Hawaii Biofuels Summit
Technical Synopsis

Prepared for
State of Hawaii
Department of Business, Economic Development, and Tourism

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I. Introduction

The Hawaii Biofuels Summit, held on August 22, 2006, brought together leaders from Hawaii's government, fuels industry, landowners, and investors to identify the most important actions State government and the private sector can take to encourage the growth of Hawaii's biofuels industry. Hawaii has aggressively supported the use of biofuels with a mandate requiring that 85 percent of gasoline distributed in the state contain 10 percent ethanol, a facility tax credit for the first 40 million gallons of ethanol produced per year, and fuel tax incentives. This commitment to biofuels was reaffirmed by the passage of SB 2957 (Act 240, Session Laws of Hawaii 2006), which sets statewide goals of 10 percent of highway fuel from alternate fuels by 2010, 15 percent by 2015, and 20 percent by 2020. Due to the need for coordination across the biofuels value chain, reaching these goals will require innovative collaboration between State government and the private sector to accelerate the expansion of Hawaii's biofuels industry.

To support this collaboration, Governor Linda Lingle, the Department of Business, Economic Development, and Tourism (DBEDT), and its consultant, the Rocky Mountain Institute (RMI) convened the Hawaii Biofuels Summit. During the Summit, participants representing each component of the biofuels value chain (agriculture, conversion, distribution, and end use), offered their views on existing barriers to biofuels development and potential important actions or solutions necessary to overcome those barriers. Using an electronic voting process, participants then prioritized the possible solutions. Based on voting results, the following solutions to accelerate biofuels development were determined to have the highest overall priority:

- Provide incentives for in-state production;
- Streamline permitting and secure County cooperation;
- Bolster and coordinate research and development on agricultural fuel crops, processing, and conversion;
- Develop infrastructure to move biofuels to market;
- Clarify water access issues; and
- Coordinate investment across the value chain.

The Summit culminated with a discussion of the next steps necessary to implement the proposed solutions.

II. The Summit Process

The development of a successful biofuels industry in Hawaii requires coordination and investment across the biofuels value chain. Therefore, the Hawaii Biofuels Summit was structured to incorporate the primary components of the biofuels value chain below.

Summit participants included public sector representatives as well as private sector representatives from each component of the value chain. To optimize the limited time allowed for the Summit, the majority of private sector participants were interviewed beforehand to obtain their views on the barriers to biofuels development, as well as their initial thoughts on possible solutions to those barriers.

At the start of the Summit, these views regarding barriers were summarized during a brief presentation, and an overview of the economics of biofuels production in Hawaii was provided. The goal of this presentation was to provide the range of perceived barriers as a basis for the subsequent discussion of solutions.

Beginning with the agricultural stakeholders, then moving to the conversion, distribution, and end use stakeholder groups, participants were given three minutes each to discuss potential solutions that they believed important to accelerating biofuels development. After these participants from each component of the value chain spoke, government and public representatives were given an opportunity to respond and discuss. Potential solutions for each sector were recorded in real time, and compiled into sectoral solution lists in preparation for a prioritization process.

The prioritization process allowed the overall group and each stakeholder group to establish the relative importance of the solutions.

A Word About Terminology

- *Overall group*—refers to all Summit participants who voted in the prioritization process
- *Sector*—refers to a component of the value chain (agriculture, conversion, distribution, end use)
- *Stakeholders*—refers to a subset of participants

For example, the prioritization process included votes on how the *overall group* and the agricultural, conversion, distribution, and end use *stakeholders* voted on solutions pertaining to the four *sectors*.

An innovative real-time electronic voting process was utilized to quickly collect data from individual participants. By each component of the value chain, Summit participants were asked to rank, using handheld voting devices, the potential solutions that had been suggested earlier in the day. The overall group average ranking was recorded, as well as the average ranking of stakeholders from each sector. The diversity of opinion within those stakeholder groups was also recorded.

Results from this prioritization process are discussed below.

Diversity of Prioritization Results

Several metrics are used to present the results of the prioritization process. The primary metric is average rank, of the overall group as well as of the stakeholder groups, which included:

- Agriculture
- Conversion
- Distribution
- End Use
- Government
- Elected Officials

The second metric that is discussed is diversity of response. Diversity is a statistic that varies between 0 and 100. A diversity score of zero means that everyone ranked a particular item the same, whereas a score of 100 means that exactly half responded as high as they could and half as low as they could. High diversity scores indicate polarization in the audience or stakeholder group.

III. Prioritization Results

A prioritization voting process was conducted for each component of the value chain (agriculture, conversion, distribution, and end use). The following sections describe the potential solutions offered by sector stakeholders pertaining to that component. Following the complete set of solutions, prioritization results are discussed, including top priorities and any differences in prioritization between groups of stakeholders.

Agriculture Sector Results

Potential solutions offered by agriculture stakeholders were as follows:

