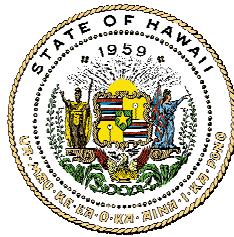


**REPORT TO THE TWENTY-FIFTH LEGISLATURE
STATE OF HAWAII**



**2008 BIOENERGY MASTER PLAN REPORT
ACT 253 OF 2007**

**PREPARED BY
DEPARTMENT OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
STATE OF HAWAII**

DECEMBER, 2008

This report has been cataloged as follows:

Hawaii. Dept. of Business, Economic Development and Tourism. Strategic Industries Division.

Bioenergy master plan report; Act 253 of 2007. Honolulu: 2008.

1. Biomass energy-Hawaii. 2. Energy policy-Hawaii.

HD9502.5.B54.H38.2008

TABLE OF CONTENTS

EXECUTIVE SUMMARY2

BACKGROUND3

 Act 253, SLH 20073

 Project Funding4

 Bioenergy Master Plan Development4

STAKEHOLDER ENGAGEMENT AND OUTREACH5

 1. *Kickoff Meeting for the Development of the Bioenergy Master Plan for the State of Hawaii – May 21, 2008*5

 2. *A Conversation with Hawaii’s Agriculture Sector – September 5, 2008*5

 3. *Survey - available on-line*.....5

 4. *Issue-based focus meetings – tentatively planned for December 2008*6

 5. *Draft Plan review meeting – tentatively planned for July 2009*.....6

 6. *Website development and maintenance – for meeting presentations, Task reports, Plan drafts*6

 7. *Stakeholder notification and communication - periodically, as appropriate*.....6

TASK LIST7

 OUTCOME I: EVALUATION OF HAWAII'S POTENTIAL TO RELY ON BIOFUELS AS A SIGNIFICANT RENEWABLE ENERGY RESOURCE.....9

 TASK 1 - Issue: Water resources9

 TASK 2 - Issue: Land resources10

 TASK 3 - Issue: Distribution infrastructure for both marine and land.....11

 TASK 4 - Issue: Labor resources and issues12

 TASK 5 - Issue: Technology to develop bioenergy feedstock and biofuels.....13

 TASK 6 – Integration and Evaluation14

 OUTCOME II: A PLAN OR ROADMAP TO IMPLEMENT COMMERCIALY VIABLE BIOFUELS DEVELOPMENT14

 TASK 7 - Issue: Permitting14

TASK 8 - Issue: Financial incentives and barriers and other funding15

TASK 9 - Issue: Business partnering.....16

TASK 10 - Issue: Identification and analysis of the impacts of transitioning to a bioenergy economy while considering applicable environmental concerns.....17

TASK 11 - Integration and Plan development.....18

OUTCOME III: STRATEGIC PARTNERSHIPS FOR THE RESEARCH, DEVELOPMENT, TESTING, AND DEPLOYMENT OF RENEWABLE BIOFUELS TECHNOLOGIES AND PRODUCTION OF BIOMASS CROPS19

 TASK 12 - Development of Strategic Partnerships.....19

OUTCOME IV: BIOFUELS DEMONSTRATION PROJECTS, INCLUDING INFRASTRUCTURE FOR PRODUCTION, STORAGE, AND TRANSPORTATION OF BIOFUELS20

 TASK 13 - Development of Biofuels Demonstration Projects.....20

OUTCOME V: PROMOTION OF HAWAII'S RENEWABLE BIOFUELS RESOURCES TO POTENTIAL PARTNERS AND INVESTORS FOR DEVELOPMENT IN HAWAII AS WELL AS FOR EXPORT PURPOSES.....21

 TASK 14 - Promotion of Hawaii’s Renewable Biofuels Resources21

NEXT STEPS22

Appendix I: Survey Form

Appendix II: Proceedings of the Kickoff Meeting for the Development of the Bioenergy Master Plan, May 21, 2008

Appendix III: Proceedings of the “Conversation with Hawaii’s Agriculture Sector” meeting, September 5, 2008

HOUSE OF REPRESENTATIVES
TWENTY-FOURTH LEGISLATURE, 2007
STATE OF HAWAII

H.B. NO. 1003
H.D. 3
S.D. 2
C.D. 1

Act 253

(excerpt)

PART III

SECTION 4. (a) The department of business, economic development, and tourism shall develop and prepare a bioenergy master plan in consultation with representatives of the relevant stakeholders. The primary objective of the bioenergy master plan shall develop a Hawaii renewable biofuels program to manage the State's transition to energy self-sufficiency based in part on biofuels for power generation and transportation. The bioenergy master plan shall address 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.
- (b) The bioenergy master plan shall address the following issues:
- (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.

EXECUTIVE SUMMARY

In July, 2007, House Bill Number 1003, House Draft 3, Senate Draft 2, Conference Draft 1, was enacted as Act 253 (to be referred to in this report as “the Act”). Part III of the Act (excerpt provided on the previous page) set forth a comprehensive list of outcomes as well as a comprehensive list of issues to be addressed by the Department of Business, Economic Development and Tourism in a Bioenergy Master Plan (to be referred to in this report as “the Plan”) for the State of Hawaii.

This Report to the Legislature sets forth the tasks required, the anticipated timeline, and tasks completed.

A contract has been put into place with the Hawaii Natural Energy Institute of the School of Ocean and Earth Science and Technology, University of Hawaii at Manoa, to carry out work associated with the development of the Plan as outlined in the Act.

An all-day Kickoff Meeting was held in May, 2008, to provide information to the public and interested parties.

A second all-day event was held in September, 2008 to engage and inform members of Hawaii’s agricultural community.

A survey has been developed, based on the categories and topics outlined in the Act, to invite experts and members of the public to express their interest in various topic areas.

This report further describes the major events undertaken in support of this project up to October, 2008, and provides an outline of the additional tasks required prior to the completion of the Plan.

Additional funding has been provided for this effort by the US. Department of Energy to the Hawaii Natural Energy Institute.

The draft of the Plan is scheduled for completion in mid-2009, with the final report submitted to the Legislature in December, 2009.

