Agriculture-Energy Case Studies in Hawaii

Hawaii Economic Development Task Force

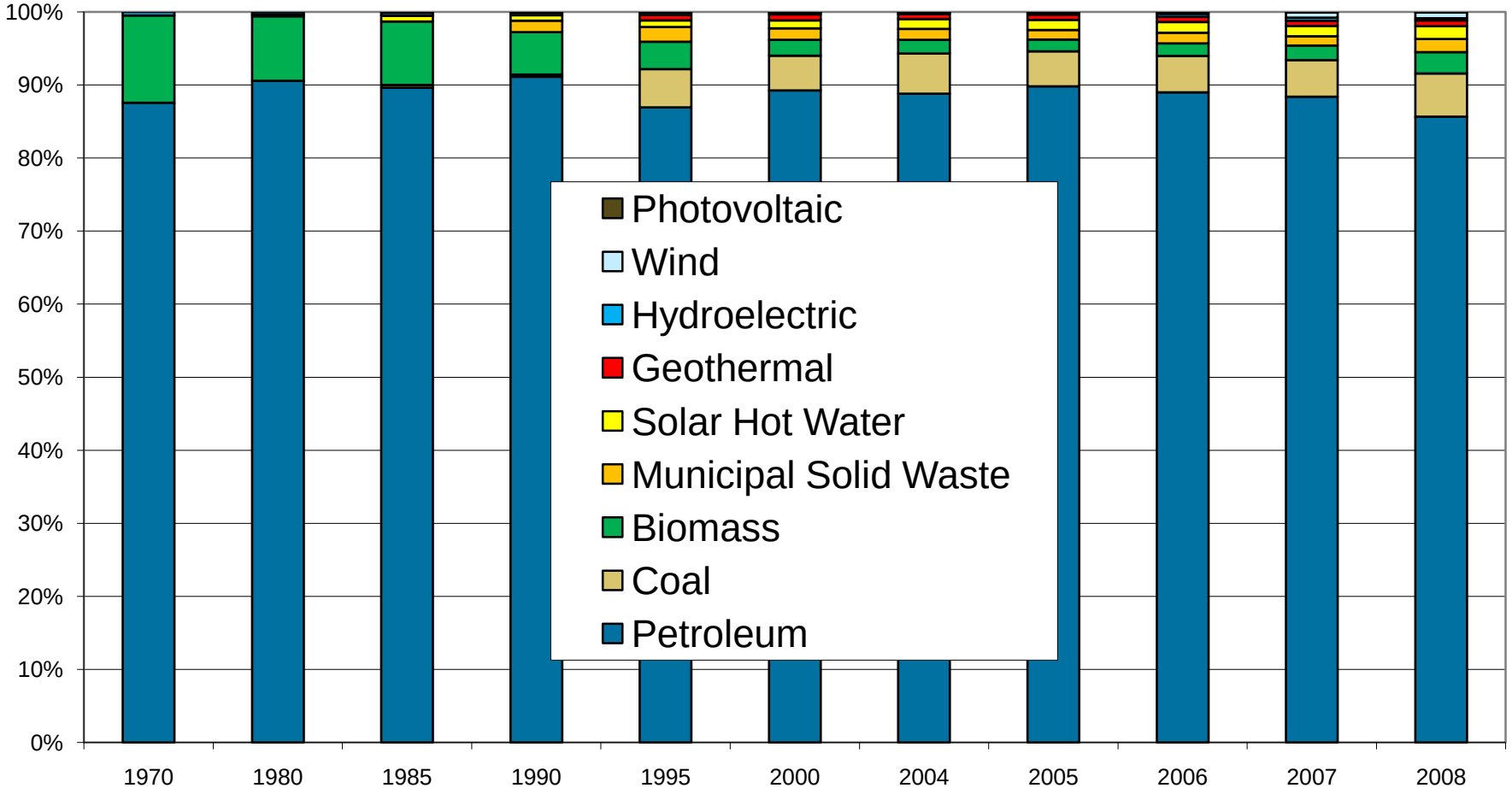
Presented by
Hawaii State Energy Office
Department of Business, Economic Development & Tourism (DBEDT)

