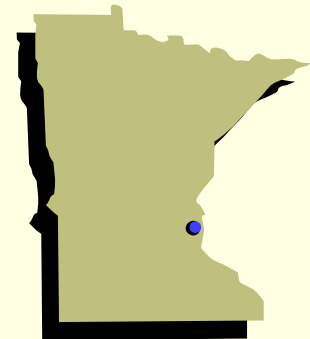




Minnesota Biomass Resources

Technologies, Evaluations, and Inventories



Keith R. Butcher
Manager of External Affairs
Center for Energy and Environment (CEE)
212 3rd Avenue North, Suite #560
Minneapolis, MN 55401



www.mncee.org



Who is CEE?



➤ **Non-Profit organization focused on:**

- energy consumption and generation,
- building sciences, and
- offering easy and comprehensive financial services.

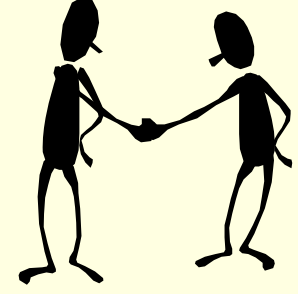
➤ **Works with:**

- Utilities
- State, Counties, and Cities
- Regulatory Agencies
- Neighborhood Associations
- Trade Associations
- Advocacy Groups
- Schools
- Hospitals
- Individual Businesses

➤ **Actions**

- Very involved in Minnesota's utility energy efficiency efforts (CIP)
- Renewables: wind, solar, and biomass
- Buildings: Indoor air-quality, sound insulation, ventilation, smoke impacts
- Next generation of energy efficiency programs
 - Full-service lighting and re-commissioning
- Financing: Neighborhood Revitalization Programs, Home Improvements

How does CEE accomplish its goals?



- Ongoing Dialogue w/ all Parties

- Partnership

- Credibility based on technical experience and approach



MINNESOTA PUBLIC UTILITIES COMMISSION





History



1994: The Prairie Island Agreement

Northern States Power can store nuclear waste, in return

- ↪ Wind Power Mandate
- ↪ Established the Renewable Development Fund
- ↪ A Biomass Mandate



Overall Philosophy



ASSUMPTIONS

Biomass Power Generation is an ongoing state interest

State has limited resources

ISSUE

Selecting the best biomass projects

- ☞ Biomass is an all-encompassing term, covering a wide range of feedstocks and technologies



Identifying Effective Biomass Strategies

Qualifying Minnesota's Resources and Evaluating Future Opportunities

- Bridge the information gap between the agriculture industry and the power generation industry
- Provide a singular resource
- Devise a common methodology
 - Feedstock availability, collection, processing, and costing
 - Power plant economic evaluation
- Develop a user-friendly interfaces and data visualization tools
 - Audience assumptions
 - Educated
 - Regulators, policy analysts, government officials, non-profits
 - Develop common default assumptions
 - Above all – maintain user flexibility



BioPower Evaluation Tool (BioPET)

- Purposes
 - Identify potential opportunities
 - Quantify impacts (costs)
 - Screen selected projects
 - Rank different approaches



Scenario Generation

- Feedstock Scenario
 - Select a pre-set feedstock or build your own
 - Define a Delivery Path
 - Output: **\$ / MMBtu** of processed biomass fuel delivered to the mouth of the power plant

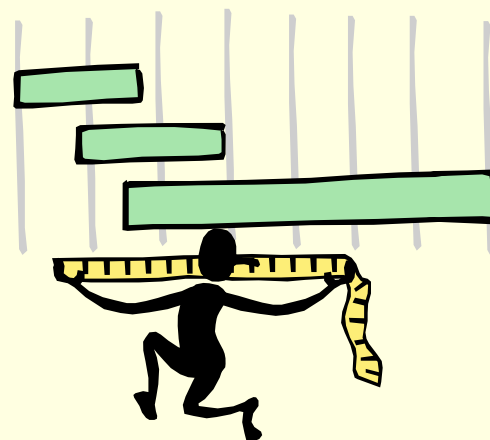
- Power Plant Scenario
 - Define size and operational characteristics

- Project Scenario
 - Select Feedstock Scenario(s)
 - Single-fuel or multi-fuel evaluation capability
 - Select Power Plant Scenario
 - Output: **¢ / kWh** using the selected processed feedstock and power plant conversion technology



