

M.L. 2014, Chp. 226, Sec. 2, Subd. 08i Project Abstract

For the Period Ending June 30, 2016

PROJECT TITLE: Itasca Community College Woody Biomass Utilization Project Design

PROJECT MANAGER: Bart Johnson

AFFILIATION: Itasca Community College

MAILING ADDRESS: 1851 E HWY 169

CITY/STATE/ZIP: Grand Rapids, MN 55744

PHONE: (218) 322-2388

E-MAIL: bart.johnson@itascacc.edu

WEBSITE: www.itascacc.edu

FUNDING SOURCE: Environment and Natural Resources Trust Fund

LEGAL CITATION: M.L. 2014, Chp. 226, Sec. 2, Subd. 08i

APPROPRIATION AMOUNT: \$112,000

Overall Project Outcomes and Results

The design and bidding portion of project has been successfully concluded. Stanley Consultants, Inc. of Minneapolis, MN has completed the design specifications and documentation for this project. Design documents were developed and out for construction bids. Bids were opened January 11, 2015 and a contractor was selected, JK Mechanical. Installation is currently underway during this summer 2016 timeframe. Students in Itasca's engineering program were involved with the heat load calculations and measurement for sizing of the new boiler. Students in the natural resource program have and continue to do lab testing for fuel characterization of potential woody biomass feedstocks.

In regards to Goal 2, Project Manager presenting the project work at the April 20th 2015 Heating the Midwest Conference, in Minneapolis. An October "ribbon-cutting" day is planned with a demonstration of the boiler and an "in the woods" chipping demonstration. The day is planned as a day for local citizens, businesses, leaders, and elected officials to come and see the whole from the woods to the boiler process and showcase the potential of woody biomass with modern technology. In regards to Goal 3 & 4, a new industrial technician program called "Process Operations" was approved that will utilize the boiler technology as part of the curriculum. This program will have the ability to have a certificate focused on bioenergy and biochemical production as the marketplace develops.

Fuel procurement plans are in development with local logger. Scaling process is being developed to use a local truck scale and develop a recording/reporting plan that will be supported by the MN DNR and local land management agencies. Natural Resource students continue to be involved in testing potential fuel suppliers for moisture, fuel, and ash content.

Project Results Use and Dissemination

The fall "ribbon-cutting" event will serve as a key aspect of the future dissemination activities. In addition to citizens, business, community leaders, and elected officials, key project partners will be invited:

- Minnesota State College and University System (MnSCU) finance division
- Swedish Energy Agency
- Swedish Bioenergy Association (Svebio)
- Bio Business Alliance of Minnesota (BBAM)
- Skogforsk -Swedish Forestry Research Institution.
- Itasca Economic Development Corporation
- Blandin Foundation

- Iron Range Resources and Rehabilitation Board (IRRRB)
- Stanley consultants

The project manager will propose the project for a presentation at the next Heating the Midwest Conference as a continuation of the presentation at April 20th 2015 conference in Minneapolis.

A October 21st Bioenergy Day, sponsored by Minnesota Power, was hosted on the ICC campus to discuss the future of bioenergy in our region. The Project Manager and ICC personnel disseminated information regarding the ICC Boiler/Woody Biomass Utilization Project at this event. Targeted audience was local and regional community members and representatives from the local forest product industry.



Environment and Natural Resources Trust Fund (ENRTF) M.L. 2014 Work Plan

Date of Report: June 23, 2016
Date of Next Status Update Report: N/A
Date of Work Plan Approval: June 4, 2014
Project Completion Date: June 30, 2016
Does this submission include an amendment request? Yes

PROJECT TITLE: Itasca Community College Woody Biomass Utilization Project Design

Project Manager: Bart Johnson
Organization: Itasca Community College
Mailing Address: 1851 E HWY 169
City/State/Zip Code: Grand Rapids, MN 55744
Telephone Number: (218) 322-2388
Email Address: bart.johnson@itascacc.edu
Web Address: www.itascacc.edu

Location: Itasca

Total ENRTF Project Budget:	ENRTF Appropriation:	\$112,000
	Amount Spent:	\$95,00
	Balance:	\$17,000

Legal Citation: M.L. 2014, Chp. 226, Sec. 2, Subd. 08i

Appropriation Language:

\$112,000 the second year is from the trust fund to the commissioner of natural resources for an agreement with Itasca Community College to develop a final design for installation of a boiler heating system using woody biomass. Students at the college must be involved in the final design process.