October 12, 2010

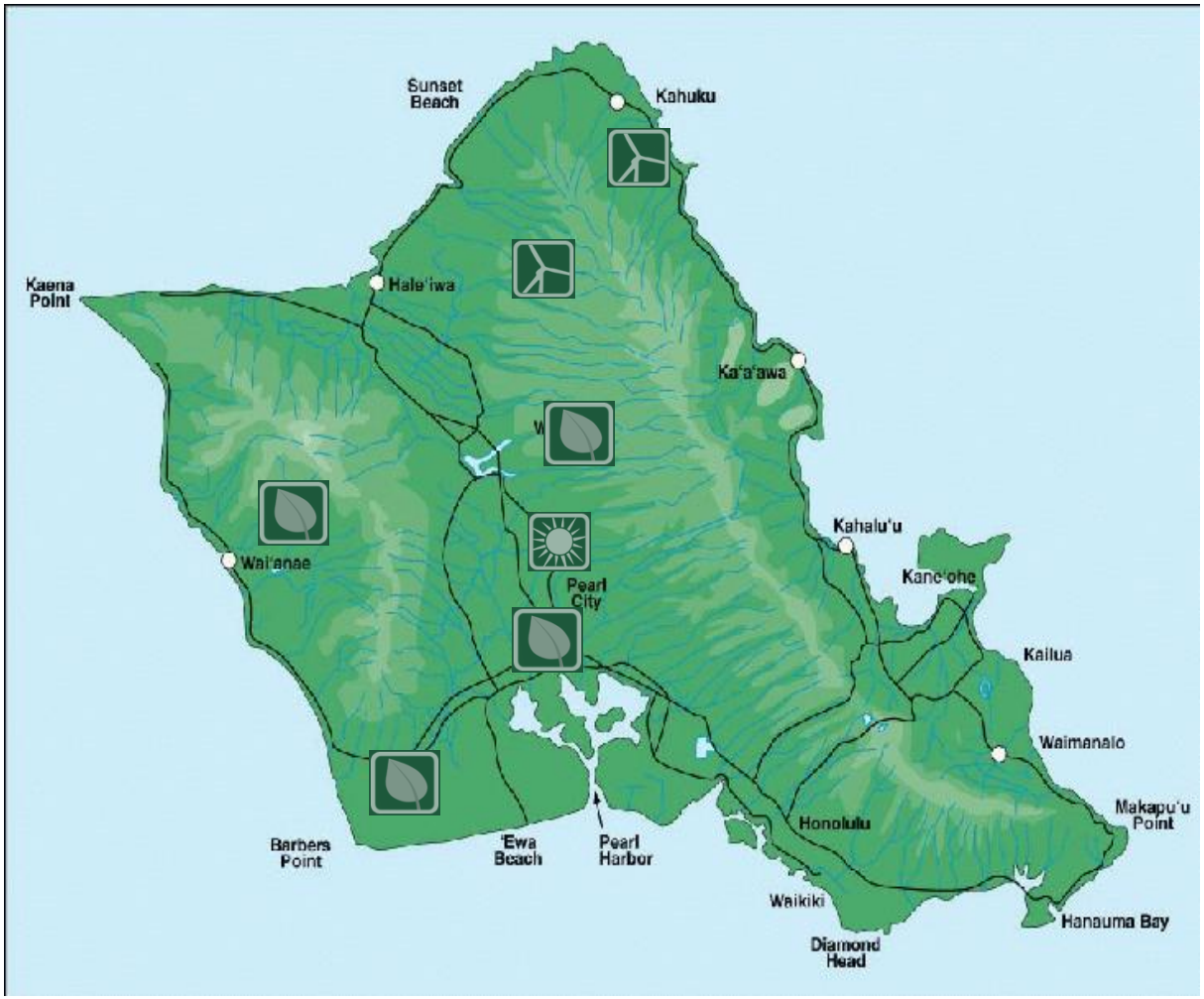
Task Force Briefing

- Operational and proposed Agriculture-Energy projects in Hawaii
- Learning from ethanol
- Supporting Agriculture-Energy efforts

