



Chariton Valley Biomass Project

“Switchgrass to Energy”

*The Iowa Project in the
US Department of Energy Initiative
Biomass Power for Rural Development*



Chariton Valley RC&D

Chariton Valley Regional Concerns

- Sustainable Soil Resource Use in Conflict with Commodity Markets Since 1970's.
- Water Resources, a Major Regional Asset, are at Risk with Current Land Use.
- Declining Rural Population and Income.
- Huge Influence of Conservation Reserve Program.
 - >10% of the RC&D Area (140,000/ 1.2M acres).
 - >15% of the Rathbun Watershed (52,000/350,000 acres).

Potential of Biomass Energy in Iowa

- Iowa imports 98% of its energy at a cost of over \$5 billion annually
- Coal, natural gas, and oil provide for more than 90% of Iowa's energy needs
- Biomass accounts for less than 3% of energy use in Iowa
- Switchgrass biomass could meet 20% of Iowa's total energy demand

Chariton Valley RC&D Biomass Project

- **Create New Market for Grasslands.**
- **Dedicated Energy Crop -Switchgrass.**
- **Co-fire With Coal - Annual Use for 200,000 tons.**
- **New Technology - Ethanol from Grass.**
- **Benefit Rural Economy and Environment.**
- **Protection of Soil, Water and Air Has Value.**
- **Public Policy Can Encourage Biomass Use.**



Switchgrass, a warm season grass native to Iowa, can reduce soil erosion, requires relatively low inputs, grows well on marginal soils, and adds significant amounts of carbon to the soil as a sequestering method for atmospheric CO₂.



**Producers and Manufacturers are Working Together to
Demonstrate Energy Crop Use.**

Grasses Used for Biomass Are Grown and Harvested With Standard Farming Practices and Equipment