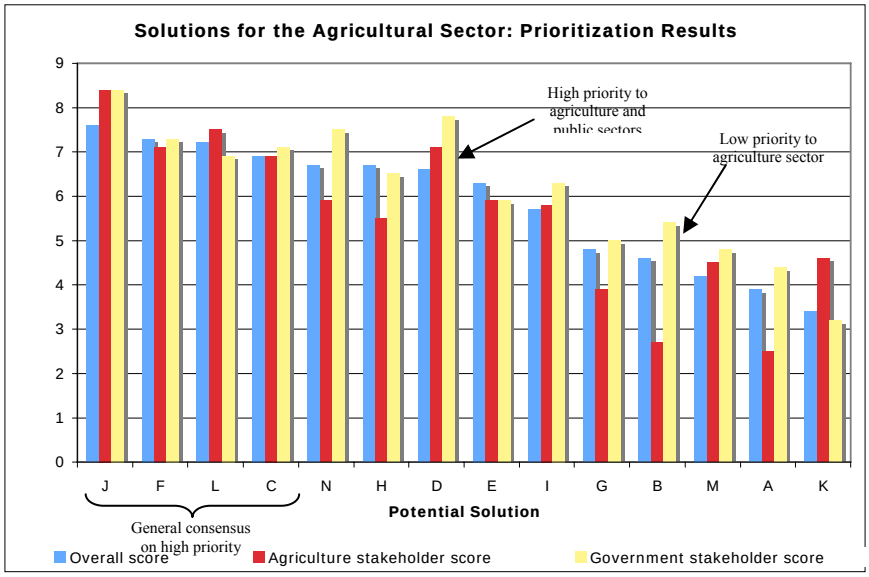
A.	Step in to **avoid subdivision** of Oahu agriculture properties and/or facilitate **coordination between landowners**
B.	**Make land leases long-term** to give certainty
C.	Finalize **Important Ag Lands** incentives[1]
D.	**Legislate prioritization** of water rights for agriculture/biofuels
E.	Prioritize decisions on streams, provide resources for the Commission on Water Resource Management to define **in-stream flow standards**
F.	**Streamline permitting** and re-zoning process (public/private partnership to map permitting requirements, biofuels permit "template", workshop for counties and agencies, re-engineer process)
G.	**Create Biofuels Authority or central coordinating person/group** with decision-making power to manage permitting process across government (including State and Counties)
H.	Ensure the **sustainability** of biofuels production
I.	Feedstock supply contracts at **long-term, minimum-price** from manufacturers or end users
J.	**Incentives for in-state production** (sliding scale subsidy, tax reduction linked to in-state feedstock production, mandate)
K.	**State to cover risk** when biofuels are more expensive than fossil fuels
L.	Incentives for **agricultural infrastructure investment** in water and roads (ITCs, reduced County property taxes)
M.	**Immigrant worker program** and agriculture worker housing program
N.	**Large-scale public/private R&D** for ethanol and biodiesel feedstocks (Biofuels Agency, MOU of understanding between HI and Brazil to take advantage of long R&D history in Brazil, curriculum at UH)

The overall group vote established the following priorities:

- **J**: Incentives for in-state production;
- **F**: Streamline permitting and re-zoning process;
- **L**: Incentives for agricultural infrastructure investment in water and roads; and
- **C**: Finalize Important Agricultural Lands Incentives.

As seen in the chart below, there was general consensus among the Summit participants, as a group, and the agricultural and government stakeholders on the importance of these solutions.

[1] The Important Agricultural Lands (IAL) program will provide incentives for in-state agricultural production. Because this process is already underway, it could provide a means to consider incentives for biofuel feedstock production.



However, there are two noticeable differences that deserve mention. First, Solution D: "Legislate prioritization of water rights for agriculture/biofuels" was ranked significantly higher by the agricultural and government stakeholders than by the overall group. The group's prioritization for this solution was low in part because of a low vote by Elected Official stakeholders. Due to the apparent importance of this solution to the stakeholders affected and to the government stakeholders, this solution likely deserves attention.

Second, Solution B: "Make land leases long-term to give certainty" was given significantly higher priority by the group and the government stakeholders than by the agriculture stakeholders. Also of note is that the agriculture stakeholders and government stakeholders are largely in agreement on most other issues, and that there is very little diversity of opinion within those stakeholder groups.

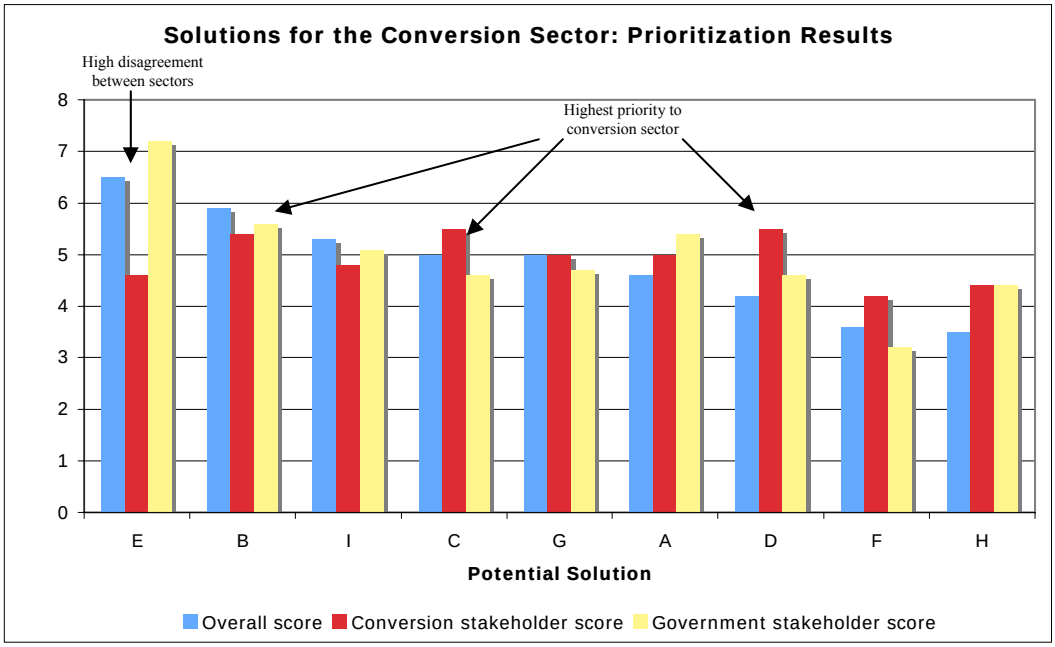
Conversion Sector Results

Solutions offered by conversion stakeholders were as follows:

A.	**Partial re-zoning** of agriculture lands for conversion facilities
B.	**Streamline permitting** and re-zoning process (public/private partnership to map permitting requirements, biofuels permit "template," workshop for counties and agencies, re-engineer process, etc.)
C.	**Create Biofuels Authority or central coordinating person/group** to manage permitting process across government
D.	Confirm commitment to existing **ethanol mandate**
E.	Incentives for **in-state production of feedstocks** to ensure supply
F.	**Harmonize tax credits** to make ethanol and biodiesel production **equal**
G.	**State tax credits** (price floor, make credits permanent, sliding scale incentive)
H.	**Facilitate coordination** between converters and anchor buyers
I.	**Invest in R&D** on next-generation technologies (expand HARC funding)

Unlike the agriculture sector vote, the overall group's priorities for the conversion sector were not well aligned to the conversion stakeholders' own priorities. The overall group's top three priorities for solutions within the sector were:

- **E**: Incentives for in-state production of feedstocks to ensure supply;
- **B:** Streamline permitting and re-zoning process; and
- **I**: Invest in R&D on next-generation technologies.



Overall group scores for this sector were relatively close to average, indicating that there were significantly greater differences of opinion on overall group priorities for the conversion sector than for the agricultural sector. This is most clear in the diversity of opinion on the group's top priority, Solution E: "Incentives for in-state production of feedstocks to ensure supply." While the overall group and the government stakeholders placed very high priority on this solution, conversion stakeholders ranked this solution seventh out of nine. This result indicates that conversion stakeholders may not place a high priority on in-state supply of feedstocks.

The top two priorities for the conversion sector reflect the need of manufacturers for certainty of demand and acceleration of the permitting process to bring new plants on line faster, and with greater efficiency. These are Solution C: "Create Biofuels Authority or central coordinating person/group to manage permitting process across government" and Solution D: "Confirm commitment to existing ethanol mandate." An extremely high diversity of opinion within the conversion stakeholders on Solution D (diversity score = 64) may reflect the differences between ethanol and biodiesel producers. Any differences between the needs of these two biofuels value chains should be explored further and considered in developing policies that do not favor either fuel type over the other, since both fuels will have a significant role in reducing Hawaii's oil dependence.

Distribution Sector Results

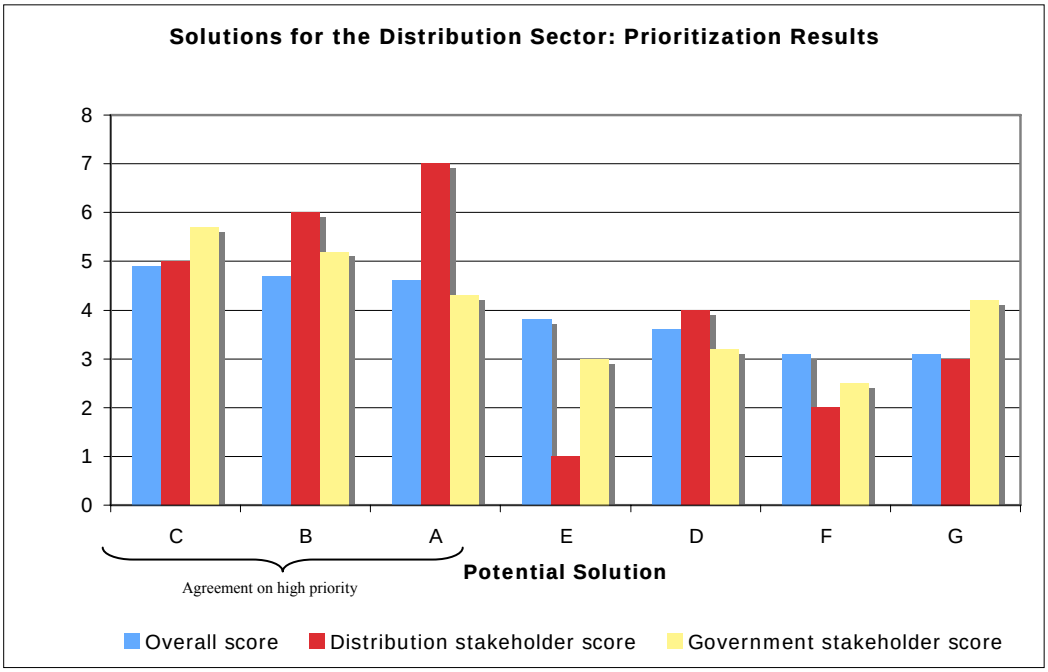
Solutions offered by distribution stakeholders were as follows:

A.	Create a **biofuels logistics master plan** for ports/roads/pipeline
B.	Investment incentives for **distribution infrastructure** (ports, terminals, storage)
C.	**Facilitate infrastructure development** due to congestion and lack of land availability (ex.—biofuels logistics master plan)
D.	**General funding support** to expand harbors
E.	**Streamline permitting**
F.	Reliable **off-take** agreements
G.	Facilitate **local self-sufficiency** by County

The overall group's top three priorities for solutions within the sector were:

- **C**: Facilitate infrastructure development due to congestion and lack of land availability.
- **B**: Investment incentives for distribution infrastructure (ports, terminals, storage); and
- **A**: Create a biofuels logistics master plan for ports/roads/pipeline.

As seen in the chart below, the general consensus between the overall group, distribution stakeholders, and government stakeholders on the importance of these solutions highlights the perception that infrastructure is the major obstacle for the distribution sector. When interpreting these results, it should be noted that there was only one distribution stakeholder.