Agriculture-Energy History in Hawaii

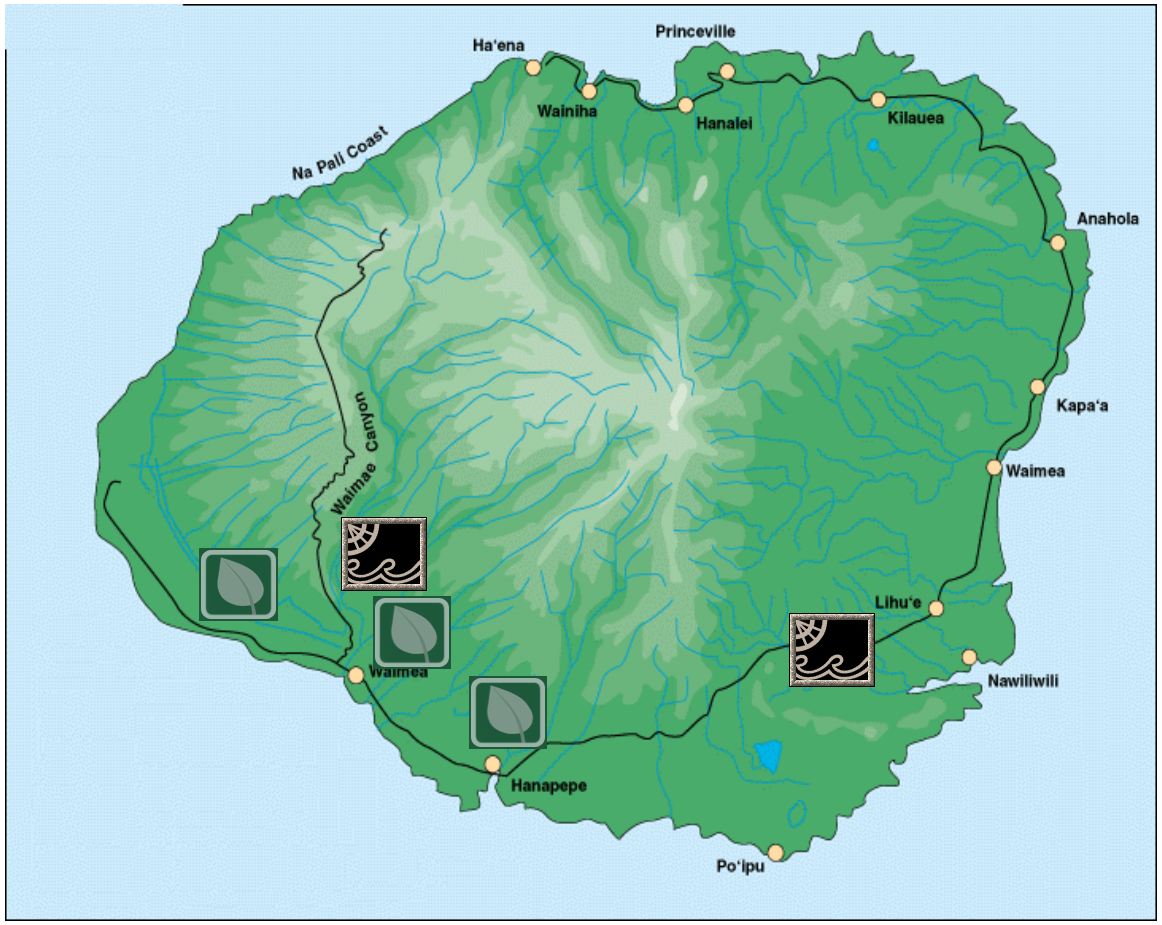


Oahu



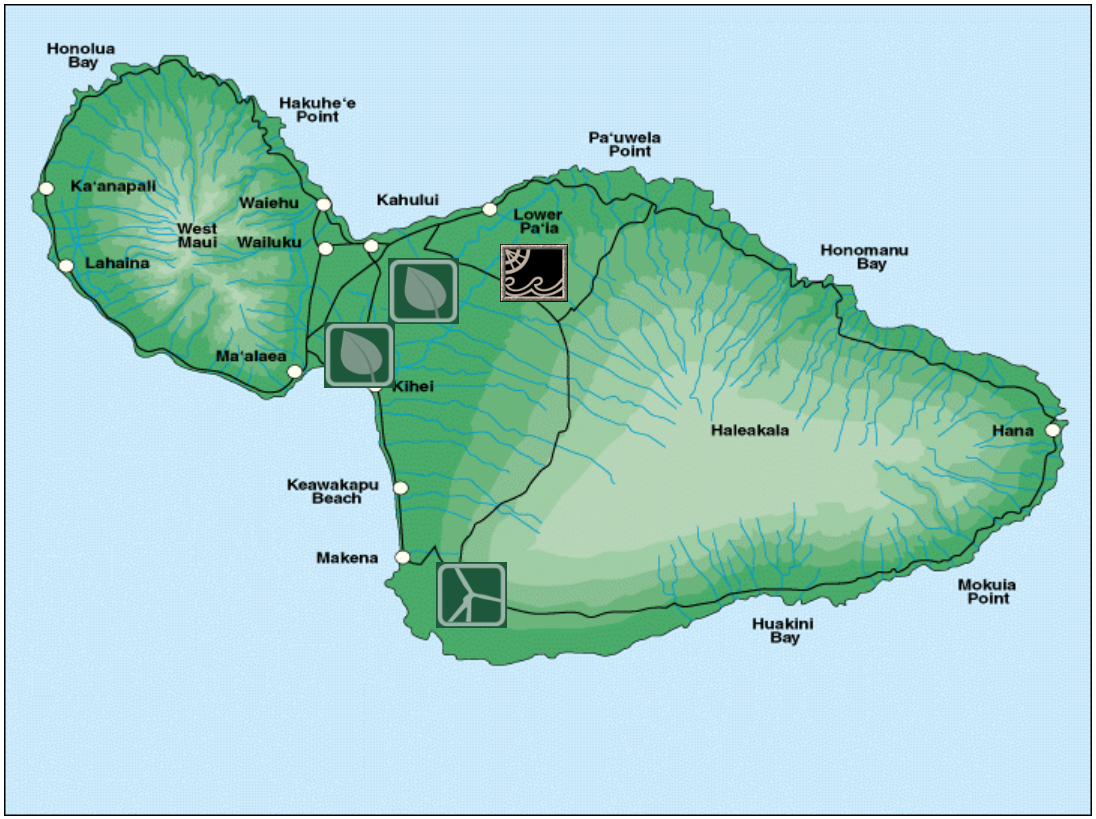
- First Wind – Kahuku
  - 30MW; Grazing Agts, commty. input; Ag/Con(R); AG
- First Wind – Kawailoa
  - 70MW; NSMP, first rights, direct Ag. leases
- Castle & Cooke – Mililani Solar
  - 20MW; subdivision/JDA; targeting D&E soil areas; leaving diversified farming; relocating farmers; “land bank”
- Phycal – Wahiawa/C.I.P. Biofuels
  - 100K gal/year; aquaculture; reclaimed wastewater; animal feed co-product; found. & ponds removable
- HARC (HI Ag. Res. Ctr) – Kunia
  - Jatropha, moringa, soy beans, local palm, kukui nut
- MAO Farms – Waianae
  - Sustainable economic development, agriculture, health, and Hawaiian culture; energy/water conservation (Ulupono Initiative)
- Biofuel Refinery (Camp. Ind. Park)