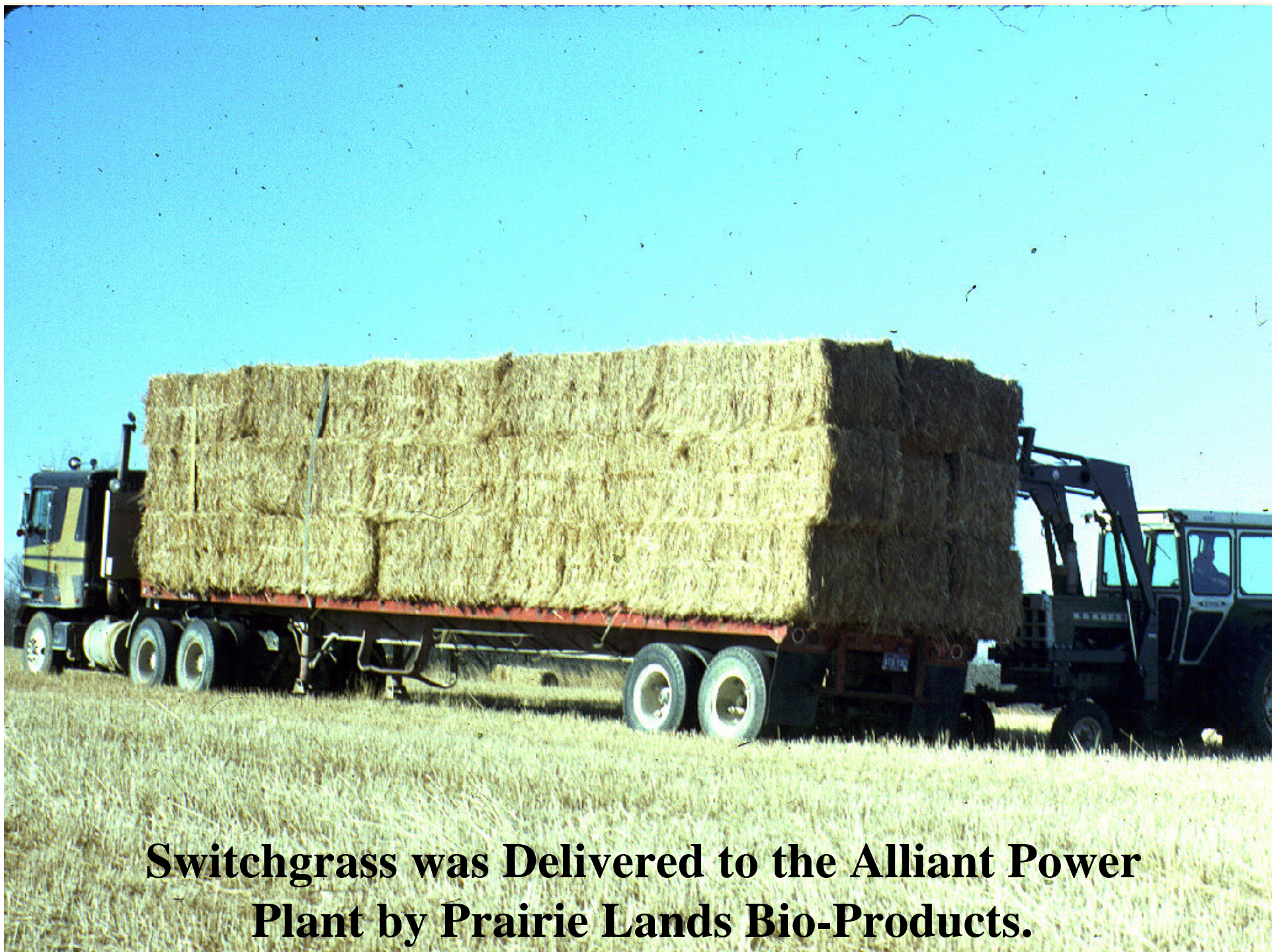


A Major Project Objective Is the Creation of New Jobs and Markets, Especially in Rural Areas





Modifications have been made at Alliant's Ottumwa Generating Station to allow Switchgrass to be burned.



Switchgrass was Delivered to the Alliant Power Plant by Prairie Lands Bio-Products.

