

바이오연료를 위한  
지속가능한 목재 바이오매스  
- 미네소타 지역

# Emerging Biomass markets

- Virginia Hibbing Utilities
- Central Minnesota Ethanol Cooperative
- Metro area biomass burners including UMN
- Cellulosic ethanol
- Others:
  - Turkey litter plant in Benson (15-20%)

## **Providing opportunities to:**

- Produce dedicated woody biomass crops
  - Native cottonwoods and hybrid poplar
  - Willows
  - Native prairie plants (ex. False indigo)
- Manage brushland areas for wildlife habitat and biomass production.
  - Northern Minnesota
  - Minnesota River Basin

## **Multiple benefits**

- Reduced use of fossil fuels – less CO<sup>2</sup>
- Greater sequestration of carbon - less CO<sup>2</sup>
- Water quality and storage benefits
- Rural economic development
- Wildlife benefits
- More productive forests

## **CSREES Integrated Watershed Management Project**

- Improving Water Quality and Enhancing Hydrologic Stability of the Minnesota River through Agroforestry and Other Perennial Cropping Systems
- Initiated in September of 2002
- Research, Outreach and Extension
- Interdisciplinary UMN team working closely with out state partners

## **LCMR I & II**

### **3rd Crops For Water Quality**

- Easements to landowners for putting in perennial crops
- Research on impact of perennial crops on water quality and storage linked to CSREES
- Learning groups in South Central and South West Minnesota

# **USDA - Development of Existing Biomass Resources through Education for Key Supply Bottlenecks**

- Training for:
  - Loggers
  - Natural Resource Professionals
  - Energy Intensive Businesses
  - Landowners

# **IREE Minnesota Terrestrial Carbon Sequestration Project**

- Develop land use options to optimize carbon sequestration benefits..
- Develop framework for carbon credit trading
- Assessment of terrestrial carbon in Minnesota



## **Research assessment for the development of principles for brush land harvest (UMN/IREE)**

- Guidelines for the sustainable harvest and management of brushland areas
  - Ecologic considerations
  - Economic considerations
- Transport model for estimating cost and energy balance

## **Challenges**

- Research (agronomic and economic) to develop viable options for landowners
- Getting policies right to promote alternative perennial crops
- Identifying and developing markets
- Enterprise development at the community level

## **Where are we going?**

- Market driven landscape change
- Targeted plantings to provide the greatest water quality (+environmental) benefit
- Plantings configured for wildlife objectives
- Rural enterprises based on bio-fuels and bio-products promoting local development
- Payments for carbon storage, water quality and other environmental services