

**Environment and Natural Resources Trust Fund
2014 Request for Proposals (RFP)**

Project Title:

ENRTF ID: 140-E

Itasca Boiler/Woody Biomass Utilization Project

Category: E. Air Quality, Climate Change, and Renewable Energy

Total Project Budget: \$ 1,035,100

Proposed Project Time Period for the Funding Requested: 2 Years, July 2014 - June 2016

Summary:

Itasca Community College is developing a national demonstration site for the effective use of woody biomass for heating, and creating training opportunities for the woody biomass energy conversion industry.

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Sponsoring Organization: Itasca Community College

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Location

Region: Northeast

County Name: Aitkin, Itasca, Koochiching, St. Louis

City / Township:

<input type="checkbox"/> Funding Priorities	<input type="checkbox"/> Multiple Benefits	<input type="checkbox"/> Outcomes	<input type="checkbox"/> Knowledge Base
<input type="checkbox"/> Extent of Impact	<input type="checkbox"/> Innovation	<input type="checkbox"/> Scientific/Tech Basis	<input type="checkbox"/> Urgency
<input type="checkbox"/> Capacity Readiness	<input type="checkbox"/> Leverage	<input type="checkbox"/> Employment	<input type="checkbox"/> TOTAL <input type="checkbox"/> %



PROJECT TITLE: Itasca Boiler/Woody Biomass Utilization Project

I. PROJECT STATEMENT This project will provide a critical step in promoting a more community based and locally stable energy supply. In 2009, Itasca Community College (ICC), a member of the Minnesota State Colleges and University System (MnSCU), began a partnership with Swedish Bioenergy Association (Svebio) which resulted in an education cooperative for the exchange of ideas and technology. The cooperative charge is to promote the use of woody biomass for energy in the mid-west and bring Sweden's boiler/energy conversion technology to the US, recognizing that Sweden has experienced a nearly 80% increase in bioenergy since 1990. This shift has led to a decrease of its greenhouse gas emissions by 9% while simultaneously growing GDP by 48% during this same time period.

Based on outcomes of the LCCMR funded project on Biomass in Northeast Minnesota, "Supporting Community-Driven Sustainable Bioenergy Projects: LCCMR Project 156-F3+4" utilizing biomass as a heating source is an effective way to reduce the release of geologically stored carbon, and shifting the focus to biogenic carbon. The same report indicates an abundance of available supply of locally derived biomass for community or district sized heating systems.

This request is the final step in a multi-year investigation into biomass heating for district sized heating needs. As ICC began its first phase of investigation in 2009, a Blandin Foundation grant allowed the College to restart its 3-decade-old woody biomass heating system. The project also allowed for a regional analysis of feedstock and characterization of the types of direct from the forest biomass feedstocks available to facilities of ICC's size. A second phase, funded through the Iron Range Resources Board granted funds to install calibration equipment on the boiler and test the direct from forest materials for heat value and cost competitiveness with the alternate fuels, specifically, natural gas. Both of these grants recognized the significance of supporting a community-driven sustainable bioenergy project. The results of both phases indicated that direct from the forest fuels can be cost competitive, are readily available, and need to be promoted as a viable and sustainable locally derived fuel source.

To demonstrate the potential for woody biomass usage, ICC must address the existing boiler's fuel feed system and the amount of operator interface time required for operation of the boiler system. Work with the Svebio has identified a boiler system that can utilize these direct from the forest materials, has operator interface requirements similar to a natural gas boiler, and meets the heating needs of the College or similar size district heating loops while be cost competitive with natural gas.

By utilizing a portion of the funds from the Iron Range Resource and Blandin Foundation grants and matching dollars from Svebio, pre-design specifications were developed by FVB Energy, Inc. to provide a blue print for the purchase of a more robust boiler, removal of the existing boiler, and re-fitting of the boiler room and feed handling system to utilize the more modern, robust equipment.

This project is requesting funds to accomplish 4 main goals.