Co-Fire Test 2000

1300 Tons - 3000 Bales

17 TPH Max Feed rate

12 - 15 TPH Average

Displaced 2% of Coal at Maximum

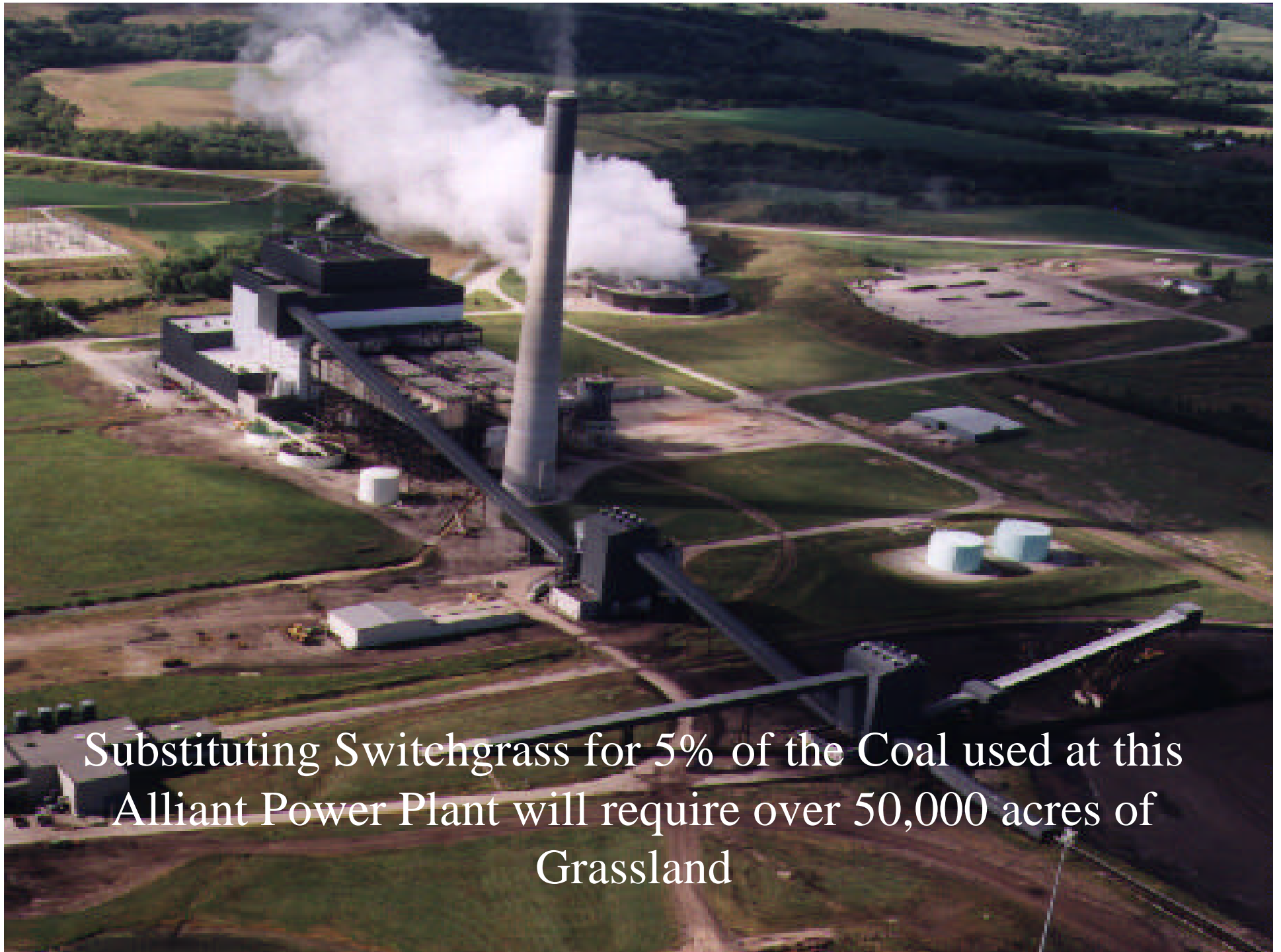
13 MW of Capacity

13,000 Homes

SO_x and NO_x Lower than Expected

Co-Fire Test 2003

- 25,000 Tons
- 12.5 TPH
- 2000 Hours of Testing
- Fully Automated



Substituting Switchgrass for 5% of the Coal used at this Alliant Power Plant will require over 50,000 acres of Grassland

Growing & Co-firing Biomass Energy Crops Can Reduce :

- Air Pollution.
- Greenhouse Gas Emissions.
- Soil Erosion.
- Water Pollution.

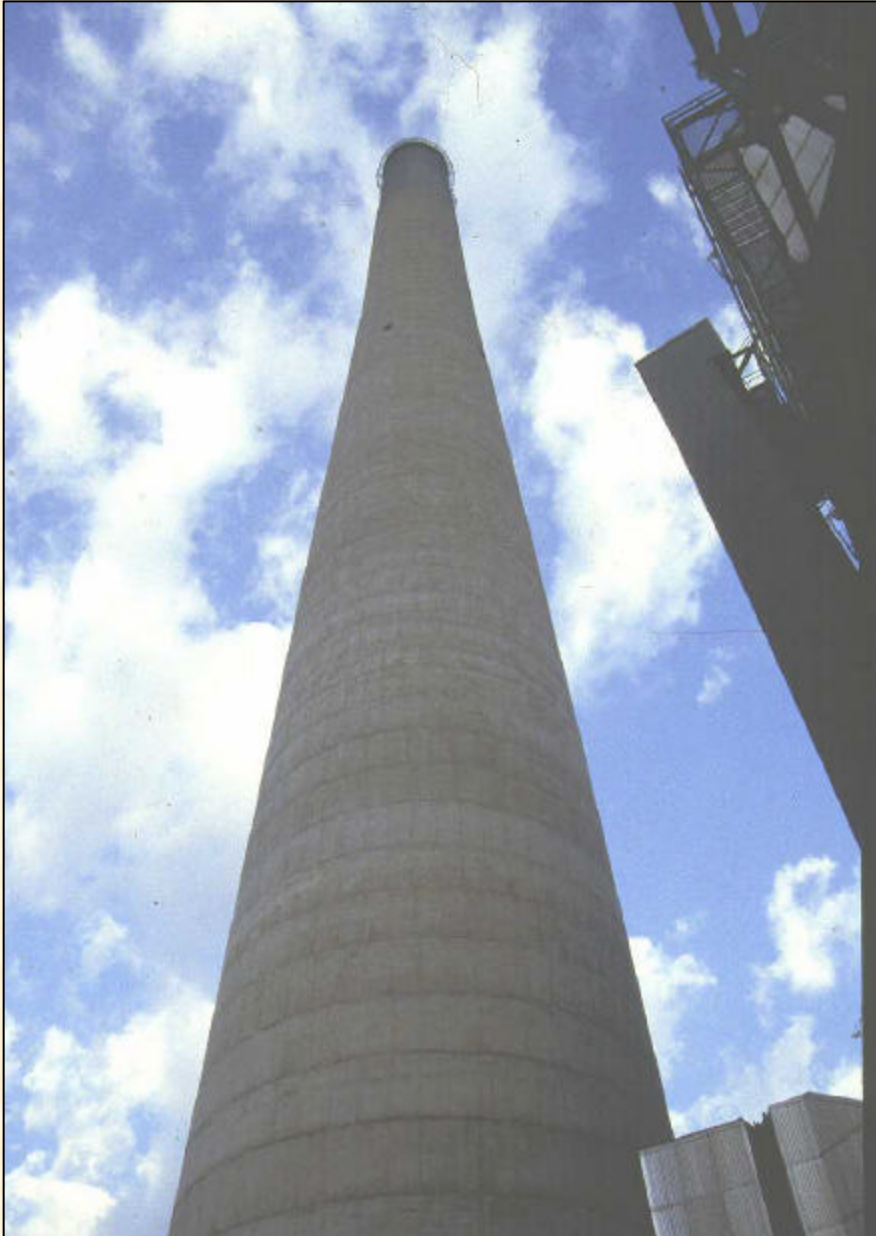
Plus Have A Major Impact on the Rural Economy.

