

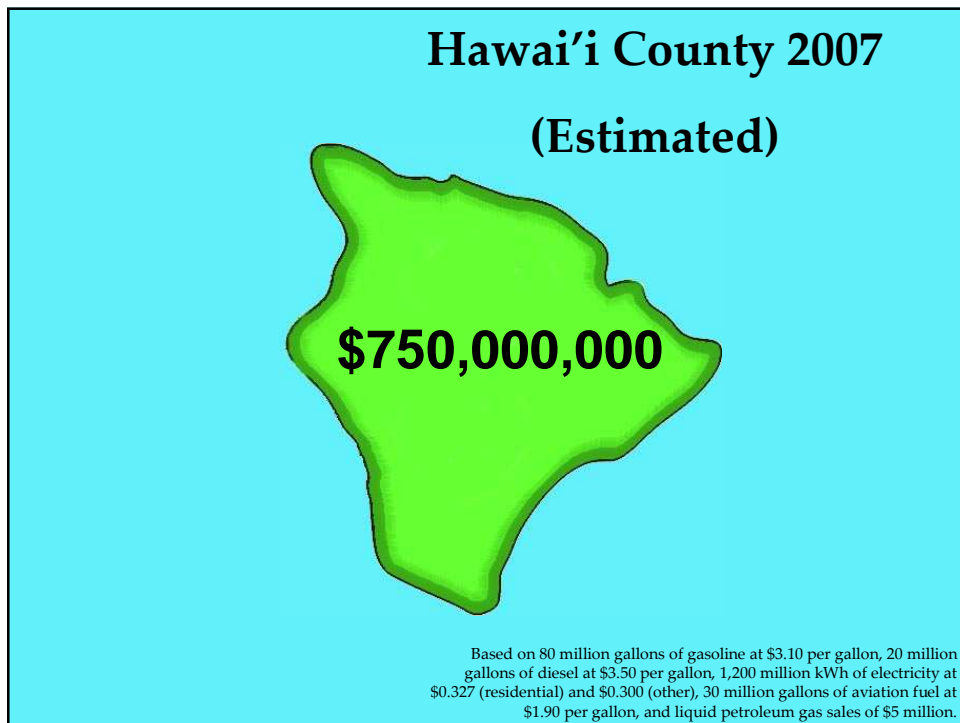
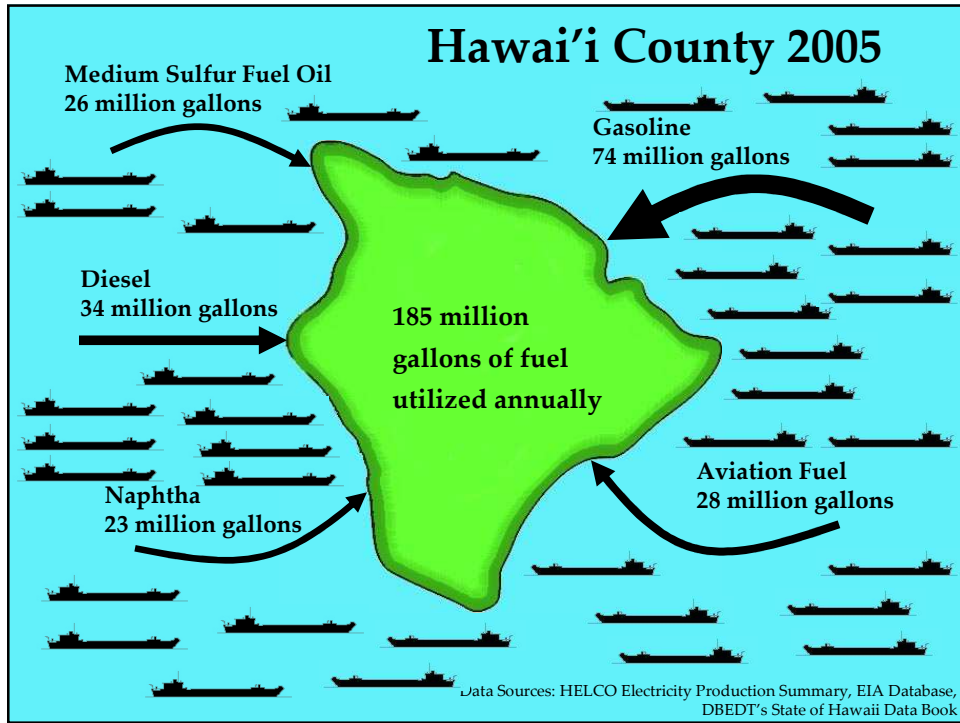
Fueling the Future of Hawai`i Island