BACKGROUND

Act 253, SLH 2007

Recognizing the importance of increased use of renewable biomass energy resources in Hawaii, the 2007 Legislature passed HB 1003 HD3 SD2 CD1, signed into law as Act 253, SLH 2007. Part III of the Act called for the preparation of a bioenergy master plan for a cohesive strategy to “set the course for the coordination and implementation of policies and procedures to develop a bioenergy industry in Hawaii.”

The Act followed the convening of two statewide bioenergy events in 2006, the Governor’s Biofuels Summit and the Ag Bioenergy Workshop. These meetings were held in acknowledgment of the benefits, the complexity, and the challenges of Hawaii-based bioenergy industry development. Meeting participants represented all sectors of the bioenergy industry value chain – biomass production, conversion, distribution and storage, and end use – that are necessary elements of successful industry development.

The increased use of the state’s biomass resources for the production of fuels for transportation and electricity can diversify Hawaii’s energy supplies and increase energy and economic security and sustainability. Moreover, unlike wind, solar, geothermal, or ocean energy, biofuels can be used in place of liquid fossil fuels with relatively little change to equipment in use in the transportation and power generation sectors. However, as participants in the 2006 meetings made clear, the development of a bioenergy industry in Hawaii poses significant challenges including limited land and water resources, adequacy of labor, lack of specialized production and distribution infrastructure, potential environmental impacts, and financial risk.

Due to the complexity of the project, further work is necessary prior to the submission of the final Plan, which is scheduled for completion in mid-December 2009.

In a related project, Act 240 of 2006 provided funding for DBEDT 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." The two-year project, under contract to Black & Veatch Corporation, began in mid 2007 and will be completed by mid 2009. As appropriate, the findings from that project will be considered in the final Plan report.

Project Funding

A separate but related program, the Hawaii Clean Energy Initiative (HCEI), is considering regulatory, policy, and technology pathways necessary for the state to achieve a goal of 70% clean energy by 2030. The partnership between the State of Hawaii and the U.S. Department of Energy (USDOE), established in January 2008, is proposing actions to increase the use of efficiency and renewable energy resources and technologies to meet Hawaii's energy needs.

To support the HCEI goal and the completion of the Bioenergy Master Plan, the USDOE has provided some additional funding directly to the Hawaii Natural Energy Institute (HNEI).

Several areas involving complex issues – water and land use, environmental impacts, infrastructure, permitting, and system modeling – will require additional effort. Specific recommendations will be included in the final Plan.

Bioenergy Master Plan Development

Act 253 provides for development of the Plan “that will set the course for the coordination and implementation of policies and procedures to develop a bioenergy industry in Hawaii.” Thus, implementation of the Plan is outside the scope of this project.

The contract provisions established between DBEDT and HNEI require Plan development in three phases: 1. establishment of tasks (provided herein) for the draft Plan; 2. a draft Plan due by July, 2009, for presentation to and review by DBEDT and stakeholders; and a final Plan due in October, 2009 for final review, discussion, and submission to the Legislature by December, 2009.

Project management and coordination responsibilities for this multi-component Plan include stakeholder outreach and engagement activities, planning for and completion of tasks, integration of task findings and recommendations, preparation of the draft and final Plan, and coordination with other initiatives.

STAKEHOLDER ENGAGEMENT AND OUTREACH

Stakeholder engagement and outreach are important -- not only in the development of the Plan, but, ultimately, in the successful implementation of the Plan.

The complexity of the area requires a significant level of community and stakeholder involvement, understanding, and discussion. A creative, comprehensive, and inclusive approach is necessary to identify synergies, efficiencies, and co-product integration that are expected to be extremely important for Hawaii, an insular location with relatively limited opportunities for economies of scale compared to some other locations but correspondingly higher costs for energy, land, agricultural inputs, and waste stream management.

The plan for stakeholder engagement and outreach, therefore, is multi-faceted. It includes:

1. *Kickoff Meeting for the Development of the Bioenergy Master Plan for the State of Hawaii – May 21, 2008*

An all-day Kickoff Meeting for the Development of the Bioenergy Master Plan was held in the auditorium of the State Capitol. The purpose of the meeting was to inform stakeholders of the project, initiate discussion of the issues involved, and survey public and stakeholder areas of interest. Topics included projections for energy supply and demand; land and water issues; feedstock research; and conversion technologies. The meeting attracted 178 participants. The meeting proceedings are attached to this report.

2. *A Conversation with Hawaii's Agriculture Sector – September 5, 2008*

A second stakeholder engagement event was held in conjunction with the biennial Hawaii Agriculture Conference at the Hawaii Convention Center. Speakers at the all-day event provided information on crops, markets, funding, and research. Attendees discussed a range of issues concerning bioenergy industry development. The meeting attracted 89 participants. The meeting proceedings are attached to this report.

3. *Survey - available on-line*

A survey was distributed to participants at a variety of meetings and events and is available on-line at hawaii.gov/dbedt/info/energy/renewable/bioenergy. The survey solicited information and comments from respondents as participants in development of the Plan.

4. *Issue-based focus meetings* – tentatively planned for December 2008
5. *Draft Plan review meeting* – tentatively planned for July 2009
6. *Website development and maintenance* – for presentations, Task reports, Plan drafts
7. *Stakeholder notification and communication* - periodically, as appropriate

It should be noted that both 2008 stakeholder meetings were successful in attracting a large number of participants with diverse experience. Due to that diversity, which may be an indication of the complexity of bioenergy industry development, the survey and discussion comments reflect a wide range of topic areas. While the surveys and meeting discussions thus far have not indicated a pattern or preponderance of sentiment with regard to specific feedstocks, concerns, technologies, or approaches to development of the Plan, it is apparent that:

- There is substantial bioenergy expertise in Hawaii;
- Concurrent supportive research and development efforts are underway including bioenergy production modeling by a national lab, the multi-fuel biofuels production assessment, the HCEI, and private sector funded feasibility analyses;
- Government funding is available for bioenergy research, development and deployment;
- Education and outreach is needed; and
- Industry development will be a long-term effort.