Kauai



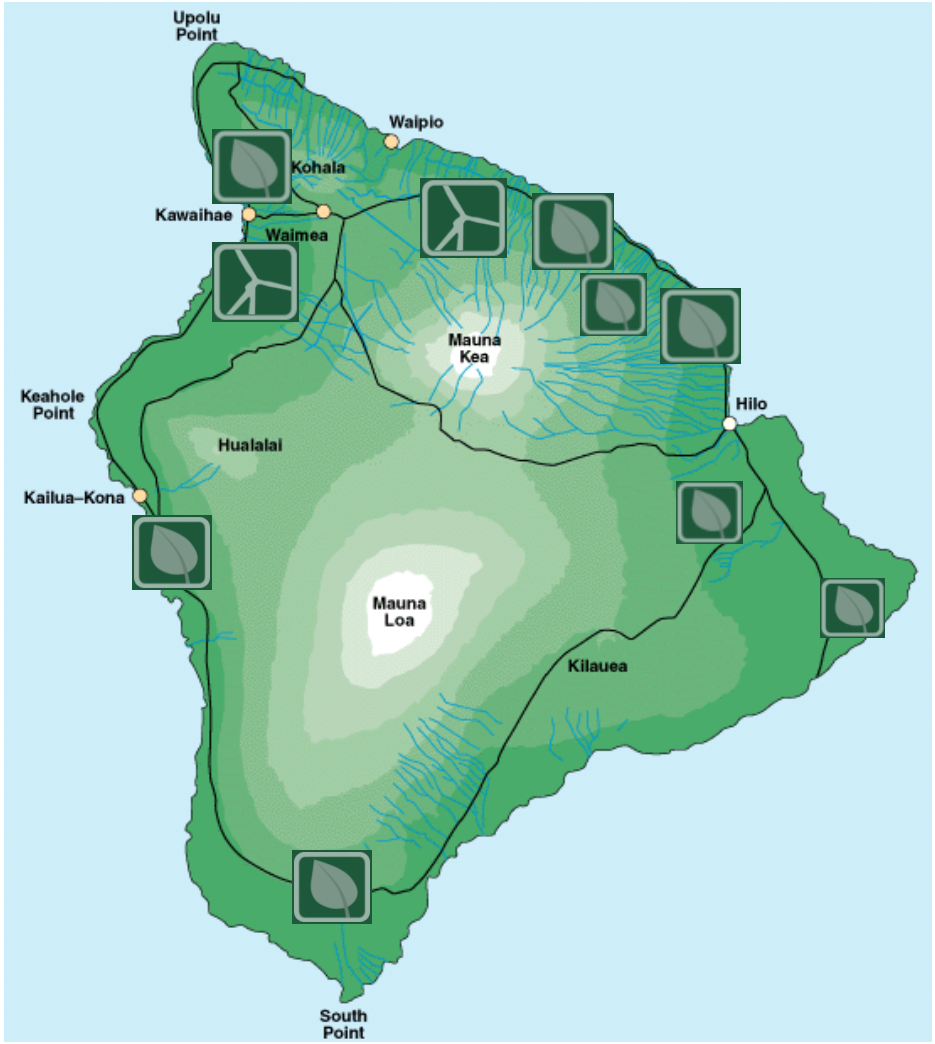
- Hydro – 8.9MW
  - Upper & Lower Lihue - KIUC
  - Kokee (Makai & Waiawa) - KAA
  - Olokele - Gay and Robinson
  - Kalaheo Hydro & Wainiha - Kauai Coffee (McBryde Sugar Co.)
- Pacific Light and Power – Kekaha
  - 4.5 MW Biomass & 3-8 MW Hydro; flood control, infrastructure, power to KAA
- Pac West – Kekaha/Hanapepe
  - 15 MW Biomass &15 MGPY Ethanol; firm power, Ag operations, infrastructure; forest mgt. agts. (hunting)
- Kauai Farm Fuel Biodiesel – Hanapepe
  - Recycle waste vegetable oil into a biodiesel heavy farm/construction equipment and boiler fuel

Maui



- HC&S - Puunene
  - 16MW Bagasse; research for algae, grass, other biomass crops and conversion technologies; sugar cane, sweet sorghum, jatropha, algae
- HR Biopetroleum (A&B)
  - Algal oils; biomass co-product as fish food
- Sempra (Shell Wind) - Ulupalakua
  - 22 MW; U. Ranch, Maui County, State lands; fire protection irrigation supports ongoing grazing; Ag. w/ conservation easement (wind only); Ag, Urban, Cons. zoning
- 1 MW Hydro (HC&S)
  - Kaheka, Paia, Hamakua