Biomass vs. Coal

Current Markets Don't Consider:

- Costs of Related Environmental Damages.
- Public Expenditures for Damage Prevention.
- Benefits of Substituting Biomass for Coal.
- Costs and Benefits May Outweigh Difference.

Environmental Impacts of Biomass



- Biomass use reduces fossil fuel emissions of:

CO_2

SO_2

NO_x

toxic metals

- Growing biomass sequesters CO_2 from the atmosphere

Environmental Impacts of Biomass



- **Reduces soil erosion rates compared to crop production on marginal land**
- **Reduces potential for sediment and chemical delivery from land in biomass**

Economics, the Environment and Government Policy

- Environmental Impacts or "Externalities".
- Byproduct of Energy and Agriculture Production.
- Significant Costs to Individuals and the Public.
- Marketplace Does Not Capture These Costs.
- Government Involvement Is Appropriate.
- Implement Adjustment Mechanisms.
- Examples Include Air & Water Pollution, Soil Erosion, Climate Change.

Greatest Value of Biomass May Be in the Agricultural Sector

- Prevent Non-point Pollution.
- Improve Soil and Water Quality.
- Carbon Sequestration/Substitution.
- Reduced Government Expenditures for
Soil and Water Conservation (CRP).
- Increased Rural Economic Development.

Biomass Commercialization Through Public Policy

- “Closed Loop” Biomass Tax Credit.
- CRP use for Biomass.
- Renewables Requirements.
- CO₂ Reduction Goals.

CLOSING THE GAP

How Public Policy Can Effect the Value of Biomass

Economic Variable	Value Per Ton	Switchgrass Value Cumulative Per Ton
Coal Equivalent	\$15	\$15
Closed Loop Tax Credit	\$21	\$36
CRP-Based Incentive	\$20	\$56
Carbon Sequestration	\$5	\$60
Minimum Price Needed for Delivered Switchgrass \$50-70		

Project Partners

Chariton Valley RC&D, Inc.

Alliant Power

Iowa Farm Bureau

National Renewable Energy Lab

USDA - NRCS, FSA, and RD

Iowa Dept. Natural Resources

Colorado State University

Iowa Div. Soil Conservation

Prairie Lands Bio-Products

Lucas, Wayne, Monroe, and Appanoose Counties/SWCD's.

Vermeer Manufacturing

John Deere Works

U. S. Dept. of Energy

Oak Ridge National Lab

Iowa State University

Iowa Energy Center

University of Iowa

Leopold Center

Private Landowners

For more information about the

Chariton Valley Biomass Project

visit our website at

www.cvrcd.org

or call

515-437-4376