County of Hawai`i

Hawai`i's Statewide Bioenergy Master Plan
Kick-Off Meeting
May 21, 2008 Honolulu, Hawai`i

Intersection of Agriculture & Energy

- Bioenergy presents broad concerns inherent with its development including
 - Energy Security
 - Food Security
 - Economic Viability
 - Impacts on Natural Resources
 - End-Use Efficiency Tradeoffs



In Harmony with the Island

- Community voices state clearly the desire for businesses to be in harmony with the community and the environment
 - General Plan Update, 2005
 - Community Development Plans 2006-2008
- Small, locally based businesses are embraced
- Living wages and affordable housing

A Community Vision...

- Locally grown and produced energy can also afford our communities the opportunity to assure that environmentally sound practices are adhered to and energy security is enhanced

Opportunities ...

- Landholdings extensive and available at reasonable prices
- Zoning infrastructure in place to support both production and processing
- No set systems for the industry- allows for innovation

Challenges...

- **Environmental Constraints**
 - Land use & competition with food crops
 - Water use constraints
 - Possible invasive species
 - Pesticides & herbicides
- **Financial Constraints**
 - Desire to have long term purchase contracts to mitigate risk of capital investment
- **Physical Constraints**
 - Limited port storage
 - No refining capacity
 - Impact on local infrastructure
- **End-Use Efficiency**
 - Power plant inefficiencies
 - Transportation sector may result in the preferred biofuels target

Procurement & The Market

- So what is the market on Hawai`i Island?
 - HELCO, a subsidiary of HECO, will transition its diesel powered plants from petroleum to biodiesel
 - This is significant market encouragement for locally grown biocrops and biodiesel
 - Yet, it is not clear if the utility's commitment to purchase certified, sustainable biofuels is a requirement or simply a purchasing preference

County's Interests...

- The County has a dual role of allowing the emerging market to function properly and yet monitoring its development and intervening where necessary
- The County can also serve as a source of information for the local population as developments and decisions are made about this new industry

County's Influence...

- County of Hawai'i's role to influence the development of bioenergy crops is limited
 - Mayor, Council, Water Supply and Environmental Management may play a role in larger projects
 - Partnerships with the industry are key
- Large private investment and utilities responding to market indicators play a significant role in determining the industry's success

County's Incentives...

- Success of new crops and industries are often contingent upon adequate subsidies
 - County RPT rates at \$8.35 per \$1000 assessed value
 - Agricultural or Ranch Land Dedication Program requires long term commitment to active agricultural production with lower assessed value
 - Biomass crops assessed at \$500 dedicated lands

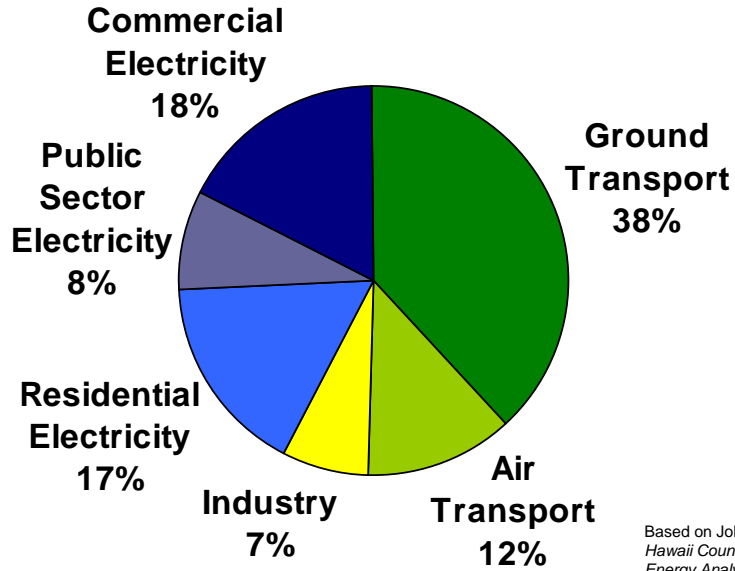
Incentives Cont...

- Potential for the creation of energy zones
 - Facilitate energy crop growth
 - Facilitate bio-fuel processing
 - Streamlined permitting process at the County level including zoning & building permits

County Regulatory...