Benefits

- Vary inputs
 - feedstock, processing needs, or technology
- Assumption Commonality
 - General availabilities
 - Common assumptions
- Understand Drivers
 - What questions to ask?
 - Sensitivity analysis

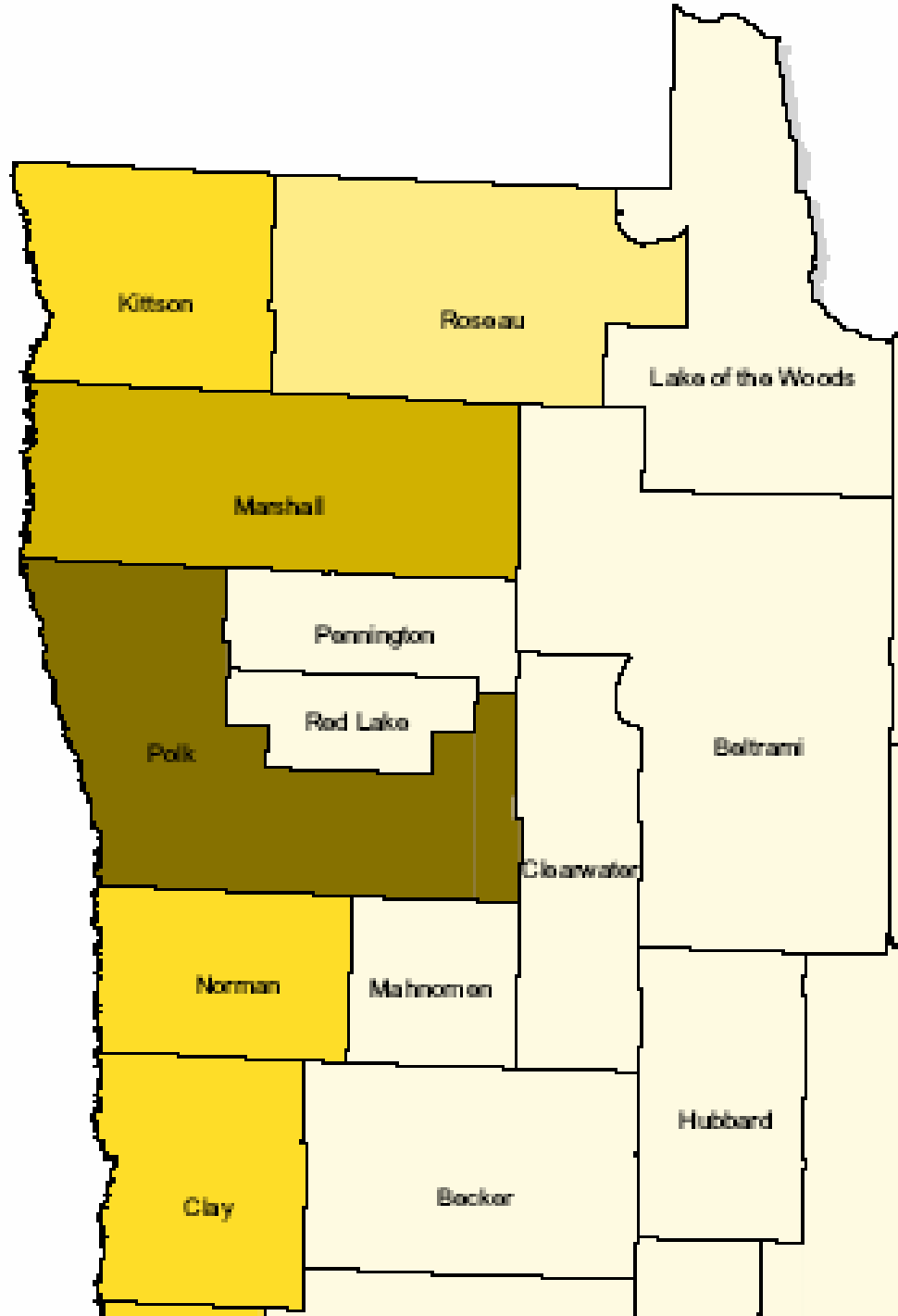
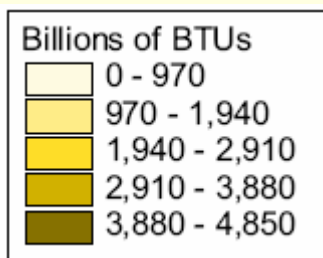