It has been noted that Hawaii's bioenergy industry progress has been strongly influenced by external and local factors including current world markets, availability of investment capital, increasing environmental concerns, new clean energy financing mechanisms, and technology advances, among others. As a result, Hawaii's business partnerships and project plans can be fluid. These observations suggest that the most effective bioenergy master plan may be one that is developed using an iterative process whereby periodic updates and modifications can reflect changing conditions, needs, and industry opportunities.

These findings and observations will be considered in development of the final Plan.

TASK LIST

APPROACH

The Task List is responsive to three key requirement areas as follows:

I. STATEWIDE COLLABORATION AND ENGAGEMENT OF STAKEHOLDERS.

For many years, the State, with its modern economic roots in plantation agriculture, has recognized the importance of biomass resources for the production of energy in Hawaii, especially the use of bagasse from Hawaii's sugar operations. With the statewide decline in the production of sugar, there has been keen interest in research, development, and commercialization of alternative bioenergy conversion technologies and biomass sources for transportation and electricity generation. A number of studies and assessments have been conducted to promote the use of biomass for energy use. Hawaii is fortunate to have industry experts and research institutions that continue to support industry development.

Importantly, in addition to bioenergy experts, industry development will involve a wide range of stakeholders including the community, landowners, utilities, oil companies, farmers, processors, financial organizations, and distributors. The engagement of these stakeholders across the bioenergy industry value chain – biomass production, conversion, distribution and storage, and end use – is necessary for the successful implementation of the Plan. Specific stakeholder activities are described later in the report.

II. ACT 253 PART III

Objective: *“The primary objective of the bioenergy master plan shall [be to] develop a Hawaii renewable biofuels program to manage the State’s transition to energy self-sufficiency based in part on biofuels for power generation and transportation.”*

Outcomes: *“The bioenergy master plan shall address 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.”*

Issues: *“The bioenergy master plan shall address the following issues:*

- (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.”*

III. DBEDT-HNEI CONTRACT PROVISIONS

- By November 1, 2008, provide a recommended prioritized, coordinated, phased list of tasks to achieve the required stakeholder involvement, issue consideration, and outcomes identified and itemized in Part III of Act 253 of 2007.
- By June 30, 2009, prepare a draft Bioenergy Master Plan for presentation to and review by DBEDT and stakeholders; incorporate comments into the draft plan.
- By October 15, 2009, submit the final draft for review, discussion and approval.
- In December, 2009, submit printed, bound copies of the final report, and all supporting files in approved electronic format, for submission to the Legislature no later than December 24, 2009.

OUTCOMES AND ISSUES

The following section lists the “outcomes” identified in the bill as well as the “issues.” Since the list of “outcomes” and the list of “issues” involve similar stakeholders and interests, the issues have been grouped under the relevant outcomes.

OUTCOME I: EVALUATION OF HAWAII'S POTENTIAL TO RELY ON BIOFUELS AS A SIGNIFICANT RENEWABLE ENERGY RESOURCE

TASK 1 - Issue: Water resources

1. Identify appropriate stakeholders, technical experts, and information sources throughout the state.
2. Conduct meetings and surveys with stakeholders, and research and analysis as necessary to determine:
 - a. State, county and federal plans, policies, statutes and regulations related to use of water resources for bioenergy production;
 - b. Considerations related to the use, availability and/or allocation of water from streams, wells, and aquifers including environmental impacts and competing uses;
 - c. Considerations related to the potential for additional sources of water – nonpotable water, wastewater, stormwater, reclaimed water, desalinated water, and other;
 - d. Potential biomass production in conjunction with phytoremediation and bioremediation processes;
 - e. Considerations related to increased efficiency of water use for bioenergy production including selection of biomass feedstocks, modeling of crop water use; technologies including irrigation techniques; and
 - f. Other considerations relevant to this topic
3. Based on findings, determine actions that should be undertaken under the Plan to:
 - a. Further understand Hawaii’s water resource availability and constraints;
 - b. Optimize this limited resource for production of bioenergy resources and products,
 - c. Address policy requirements necessary for implementation of the Plan, and
 - d. Recommend additional supportive actions.
4. Deliverables
 - a. Progress Report due 2/27/09 summarizing work from project inception to 2/27/09 and including detailed reports on findings to date for each of items 1 and 2 a – f.
 - b. Final report due 4/30/09, in specified format, summarizing Task 1 work and including:
 - i. Updated detailed reports for each of items 1 and 2 a –f;

- ii. Supporting “*Technical, legal, regulatory, policy, and economic analyses as requested, directed, and approved by the State*”; and
- iii. Recommendations for actions described in item 3. Recommendations shall include:
 - A minimum required budget, timeline, lead organization, and potential funding source(s). For activities best handled by the private sector, so state. If incentives have been suggested, proposed, or evaluated, so reference.
 - Funding requirements by year and potential funding source(s).
- c. Participation and support, as appropriate, in meetings, discussions, and expert reviews necessary for development of the Draft Plan (6/30/09 completion), the Final Draft Plan (10/15/09 completion), and the Final Plan (12/12/09 completion). Mandatory meetings:
 - i. Issue focus meeting – tentatively December 2008
 - ii. Integration meeting – tentatively May 2009
 - iii. Draft Plan stakeholder review meeting – tentatively July 2009

TASK 2 - Issue: Land resources

1. Identify appropriate stakeholders, technical experts, and information sources throughout the state.
2. Conduct meetings and surveys with stakeholders, and research and analysis as necessary to determine:
 - a. State, county, and federal plans, policies, statutes and regulations related to use of land resources for bioenergy production;
 - b. Considerations related to the ownership, permissible use, location, availability and/or allocation of appropriate land, and competing uses; and
 - c. Considerations related to increased productivity of land use for bioenergy production including selection of biomass feedstocks, bioenergy technologies or any other factors; and
 - d. Other considerations relevant to this topic.
3. Based on findings, determine actions that should be undertaken under the Plan to:
 - a. Further understand Hawaii’s land resource availability and constraints;
 - b. Optimize use of land resources,
 - c. Address policy requirements necessary for implementation of the Plan, and
 - d. Recommend additional supportive actions.
4. Deliverables
 - a. Progress Report due 2/27/09 summarizing work from project inception to 2/27/09 and including detailed reports on findings to date for each of items 1 and 2 a – d.

