Regional and State Biomass Assessments, Analysis & Roadmaps Leading to Projects: Lessons Learned

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Pacific Regional Biomass Energy Program

- **A state based partnership since 1983**
- **Work in cooperation with the other 4 regions**
- **The states of AK, HI, ID, MT, OR, & WA in partnership with U.S. Department of Energy**
- **Each partner has expertise and functions as a multi-state team**
- **Website is www.pacificbiomass.org**

Northwest CHP Applications Center

- **A multi-state effort – AK, ID, MT, OR & WA**
  - **WSU Extension Energy Program serves as lead**
  - **98 Regional CHP projects total 1,218 MWc**
  - **Combination of industrial and agriculture projects**
  - **Technical assistance information, reports and case studies**
  - **Problem solving & trouble shooting**
  - **Support of regional & state CHP initiatives**
  - **www.chpcenter.org**

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Introduction - Feedstocks

The Pacific Region is bioenergy rich

- **Broad variation of feedstocks: Tropical to boreal forest**
- **A very mixed feedstock region – Special challenges**
- **Energy crops – Are additional to current biomass**
- **Energy crop agronomy is needed**
- **How and why do you do a state inventory?**

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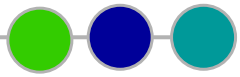
First: Perspectives are crucial

The Pacific Region: Biofuels, biopower & bioproducts – The partnership very purposefully has a broad focus – Feedstock competition

- **Organic waste to feedstocks and revenue streams**
- **Food, feed, fiber, and bioenergy – 25 X '25 view**
- **A developing rural opportunity – But, not on autopilot**
- **Goal of maximizing the rural opportunity**
- **Economics have to work on-farm and through out the value chain**
- **Environmental improvements**
- **Sustainability is a key value**
- **All biomass is local – Scale for local projects**



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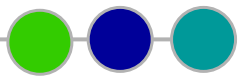
How much can we get?

- **What do we know?**
- **What do we need to know?**
- **Can we fill in the gaps?**
- **What are the economics?**
- **What is the roadmap?**



How much? A moving Target

- Research and development changes the answer – a strong 25+ year effort
- The Okanola Project lesson
- Major biofuel crop development underway in Pacific Region
- Getting the head count right – Tons of biomass
- Forests: Slash to mills and healthy forests

Economics and co-products

- Co-products are necessary for the economics to work
- Has to impact the whole value chain – Starting at the farm
- Kate Painter, Enterprise Budgets, Climate Friendly Farming www.cff.wsu.edu
- Biodiesel example
  - Ownership options
  - On-farm
  - At the crusher – Shipping DDG and meal from Mid-West
  - At the biodiesel facility - Glycerin

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Feedstocks – State based inventories with analysis are essential

Important for long-term direction and vision

- **Can it really make an difference? Why?**
- **Policy guidance – A strategic foundation stone**
- **Inclusive focus (meticulous counting of all feedstocks)**
- **Funding for research and implementation**
- **Data collection is hard and detailed**
- **A very long track record of national and broad regional inventories undercounting western states**

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Washington Biomass Inventory and Bioenergy Assessment

- **Very strong inventory and assessment with feedstock characterization**
- **44 sustainable feedstocks inventoried**
- **16.9 million dry tons of underutilized biomass**
- **1,769 MWc of potential power**
- **Growing energy crops would be additional**
- **www.pacificbiomass.org has an interactive map and database at county level**
- **Better forest data would add 3 to 13 million more tons sustainable**

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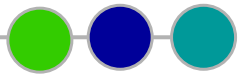
An Economic Development Tool - Biomass Inventory and Bioenergy Assessment

- Project developers get a very quick, detailed and inclusive look at the county level of all biomass opportunities – Answers the "How much?" question
- The second question with diverse feedstocks is "What are the chemical characteristics of each feedstock?"
- Report: Biomass Inventory Technology and Economics Assessment, Report 1. Characteristics of Biomass http://www.ecy.wa.gov/climatechange/2008CATdocs/IWG/bw/071108_bitea.pdf
- Is there below county level data? – This is where the state hands off to the developer



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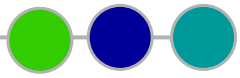
Inventory & Assessment Lessons

- Each state needs their own
- Needed for policy guidance & protection from poor analysis
- Be very thorough and meticulous (all feedstocks)
- Work to ensure local scale technology research & development – Bioenergy has a diseconomy of scale
- Develop your in-state university research & development capacity
- Solid waste mind set shift to beyond waste
- If its organic it has value
- Form a multi-state agency team



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Alaska

- Alaska Energy Authority
- Barged in diesel runs power to a range of $.21-.80/kWh
- Alaska Energy Inventory – Governor mandate – 2007 Funding - $500,000
- Renewable energy atlas and inventory is complete with major biomass component. GIS development is now underway
- Alaska roadmaps – Alaska Rural Energy Plan, Railbelt Energy Plan
- Alaska Wood Energy Development Task Group
- Renewable Energy Fund
- Fish oil biodiesel
- Staff increase – Bioenergy is now has 3 staff
- University of Alaska – Artic Energy Technology Development Laboratory