- First, by purchase of a robust biomass boiler system, it will develop a critical "anchor project" that will serve to systematically cultivate a sustainable mechanism that accelerates market development, expansion, and technology transfer activities between clean energy technology actors in Minnesota and in Sweden.
- Second, the project will serve as a success story; a regionally and nationally-recognized commercial demonstration site that showcases a biomass-fueled district energy system utilizing direct from the forest woody biomass fuel products and know-how that delivers reliable, economically competitive (with natural gas), environmentally-friendly, and highly efficient renewable energy.
- Third, the project will increase public knowledge and understanding related to bioenergy, by developing programs related to education, outreach, and training activities in joint cooperation and through knowledge sharing activities with project partners.
- Fourth, the project will serve to provide the platform for workforce development and certificate programs that aim to develop the necessary skill sets for current and future workers in the bioenergy sector.

II. DESCRIPTION OF PROJECT ACTIVITIES



Environment and Natural Resources Trust Fund (ENRTF)

2014 Main Proposal

Project Title: Itasca Boiler/Woody Biomass Utilization Project

Activity 1: Budget: \$112,600 Finalize Boiler Installation Design Utilizing pre-design specifications developed in the initial phases of this project, final design documents will be developed and approved by MnSCU. The boiler will meet design specifications for utilization of direct from forest material, such as whole tree chipped materials derived from logging site residue.

Activity 2: Budget: \$800,800 New Boiler Installation Demolish and remove existing boiler, including any abatement of hazardous materials. The supply contract for the purchase of new boiler and construction and installation contracts will be administered on site. Contracts will provide for re-alignment of feed system and ash disposal for new boiler.

Activity 3: Budget: \$61,700 Education Curriculum Development Provide for training of staff in operation and control for new boiler system. Develop educational materials for incorporation of biomass heating into curriculums in Natural Resources, Engineering and Power Generation. Develop outreach and community education programs to increase awareness of the cost effectiveness and community stabilization effects of forest biomass heating systems.

Activity 4: Budget: \$60,000 Public Awareness Provide local media informational materials and nationally recognized training curriculum to extend the work force in the bioenergy sector through the existing cooperative with Skogforsk and through National Network of Pulp and Paper Technology and Training, of which ICC is the mid-west node.

Outcomes	Completion Date
1. Development of final design for boiler, feed system, distribution tie-in, and ash disposal	January 2015
2. Removal of existing boiler and installation of new boiler, administration of installation contract, and operational testing.	October 2015
3. Develop training materials and provide demonstration and educational workshops	March 2016
4. Develop public awareness of biomass resources and use for thermal energy heating systems through media and College centered demonstration workshops.	June 2016

III. PROJECT STRATEGY

A. Project Team/Partners

Swedish Bioenergy Association (Svebio) has facilitated the development of an educational coop between Itasca Community College and Skogforsk to foster advances in biomass based energy in Minnesota. They will continue to assist with technology transfer and development of skill set for boiler operations and public awareness information. The BioBusiness Alliance of Minnesota (BBAM) and the Area Partnership for Economic Expansion (APEX), which provided partial funding for the FVB study, investigative travel and a preliminary SEH study for the feasibility of boiler replacement, will continue support for the project. Additionally, regional forest product suppliers and producers have cooperated by providing biomass materials for testing in the initial phases of the project. They will continue support by providing direct from the forest biomass materials.

B. Timeline Requirements

The final design and contracts must be completed during the first nine months of the project since tie-into the heating system must occur over the summer months. The system must be operational prior to the 2015/2016 heating system, which typically occurs in early October.

C. Long-Term Strategy and Future Funding Needs

The operation and maintenance of the boiler is a part the College’s operating budget. Based on initial phases of the project, it is anticipated that installation of the new system will reduce long-term heating costs.

Education efforts will become self-sustaining, as customized training will provide ongoing revenue for education to the public.

