The Bioenergy Training Center is the gateway to the curriculum series, training program information, and assessment tools. On-line courses are offered as modules, where learners can choose to learn sequentially or focus on specific content. Extension educators will find materials in these courses that can be used in the development of their own public education programs.

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The Bioenergy Training – Modular Course Series is a multi-state collaborative effort involving content experts, peer reviewers, instructional designers, editors and coordinators from throughout the North Central region and beyond.

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**SUSTAINABLE BIOENERGY**

The introductory series contains four modules that present core topics and key concepts around bioenergy generation and environmental sustainability. The curriculum covers a wide range of issues, including sustainability concerns, technical aspects of bioenergy generation, bioenergy feedstock production, water quality, and community engagement processes to assist communities in understanding the implications of bio-based alternative energy.

**BIOEN1: Introduction to Bioenergy**: Background; Bioenergy products, feedstocks, co-products & by-products; Economic, social & ecological impacts of bioenergy at local, national, and global levels; Current and emerging challenges to bioenergy development

**BIOEN2: Bioenergy Crop Production & Harvesting**: Marketing and economics; Bioenergy crop production: A crop-by-crop analysis; Best management practices for protecting soil, water & wildlife

**BIOEN3: Water Resources**: Issues & Opportunities in Bioenergy Generation: Introduction; Watershed-level impacts; water use in bioenergy production; Policy options & implications

**BIOEN4: Community Economic Development & Bioenergy Generation**: Introduction to community issues in bioenergy development; Community participation in renewable energy development; Roles for Extension educators

**ASSESSMENT TOOLS**: The Sustainable Bioenergy Course features three assessment tools to encourage community participation in decision making about energy alternatives (available in pdf download):

- Community Assessment Checklist for Renewable Energy
- Bioenergy & Renewable Energy Community Assessment Toolkit and Matrices
- Renewable Energy Community Preparedness Index

**ON-FARM ENERGY CONSERVATION AND EFFICIENCY**

The second series contains three modules that introduce the importance of on-farm energy conservation and efficiency. Technology options and best practices are discussed, and available tools and resources are identified to assist clients in energy conservation transitions.

**ENCON1: Introduction to Farm Energy Use**: Farm energy use; Energy supply & costs forecast; Energy conservation & efficiency considerations

**ENCON2: Farm Practices to Improve Energy Efficiency**

**ENCON2A – Cropland**: Tillage practices; Planting; Maintenance; Matching tractor to implement and load; Management of fertilizer use; Equipment operation; Crop production management

**ENCON2B – Dairy Farms**: Refrigerated compressors; Refrigeration heat recovery; Water heating; Well water pre-cooling; Variable-speed milk pumps; Variable-speed vacuum pumps; Energy assessment tools

**ENCON2C – Grain Drying**: Dryer energy use; Continuous-flow dryers; Batch dryers; High temperature dryer cooling options; Energy assessment tools

**ENCON2D – Irrigation**: Pumping; Center pivot & linear move; Solid set, hand move, wheel move; Irrigation scheduling; Energy assessment tools

**ENCON2E – Animal Housing**: Ventilation; Lighting; Solid set, hand move, wheel move; Energy assessment tools

**ENCON2F – Greenhouses**: Principle of heat loss; Greenhouse layout; Orientation; Glazing materials; Infiltration; Thermal curtains; Heating systems; Environmental controls; Space utilization; Ventilation; Supplemental lighting; Temperature levels; Passive solar greenhouses; Energy assessment tools

**ENCON3: Resources**: State & utility energy efficiency programs; Federal energy efficiency programs

**ANAEROBIC DIGESTION**

The third series contains seven modules focused on the use of anaerobic digestion technologies. Details of the process are introduced, as well as factors that influence start-up, operation and control of anaerobic digesters at different scales.

**ANDIG1: Introduction to Anaerobic Digestion**: The anaerobic digestion process; Background; Products from anaerobic digestion; Environmental benefits and concerns

**ANDIG2: Factors that Affect Manure Digestion**: Microbial population; Feedstocks; Loading rate; Mixing; Environmental factors

**ANDIG3: Types of Anaerobic Digesters**: Introduction; Passive systems; Low-rate systems; High-rate systems; Choosing a digester

**ANDIG4: Anaerobic Digester Start-up, Operation and Control**: The anaerobic digestion process; Start-up; Operation & control; Reasons for digester failure; Implementing safety procedures

**ANDIG5: Economics of On-farm Anaerobic Digesters**: Capital requirements, Operating and maintenance costs; Products & by-product markets; Computer decision tools for digester economic assessment

**ANDIG6: Cooperative Development of Digesters**: Regulations; Obtaining community and government support; Community needs assessment; Business structure; Case studies

**ANDIG7: State and Federal Regulations**: Federal regulations; State regulations; Local regulations; Occupational health & safety

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