GOAL: A common metric for evaluating diverse projects

all values can be overwritten by the user

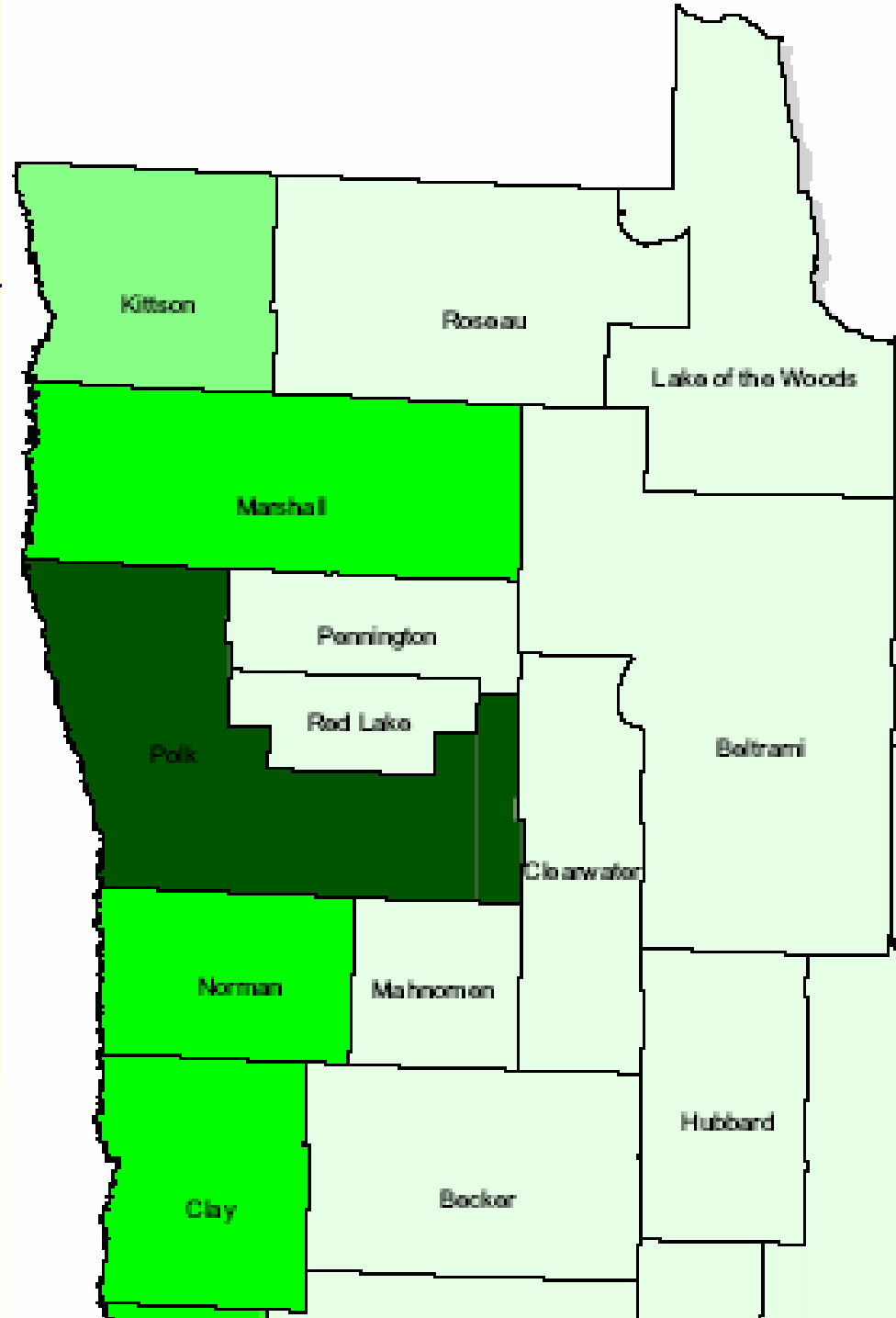
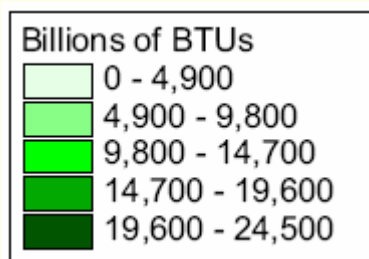


