Part 4: Conclusion

“Growing biofuel crops is a considerably long-term investment. We need to frame the food vs. fuel issue in tandem with the Bioenergy Master Plan so people are comfortable with large land commitments for biofuel. It is a multi-generational commitment to bioenergy.”

Stakeholder comment, April 2, 2009
4.0 Conclusion

This Bioenergy Master Plan report was developed in accordance with Act 253, Session Laws of Hawaii (SLH) 2007, which called for a bioenergy master plan to “set the course for the coordination and implementation of policies and procedures to develop a bioenergy industry in Hawaii.”

As required by the Act, it addresses 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.”

and 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.”

During the course of the studies, a number of unique work products were prepared that will facilitate industry efforts. These resources may be found in the Issue Reports in Vol II as follows:

- **Land and Water Resources** (Section 2.1) – GIS map layers showing irrigation systems, soil, topography, climate, and potential selected irrigated and rainfed crop yields for Oahu, the Big Island, Maui county, and Kauai.
- **Distribution Infrastructure** (Section 2.2) – Diagrams and descriptions of statewide fueling infrastructure systems.
- **Technology** (Section 2.4) – Characterization of the status of crops and crop production technologies for bioenergy applications and of conversion technologies used to transform feedstocks into bioenergy products. Identification of technology gaps.
- **Permitting** (Section 2.5) – Process flow charts and comprehensive listing of permits.
- **Financial Incentives** (Section 2.6) – Comprehensive listings of current and proposed incentives.
- **Business Partnering** (Section 2.7) – Matrixes of partnership structures and components and a Bioenergy Partner Catalog.
- **State, County, and Federal Plans, Policies, Statutes, and Regulations** (Section 2.10)

Strategic partnerships identified in Section 3.3 (Vol I) were formed to address information gaps in the value chain and to leverage resources. Stakeholder input was instrumental in identifying biofuel demonstration projects as summarized in Section 3.4 (Vol I). Methods to promote Hawaii’s renewable biofuels resources are contained in Section 3.5 (Vol I).

A bioenergy industry is a unique and inclusive industry, spanning nearly all of Hawaii’s commercial and public sectors. To develop local biofuel production capacity sufficient to displace a significant amount of imported fuels, the industry must comprise all of the necessary components – locally available feedstocks including agricultural waste and/or crops, conversion of biomass to useable fuels, distribution infrastructure, and end user markets. Each component of this value chain must be economically and technically viable, requiring the support of investors, government regulators, policy makers, and researchers.

Its environmental and economic impacts affect a broad range of stakeholders including other industries and the community. Several stakeholder events were held and a website was established to disseminate information and to receive input from stakeholders during the project. Stakeholder input is incorporated in the Issue Reports (Vol II) and in the stakeholder review comments (Vol III).

Our analysis indicates that Hawaii does have the potential to meet the production scenario goals used in this report. However, the Issue Reports point to a number of industry challenges of which the most significant is the availability of reliable local supplies of economically feasible feedstocks to mitigate business risk and enhance the probability of value chain viability. Overcoming this challenge will require a Renewable Biofuels Program to serve as both an industry champion and an industry facilitator to carry out the recommendations in this report.

The industry roadmap recommends actions for a Renewable Biofuels Program to address the four primary areas of industry concern – availability and use of resources, value chain interdependencies, industry impacts, and program level coordination. These actions involve assessments, community involvement, partnerships, incentives, coordination, planning, education and outreach, demonstration projects, research, and policy requirements.

The Issue Reports underscore the need for more and better data and analytical tools, the lack of which will continue to challenge more precise industry planning. This bioenergy master plan therefore points to a path for government and industry action needed to enable informed policy development, appropriate programmatic actions, response to stakeholder concerns, and decisions concerning feedstock, conversion technology, and products. It recognizes the need for government and stakeholders to continually monitor the industry and reset the priorities as technologies and opportunities evolve.
The development of a bioenergy industry as a component of a more secure and stable energy future for Hawaii will take the sustained support and commitment by industry, government, and the community. With the wide range of issues, stakeholders, value chain components, changing market conditions, continuing technology innovations, and environmental incentives and disincentives, industry planning cannot and should not be a finite nor close-ended task.

It should be remembered that the renewable biofuels program will be responsible for the development of a new industry currently characterized by complexity and perceived competition for essential resources. If planned, coordinated, and implemented appropriately, this industry has the potential to benefit Hawaii’s other industries, especially agriculture and the refineries, as well as to enhance the economic and energy security of the state.