However, the distribution stakeholder gave solutions A: "Create a biofuels logistics master plan for ports/road/pipeline" and C: "Facilitate infrastructure development due to congestion and lack of land availability" reversed priority compared to the overall group and government stakeholders (1st and 3rd vs. 3rd and 1st for the overall group and the public sector, respectively). This could indicate that distribution stakeholders expect the government to play a major role in launching a biofuels industry in Hawaii, by first establishing a clear direction (Solution A), then providing some funding (solution B: "Investment incentives for distribution infrastructure," and in a less important manner, facilitate infrastructure development (Solution C).

It is also important to highlight the high diversity score between government stakeholders on two proposed measures: A: “Create a biofuels logistics master plan for ports/road/pipeline” (52 diversity score), and G: “Facilitate local self-sufficiency by County” (51 diversity score). This difference may result from State vs. county government stakeholder representation. It might also be that these solutions lacked clarity, as they were not discussed in depth.

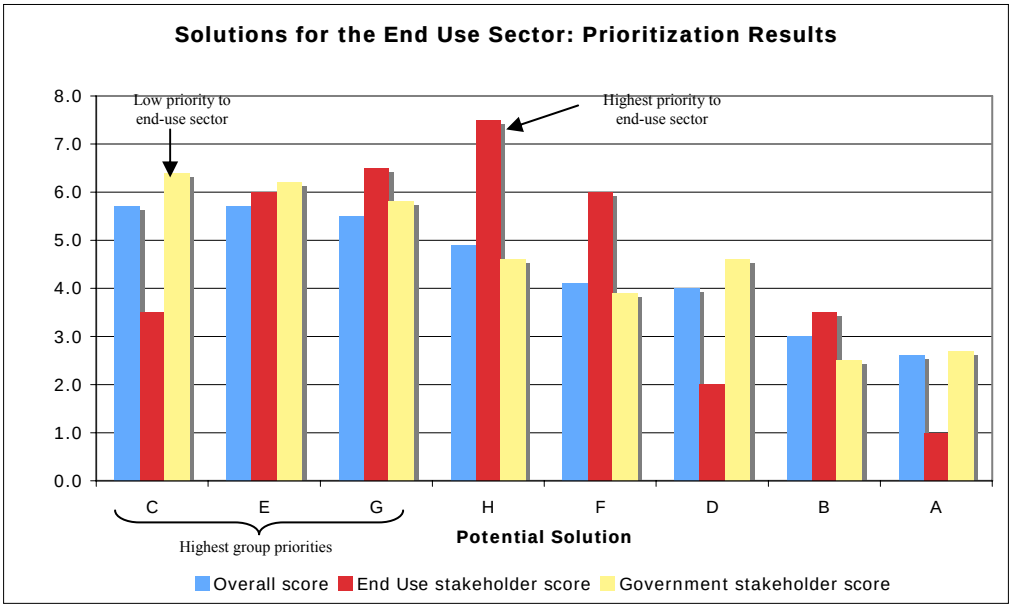
End Use Sector Results

Solutions offered by End Use sector participants were as follows:

A.	Subsidize purchase of **flex fuel vehicles**
B.	State, not ratepayer, to **cover any difference between biofuels price and oil price**
C.	Incentives for **in-state production** of biofuels
D.	Incentives for **increased storage** for biofuels
E.	Provide for **certainty of supply**
F.	Allow utilities to get a **higher rate of return** for biofuels
G.	**Streamline permitting**
H.	**PUC support** for utility participation in biofuels

The overall group and end use stakeholders had considerable differences in priorities. These differences are important, since the utility end use stakeholders can potentially provide a significant market for biofuels. The overall group’s top priorities for solutions within the sector are:

- **C**: Incentives for in-state production of biofuels;
- **E**: Provide for certainty of supply; and
- **G**: Streamline permitting.



The end use stakeholders' priorities may reflect the importance of the utility regulatory regime and its role in management of risk and return that may be associated with the transition from one fuel commodity to another. These stakeholders' top priorities, securing Public Utility Commission (PUC) support for utility participation in biofuels and allowing the utilities to get a higher rate of return for biofuels plants, were not among the overall group's top three priorities. From the end user perspective, the cost of biofuels is more important than its source; hence the lower importance of in state-production. These results indicate that the PUC and DCA should be actively engaged in the biofuels discussion.

IV. Next Steps

The Biofuels Summit framed the issues and focused the dialog on the most important actions State government and the private sector can take to encourage the growth of Hawaii's biofuels industry. Following the prioritization of solutions through the voting process, possible next steps toward implementation of six of the highest priority solutions were discussed. The six potential solutions were identified as overarching themes from among the top priorities from each sector vote. As a result of the discussion, next steps and lead agency were identified for four of the six solutions:

Provide incentives for in-state production

Incentives for in-state production received the highest priority in three of the four sector votes. This is clearly a priority to the agricultural stakeholders. However, while it was also ranked highest in the conversion and end use votes, this ranking is largely due to the vote of government stakeholders rather than the conversion and end use stakeholders themselves. Since the Hawaii Department of Agriculture (HDOA) is developing incentives under the Important Agricultural Lands (IAL) Initiative, an important next step for this solution is consideration of biofuels incentives within the IAL process.

Streamline permitting and secure County cooperation

Streamlining the permitting process was also ranked in the top three priorities of three of the sector votes. Permitting affects every sector of the value chain, and is therefore a high priority of the majority of stakeholders.

Bolster research & development

Ethanol and biodiesel feedstocks both require additional research and development (R&D). HDOA has brought together Hawaii's different agricultural research organizations to avoid duplication of efforts. It was proposed that HDOA or the University of Hawaii act as the coordinating body for this solution, and that Federal funding be sought for R&D through the U.S. Department of Energy and the U.S. Department of Agriculture.

