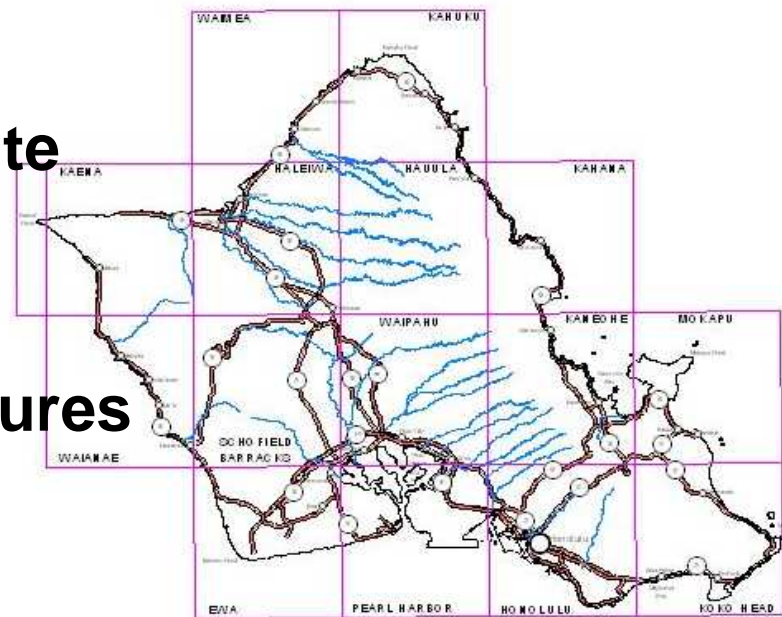
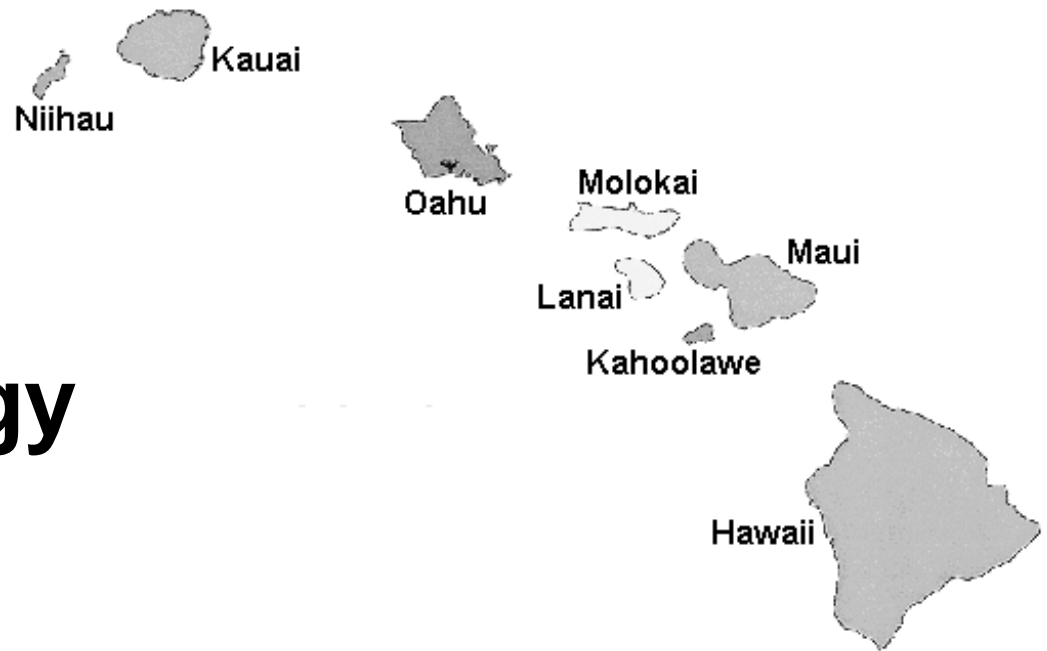




# Hawaii Bioenergy Master Plan

Scott Turn  
Hawaii Natural Energy Institute  
University of Hawaii

Sakamaki Extraordinary Lectures  
August 5, 2009



# Hawaii Bioenergy Master Plan

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- Legislatively mandated in 2007
- 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.*



## .... address the following outcomes

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- 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.”**