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Hawaii

- State Energy Office is in the Dept. of Business, Economic Development & Tourism – Strategic Industries Division
- State Policies and Incentives
  - 1994 -- 10% Ethanol Mandate – implemented April 2, 2006 by administrative rule
  - 2004 -- RPS enacted with percentages rising to 20% by 2020
  - 2006 – Energy For Tomorrow Comprehensive Energy Package: “Fuels Through Farming”components
    - RPS statute strengthened
    - Alternative Fuels Standards for highway fuel use with percentages rising to 20% by 2020
    - State biofuels purchase preference of 5 cents/gal
    - $200,000 for statewide biofuels production assessment now underway.
    - $150,000 for the Department of Agriculture to assist with biofuel projects
  - 2007 – Continued emphasis on bioenergy
    - Act 253 - $300,000 appropriated for a Bioenergy Master Plan
    - Act 261 - $59 million in special purpose revenue bonds authorized for BlueEarth Maui Biodiesel, LLC plant on Maui. 40 million gal/yr scale up to 120 million gal/yr
    - Act 159 – Allows biofuel production facilities on agriculture-zoned lands
    - Act 209 – Exempts alchohol fuels from state excise taxes
    - SCR 164 – Requires a study to create a one-stop shop permit shop for renewable energy projects

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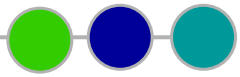
Hawaii

- Other recent support
  - Report -- Biomass and Bioenergy Resource Assessment, 2002
  - Physicochemical Analysis 2005
  - Report – Potential for Ethanol Production in Hawaii, 2006
  - Report – Biodiesel Crop Implementation in Hawaii, 2006
  - Governor's Hawaii Biofuels Summit, 2006
  - Bioenergy Master Plan under development 2008
  - Update of Biomass and Bioenergy Resource Assessment underway
- Research Experts
  - University of Hawaii – College of Tropical Agriculture and Human Resources, Hawaii Natural Energy Institute
  - Hawaii Agricultural Research Center



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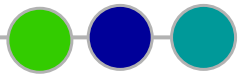
Idaho

- Idaho Office of Energy Resources
- Idaho has a long biodiesel history
- Fueling station grants - $690,000 – for E-85 and biodiesel
- Pacific Ethanol - $380,000 infrastructure grant for 50 MGY plant
- National Biodiesel Education Program – At University of Idaho (since 1979) - Jon Van Gerpen
- Brassica Breeding and Research - University of Idaho
- Idaho Roadmap – Idaho Energy Plan 2007 by State Legislature
- Feasibility studies



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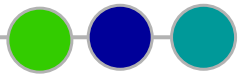
Montana

- Montana Department of Environmental Quality
- Ethanol mandate with 40 MGY trigger & Renewable Electricity Std.
- Tax incentives
- Strong biofuels program (ethanol & biodiesel) – State working group
- Biopower and bioheat/CHP – Fuels for Schools ($450,000) & Woody Biomass Work Group
- Roadmap: Climate Change Action Plan – Biomass/biofuels prominent
- Environmental expertise is a key strength
- Fuel testing lab at Havre, MT - $250,000 for equipment
- Strong training and outreach effort
- Montana State University - Camelina



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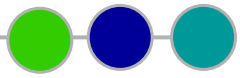
Oregon

- Oregon Departments of Energy, Agriculture & Forestry
- Oregon roadmap: Renewable Energy Action Plan April 2005 with strong bioenergy section
- RFS & RPS - 2007
- Very strong state tax incentives from grower to facility development – Strengthened in 2007
- Biomass inventory with routine updates
- Three working groups – Agriculture, forest and urban plus state team
- State staffing is increasing – 3.3 FTE
- Oregon State – Western Sun Grant & canola



Washington

- Washington Departments of CTED, Agriculture, Ecology & WSU EEP – Broader State Bioenergy Team
- RFS & RPS - 2006
- Biomass inventory 12 2005 and feedstock characterization 07 2007
- $23 million in biennial bioenergy capital projects – Energy Freedom Program
- $8.8 million in biennial operating bioenergy budget
- State staffing is increasing – 5.3 FTE
- Washington roadmap – Nine legislative studies underway
- Center for Bioproducts & Bioenergy – WSU & PNNL - $2.0 million
- Near-term research – $2.0 million
- Beyond Waste - Organic waste to resources - $1.35 million

States – Concluding thoughts

- States are maturing their bioenergy efforts and funding
- Recognition of need for inventories, assessments and roadmaps tied to bioenergy policy, goals and direction
- Relationships between state governments and universities are developing – Not always smooth
- Broad focus – Biofuels, biopower & thermal, bioproducts
- Multi-state coordination is healthy and continues – Strong regional asset
- To reach national goal of 20 percent reduction in 10 years or 35 billion gallons by 2017– States are needed

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Largest Extension-Based Energy Program in the Country

Staff of 60

Engineers
Energy specialists
Scientists
Web and graphics
Other professionals

Approximately $6 million annual budget

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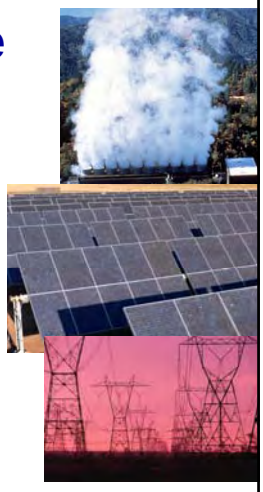
Technical Expertise

- Energy efficiency engineering
- Building sciences and standards
- Renewable resources
- District heating/utilities and distributed generation/combined heat & power
- Federal Energy Management Program support
- Climate change
- Agricultural Energy
- Energy supply and consumption data
- Program research and evaluation



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Outreach and Implementation

- One-on-one technical consultations and audits
- Education and training
- Clearinghouse services
- Publication research, development and distribution
- Energy library
- Website development and maintenance
- Software development, distribution and support
- Resource Efficiency Management
- Industries of the Future outreach
- Participation on regional and national advisory and technical committees