- b. Final report due 4/30/09, in specified format, summarizing work on Task 2 and including:
 - i. Updated detailed reports for each of items 1 and 2 a –d;
 - ii. Supporting “*Technical, legal, regulatory, policy, and economic analyses as requested, directed, and approved by the State*”; and
 - iii. Recommendations for actions described in item 3. Recommendations shall include:
 - A minimum required budget, timeline, lead organization, and potential funding source(s). For activities best handled by the private sector, so state. If incentives have been suggested, proposed, or evaluated, so reference.
 - Funding requirements by year and potential funding source(s).
- c. Participation and support, as appropriate, in meetings, discussions, and expert reviews necessary for development of the Draft Plan (6/30/09 completion), the Final Draft Plan (10/15/09 completion), and the Final Plan (12/12/09 completion). Mandatory meetings:
 - i. Issue focus meeting – tentatively December 2008
 - ii. Integration meeting – tentatively May 2009
 - iii. Draft Plan stakeholder review meeting – tentatively July 2009

TASK 3 - Issue: Distribution infrastructure for both marine and land

1. Identify appropriate stakeholders, technical experts, and information sources throughout the state.
2. Conduct meetings and surveys with stakeholders, and research and analysis as necessary to determine:
 - a. Considerations related to roads, harbors, pipelines, storage capabilities and any other appropriate infrastructure needs related to increased use of bioenergy and development of a bioenergy industry; and
 - b. Other considerations relevant to this topic.
3. Based on findings, determine actions that should be undertaken under the Plan to:
 - a. Develop or enhance infrastructure to meet the needs of a bioenergy industry;
 - b. Address policy requirements necessary for implementation of the master plan, and
 - c. Recommend additional supportive actions.
4. Deliverables
 - a. Progress Report due 2/27/09 summarizing work from project inception to 2/27/09 and including detailed reports on findings to date for items 1 and 2.
 - b. Final report due 4/30/09, in specified format, summarizing work on Task 3 and including:

- i. Updated detailed reports for items 1 and 2;
- ii. Supporting “*Technical, legal, regulatory, policy, and economic analyses as requested, directed, and approved by the State*”; and
- iii. Recommendations for actions described in item 3. Recommendations shall include:
 - A minimum required budget, timeline, lead organization, and potential funding source(s). For activities best handled by the private sector, so state. If incentives have been suggested, proposed, or evaluated, so reference.
 - Funding requirements by year and potential funding source(s).
- c. Participation and support, as appropriate, in meetings, discussions, and expert reviews necessary for development of the Draft Plan (6/30/09 completion), the Final Draft Plan (10/15/09 completion), and the Final Plan (12/12/09 completion). Mandatory meetings:
 - i. Issue focus meeting – tentatively December 2008
 - ii. Integration meeting – tentatively May 2009
 - iii. Draft Plan stakeholder review meeting – tentatively July 2009

TASK 4 - Issue: Labor resources and issues

1. Identify appropriate stakeholders, technical experts, and information sources throughout the state.
2. Conduct meetings and surveys with stakeholders, and research and analysis as necessary to determine:
 - a. Considerations related to job categories, skill levels, workforce development, compensation, cost of living, job location, and any other appropriate workforce issues related to development of a bioenergy industry; and
 - b. Other considerations relevant to this topic.
3. Based on findings, determine actions that should be undertaken under the Plan to:
 - a. Develop or enhance labor resources to meet the needs of a bioenergy industry;
 - b. Address policy requirements necessary for implementation of the master plan, and
 - c. Recommend additional supportive actions including legislation.
4. Deliverables
 - a. Progress Report due 2/27/09 summarizing work from project inception to 2/27/09 and including detailed reports on findings to date for items 1 and 2.
 - b. Final report due 4/30/09, in specified format, summarizing work on Task 4 and including:
 - i. Updated detailed reports for items 1 and 2; and

- ii. Recommendations for actions described in item 3. Recommendations shall include:
 - A minimum required budget, timeline, lead organization, and potential funding source(s). For activities best handled by the private sector, so state. If incentives have been suggested, proposed, or evaluated, so reference.
 - Funding requirements by year and potential funding source(s).
- c. Participation and support, as appropriate, in meetings, discussions, and expert reviews necessary for development of the Draft Plan (6/30/09 completion), the Final Draft Plan (10/15/09 completion), and the Final Plan (12/12/09 completion). Mandatory meetings:
 - i. Issue focus meeting – tentatively December 2008
 - ii. Integration meeting – tentatively May 2009
 - iii. Draft Plan stakeholder review meeting – tentatively July 2009

TASK 5 - Issue: Technology to develop bioenergy feedstock and biofuels

1. Identify appropriate stakeholders, technical experts, and information sources throughout the state.
2. Conduct meetings and surveys with stakeholders, and research and analysis as necessary to determine:
 - a. Existing and near-term bioenergy technologies and feedstocks – production and use – including potential Power Purchase Agreements and planned private sector development.
 - b. Range of bioenergy production and use technologies that should be considered for determination of applicability to Hawaii opportunities and conditions. Consider opportunities for value added residues or co-products; and
 - c. Other information identified as relevant to this topic.
3. Based on findings, determine actions that should be undertaken under the Plan to:
 - a. Characterize (cost, scale, inputs, by-products, etc.) those technologies most appropriate to development of a bioenergy industry in Hawaii;
 - b. Address policy requirements necessary for implementation of the master plan, and
 - c. Recommend additional supportive actions, including research, development, and demonstration, to encourage the use of these technologies.
4. Deliverables
 - a. Progress Report due 2/27/09 summarizing work from project inception to 2/27/09 and including detailed reports on findings to date for items 1 and 2 a - c.
 - b. Final report due 4/30/09, in specified format, summarizing work on Task 5 and including:
 - i. Updated detailed reports for items 1 and 2 a - c; and