Coordinate across the value chain

Biofuels development is complicated and significant coordination is needed to overcome key challenges identified during the Summit. DBEDT will arrange meetings of stakeholders to begin discussion of coordination between producers and buyers.

While the overall group prioritized the following areas as important, a clear lead and path forward did not emerge during the Summit.

Support infrastructure development

The highest priority of the distribution sector was clearly "support for infrastructure development." Infrastructure development was also key for the agricultural sector. Although the need for a subgroup to carry forward infrastructure solutions was identified, an appropriate entity to coordinate such an effort was not identified.

Clarify the water access issue

Water access and availability is clearly a key challenge for biofuels development. Two general methods were identified to carry this issue forward: (1) take legislative action or otherwise change Hawaii laws and regulations to favor agricultural uses of water, and (2) provide sufficient financial and personnel resources to the relevant agencies to execute tasks within the context of existing laws and regulations. However, while most sectors placed a high priority on legislating prioritization of water rights, voting results indicate that this area is a low priority for elected officials. Although Summit participants discussed many discrete next steps, including examining the potential for increased water efficiency and for the reuse of water, no clear next steps emerged.

V. Moving Biofuels Forward

The results of the Hawaii Biofuels Summit discussions and prioritization process indicate that there is a need for innovative collaboration between State government and the private sector to accelerate expansion of Hawaii's biofuels industry. For each of the identified priority solutions to be adequately addressed, leadership from multiple governmental agencies, non-government organizations, and the private sector must be engaged and must be committed to:

- Providing incentives for in-state production;
- Streamlining permitting and securing County cooperation;
- Bolstering and coordinating research and development on agricultural fuel crops, processing, and conversion;
- Developing infrastructure to move biofuels to market;
- Clarifying water access issues; and
- Coordinating investment across the value chain.

Appendix A: Barriers & Solutions

UNIVERSAL BARRIERS ACROSS THE BIOFUELS VALUE CHAIN			
Area	Barriers	Solutions	Examples and Potential Options
Physical Constraints	Markets/production geographic mismatch	1) Facilitate siting and permitting of biofuels production on Oahu 2) Increase distribution infrastructure between islands to allow fuel shipments 3) Quantify market demand for biofuels	
	Logistical infrastructure bottlenecks	1) Map out current uses and future needs of infrastructure 2) Provide infrastructure investment incentives 3) Take over responsibility for critical infrastructure 4) Provision of open access for biofuels through oil company infrastructure	• **ITC**: Florida has a state tax credit available for costs incurred July 1, 2006 to June 20, 2010 for 75% of all capital costs, operation and maintenance costs and R&D costs incurred in connection with an investment in the production, storage, and distribution of biodiesel (B10-B100) and ethanol (E10-E100) in the state. • **Detaxation**: Florida provides tax exemption on state sales tax, rental, use, consumption, distribution and storage tax on materials used in the distribution of biodiesel (B10-B100) and ethanol (E10-E100), including refueling infrastructure, transportation, and storage. Gasoline refueling station pump retrofits for ethanol also qualify. • **Open access**: extend "exclusivity" contract exemption to terminals by requiring terminals to accept biofuels fuels with regulated maximum tarrifs for biofuels. • Cost share between public and private for distribution infrastructure
Legal and Environmental	Permit time and complexity	1) Streamline permitting and rezoning process 2) Legislative mandates/exemptions if necessary 3) Public/private partnership to map permitting requirements, critical path 4) Create a Biofuels Authority, similar to the HCDA	• Washington: Single point coordination of biofuels permit through Dept of Ecology

		5) Create a biofuels permit "template" for standardized ethanol/biodiesel facilities that site-specific information can be plugged into; identify necessary/ relevant environmental assessments, water permits. Avoid duplicative permits. 6) Hold a permitting workshop for counties and state agencies to improve coordination 7) Train local private sector consultants to understand permitting process	
	Not In My Back Yard (NIMBY) phenomenon	1) Quantify and publicize the economic multiplier effects of in-state biofuels development	• Link funding to the amount of jobs being created/sustained
Financial Risks	Oil-biofuels spreads vs. investment cost recovery	1) Create a sliding scale biofuels tax credit that is tied to the price of oil	• Sugar industry price supports
	Research and development knowledge gaps	1) Invest in R&D on new crop cultivars and mechanical harvesting techniques to increase productivity to allow HI to compete 2) GMO for drought resistance 3) Start research on next generation biofuels technologies now, leverage federal funds 4) Establish MOU between HI and Sao Paulo, Brazil for technological cooperation 5) Expand HARC funding	• Federal funds: §1512 EPAct: Grants are available to producers of cellulosic biomass ethanol to assist the producers in building eligible production facilities. $100M-400M. • Incentives new technologies and crops that will, in long term, be self sustaining
	Stability and duration of government policies and incentives	1) Improve public awareness of the value of biofuels to engender long-term community support 2) Confirm commitment to E10 mandate	• Extend federal/state incentives • Focus HI congressional delegation on extension of Federal biofuels credits (sliding scale)

AGRICULTURE: ETHANOL FEEDSTOCKS			
Area	Barriers	Solutions	Examples and Potential Options
Physical Constraints	Contiguous land at minimum efficient scale (20,000 acres for sugarcane)	1) Facilitate availability of water and markets to encourage commitment from landowners that are focused on agriculture 2) Step in to avoid subdivision of Oahu agriculture properties	• Conservation districts • Important Agricultural Lands • Land trusts • Transfer of Development Rights on land • Variances on agriculture land for condominium

