

**Environment and Natural Resources Trust Fund
2011-2012 Request for Proposals (RFP)**

LCCMR ID: 176-F3+4

Project Title: Linking Brushland Management and Bioenergy Feedstock Supply

Category: F3+4. Renewable Energy

Total Project Budget: \$ \$79,040

Proposed Project Time Period for the Funding Requested: 1.25 yrs, July 2011 - Sept 2012

Other Non-State Funds: \$ 0

Summary:

Link brushland management with bioenergy feedstock supply through the lowering of ground pressure on brush harvester.

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Sponsoring Organization: Stempower Resources

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Location

Region: NW, NE, Central

Ecological Section: ds (223N), Red River Valley (251A)

County Name: rns, Todd, Wadena, Wilkin, Wright, Yellow Medicine

City / Township:

_____ Funding Priorities	_____ Multiple Benefits	_____ Outcomes	_____ Knowledge Base
_____ Extent of Impact	_____ Innovation	_____ Scientific/Tech Basis	_____ Urgency
_____ Capacity Readiness	_____ Leverage	_____ Employment	_____ TOTAL _____%

2011-2012 MAIN PROPOSAL

PROJECT TITLE: Linking brushland management and bioenergy feedstock supply by lowering the ground pressure of brushland harvester.

I. PROJECT STATEMENT

There are over one million acres of brushland in Minnesota that provide important ecosystem services, such as wildlife habitat and flood control. After an increase in the expansion of agricultural, forestry and development in the mid-1800's, brushland habitat quality has declined. Brushlands have been converted to agricultural land or transitioned into forests following the suppression of fire. Wildlife managers expend resources to maintain these brushlands. The DNR in 2008 spent approximately \$400,000 on mowing brushlands for the benefit of wildlife species, such as warblers and moose. To alleviate the resources drain that brushland management places on the land managers and increase the acres treated, several groups have suggested linking brushland management with bioenergy production.

Minnesota currently has a robust biomass-to-energy industry, with 52 facilities utilizing 450,000 bone dry tons of open-market biomass a year. This industry provides jobs in the rural economy and keeps energy dollars within the state. As the industry expands to meet state and national energy goals, new sources of biomass will have to be utilized. The stress on forests and agricultural land may be minimized if previously unavailable landscape, such as brushlands, could be sustainably harvested.

Currently, there is only one commercially available technology to economically harvest brushland biomass. The BioBaler WB-55 is a pull-behind unit that simultaneously cuts and bales brush. The resulting 4-foot wide, half-ton bale can be transported, stored, dried and utilized in bioenergy facilities. Stempower Resources currently owns and commercially operates the BioBaler. The firm has been performing brushland management, on private, state and federal wildlife management areas since late 2009.

To increase the operation of the machine on lowland brushlands, the ground pressure of the machine must be reduced from 18 pounds per square inch (PSI) to less than 5 PSI. A modification to the carrying systems through the addition of tracks would lower the ground pressure and demonstrate an effective way to manage previously inaccessible brush landscapes. Additionally, land managers could reduce their per acre costs by recovering and selling the biomass to bioenergy facilities. Furthermore, utilizing brushlands would reduce pressure on forests and decrease the use of roundwood, which competes for production with the pulp and paper industry.

The overall goal of the project is to modify an existing, proven technology to work under Minnesota conditions and thereby demonstrate that brushland management can be a win-win endeavor. There are three specific outcomes. Firstly, the project will demonstrate to land management contractors that the BioBaler can be operated profitably under diverse climatic and landscape conditions. Secondly, the project will demonstrate to public and private land managers that they can employ the technologies on lowland brushlands to achieve their habitat goals at a lower cost. Thirdly, the project will demonstrate to the bioenergy industry, that brushlands can be harvested at a large enough volume to be considered viable feedstocks.

The project will achieve these goals by performing the following four activities. Firstly, hold a round table meeting and field session with land managers, engineers and contractors to assess the types of landscapes and conditions required for successful operation. Secondly, work with engineers at Dakota Peat and Equipment to develop a tracked system for the existing machine achieves ground pressures of 5 PSI or lower. Thirdly, field test on a diversity of landscapes. Lastly, hold a public field day to showcase improvements

II. DESCRIPTION OF PROJECT ACTIVITIES

Activity 1: Round table meetings, field visits. Budget: \$4,800

Joint meetings will be held with public and private land managers, contractors and engineers to discuss constraints and opportunities of lowland brushland harvest in Minnesota.

Outcome 1: Round table meeting for brainstorming landscape challenges and specific technological solutions. Field visits to five sites representing range of lowland brush sites. Deliverable: Two-page document highlighting meeting findings. Used by engineering firm to develop solutions. Completion

date: August 2011. **Outcome 2:** Copies of specific engineering options are drafted and circulated to participants. Comments and suggestions are submitted, addressed and final plan approved by group. Deliverable: Final engineering plan, approved by group. Completion date: November 2011.

Activity 2: Engineering and carrying system construction. Budget: \$61,375

After the final plan has been approved the group, Dakota Peat and Equipment engineers, lead by Randy Dufault, will design and construct equipment. Existing, proven track technology will be explored and modified to fit BioBaler. In designing and installation, three principles will drive process: quality, cost and ability to meet ground pressure goals. **Outcome 1:** Preliminary overview of technology options based on three aforementioned principles.

Installation and 'lab-scale' testing of carrying system infrastructure. Completion date: February 2012.

Activity 3: Field test and evaluation. Budget: \$8,400

Field testing of carrying system will be undertaken. Participants from activity one will have the option to view machine and make suggestions. Engineer will have time to address concerns, if necessary.