- ii. Recommendations for actions described in item 3. Recommendations shall include:
 - A minimum required budget, timeline, lead organization, and potential funding source(s). For activities best handled by the private sector, so state. If incentives have been suggested, proposed, or evaluated, so reference.
 - Funding requirements by year and potential funding source(s).
- c. Participation and support, as appropriate, in meetings, discussions, and expert reviews necessary for development of the Draft Plan (6/30/09 completion), the Final Draft Plan (10/15/09 completion), and the Final Plan (12/12/09 completion). Mandatory meetings:
 - i. Issue focus meeting – tentatively December 2008
 - ii. Integration meeting – tentatively May 2009
 - iii. Draft Plan stakeholder review meeting – tentatively July 2009

TASK 6 – Integration and Evaluation

1. Compile, analyze, evaluate, and integrate findings from Tasks 1-5 to determine recommended actions to be incorporated in the Plan including specific objectives and timelines.
2. Based on findings, determine actions that should be undertaken under the Plan to facilitate development of a bioenergy industry including:
 - a. Policy requirements necessary for implementation of the master plan, and
 - b. Other supportive actions.
3. Deliverable due 5/30/09: Report on the “Evaluation of Hawaii's Potential To Rely on Biofuels as a Significant Renewable Energy Resource” for inclusion in the Plan.

OUTCOME II: A PLAN OR ROADMAP TO IMPLEMENT COMMERCIALY VIABLE BIOFUELS DEVELOPMENT

TASK 7 - Issue: Permitting

1. Identify appropriate stakeholders, technical experts, and information sources throughout the state.
2. Conduct meetings and surveys with stakeholders, and research and analysis as necessary to determine:
 - a. The status of State, federal, and county regulatory processes relevant to permitting Hawaii based bioenergy facilities with regard to complexity and timeliness; and
 - b. Other information identified as relevant to this topic.
3. Based on findings, determine actions that should be undertaken under the Plan to:
 - a. Facilitate development of a bioenergy industry;

- b. Address policy requirements necessary for implementation of the master plan, and
 - c. Recommend additional supportive actions.
4. Deliverables
- a. Progress Report due 2/27/09 summarizing work from project inception to 2/27/09 and including detailed reports on findings to date for items 1 and 2.
 - b. Final report due 4/30/09, in specified format, summarizing work on Task 7 and including:
 - i. Updated detailed reports for items 1 and 2; and
 - ii. Recommendations for actions described in item 3. Recommendations shall include:
 - A minimum required budget, timeline, lead organization, and potential funding source(s). For activities best handled by the private sector, so state. If incentives have been suggested, proposed, or evaluated, so reference.
 - Funding requirements by year and potential funding source(s).
 - c. Participation and support, as appropriate, in meetings, discussions, and expert reviews necessary for development of the Draft Plan (6/30/09 completion), the Final Draft Plan (10/15/09 completion), and the Final Plan (12/12/09 completion). Mandatory meetings:
 - i. Issue focus meeting – tentatively December 2008
 - ii. Integration meeting – tentatively May 2009
 - iii. Draft Plan stakeholder review meeting – tentatively July 2009

TASK 8 - Issue: Financial incentives and barriers and other funding

- 1. Identify appropriate stakeholders, technical experts, and information sources throughout the state.
- 2. Conduct meetings and surveys with stakeholders, and research and analysis as necessary to determine:
 - a. Appropriate financial incentives or barriers;
 - b. Funding that may be available to support the development of a bioenergy industry; and
 - c. Other information identified as relevant to this topic.
- 3. Based on findings, determine actions that should be undertaken under the Plan to:
 - a. Facilitate development of a bioenergy industry;
 - b. Address policy requirements necessary for implementation of the master plan, and
 - c. Recommend additional supportive actions.
- 4. Deliverables
 - a. Progress Report due 2/27/09 summarizing work from project inception to 2/27/09 and including detailed reports on findings to date for items 1 and 2.

- b. Final report due 4/30/09, in specified format, summarizing work on Task 8 and including:
 - i. Updated detailed reports for items 1 and 2; and
 - ii. Recommendations for actions described in item 3. Recommendations shall include:
 - A minimum required budget, timeline, lead organization, and potential funding source(s). For activities best handled by the private sector, so state. If incentives have been suggested, proposed, or evaluated, so reference.
 - Funding requirements by year and potential funding source(s).
- c. Participation and support, as appropriate, in meetings, discussions, and expert reviews necessary for development of the Draft Plan (6/30/09 completion), the Final Draft Plan (10/15/09 completion), and the Final Plan (12/12/09 completion). Mandatory meetings:
 - i. Issue focus meeting – tentatively December 2008
 - ii. Integration meeting – tentatively May 2009
 - iii. Draft Plan stakeholder review meeting – tentatively July 2009

TASK 9 - Issue: Business partnering

1. Identify appropriate stakeholders, technical experts, and information sources throughout the state.
2. Conduct meetings and surveys with stakeholders, and research and analysis as necessary to determine:
 - a. Stakeholders, mechanisms, and supportive actions that should be considered to determine applicability to Hawaii opportunities and conditions; and
 - b. Other information identified as relevant to this topic
3. Based on findings, determine actions that should be undertaken under the Plan to facilitate development of a bioenergy industry including:
 - a. Policy requirements necessary for implementation of the master plan, and
 - b. Other supportive actions.
4. Deliverables
 - a. Progress Report due 2/27/09 summarizing work from project inception to 2/27/09 and including detailed reports on findings to date for items 1 and 2.
 - b. Final report due 4/30/09, in specified format, summarizing work on Task 9 and including:
 - i. Updated detailed reports for items 1 and 2; and
 - ii. Recommendations for actions described in item 3. Recommendations shall include:

- A minimum required budget, timeline, lead organization, and potential funding source(s). For activities best handled by the private sector, so state. If incentives have been suggested, proposed, or evaluated, so reference.
 - Funding requirements by year and potential funding source(s).
- c. Participation and support, as appropriate, in meetings, discussions, and expert reviews necessary for development of the Draft Plan (6/30/09 completion), the Final Draft Plan (10/15/09 completion), and the Final Plan (12/12/09 completion). Mandatory meetings:
- i. Issue focus meeting – tentatively December 2008
 - ii. Integration meeting – tentatively May 2009
 - iii. Draft Plan stakeholder review meeting – tentatively July 2009

TASK 10 - Issue: Identification and analysis of the impacts of transitioning to a bioenergy economy while considering applicable environmental concerns.