Hawaii



- Nex-Gen – Paauilo & Waikoloa (100kW)
  - Big Island Beef, Wailoka Village wastewater treatment
- HR BioPetroleum/Cellana (NELHA)
  - Marine microalgae into animal feed co-product; fuel
- USDA Pacific Basin Ag. Research Ctr.
  - Researching bioenergy crops on Hamakua Coast
  - UH Hilo – oil pal; jatropha studies
- Hu Honua – Pepeekeo
  - 25 MW Biomass; eucalyptus, renovate existing Hilo Coast Power facility
- Big Island Carbon – Kawaihae
  - Mac nut shells into carbon; $5M USDA-backed loan, DHHL lease
- Hawaii Pure Plant Oil Jatropha Farm (HIPPO) – Puna
  - 300 acres of jatropha
- Pacific Biodiesel – Keaau (Proposed)
  - 2.6MGY; community-based model (accept what local farmers will produce); researching jatropha as a feedstock for biodiesel; co-products of animal feed, soap, fertilizer
- Mele Associates – Kau (Proposed)
  - 15 MW, 5 MGY; drop-in biofuels (HELCO)
  - Ed Olson Trust: Christmas berry, haole koa, eucalyptus
- Hamakua Springs Country Farms – Pepeekeo
  - Self-sustainable/off-grid farming (hydro)
- Other community-based models: accept diversity of locally grown feedstocks

Statewide Agriculture-Energy Efforts

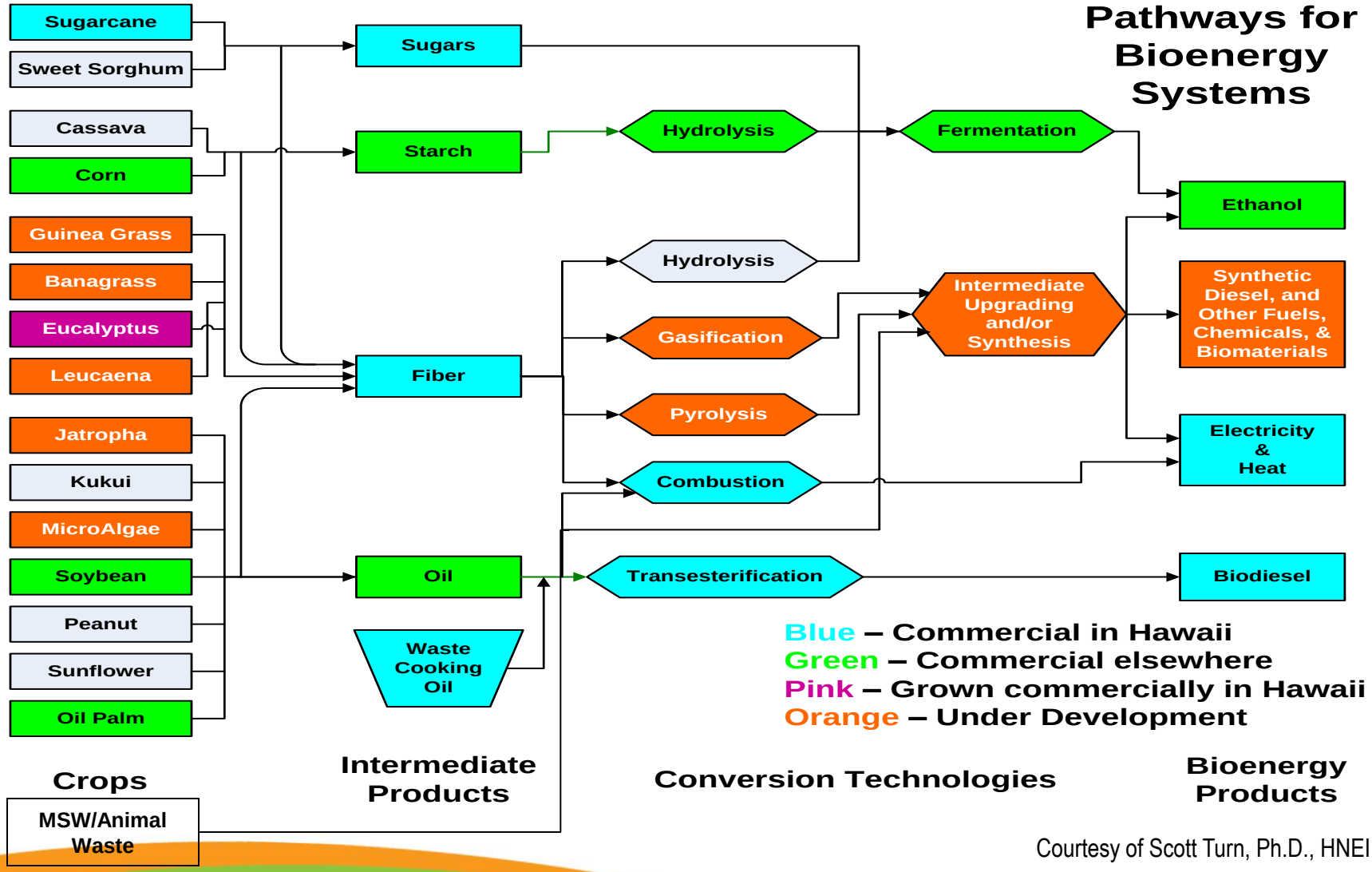
- Hawaii BioEnergy (KS, ML & P, Grove Farm)
  - Researching viability of energy crops: energy cane, sorghum, algae, and co-products
- Ulupono Initiative
  - Social investment organization - Renewable energy, local agriculture, waste reduction
  - Sopogy, Hawaii BioEnergy, Kapalua Farms, MAO Organic Farms; Re-use Hawaii
- CTAHR/HNEI/HARC/HC&S (A&B), UH Hilo research efforts
- ALISH Mapping – Office of Planning, Counties
  - Identify lands suited for food and energy production
- Bioenergy Planning – DBEDT (OP/SID), DOA, DLNR, DHHL, LUC, others
  - Bioenergy Master Plan (December 2009)
  - Economics, Environment, Land & Water, Permitting, etc.