Outcome 1: Field testing and evaluation of carrying system. Concerns and technological problems will be addressed during field testing. Completion date: April 2012. **Outcome 2:** A working carrying system is completed and approved by activity one participants. Baler ready for public demonstration. Completion date: July 2012

Activity 4: Demonstration of technology to public. Budget: \$4,465

Carrying system is presented to public in a field day. Laurentian RC & D will help publicize and host demonstration. **Outcome 1:** Field day of final carrying system. Sign-in and evaluation of demonstration day will be available to quantify who participated and what was learned. Completion date: September 2012.

III. PROJECT STRATEGY

A. Project Team/Partners

Stempower Resource, Peter Gillitzer. Role: project manager, including participating in planning meetings, fund administration, demonstration day and schedule management. Stempower will be contributing BioBaler WB-55 and tractor to project. **Laurentian RC & D, Paul Sandstrom.** Role: meeting participant and demonstration day manager. Laurentian will participate in meeting and contribute expertise on brushland landscape. Mr. Sandstrom will manage demonstration day and manage all fund for activity 4. **Minnesota Sharp-tailed Grouse Society, Bill Berg.** Role: meeting participant and technical advisor. Mr. Berg will contribute expertise on brushland landscape and technical advice on successful brushland equipment. Sharp-tail Grouse Society will not directly receive funding from grant. **Dakota Peat and Equipment, Randy Dufault.** Role: engineering and carrying system installation. Mr. Dufault will participate in all meetings, offer engineering advice and manage the design and installation of carrying system. Dakota Peat and Equipment will receive funds from activity 2 for services. **Minnesota Native Landscapes, Joe Schaffer.** Role: meeting participant and contractor representative. Mr. Schaffer will participant in all meetings and offer operational expertise on baler carrying system. Minnesota Native Landscapes will provide baler operator and equipment transportation services. They will receive funds from activity 3 and mobilization fees from activity 4.

B. Timeline Requirements. The timeline includes four months of planning, twelve months of carrying system design, install and testing and one month for demonstration. All project steps are sequential and successfully completion of each activity is required to move on to next activity.

C. Long-Term Strategy and Future Funding Needs

This project is part of a larger privately funded endeavor that began in September 2009 with the commercialization of the BioBaler. The design of the carrying system could be installed or integrated on future balers and continued indefinitely. Previous efforts include five years of research and development by BioBaler manufacturer. From September 2009 to April 2010, Stempower has been field testing, designing tractor modifications and operating the BioBaler through privately funded sources. The intent of the project is to make investments for expanding the types of landscapes the BioBaler can be utilized in, after which, the land management fees and biomass feedstock will fund continued investment in brush harvesting.

2011-2012 Detailed Project Budget

IV. TOTAL TRUST FUND REQUEST BUDGET 1.25 years

<u>BUDGET ITEM</u>	<u>AMOUNT</u>
Personnel: Peter Gillitzer, Stempower, project coordination, 1.25 years @ 10% of time, 75% salary, 25% benefits, activity 1,2,4	\$ 18,750
Paul Sandstrom, Laurentian RC&D, meeting and field day coordination, 1.25 years @ 2% of time. 75% salary, 25% benefits, one person, activity 1,4	\$1,250
Contracts: Dakota Peat and Equipment, East Grand Forks, MN ,design and engineering services, enginnering services, activity 2	\$ 15,000
Minnesota Native Landscapes, mobilization of equipment and operator, 700 miles x \$2 per mile; 50 hrs of operator services @ \$140 per hour, activity 3	8,400
Equipment/Tools/Supplies: Carrying system hardware, Mattracks, Thief River Falls, MN, or similar carrying system dealer, activity 2	\$ 34,000
Travel: 800 miles x \$0.55 per mile for Gillitzer, Sandstrom, activity 1,4	\$ 440
Additional Budget Items: promotional materials for demonstration, including brochures, sanitation, signage for Sandstrom, activity 4	\$ 1,200
TOTAL ENVIRONMENT & NATURAL RESOURCES TRUST FUND \$ REQUEST	\$ 79,040

V. OTHER FUNDS

<u>SOURCE OF FUNDS</u>	<u>AMOUNT</u>	<u>Status</u>
Other Non-State \$ Being Applied to Project During Project Period: The BioBaler-tractor system will be applied to the project. Estimate system will be removed from operation for three months or 480 hrs of operation x \$150 per hour operations costs	\$ 72,000	Secured
Other State \$ Being Applied to Project During Project Period:	n/a	
In-kind Services During Project Period: Bill Berg and Joe Schaffer will donate approximately 20 hrs each in participating in design and planning. 20 hrs x \$30 per hour x 2 persons.	\$ 1,200	Secured
Remaining \$ from Current ENRTF Appropriation (if applicable):	n/a	
Funding History:	n/a	

Peter Gillitzer is president and co-founder of Stempower Resources, a land management and biomass feedstock supply firm. Peter holds a BS degree in natural resource policy and a MS degree in applied plant science from the University of Minnesota-Twin Cities. He has been working in biomass energy industry since 2004 conducting research on the utilization of brushlands and assessment of the states' feedstock resources. His resume includes project co-management of two state-funded studies, the Chisago and White Earth Biofuel Feasibility Study, which assisted Minnesota communities in assessing the biomass-to-energy resources in their regions.

Stempower Resources core competencies include providing procurement services to bioenergy facilities and conducting land management. Its current customers include private landowners, the State of Minnesota and US Fish and Wildlife Service and a growing list of energy facilities, including Minnesota Power and the University of Minnesota. Formed by veterans of the land management and oil-natural gas industry, it has also commercially operated and promoted the country's first BioBaler.