2014 Detailed Project Budget

Project Title: Itasca Boiler/Woody Biomass Utilization Project

IV. TOTAL ENRTF REQUEST BUDGET: 2 years (2014-2016)

BUDGET ITEM	AMOUNT
Personnel: Project administrator - 2 years, 160 hrs/yr @ \$110.00/hr = \$35,200	\$ 35,200
Personnel: Development of educational materials for Power Generation curriculum 30% time, (10 credit hours) = \$31,000	\$ 31,000
Personnel: Development of educational materials in Engineering (3 credit hours) + and Natural Resource (3 credit hours) - 10% time each Department faculty = \$18,600	\$ 18,600
Personnel: Training maintenance staff 60 hrs at \$55.00/hr = \$3300	\$ 3,300
Contract: Professional services for final design, contract preparation and abatement - FVB Energy estimate	\$ 95,000
Contract: Contractor to be determined. Demolition and removal of existing boiler.	\$ 176,000
Contract: Contractor to be determined. Installation of new boiler, including distribution pumps and piping.	\$ 90,000
Contract: Contractor to be determined. Alignment of and repairs to existing fuel feed system; re-routing of ash disposal system.	\$ 103,000
Contract: Economic analysis to demonstrate costs/benefits of a local biomass energy and supply chain.	\$ 30,000
Equipment/Tools/Supplies: Purchase of 2.8 MMBtu/hr (817 kW) output biomass boiler.	\$ 423,000
Acquisition (Fee Title or Permanent Easements): -NA-	\$ -
Travel: -NA-	\$ -
Additional Budget Items: Development of instructional video for use on public access media and outreach workshops - 30 minutes in length	\$ 30,000
TOTAL ENVIRONMENT AND NATURAL RESOURCES TRUST FUND \$ REQUEST =	\$ 1,035,100

V. OTHER FUNDS

SOURCE OF FUNDS	AMOUNT	Status
Other Non-State \$ Being Applied to Project During Project Period: Travel to Sweden for technology transfer (3 individuals, 1 week duration, 2 trips), funding through Swedish Energy Agency	\$ 19,200	Funding pending
Other State \$ Being Applied to Project During Project Period: -NA-	\$ -	
In-kind Services During Project Period: The college will provide classroom space, classroom support and instructional technology for training and outreach workshops(5 day/year, 2 years, \$160.00/day)	\$ 1,600	Secured
Remaining \$ from Current ENRTF Appropriation (if applicable): -NA-	\$ -	
Funding History: Blandin Foundation Grant (\$30,000) to provide student opportunities in the evaluation of woody biomass fuels available from the forest.. Iron Range Resource Grant(\$30,000) for installation of instrumentation to evaluate heat recovery and thermal energy derived from test fuels pre-design work for new boiler installation	\$ 60,000	Funds expended, projects complete

Itasca Community College

Grand Rapids, MN



- ~ 1000 Students
- A.A. & A.A.S Degrees
- Programs in:
 - Engineering
 - **Page 5 of 6**
 - Power Generation

Minnesota State Colleges and
Universities 07/25/2013 MNSCU

PROJECT TITLE: Itasca Boiler/Woody Biomass Utilization Project

Organization:

Itasca Community College (ICC), a two-year community founded in 1922, is located in Grand Rapids in far northeastern Minnesota. Itasca Community College (ICC) is a member college of the Minnesota State Colleges and Universities system (MnSCU) (www.mnscu.edu) and is governed by the MnSCU Board of Trustees. In addition, ICC is a partner college under the Northeast Higher Education District (NHED) that serves northeast Minnesota's higher education needs. NHED's mission is to provide quality higher education to the communities throughout northeastern Minnesota by developing a regional structure that will preserve college autonomy but will also align programs and services to better prepare residents for learning, employment, citizenship, and life.

Itasca Community College serves approximately 1300 students each year (headcount) and has an annual of approximately \$13,000,000. ICC offers a number of transfer programs as well as programs for employment. Most notable and relevant to this project proposal are ICC's nationally recognized Engineering program, the Industrial Technology Power Generation program, and the Natural Resource Program which is accredited by the Society of American Foresters. Other program areas an associate of arts program and a number of associate of science programs, certificate and diploma programs. In addition to degree programs, ICC has a robust customized training program through Advanced Minnesota (www.advancedmn.org), an organization that provides training across the NHED colleges.

More information about ICC can be found on the official website: www.itascacc.edu

Project Manager:

Bart Johnson, project manager, is an employee of Itasca Community College. Bart holds a master's degree in mechanical engineering. He has been the lead manager on Phase One and Phase Two of the Itasca Boiler/Woody Biomass Project. Currently Bart Johnson is the Coordinator and lead instructor of ICC's Engineering Program and will be assuming the position of Dean of Academic Affairs at ICC on July 15, 2013.

His resume is attached.