Learning from Ethanol

- Ethanol Mandate: 85% 10% (100% imported)
- Ethanol Facility Tax Credit (2006; 1 ½ yrs after Mandate): $0.30/gal
- Problems:
  1. Got cheaper to import ethanol (ethanol down; import tax credit; domestic labor)
  2. Industry was not ready when incentives were available (land, financing)
  3. Ethanol feedstocks limited (only sugar cane, MSW, food waste, pineapple residue)
- Solutions:
  1. Incentives to offset tech./capital risks with new industry; investment assurances
     - HB 2519/2237 (2010) – include other biofuels, locally grown, “kick-in date”, $0.30/gal
  2. Industry is ready (steam boilers, biodigestion, algae, other)
     - Small and large landowners considering bioenergy crop production; land = financing
     - Suit crops for land, not suit land for crops (Ed Olson Trust)
     - Now assessing land/water suitability and availability, feedstock costs, conversion costs, environmental impacts
  3. Amend HRS 235-100.3 to include other feedstock types ?

Potential for Ethanol Production in Hawaii, HNEI, SOEST, CTAHR (2006)

Bioenergy Conversion Technologies



Courtesy of Scott Turn, Ph.D., HNEI

Supporting Agricultural-Energy Efforts

- Support **all** forms of agriculture and conversion technologies
  - Start Big - mechanized production; economies of scale
  - Start Small - one gallon at a time; continue what works; small-scale appropriate conversion technologies
- Identify market demand (HECO, military, airlines, ground transport)
  - "If you build it, they will come."
  - Incentivize the demand (co-ops, DOE grants)
- Identify market supply
  - Appropriate feedstock crops – continued research
    - CTAHR, HI BioEnergy, HARC, HNEI, HC&S, Ed Olson Trust
  - Assess feedstock crop lands and water
    - ALISH (incentives, designations); bioenergy **not** on prime Ag. lands?
    - ACOE Hydropower Study
    - Non-potable water resources – reclamation efforts
- Incentives for utilities to get power form Ag producers