		3) Facilitate coordination between landowners 4) For development-focused landowners, allow residential-ag condos for biodiesel (similar structure to Hokulia)	
Legal and Environmental	Water availability and cost	1) Appropriate solution is island/site specific 2) State ownership of water assets, like water utility for Oahu (Lake Wilson); may require exercise of eminent domain 3) Legislate prioritization of water rights 4) Encourage legislature to consider tax credits for water infrastructure investment. 5) Prioritize public-sector water infrastructure investment. 6) Prioritize streams in light of agriculture, and create in-stream flow standards (recognizing that this will ultimately be decided by the courts) 7) Determine fair water allocation and pricing methodology 8) Create ITCs or other financing mechanisms to buy down cost of private water improvement actions (wells, restoration of irrigation) 9) R&D to determine cultivars that are less water intensive/more drought resistant	
	Environmental emissions/effluents	1) Coordinate with private sector to understand what emissions/effluents are for ethanol facilities and what permits are necessary 2) Ensure the sustainability of biofuels production	• Green Star Products biodiesel production with zero net carbon dioxide emissions in Idaho
Financial Risks	Lead time to market	1) Utility supply contracts for volume off-take	• When not in production, but land growing biofuel crop, receive x% of market price per bushel. Based on acreage in production. • Start-up incentives: low/no interest loans for biofuel farm equipment
	Long-term off-take &	1) Utility as anchor buyer for biofuels at	•

	minimum price floor	minimum floor price 2) Finalize Important Ag Lands incentives 3) Establish price protections for farmer	
	Import Parity	1) Crop subsidies (sliding scale) for Hawaii biofuels vs. import parity 2) Detaxation linked to in-state production (phased in)	• Indiana offers a $1/gallon tax credit for in-state production of B100 that is used to create blended biodiesel; the blender receives a $0.02/gallon tax credit for biodiesel (B2 and higher) blended in Indiana; distributors receive a $0.01/gallon tax credit for biodiesel distributed in Indiana. The credits have individual monetary caps and a cumulative monetary cap. • Washington and Minnesota have Renewable Fuel Standards that are conditional, based on the in-state production of biodiesel and ethanol. If in-state capacity is not at the level needed to meet the renewable fuel standard, then the standard will not go into effect.
	High investment for infrastructure	1) ITC or accelerated depreciation for agricultural investments in water, roads, or production infrastructure 2) Reduce property taxes for land in biofuels; must lower investment cost to lower required duration for contracts 3) Allow residential development to subsidize mixed agriculture (500 acre/biodiesel/orchard)	• Florida tax exemption on infrastructure • Colorado sliding scale tax credit for investment in infrastructure: 35% of investment 2006-2009; 20% of investment 2009-2011
	Labor cost/availability	1) Immigrant worker program and ag housing program; temporary labor force, if necessary. 2) Reduce benefits requirements or provide exemptions to lower labor cost for immigrants 3) Create educational programs for workers/maintenance crews to train on new crops/technologies	• Agribusiness Education Training and Incubation (AETI) program at UH
	Research and Development	1) Public private collaboration of biofuels crop R&D, ~$10 MM, 3-year effort needed. State and federal funding, leveraging local agricultural research institutions, in partnership with international institutes.	• Renewable Energy & Energy Efficiency Improvement Grant program (USDA) • Value-Added Grant program (USDA) • Advanced Energy Initiative loan guarantees • §932 EPAct 2005: R&D, demonstration, and commercial application for bioenergy, including

		2) Explore improved varieties of sugar cane 3) Direct R&D funding to include crops that rely on minimal water; invasive plants 4) Direct a % of ag research funding to be dedicated to biofuels 5) Focus UH college of engineering on biofuels	biofuels. • Hawaii Act 221 Tax Credit Eligibility
	Continuity of land leases	1) Put state lands in long-term leases 2) Through Act 183, identify important agricultural lands to be committed to agriculture in long-term	•

AGRICULTURE: BIODIESEL FEEDSTOCKS			
Area	Barriers	Solutions	Examples and Potential Options
Financial Risks	Lead time to market	*Same as for ethanol feedstocks*	• *Same as for ethanol feedstocks*
	Long term off take/minimum price floor	*Same as for ethanol feedstocks*	• *Same as for ethanol feedstocks*
	Crop selection/R&D	1) Fund R&D to determine viable biodiesel crops for Hawaii, and cost structure 2) Direct R&D funding to include crops that rely on minimal water; invasive plants 3) Focus needs to be on mechanical harvesting and efficient processing/ byproduct utilization	• R&D funding, look federally and at Midwest universities • UH funding for biodiesel algae
	Labor cost/availability	*Same as for ethanol feedstocks*	• *Same as for ethanol feedstocks*
	Continuity of land leases	*Same as for ethanol feedstocks*	• *Same as for ethanol feedstocks*

CONVERSION			
Area	Barriers	Solutions	Examples and Potential Options
Physical Constraints	Impact to refinery balances		
	Moving product to market		
Legal and Environmental	Facility zoning on ag lands	1) Allow for partial re-zoning for conversion facilities 2) Work with counties to facilitate re-zoning process	• Variances for agricultural land for ethanol • Amend Cooperative structure for biodiesel to allow non-farmers to invest so farmers have enough equity.

