

## **Bioenergy and Bioproduct Research and Outreach at Washington State University**

### **Bioenergy and Bioproducts Overview**

**National** (Agricultural Research Center, WSU Extension Energy Program)

- Member of joint DOE/USDA Biomass Research and Development Technical Advisory Committee
- Member of National Biomass State and Regional Partnership Collaboration

**Regional and State** (WSU Extension Energy Program)

- Washington Project Leader for six state Pacific Regional Biomass Energy Partnership
- Maintain content rich regional bioenergy website <http://www.pacificbiomass.org/>
- Broad information about Washington's bioenergy status and activities
- Strategic Planning/Roadmapping
- Broad bioenergy and renewable energy expertise
- Climate Friendly Farming Project website: <http://cff.wsu.edu>

### **Biofuels**

**Biodiesel** (WSU Extension Energy Program, Climate Friendly Farming Project, USDA ARS)

- Oilseed cropping production potentials map for rain-fed agricultural region of Eastern Washington and Oregon
- Biofuel Variety Trials for irrigated production
- Biofuel Variety Trials for rain-fed production (esp. perennial crops)
- Community / Regional economic impact and benefit : cost analysis of emerging biofuel industry
- Technical, economic and policy analysis
- Outreach to farmers, communities, policy-makers, consumers on agricultural production of feedstock crops
- Assist both public and private sector groups interested in using/marketing biodiesel as a fuel
- Technical and programmatic assistance to the Puget Sound Clean Cities Coalition (market development)

**Ethanol** (WSU Extension Energy Program, Agri-environmental and Bioproducts Engineering Research Group - AEBE)

- Co-fermentation of C5, ligno-cellulosic sugars (wheat straw, paper pulp, etc.) for ethanol production
- Technical, economic and policy analysis
- Assist both public and private sector groups interested in using/marketing ethanol as a fuel.

**Bioproducts** (AEBE, Climate Friendly Farming Project)

- Omega 3 Fatty Acids from glycerin (waste product from biodiesel production)
- Chemicals from wheat straw (via waste products from ethanol production)
- Partnership development with Washington-based industry for commercialization of products

## **Biomass**

***Anaerobic Digestion (AD)*** (WSU Whatcom County Extension, AEBE, Climate Friendly Farming Project, WSU Extension Energy Program)

- Economic / technical evaluation and demonstration of a commercial-scale dairy anaerobic digester – state's first commercial dairy anaerobic digester operating via partnership with Darryl Vander Haak
- Basic research on performance improvements of the anaerobic digestion process
- Applied research and technology development on novel approaches and processes for anaerobic digestion for various scales and end-use applications
- Technology R & D for global application and adoption of "village-scale" AD, and associated technologies
- Technology assessment on various anaerobic digestion processes
- Economic and policy analysis on AD
- Community / Regional economic impact and benefit : cost analysis of emerging on-farm (AD) bioenergy industry
- Information, workshops, technical assistance, and outreach

***Bioenergy Inventory Assessment*** (AEBE, WSU Extension Energy Program)

- A bioenergy inventory assessment has been completed for Eastern Washington
- Phase 2 of the assessment (Western Washington) has begun
- Wheat Straw for Ethanol Production: A Resource, Technical and Economic Assessment
- Logging and Agricultural Residue Supply Curves
- Washington Bioenergy Facilities Directory

***Sustainable Waste to Energy Education and Technology Center SWEET*** (WSU Material Resources Management / Compost Facility, Climate Friendly Farming Project, AEBE, Veterinary Medicine)

- Development of a state of the art waste to energy technology center for waste management, research, teaching and outreach on the WSU campus.
- Comparative technical and economic evaluations of waste to energy technologies
- R & D on waste management for developing waste issues (i.e. infectious diseases / prions – "Mad Cow Disease" – from animal rendering, etc.)
- R & D on new, value-added products from waste materials

***Bioproducts*** (AEBE, Climate Friendly Farming Project)

- Applied research and technology development on "co-products" from the anaerobic digestion process: i.e. high-value uses and processing of the digested fiber, nutrient extraction from the liquid effluent (slow release fertilizer)
- Nisin and Lactic Acid from cheese whey
- Chitosin and Lactic Acid from cull potatoes
- Partnership with Washington-based industry for commercialization of products
- Carbon credits and green tags/tariffs

## **Contacts**

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