1. Identify appropriate stakeholders, technical experts, and information sources throughout the state.
2. Conduct meetings and surveys with stakeholders, and research and analysis as necessary to determine:
 - a. Range of potential impacts that should be considered as applicable to Hawaii opportunities and conditions; and
 - b. Requirements necessary for appropriate analysis or measurement of such impacts;
 - c. Other considerations relevant to the topic.
3. Based on findings, determine actions that should be undertaken under the Plan to:
 - a. Conduct appropriate impacts analysis;
 - b. Reduce the likelihood of negative impacts;
 - c. Increase the likelihood of positive impacts;
 - d. Facilitate development of a bioenergy industry using an approach that is sensitive to impacts;
 - e. Address policy requirements necessary for implementation of the master plan, and
 - f. Recommend additional supportive actions.
4. Deliverables
 - a. Progress Report due 2/27/09 summarizing work from project inception to 2/27/09 and including detailed reports on findings to date for items 1 and 2.
 - b. Final report due 4/30/09, in specified format, summarizing work on Task 10 and including:
 - i. Updated detailed reports for items 1 and 2; and

- ii. Recommendations for actions described in item 3. Recommendations shall include:
 - A minimum required budget, timeline, lead organization, and potential funding source(s). For activities best handled by the private sector, so state. If incentives have been suggested, proposed, or evaluated, so reference.
 - Funding requirements by year and potential funding source(s).
- c. Participation and support, as appropriate, in meetings, discussions, and expert reviews necessary for development of the Draft Plan (6/30/09 completion), the Final Draft Plan (10/15/09 completion), and the Final Plan (12/12/09 completion). Mandatory meetings:
 - i. Issue focus meeting – tentatively December 2008
 - ii. Integration meeting – tentatively May 2009
 - iii. Draft Plan stakeholder review meeting – tentatively July 2009

TASK 11 - Integration and Plan development

1. Compile, analyze, evaluate, and integrate findings from Task 6–10 and 12–14, and findings to date from meetings, surveys, and other information gathered.
2. Prepare recommendations relevant to each task, and additionally:
 - a. Mechanisms for continued stakeholder involvement and collaboration, education and outreach, longer-term monitoring of Plan progress, advisory board or other organized structure, or any other actions to promote successful implementation of the Plan.
 - b. Means for longer-term funding to support Plan implementation and sustain biofuels industry development.
3. Deliverables
 - a. Draft Plan including objectives and timelines, findings, milestones, recommended actions, estimated budgets, and conclusions by June 30, 2009, for review by State and stakeholders. Recommendations shall include:
 - i. A minimum required budget, timeline, lead organization, and potential funding source(s). For activities best handled by the private sector, so state. If incentives have been suggested, proposed, or evaluated, so reference.
 - ii. Funding requirements by year and potential funding source(s).
 - b. Final Draft Plan, incorporating review comments, to State and stakeholders by 10/15/09.
 - c. Final Plan and copies, as required under contract, to State by 12/12/09.

OUTCOME III: STRATEGIC PARTNERSHIPS FOR THE RESEARCH, DEVELOPMENT, TESTING, AND DEPLOYMENT OF RENEWABLE BIOFUELS TECHNOLOGIES AND PRODUCTION OF BIOMASS CROPS

TASK 12 - Development of Strategic Partnerships

1. Identify appropriate stakeholders, technical experts, and information sources throughout the state.
2. Conduct meetings and surveys with stakeholders, and research and analysis as necessary to determine:
 - a. Potential partners, project opportunities, and supportive actions that should be considered for determination of project-specific partnerships applicable to Hawaii opportunities and conditions.
3. Based on findings,
 - a. Recommend partnership opportunities, and actions to support such opportunities, to be undertaken under the Plan, and
 - b. Address policy requirements necessary for Plan implementation.
4. Deliverables
 - a. Progress Report due 2/27/09 summarizing work from project inception to 2/27/09 and including detailed reports on findings to date for items 1 and 2.
 - b. Final report due 4/30/09, in specified format, summarizing work on Task 12 and including:
 - i. Updated detailed reports for items 1 and 2; and
 - ii. Recommendations for actions described in item 3. Recommendations shall include:
 - A minimum required budget, timeline, lead organization, and potential funding source(s). For activities best handled by the private sector, so state. If incentives have been suggested, proposed, or evaluated, so reference.
 - Funding requirements by year and potential funding source(s).
 - c. Participation and support, as appropriate, in meetings, discussions, and expert reviews necessary for development of the Draft Plan (6/30/09 completion), the Final Draft Plan (10/15/09 completion), and the Final Plan (12/12/09 completion).

OUTCOME IV: BIOFUELS DEMONSTRATION PROJECTS, INCLUDING INFRASTRUCTURE FOR PRODUCTION, STORAGE, AND TRANSPORTATION OF BIOFUELS

TASK 13 - Development of Biofuels Demonstration Projects

1. Identify appropriate stakeholders, technical experts, and information sources throughout the state.
2. Conduct meetings and surveys with stakeholders, and research and analysis as necessary to determine:
 - a. Potential demonstration project opportunities, potential partners, and supportive actions applicable to Hawaii opportunities and conditions.
3. Based on findings, determine actions that should be undertaken under the Plan to:
 - a. Facilitate development of biofuels demonstration projects;
 - b. Address policy requirements necessary for implementation of the master plan, and
 - c. Recommend additional supportive actions.
4. Deliverables
 - a. Progress Report due 2/27/09 summarizing work from project inception to 2/27/09 and including detailed reports on findings to date for items 1 and 2.
 - b. Final report due 4/30/09, in specified format, summarizing work on Task 13 and including:
 - i. Updated detailed reports for items 1 and 2; and
 - ii. Recommendations for actions described in item 3. Recommendations shall include:
 - A minimum required budget, timeline, lead organization, and potential funding source(s). For activities best handled by the private sector, so state. If incentives have been suggested, proposed, or evaluated, so reference.
 - Funding requirements by year and potential funding source(s).
 - c. Participation and support, as appropriate, in meetings, discussions, and expert reviews necessary for development of the Draft Plan (6/30/09 completion), the Final Draft Plan (10/15/09 completion), and the Final Plan (12/12/09 completion).