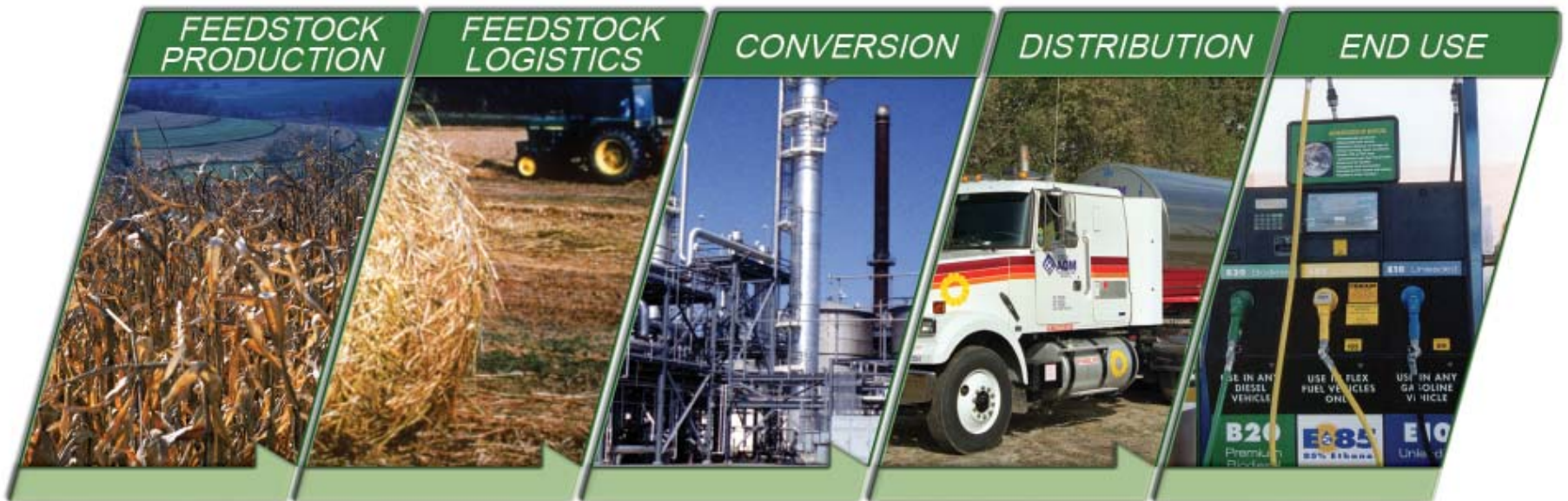


# .... address the following issues

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.”*



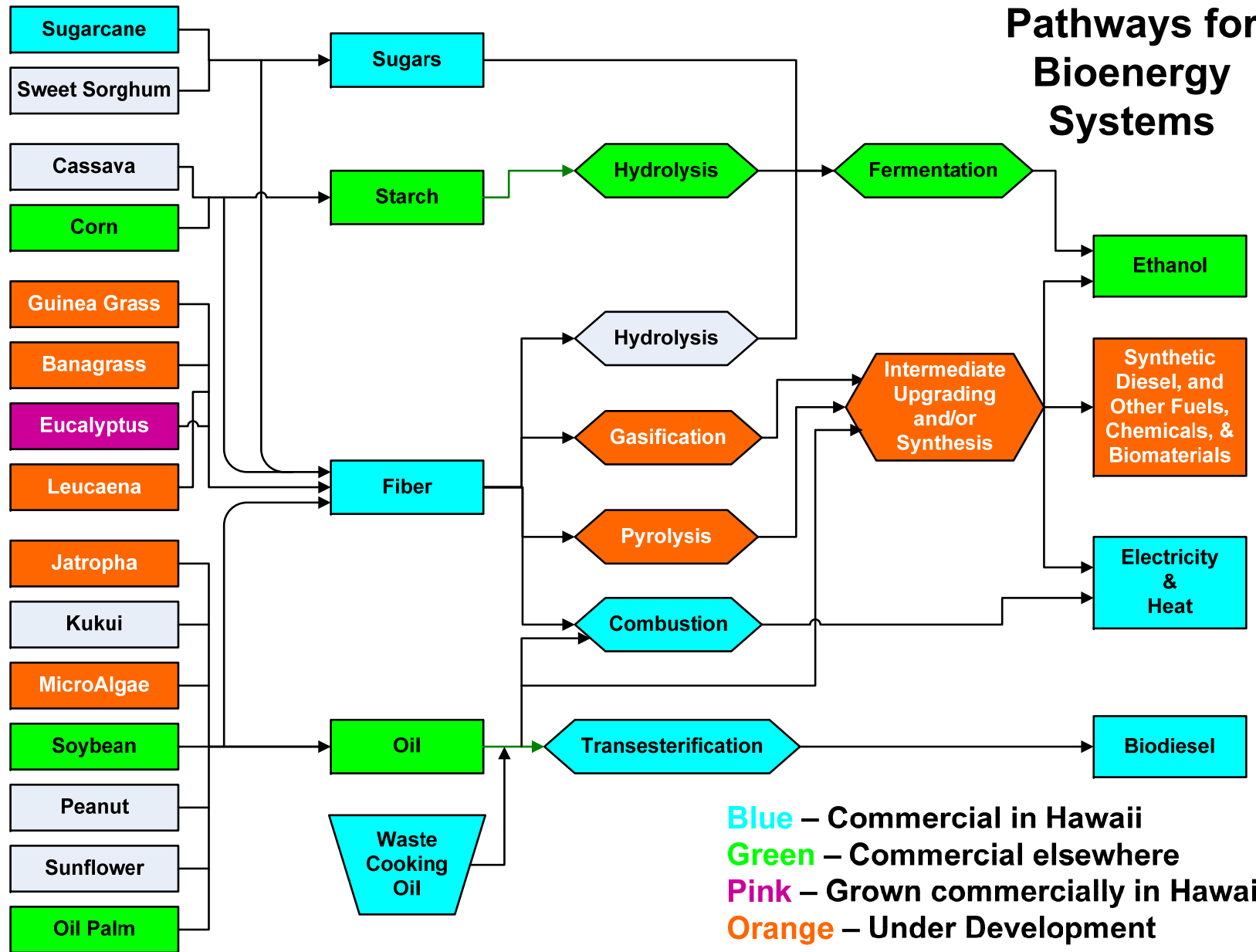
# Five Part Biofuel Value Chain



<http://www1.eere.energy.gov/biomass/pdfs/nbap.pdf>



# Pathways for Bioenergy Systems



Crops

Intermediate Products

Conversion Technologies

Bioenergy Products

***OUTCOME I: Evaluation of Hawaii's potential to rely on biofuels as a significant renewable energy resource***

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- 1. Water resources***
- 2. Land resources***
- 3. Distribution infrastructure for both marine and land***
- 4. Labor resources and issues***
- 5. Technology to develop bioenergy feedstock and biofuels***
- 6. Integration and evaluation***



## ***OUTCOME II: Plan or roadmap to implement commercially viable biofuels development***

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- 1. Permitting***
- 2. Financial incentives and barriers and other funding***
- 3. Business partnering***
- 4. Identification and analysis of the impacts of transitioning to a bioenergy economy while considering applicable environmental concerns***
- 5. Integration and plan development***



# Remaining Activities

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- **OUTCOME III**: Strategic partnerships for the research, development, testing, and deployment of renewable biofuels technologies and production of biomass crops
- **OUTCOME IV**: Biofuels demonstration projects, including infrastructure for production, storage, and transportation of biofuels
- **OUTCOME V**: Promotion of Hawaii's renewable biofuels resources to potential partners and investors for development in Hawaii as well as for export purposes



# ***OUTCOME I: Evaluation of Hawaii's potential to rely on biofuels as a significant renewable energy resource***

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## **Water resources**

***Ali Fares, UH Department of Natural Resources and Environmental Management***

***Aly El-Kady, UH Water Resources Research Center***

***William Tam, Attorney at Law***

***Denise Antolini, Richelle Thomson, UH Law School***

## **Land resources**

***Richard Ogoshi, UH Dept. of Tropical Plants and Soil Sciences***

***Carl Evensen, Ali Fares, UH Department of Natural Resources and Environmental Management***

***William Tam, Attorney at Law***

***Denise Antolini, Richelle Thomson, UH Law School***



# ***OUTCOME I: Evaluation of Hawaii's potential to rely on biofuels as a significant renewable energy resource***

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## **Infrastructure (marine and land)**