		3) Identify appropriate uses on ag lands	
Financial Risks	Security of feedstock supply and cost	1) Create incentives for local production at a cost-competitive level 2) Make existing tax credits permanent 3) Harmonize tax credits to make ethanol and biodiesel equal	• Indiana example mentioned above.
	Duration of off-take agreements	1) Facilitate coordination between converters and anchor buyers (utilities, marine 2) Invest in R&D on next-generation conversion technologies	• Instead of creating a floor price of commodity, create a tax on oil when it drops below the price of alt. fuel. or create CO2 tax

DISTRIBUTION			
Area	Barriers	Solutions	Examples and Potential Options
Physical Constraints	Limited port, terminal, and storage capacity & monopoly control	1) Require open access for terminals and port storage; explore capacity to store various fuels in existing storage units, etc. 2) State ownership/utility for terminals and port storage 3) State funds support for distribution network upgrades including roadway systems 4) Create a biofuels logistics master plan for ports/roads/pipeline to allow movement of product to Oahu 5) Investment incentives for distribution infrastructure (including incentives directed at private landowners for terminals and pipelines) 6) Facilitate infrastructure development due to congestion and lack of land availability 7) Subsidize investment in E85 infrastructure 8) Create pilot E85 project with small piece of land near energy corridor for tank, a few pumps, and loading rack, trucks and a few stations (~$10MM) 9) Facilitate local self-sufficiency by county	• Florida example of tax exemptions for storage
Financial	Market	10) Guarantee reliable off-take agreements	•

Risks			

END USE			
Area	Barriers	Solutions	Examples and Potential Options
Physical Constraints	Availability, cost, and consumer demand for flex fuel vehicles	1) Subsidize purchase of flex fuel vehicles 2) Mandate graduating sale scale for FFVs	• Tax credit for purchasing alt fuel vehicles: CO, CT, GA, IL, IN, KS, LA, NY, OK, OR, TX • Free parking for hybrids/ alt fuel vehicles: AZ, CA, CT, TX, UT
Legal and Environmental	OEM warranties		• ASTM Fuel standard for B20 in development, due 2007.
	Air emissions impacts		
	Reliability of biofuels supply vs. obligation to serve	1) Support in-state production 2) Subsidize increased storage	
	Prudence of long-term fixed-price fuel contracts	1) State, not ratepayer, to cover difference between biofuels price and oil price to ensure no rate increase due to biofuels (no hidden tax) 2) Allow utility to vertically integrate for sharing of current converter profit margin; direct PUC to consider higher rate of return for utilities 3) Allow utility to enter into tolling arrangement 4) Provide PUC support for utility participation in biofuels	• Reduce fuels contract duration to 5 year with options to extend, since if oil drops, dual fuel units can be switched and biodiesel investment is recovered.
Financial Risks	Impact on rates when biofuels are more expensive than oil	1) Pay for potential overages from benchmark with government fund	
	Long-term buyer	2) Partnership with Dept of Defense	

Appendix B: Detailed Prioritization Results

The following tables contain the results of the prioritization vote for each sector. Solutions are ordered by overall group score from highest priority to lowest priority. Average scores are also presented for each stakeholder group, along with the diversity of that stakeholder group's vote. Diversity represents the extent to which voters in that stakeholder group agreed or disagreed about the priority of a particular solution.[2] As a general rule of thumb, a diversity score <30 indicates a high degree of agreement, a score between 31 and 50 indicates moderate agreement, and a score >50 indicates a high degree of disagreement.[3] Pink indicates the solution with the highest score for that sector, and blue indicates the solution with the lowest score for that sector.

Agriculture Sector Results

Highest possible score: 14
Lowest possible score: 1

	Solution	Overall score	Agriculture		Conversion		Distribution		End Use		Elected Official		Public Sector	
			Score	*Diversity*	*Score*	*Diversity*	*Score*	*Diversity*	*Score*	*Diversity*	*Score*	*Diversity*	*Score*	*Diversity*
J	**Incentives for in-state production** (sliding scale subsidy, detaxation linked to in-state, mandate, etc)	7.6	8.4	16	5.9	52	7	0	9	0	5.2	13	8.4	20
F	partnership to map permitting requirements, biofuels permit ŅtemplateÓ, workshop for counties & agencies, re-engineer proces etc)	7.3	7.1	34	7.1	40	10	0	8.5	11	7.2	6	7.3	23
L	Incentives for **agricultural infrastructure investment** in water and roads (ITCs, reduced County property taxes)	7.2	7.5	50	7.4	15	8	0	8	5	5.8	33	6.9	14
C	Finalize **Important Ag Lands** incentives, etc	6.9	6.9	36	5.9	33	9	0	6	0	7.8	16	7.1	33
H	Ensure the **sustainability** of biofuels production	6.7	5.5	37	6.8	31	10	0	8.5	1	8	42	6.5	34
N	**Large-scale public/private R&D** for ethanol and biodiesel feedstocks (ex.ŅBiofuels Agency, MOU of understanding between HI and Brazil, curriculum at UH)	6.7	5.9	34	5	67	9	0	6	79	9	2	7.5	22
D	**Legislate prioritization** of water rights for agriculture/biofuels	6.6	7.1	41	6.4	21	6	0	7.5	1	2.2	23	7.8	29
E	Prioritize decisions on streams, provide resources for Water Commission to define **in-stream flow standards**	6.3	5.9	45	5.5	15	8	0	9	5	8.2	6	5.9	34
I	Feedstock supply contracts at **long-term, minimum-price** from manufacturers or end users	5.7	5.8	43	6	27	7	0	3.5	11	3.8	3	6.3	28
G	**Create Biofuels Authority or central coordinating person/group** with decision-making power to manage permitting process across government (including State and Counties)	4.8	3.9	29	4.5	57	4	0	2.5	11	5.5	36	5	51
B	**Make land leases permanent** to give certainty	4.6	2.7	29	6.1	31	5	0	4.5	60	4.8	31	5.4	41
M	**Immigrant worker program** and ag housing program	4.2	4.5	35	2.1	10	5	0	4.5	1	3	27	4.8	39
A	Step in to **avoid subdivision** of Oahu agriculture properties and/or facilitate **coordination between landowners**	3.9	2.5	17	4.4	46	3	0	3	20	7	15	4.4	30
K	**State to cover risk** when biofuels are more expensive than alternative	3.4	4.6	35	2.6	31	1	0	6.5	60	1.5	4	3.2	34