I. PROJECT TITLE: Itasca Boiler/Woody Biomass Utilization Project

II. 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) began a partnership with the Swedish Bioenergy Association (Svebio) which resulted in an education cooperative for the exchange of ideas and technology. The cooperative's 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.

This project is the final design phase for 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 a Blandin Foundation grant and matching dollars from Svebio and the Itasca Economic Development Corporation (IEDC), 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 allows Itasca Community College to begin goal one of four for the final phase of the Itasca Boiler/Woody Biomass Utilization Project:

- Goal 1: Purchase of a robust biomass boiler system to 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.
- Goal 2: 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.
- Goal 3: 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.
- Goal 4: The project will 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.

III. PROJECT STATUS UPDATES:

Project Status as of January 1, 2015:

The project is progressing along according to schedule. In regards to Goal 1, funding for boiler purchase and installation have been secured through the MNSCU bonding process. The MNSCU bidding and selection process for a design firm is complete; Stanley Consultants, Inc. of Minneapolis, MN was selected as the design firm. Design documents are being developed and the tentative date to go out for construction bids is April 30th with a planned installation of fall 2015. Visits of boiler installations/manufacturers were completed in Sweden and New England states in fall 2014 and winter 2015, respectively. Students in the engineering program have been involved with the heat load calculations and measurement for sizing of the new boiler.

In regards to Goal 2, Project Manager is presenting this project work at the April 20th 2015 Heating the Midwest Conference, in Minneapolis. Initial plans for project dissemination is in process with local forest product partners. In regards to Goal 3 & 4, a new industrial technician program is being developed which will utilize the boiler technology as part of the curriculum. This program will have the ability to have a certificate focused on bioenergy as the marketplace develops.

Fuel procurement plans are in place with local loggers. Scaling process is being developed to use a local truck scale and develop a recording/reporting plan that will be supported by the MN DNR and local land management agencies. Natural Resource students have been involved in testing potential fuel suppliers for moisture, fuel, and ash content.

Project Status as of July 1, 2015:

The project is continuing to progress. In regards to Goal 1, funding for boiler purchase and installation have been secured through the MNSCU bonding process. Stanley Consultants, Inc. of Minneapolis, MN is developing design specifications and documentation. Design documents were developed and out for construction bids in mid-April. Bids were opened May 5th and exceeded available funding. Consulting engineering firm is redesigning the project and planning for new bids to go out mid-September. Tentative installation is now planned for Summer 2016. Students in the natural resource program have continued lab testing for fuel characterization of potential woody biomass feedstocks.

In regards to Goal 2, Project Manager presented this project work at the April 20th 2015 Heating the Midwest Conference, in Minneapolis. An October 21st Bioenergy Day, sponsored by Minnesota Power, will be hosted on the ICC campus to discuss the future of bioenergy in our region. The Project Manager and ICC personnel will disseminate information regarding the ICC Boiler/Woody Biomass Utilization Project at this event. Targeted audience is local and regional community members and representatives from the local forest product industry. In regards to Goal 3 & 4, a new industrial technician program called "Process Operations" is being developed which will utilize the boiler technology as part of the curriculum. This program will have the ability to have a certificate focused on bioenergy and biochemical production as the marketplace develops.

Fuel procurement plans are delayed with local loggers until a construction completion date is set. Scaling process is being developed to use a local truck scale and develop a recording/reporting plan that will be supported by the MN DNR and local land management agencies. Natural Resource students continue to be involved in testing potential fuel suppliers for moisture, fuel, and ash content.

Project Status as of January 1, 2016:

The design and bidding portion of project is coming to a conclusion. In regards to Goal 1, additional funding needed due to higher than expected bids have been secured through the MNSCU system office. Stanley Consultants, Inc. of Minneapolis, MN updated design specifications and documentation. Design documents were

developed and out for construction bids. Bids were opened January 11, 2015 and a contractor was selected, JK Mechanical. Installation is planned for upcoming Summer 2016. Students in the natural resource program have continued lab testing for fuel characterization of potential woody biomass feedstocks.