OUTCOME V: PROMOTION OF HAWAII'S RENEWABLE BIOFUELS RESOURCES TO POTENTIAL PARTNERS AND INVESTORS FOR DEVELOPMENT IN HAWAII AS WELL AS FOR EXPORT PURPOSES

TASK 14 - Promotion of Hawaii's Renewable Biofuels Resources

1. Identify appropriate stakeholders, technical experts, and information sources throughout the state.
2. Conduct meetings and surveys with stakeholders, and research and analysis as necessary to determine:
 - a. Business and financial opportunities related to local and export markets for Hawaii bioenergy resources and products;
 - b. Supportive actions that should be considered to promote such opportunities; and
 - c. Means of measuring effectiveness of such promotional activities.
3. Based on findings, determine actions that should be undertaken under the Plan to:
 - a. Facilitate development of a Hawaii's renewable biofuels resources; and
 - b. Address policy requirements necessary for implementation of the master plan.
4. Deliverables
 - a. Progress Report due 2/27/09 summarizing work from project inception to 2/27/09 and including detailed reports on findings to date for items 1 and 2.
 - b. Final report due 4/30/09, in specified format, summarizing work on Task 14 and including:
 - i. Updated detailed reports for items 1 and 2; and
 - ii. Recommendations for actions described in item 3. Recommendations shall include:
 - A minimum required budget, timeline, lead organization, and potential funding source(s). For activities best handled by the private sector, so state. If incentives have been suggested, proposed, or evaluated, so reference.
 - Funding requirements by year and potential funding source(s).
 - c. Participation and support, as appropriate, in meetings, discussions, and expert reviews necessary for development of the Draft Plan (6/30/09 completion), the Final Draft Plan (10/15/09 completion), and the Final Plan (12/12/09 completion).

NEXT STEPS

The tasks, as described above, are to be completed; stakeholder input, also described above, is to be included; the tasks, issues, and outcomes described above are to be integrated into a comprehensive plan of action and assembled into a draft report by mid-2009; the draft report is to be reviewed and vetted during mid-to-late 2009; and the final report is to be prepared, finalized, and submitted to the Legislature by December of 2009.

Appendix I: Survey Form

Electronic version available here:

<http://hawaii.gov/dbedt/info/energy/renewable/bioenergy/>

Survey

It will take the effort of many knowledgeable people, working together, to determine if and how bioenergy could provide benefits to Hawaii's citizens, economy, and the environment. We ask for your kokua in helping to gather the information we need.

Please select your top area(s) of expertise and interest, in order of priority. There are more topics on the other side. Use "1" to indicate your top area, "2" for second (if any), "3" for third.

Comments and suggestions may be provided in all areas. Please mail this (and any additional documents) to DBEDT - SID - Bioenergy, PO Box 2359, Honolulu, HI 96804; or provide input via email: bioenergy@dbedt.hawaii.gov.

Thank you for your input!

#	Topic	Comment / suggestion
_____	a.1. Strategic partnerships for the research, development, testing, and deployment of renewable biofuels technologies and production of biomass crops	
_____	a.2. Evaluation of Hawaii's potential to rely on biofuels as a significant renewable energy resource	
_____	a.3. Biofuels demonstration projects, including infrastructure for production, storage, and transportation of biofuels	
_____	a.4. Promotion of Hawaii's renewable biofuels resources to potential partners and investors for development in Hawaii as well as for export purposes	
_____	a.5. A plan or roadmap to implement commercially viable biofuels development	

#	Topic	Comment / suggestion
_____	b.1. Specific objectives and timelines	
_____	b.2. Water resources	
_____	b.3. Land resources	
_____	b.4. Distribution infrastructure for both marine and land	
_____	b.5. Labor resources and issues	
_____	b.6. Technology to develop bioenergy feedstock and biofuels	

b.7. Permitting	
b.8. Financial incentives and barriers and other funding	
b.9. Business partnering	
b.10. Policy requirements necessary for implementation of the master plan	
b.11. Identification and analysis of the impacts of transitioning to a bioenergy economy while considering applicable environmental concerns.	

Additional comments or suggestions

Contact information (optional):

Name: _____
Dr. / Mr. / Ms. First Last

Affiliation: _____

Address: _____

Phone(s): _____

E-Mail: _____

Website _____

This form is available for download from www.hawaii.gov/dbedt/info/energy/renewable/bioenergy

THANK YOU!

**Appendix II: Proceedings of the Kickoff Meeting for the
Development of the Bioenergy Master Plan, May 21, 2008**

194 pages

Electronic version available here:

<http://hawaii.gov/dbedt/info/energy/renewable/bioenergy/kickoff>

Kickoff Meeting for the Development of the Bioenergy Master Plan

May 21, 2008

AGENDA ([download PDF](#))

PROCEEDINGS - Download individual presentations below; or, scroll to the bottom to download 290 pages (pdf file, 48 Megabytes).

Topic

Presenter



Keynote

David Cole



Development of the Bioenergy Master Plan; signing of Act 90

Governor Linda Lingle

International Energy Supply and Demand

Fereidun Fesharaki



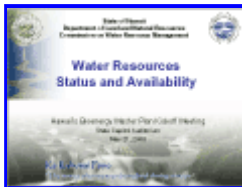
Hawaii's Energy

State of Hawaii:
Maria Tome
Department of Business, Economic Development, & Tourism



Agricultural Lands

State of Hawaii:
Sandra Kunimoto
Department of Agriculture



Water Resources

State of Hawaii:
Lenore Ohye
Commission on Water Resource Management



County Perspective - Big Island

County of Hawaii:
Diane Ley
Department of Research & Development



County Perspective - Maui

County of Maui:
Jonathan Starr

Planning Commission



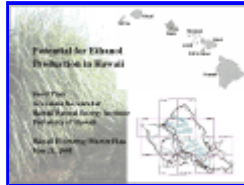
Biofuels Assessment Project

Black & Veatch:
James Easterly
Project Manager



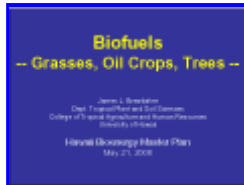
*What Can Grow in Hawaii:
Crop Research*