Wheat Straw





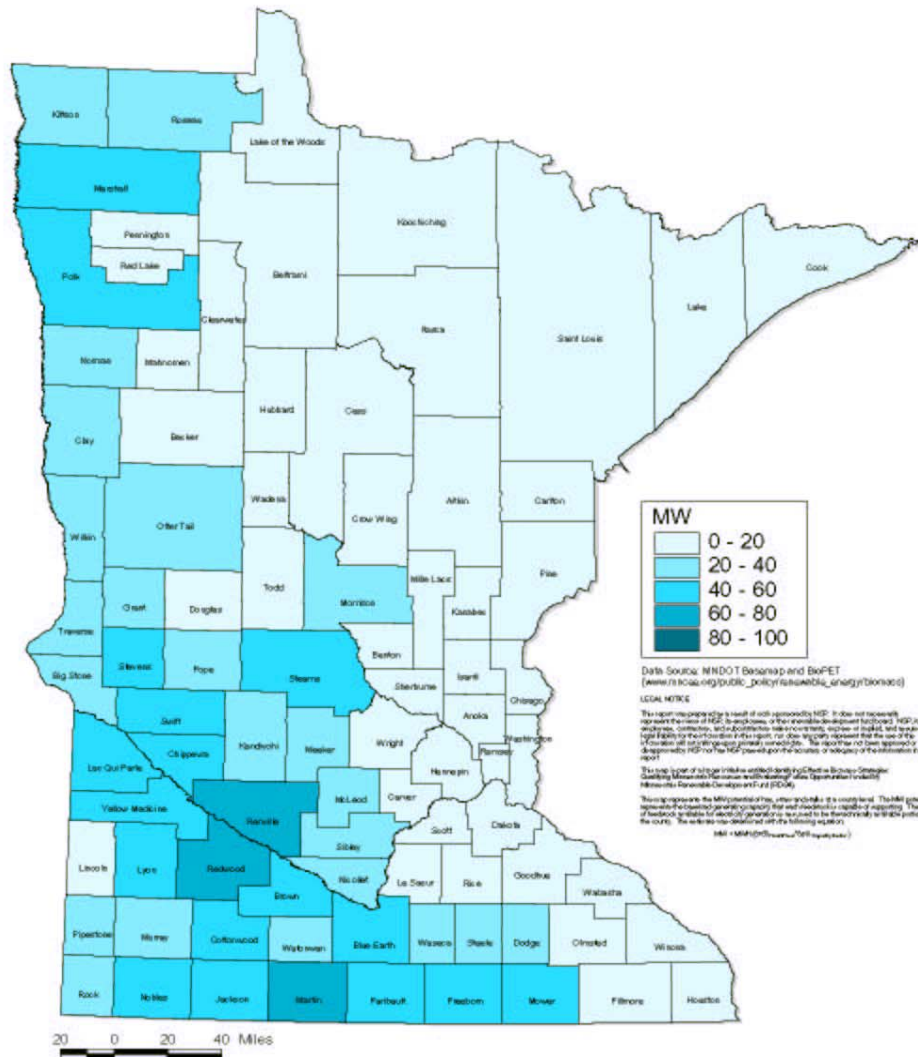
Sugar Beets





Total Hays, Straws, and Stalks

Identifying Effective Biomass Strategies in Minnesota Hay, Straw and Stalks Potential Megawatts of BioPower Capacity by County





Next Steps

Final Report (including peer review)

Added Evaluation Functionality

Web-based Mapping Tool

Expected completion date: **October 2007**

www.mncee.org

Click on “Public Policy” | “Renewables” | “Biomass”



Thank You!!

Keith R. Butcher
Manager of External Affairs
Center for Energy and Environment (CEE)
212 3rd Avenue North, Suite #560
Minneapolis, MN 55401
Tel: (612) 335-5890
kbutcher@mncee.org

www.mncee.org

Click on “Public Policy” | “Renewables” | “Biomass”