In regards to Goal 2, no updates. See dissemination section below. In regards to Goal 3 & 4, a new industrial technician program called "Process Operations" has been approved and will start in the Fall 2017 which will utilize the boiler technology as part of the curriculum. This program will have the ability to have a certificate focused on bioenergy and biochemical production as the marketplace develops.

Fuel procurement plans are in development with local logger. Scaling process is being developed to use a local truck scale and develop a recording/reporting plan that will be supported by the MN DNR and local land management agencies. Natural Resource students continue to be involved in testing potential fuel suppliers for moisture, fuel, and ash content.

Overall Project Outcomes and Results:

The design and bidding portion of project has been successfully concluded. Stanley Consultants, Inc. of Minneapolis, MN has completed the design specifications and documentation for this project. Design documents were developed and out for construction bids. Bids were opened January 11, 2015 and a contractor was selected, JK Mechanical. Installation is currently underway during this summer 2016 timeframe. Students in Itasca's engineering program were involved with the heat load calculations and measurement for sizing of the new boiler. Students in the natural resource program have and continue to do lab testing for fuel characterization of potential woody biomass feedstocks.

In regards to Goal 2, Project Manager presenting the project work at the April 20th 2015 Heating the Midwest Conference, in Minneapolis. An October "ribbon-cutting" day is planned with a demonstration of the boiler and an "in the woods" chipping demonstration. The day is planned as a day for local citizens, businesses, leaders, and elected officials to come and see the whole from the woods to the boiler process and showcase the potential of woody biomass with modern technology. In regards to Goal 3 & 4, a new industrial technician program called "Process Operations" was approved that will utilize the boiler technology as part of the curriculum. This program will have the ability to have a certificate focused on bioenergy and biochemical production as the marketplace develops.

Fuel procurement plans are in development with local logger. Scaling process is being developed to use a local truck scale and develop a recording/reporting plan that will be supported by the MN DNR and local land management agencies. Natural Resource students continue to be involved in testing potential fuel suppliers for moisture, fuel, and ash content.

IV. PROJECT ACTIVITIES AND OUTCOMES:

ACTIVITY 1: Develop Boiler Installation Final Design

Description:

Finalize boiler installation design utilizing pre-design specifications developed in the initial phases of this project. Final design documents will be developed and approved through the Minnesota State College and University (MnSCU) system finance office. The boiler will meet design specifications for utilization of direct from forest material, such as whole tree chipped materials derived from logging site residue.

Students within the Natural Resources and Engineering program will be involved in the boiler design through project work with the Forest Products course. First, students will identify raw material specifications generated

from “in-woods” biomass operations. Using this data, students will identify critical deficiencies in the existing system and provide input on new system design features. The goal of these two components is to increase awareness of current technology, understand potential options and identify solutions, which are applicable to a district, sized heating project.

Summary Budget Information for Activity 1:

ENRTF Budget: \$ 112,000
Amount Spent: \$ 95,000
Balance: \$ 17,000

Activity Completion Date: May 30, 2016

Outcome	Completion Date	Budget
1. MNSCU process for soliciting bids and design firm selected	October 30, 2014	\$ 5,000
2. Student Input to design process	May 15, 2015	\$ 0
3. Completion of final boiler installation design	June 30, 2015	\$ 90,000

Activity Status as of January 1, 2015:

Funding for boiler purchase and installation have been secured through the MNSCU bonding process. The MNSCU bidding and selection process for a design firm is complete; Stanley Consultants, Inc. of Minneapolis, MN was selected as the design firm. Design documents are being developed and the tentative date to go out for construction bids is April 30th with a planned installation in Fall 2015. Students in the engineering program have been involved with the heat load calculations and measurement for sizing of the new boiler. They are beginning initial work on designing expansion system.

Fuel procurement plans are in place with local loggers. Scaling process is being developed to use a local truck scale and develop a recording/reporting plan that will be supported by the MN DNR and local land management agencies. Natural Resource students have been involved in testing potential fuel supplies for moisture, fuel, and ash content.

Activity Status as of July 1, 2015:

Design documents were developed and out for construction bids in mid-April. Bids were opened May 5th and exceeded available funding. Consulting engineering firm is redesigning the project and planning for new bids to go out mid-September. Tentative installation is now planned for Summer 2016. Students in the natural resource program have continued lab testing for fuel characterization of potential woody biomass feedstocks.