Supporting Agricultural-Energy Efforts

- Facilitating partnerships between Agriculture and Energy
  - Infrastructure maintenance agreements
  - Keep existing leases – first right of refusal, longer term renewals; water rights
- Irrigation system rehabilitation tax credits
- Incentives for co-products (often make projects $ viable) & residuals
  - Animal feed, fertilizer, pharmaceuticals
- Facilitate species import investigations and processes
  - Programs to harvest invasive species for bioenergy; deforestation programs
- Facilitate energy efficiency efforts at Agriculture facilities
  - Education, outreach, auditors and inspectors
- Note: Quality control measures – compliance incentives?
  - RSB (HECO RFP)
    - Ensures food security and environmentally sound biocrop production
  - EISA (Energy Independence & Security Act)
    - 36M gal. by 2022 (cellulosic, biomass, advanced, conventional)
    - RIN (every gallon biofuel; tradable credit; EPA tracking/reporting)

Agriculture-Energy Legislation

- Agricultural Lands of Importance to the State of Hawaii (ALISH)
  - Includes and types suitable for energy production (includes most bioenergy crops, wind)
  - Contiguous use, limited infrastructure improvements, incentives
    - Assist grant/loan and financing opportunities; property assessed as Agricultural use; GET exemption for retail produce sale; permitting preferences
- Enterprise Zones (State-County)
  - Agriculture production/processing qualify; Must increase employment by 10% to 15%
  - State incentives: 100% GET exemption, 80% income tax reduction, %80 UEI reduction
  - County incentives: priority permitting, zoning waivers, property tax adjustments
- HRS 205 (Land Use Commission)
  - State Ag. District – Agriculture-Energy facilities, biofuel processing, wind, aquaculture, solar (D & E only); check with county; may need amendment to include algae
- HRS 201N – Facilities w/ capacity to generate 5MW or 1MGY biofuels
- C&CH Biofuels Processing facilities – permitting in AG and I zones

Agriculture and Energy Incentives/Programs

USDA

- Rural Energy Development Grants
  - Clean energy grant and loan guarantee p
- Business & Industry Guarant'd Loan Program
  - Locally processed, distributed, marketed food products
- Environmental Quality Incentives Program
  - 75% conservation (emission reduction)
- Biomass Crop Assistance Program (BCAP)
  - Farmers paid for eligible crops delivered to conversion facility

HAWAII

- Solar /PV - 35% RETC (30% Fed. RETC/grant); System – "integrated & independent"
- Wind - 35% RETC (30% Fed. RETC/grant)
- Property Assessed Clean Energy (PACE) Bonds*
- Feed-In Tariff (FIT)* – onshore wind, inland hydro, solar (likely will not include biofuels)

DOE

- Small Ethanol Producer Tax Credit (exp. Dec. 2010)
  - "Small" (<60MGY) ethanol producers get $0.10/gal tax credit for first 15MG
- Advanced Biofuel Production Grants/Loan Guarantees
  - Commercial-scale biorefineries ($250M loan guarantee/50% project costs)
- Advanced Energy Research Project Grants
  - Transformational technologies (biomass energy)
- Alternative Fuel Infrastructure Tax Credit (Dec. 2010)
  - Tax credit for infrastructure/equipment installation; up to 50%, not to exceed $50K
- Improved Energy Technology Loans
  - Early commercial use (not R&D); %100 guarant'd

OTHER STATES

- Similar incentives

*** Proposed**

Programs to Assist Agriculture-Energy

- Existing
  - Online permitting efforts (DOH)
  - Grid stability and interconnect studies (battery projects)
    - Counties, HECO, MECO, HELCO, KIUC
  - ALISH (OP)
  - Energy Efficiency and Conservation Block Grants (Counties)
    - County block grants (agriculture sector?)
  - Efficiency rebate programs (State, KIUC, HECO)
  - EB-5 Program
  - Loan guarantee programs
- Proposed
  - Soil classification studies (DOA, OP)
  - Hydropower and/or waterflow studies (ACOE)
  - Islandwide Habitat Conservation Plans (DLNR)

THANK YOU

HAWAII STATE ENERGY OFFICE
DEPT. OF BUSINESS, ECONOMIC DEVELOPMENT & TOURISM
235 BERETANIA STREET, 5TH FLOOR
HONOLULU, HI 96804

PHONE: (808) 587-9009