[2] Diversity is a statistic that varies between 0 and 100. A diversity score of zero means that everyone responded exactly the same way to the question whereas a score of 100 means that exactly half responded as high as they could and half as low as they could. High diversity scores indicate polarization in the audience or subgroup. Diversity is calculated as the Sum of Squares (Sum of Squared deviations from the mean or SS) that exists in the data divided by the maximum SS that could exist if the audience was equally split at the low and high end of the scale (times 100).
[3] Diversity scores for the Distribution Sector are all reported as zero because only one person voted in that category.

Conversion Sector Results

Highest possible score: 9
Lowest possible score: 1

	Solution	Overall score	Agriculture		Conversion		Distribution		End Use		Elected Officials		Public Sector	
			Score	*Diversity*	*Score*	*Diversity*	*Score*	*Diversity*	*Score*	*Diversity*	*Score*	*Diversity*	*Score*	*Diversity*
E	Incentives for **in-state production of feedstocks** to ensure supply	6.5	6.8	41	4.6	37	6	0	5.5	14	6.8	11	7.2	18
B	**Streamline permitting** and re-zoning process (public/private partnership to map permitting requirements, biofuels permit ŅtemplateÓ, workshop for counties and agencies, re-engineer process, etc)	5.9	5.8	24	5.4	30	9	0	9	0	4.8	11	5.6	38
I	**Invest in R&D** on next-generation technologies (expand HARC funding)	5.3	6	47	4.8	21	7	0	5	6	4.2	67	5.1	29
C	**Create Biofuels Authority or central coordinating person/group** to manage permitting process across government	5	4.8	44	5.5	44	5	0	4	25	4.7	60	4.6	48
G	**State tax credits** (price floor, make credits permanent, sliding scale incentive)	5	5.1	43	5	41	8	0	6.5	14	5	28	4.7	25
A	**Partial re-zoning** of ag lands for conversion facilities	4.6	4.4	37	5	34	2	0	5	0	1.8	4	5.4	49
D	Confirm commitment to **existing ethanol mandate**	4.2	3.4	29	5.5	64	1	0	3	0	5.5	5	4.6	39
F	**Harmonize tax credits** to make ethanol and biodiesel production **equal**	3.6	3.1	22	4.2	51	4	0	4.5	39	5.2	32	3.2	40
H	**Facilitate coordination** between converters and anchor buyers	3.5	2.1	16	4.4	45	3	0	1	0	5.5	64	4.4	32

Distribution Sector Results

Highest possible score: 7
Lowest possible score: 1

	Solution	Overall score	Agriculture		Conversion		Distribution		End Use		Elected Officials		Public Sector	
			Score	*Diversity*	*Score*	*Diversity*	*Score*	*Diversity*	*Score*	*Diversity*	*Score*	*Diversity*	*Score*	*Diversity*
C	**Facilitate infrastructure development** due to congestion and lack of land availability (ex.Ňbiofuels logistics master plan)	4.9	4.2	22	3.4	19	5	0	5.5	3	6.2	2	5.7	11
B	**infrastructure** (ports, terminals, storage)	4.7	3.8	35	4.9	5	6	0	5.5	25	3.8	8	5.2	10
A	Create a **biofuels logistics master plan** for ports/roads/pipeline	4.6	4.8	39	3.1	60	7	0	5.5	25	5.8	52	4.3	52
E	**Streamline permitting**	3.8	3.8	59	4.6	41	1	0	4.5	25	4.8	13	3	16
D	**General funding support** to expand harbors	3.6	4.2	41	3.8	27	4	0	4	11	2.5	31	3.2	27
F	Reliable **off-take** agreements	3.1	3	46	4.8	72	2	0	1.5	3	4	72	2.5	23
G	Facilitate **local self-sufficiency** by County	3.1	2.2	24	3.4	47	3	0	1.5	3	3	28	4.2	69

End Use Sector Results

Highest possible score: 8
Lowest possible score: 1

	Solution	Overall score	Agriculture		Conversion		Distribution		End Use		Elected Officials		Public Sector	
			Score	*Diversity*	*Score*	*Diversity*	*Score*	*Diversity*	*Score*	*Diversity*	*Score*	*Diversity*	*Score*	*Diversity*
C	Incentives for **in-state production** of biofuels	5.8	5.1	43	6	29	4	0	5	8	5	71	6.4	37
E	Provide for **certainty of supply**	5.4	4.5	57	4.8	16	1	0	4.5	18	7.5	2	6.2	17
G	**Streamline permitting**	5.4	5.3	56	5.6	30	2	0	6	33	4.7	34	5.8	27
H	**PUC support** for utility participation in bi	4.7	4.6	33	5.5	41	3	0	4	73	4.2	10	4.6	44
D	Incentives for **increased storage** for biofuels	4.2	3.3	14	3.6	20	6	0	4.5	51	6	37	4.6	28
F	Allow utilities to get a **higher rate of return** for biofuels	4	4.5	40	4.4	42	5	0	3.5	18	3	12	3.9	33
B	State, not ratepayer, to **cover any difference between biofuels price and oil price**	3.1	3.2	38	3.4	30	8	0	4	8	2.7	45	2.5	24
A	Subsidize purchase of **flex fuel vehicles**	2.9	2.3	30	3.4	57	7	0	4.5	100	3	16	2.7	28