the nursery.

South Point is receiving support from and collaborating with the Hawaii Biodiesel Consortium, the University Of Hawaii Hilo- College Of Agriculture, Forestry and Natural Resource Management, and the Hawaii Agricultural Research Center.

- University of Hawaii, Hilo, College of Agriculture, Forestry and Natural Resource Management, is raising about 50 oil palm trees. An order has gone out to purchase 10,000 oil palm seeds. Eight test plot sites for *jatropha curcas* are planned or under development.

² http://biodieselmagazine.com/article.jsp?article_id=1938

³ <http://hawaii2050.org/images/uploads/2050 CE.pdf>

⁴ http://www.netl.doe.gov/moderngrid/docs/Hawaii_OE_DER-002.pdf

⁵ <http://learning.kohalacenter.org/general/announce.asp?id=785>

- A Big Island lab is developing tissue culture techniques for jatropha (3 million plants under cell culture).

Energy Feedstock Program Milestones and Objectives

Initial Milestones and Objectives are:

1. Encourage discussions between local producers and processors;
2. Support related research through creation of awareness of HDOA's Agricultural Research Program and other sources of funding;
3. Disseminate energy feedstock information to potential producers through HDOA website;
4. Inform tenants of State Agricultural Parks and lands being transferred to HDOA from DLNR through the non-agricultural park lands program about energy feedstock production opportunities as research findings become available;

Monitoring

HDOA is in the initial stages of planning on how to fulfill this role. Expertise in biofuel processing facilities and appurtenances is not currently available within the department. With most facilities expected to be in production by 2009, it will be necessary to obtain funds to hire staff for this responsibility or to contract for the services.

Staffing

Funds were not provided by the legislature for the authorized temporary positions. Without funding, the Energy Feedstock program will be extremely limited in its ability to carry out the intent of the legislation.