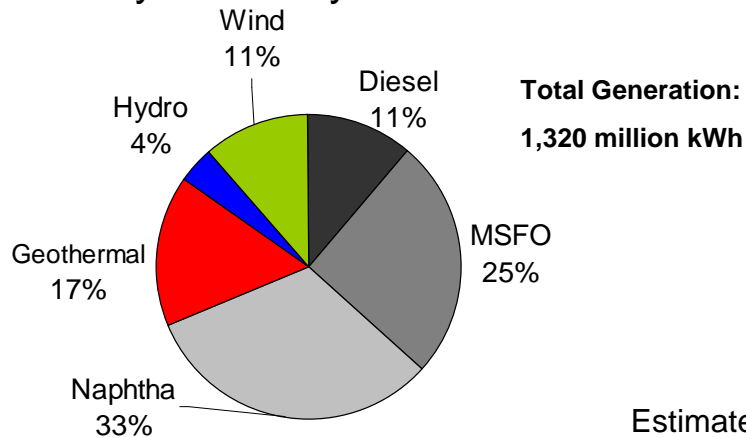
- Direct influence over zoning
- Some coastal management issues
- Access to domestic water

How is energy used on the island?



Electricity Generation

Hawaii County Electricity Production - 2008



The Potential...

- HARC's 2006 study, "Biodiesel Crop Implementation in Hawai'i" indicated
 - Potential yields in Hawai'i County at over 100 million gallons of biodiesel
 - Resulting in meeting the needs of all the island's demand for highway, non-highway and utility use three times over

Potential Crops

- Kukui Nut (*Aleurites moluccana*)
- Macadamia Nut
- Avocado
- Coconut
- All have the highest oil content of any species with the exception of palm oil

Deploy multiple technologies to succeed

- Algae may have the largest potential with low inputs and high output of energy
- Agroforestry is well established on Hawai`i Island; therefore, research is needed in
 - Integrated agroforestry principals applied
 - Result is less inputs and reduced costs
 - To establish more diverse, productive and healthy forests
 - Remain profitable and commercially viable

Life Cycle Benefits...

- All biofuels are not created equal; hence, a wide array of energy yields and environmental impacts can be expected

Local life cycle costs...

- Recommended research be carried out to address Hawai`i Island life cycle energy benefits and added energy security under a range of production schemes
 - A master plan with requirements for land, water, capital & infrastructure
 - Coordination of local infrastructure improvements
 - County lands made available
 - Assistance provided to local growers

Current Efforts by County...

- Procure funding for experimental production studies to assess the feasibility of cellulosic and biodiesel crop growth and harvesting on Hawai`i Island.
 - Supplemental funds to support research into production and fuel potential
 - Access provided to County lands at Paauilo for UH-H's College of Agriculture, Forestry & Natural Resource Management

Support Resources...

- UHH College of Agriculture, Forestry & Natural Resource Management
- UH-M College of Tropical Agriculture & Human Resources
- DBEDT – Natural Energy Lab of Hawaii
- U.S. Department of Agriculture Programs and Offices include:
 - Pacific Basin Agriculture Resource Center
 - Forest Service
 - Rural Development

Communities determining trade-offs...

- Food production vs. energy production
- Land and water use
- Potential for introduction of invasive species
- Fate of by-products or waste materials
- Lag time to production
- Uncertainty of crop yields
- Labor costs

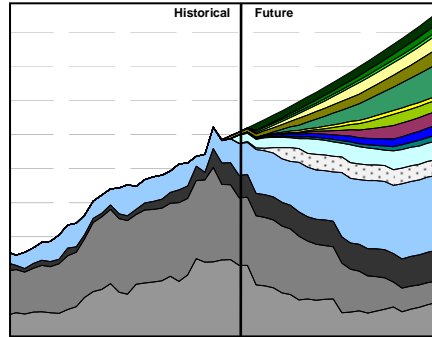
Desired Outcomes...

- Development of a bioenergy industry should contribute to, rather than detract from, sustainable agriculture
- Local crops and production of fuels could result in improved energy security
- A local bioenergy industry can provide an economic boon to local agriculture and related support sectors through synergy and research

The Vision...

- Small scale to match the diversified land holdings and communities' desire for smaller-sized businesses
- On island use of the bioenergy production vs. for export
- Non-extractive utilization of the natural resources
- Regenerative approach – cellulosic processing of crops and by-products

**Acknowledge the authors of the
Hawai'i County Energy Sustainability Plan**



http://co.hawaii.hi.us/rd/hiesp_full.pdf