Hawaii Agricultural Research Center
Michael Poteet



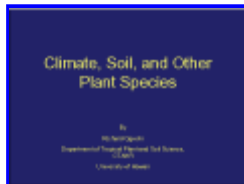
*What Can Grow in Hawaii:
Grasses and Trees for Ethanol Production*

University of Hawaii:
Scott Turn
Hawaii Natural Energy Institute



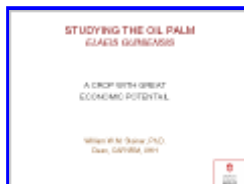
*What Can Grow in Hawaii:
Grasses, Oil Crops, Trees*

University of Hawaii:
James Brewbaker
College of Tropical Agriculture & Human Resources



*What Can Grow in Hawaii:
Climate, Soil, and Other Plant Species*

University of Hawaii:
Richard Ogoshi
College of Tropical Agriculture & Human Resources



*What Can Grow in Hawaii:
Oil Palm*

University of Hawaii:
William Steiner
College of Agriculture, Forestry & Natural Resource Management



*What Can Grow in Hawaii:
Algae*

University of Hawaii:
Richard Rocheleau
Hawaii Natural Energy Institute



*What Can Grow in Hawaii:
Invasive Species*

State of Hawaii:
Chris Buddenhagen
Hawaii Invasive Species Council



*Conversion Technologies & By-Products:
Integrated Energy Farm*

Gay & Robinson:
Alan Kennett



*Conversion Technologies & By-Products:
ClearFuels Technology*

ClearFuels Technology:
Eric Darmstaedter



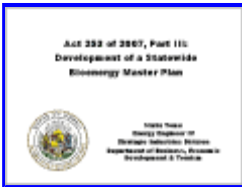
*Conversion Technologies & By-Products:
Oilseeds*

Pacific Biodiesel:
Robert King



*Conversion Technologies & By-Products:
Gasification and Pyrolysis*

United States Department of E
James Spaeth



*Act 253 of 2007: Development of a Bioenergy
Master Plan for the State of Hawaii*

State of Hawaii:
Maria Tome
Department of Business, Econo
Development, & Tourism



*US DOE Biomass Program: Research and
Resources*

United States Department of E
James Spaeth



Bioenergy and Sandia

Sandia National Laboratories:
Ron Pate
Energy, Water, and Biofuels
Interdependencies and System



*Feed-Flexible Processing of Oil-Rich Crops to
Transportation Fuel*

UOP:
Joseph Kocal

INPUT REQUESTED



SURVEY - PDF(Downloadable)

Your input is welcome.

PDF form requires Adobe Acrobat.

Or, input may be emailed to bioenergy (at) dbedt.hawaii.gov



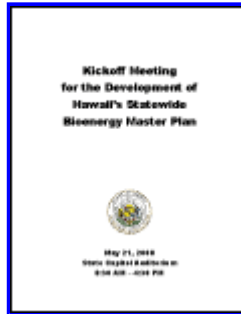
*SURVEY - MS Word
(Downloadable)*

Your input is welcome.

Doc form requires MS Word.

Or, input may be emailed to bioenergy (at) dbedt.hawaii.gov

COMPLETE PROCEEDINGS



290 pages
PDF file
48 Megabytes

- Agenda
- All presentations
- Survey

**Appendix III: Proceedings of the “Conversation with Hawaii’s
Agriculture Sector” meeting, September 5, 2008**

96 pages









Electronic version available here:

<http://hawaii.gov/dbedt/info/energy/renewable/bioenergy/ag2008/>

A Conversation with Hawaii's Agriculture Sector

September 5, 2008

PROCEEDINGS - Download individual presentations below; or, scroll to the bottom to download 96 pages (pdf file, 18 Megabytes).

Topic	Presenter
	State of Hawaii: Sandra Kunimoto Department of Agriculture
<i>Welcoming Remarks</i>	
	State of Hawaii: Theodore Liu Department of Business, Economic Development & Innovation (DBEDT)
<i>Welcoming Remarks</i>	
	Maria Tome DBEDT - Hawaii State Energy Office
<i>Bioenergy Master Plan Project</i>	
	Scott Turn UH - Hawaii Natural Energy Institute (HNEI)
<i>Bioenergy Systems Overview</i>	
	Bill Cowern
<i>Oil Palm</i>	
	Robert Osgood
<i>Banagrass</i>	
	Michael Poteet Hawaii Agriculture Research Center (HARC)
<i>Jatropha</i>	
	James Brewbaker UH - College of Tropical Agriculture (CTAHR)
<i>Tree Crops</i>	

Guinea Grass

James Carpenter
CTAHR



Bioenergy Markets

Karl Stahlkopf
Hawaiian Electric Company, Inc.



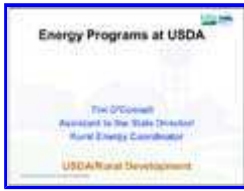
Bioenergy Markets

Paul Zorner
Hawaii BioEnergy, LLC



Bioenergy Markets

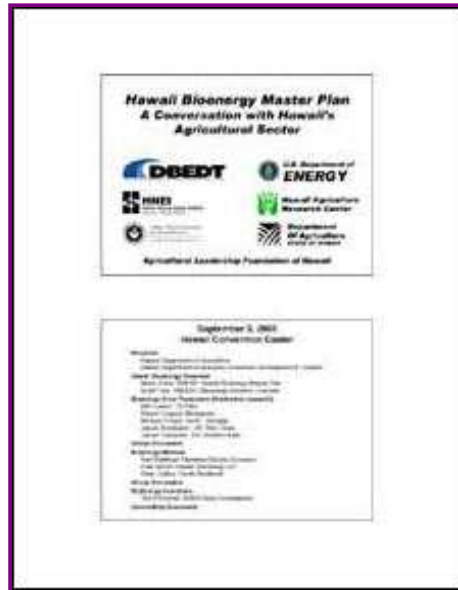
Brian Collins
Pacific Biodiesel, Inc.



Energy Programs at USDA

Tim O'Connell
United States Department of Agriculture (USDA)

COMPLETE PROCEEDINGS



96 pages
PDF file
18 Megabytes

- Presentations
 - Survey