***Manfred Zapka, Marc M. Siah & Associates, Inc., Engineering Consultants***

## **Labor**

***James Spencer, UH Globalization Research Center  
ann Yamamoto, Consultant and former Exec. Director of  
Workforce Development Council, DLIR***

## **Technology**

***Samir Khanal & Charles Kinoshita, UH Dept of Molecular  
Biosciences and Bioengineering  
Scott Turn, UH HNEI***

## **Integration and evaluation**

**Team**



# ***OUTCOME II: Plan or roadmap to implement commercially viable biofuels development***

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## **Permitting**

***Manfred Zapka, Marc M. Siah & Associates, Inc.***

## **Financial incentives**

***Denise Konan, Iman Naseri, Craig Cole, UH Dept. of Economics***

## **Business partnering**

***Steven Chiang, Janel Yamamoto, UH Agribusiness Incubator Program***

***Charles Kinoshita, UH Dept. of Molecular Biosciences and Bioengineering***

## **Impacts**

***Makena Coffman, UH Department of Urban & Regional Planning***

***Andrew Tomlinson, Pacific Consulting Services, Inc.***

***Curtis Daehler, UH Department of Botany***

## **Integration and plan development**

***Team***



# Significant Resource Working Scenario

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- **Displacement of 20% of 2007 transportation (gasoline and diesel) and power generation (diesel and fuel oil) fuel use**
- **Bioenergy projects identified by HECO in Hawaii Clean Energy Initiative agreement of 10-20-08**
- **Bioenergy projects identified by KIUC**



# Project Timeline

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- **9/05/08 – Stakeholder meeting in conjunction with the Hawaii Ag Conf.**
- **4/02/09 – Stakeholders meetings**
- **6/30/09 – First draft plan to DBEDT**
- **8-9/09 – Draft plan completed and distributed for review**
- **10/09 – Final draft due to DBEDT**
- **12/09 – Final plan to DBEDT**



# Hawaii Bioenergy Master Plan



U.S. Department of  
**ENERGY**



[www.hnei.hawaii.edu/bmpp/home.asp](http://www.hnei.hawaii.edu/bmpp/home.asp)