Activity Status as of January 1, 2016:

Design documents were updated, additional project funds were received from MSNCU system office in Dec 2015, and the project was successfully rebid. Demolition of existing boiler equipment with begin May 15th and new wood boiler will be installed by October heating season.

Final Report Summary:

Through the MNSCU bidding and selection process, Stanley Consultants, Inc. of Minneapolis, MN was selected as the design firm. Design documents were developed with a planned installation in Fall 2015. Students in the engineering program have been involved with the heat load calculations and measurement for sizing of the new boiler. They also made significant contribution to designing the expansion system. However, bids came in over the funding secured through the MNSCU bonding process for boiler purchase and installation.

Design documents were then updated, additional project funds were received from MSNCU system office in Dec 2015, and the project was successfully rebid. Demolition of existing boiler equipment with began May 15th and new wood boiler will be installed by October heating season.

V. DISSEMINATION:

Description: Sharing status of development for final boiler design specifications developed in this project phase with key project partners. The RFP process and final design documents will be shared with the Minnesota State College and University System (MnSCU) finance division for the purposes of capital bonding funding and project approval. Keep the Bioenergy MOU between Sweden and Minnesota Implementation Task Force updated on status of Itasca Woody Biomass Utilization Project. This will include communications with Swedish Energy Agency, Swedish Bioenergy Association (Svebio), Bio Business Alliance of Minnesota (BBAM), and Skogforsk - Swedish Forestry Research Institution. Project status will also be disseminated to regional woody biomass industry companies, the Itasca Economic Development Corporation, and the initial project sponsors of the Blandin Foundation and the Iron Range Resources and Rehabilitation Board (IRRRB).

Status as of January 1, 2015:

This project was selected by the 2015 Heating the Midwest Conference for highlighting as part of “Biomass Heating Case Studies I: Practical Small to Medium Scale Deployments”. The Project Manager will present the project activities to date and plans for the future.

Status as of July 1, 2015:

The Project Manager presented this project work at the April 20th 2015 Heating the Midwest Conference, in Minneapolis. An October 21st Bioenergy Day, sponsored by Minnesota Power, will be hosted on the ICC campus to discuss the future of bioenergy in our region. The Project Manager and ICC personnel will disseminate information regarding the ICC Boiler/Woody Biomass Utilization Project at this event. Targeted audience is local and regional community members and representatives from the local forest product industry.

Status as of January 1, 2016:

No dissemination updates. Ribbon cutting and newspaper article planning in process to highlight the project and the funding sources.

Final Report Summary:

The fall “ribbon-cutting” event will serve as a key aspect of the future dissemination activities. In addition to citizens, business, community leaders, and elected officials, key project partners will be invited:

- Minnesota State College and University System (MnSCU) finance division
- Swedish Energy Agency
- Swedish Bioenergy Association (Svebio)
- Bio Business Alliance of Minnesota (BBAM)
- Skogforsk -Swedish Forestry Research Institution.
- Itasca Economic Development Corporation
- Blandin Foundation
- Iron Range Resources and Rehabilitation Board (IRRRB)
- Stanley consultants

The project manager will propose the project for a presentation at the next Heating the Midwest Conference as a continuation of the presentation at April 20th 2015 conference in Minneapolis.

A October 21st Bioenergy Day, sponsored by Minnesota Power, was hosted on the ICC campus to discuss the future of bioenergy in our region. The Project Manager and ICC personnel disseminated information regarding the ICC Boiler/Woody Biomass Utilization Project at this event. Targeted audience was local and regional community members and representatives from the local forest product industry.

VI. PROJECT BUDGET SUMMARY:

A. ENRTF Budget Overview:

Budget Category	\$ Amount	Explanation
Personnel:	\$ 17,000	1 project manager for 11% FTE for year 1 and 5% FTE for year 2
Professional/Technical/Service Contracts:	\$ 95,000	Professional services for final design, contract preparation and abatement. Contract will be to a single firm determined through MNSCU bidding process.
TOTAL ENRTF BUDGET:	\$ 112,000	

Explanation of Use of Classified Staff: N/A

Explanation of Capital Expenditures Greater Than \$5,000: N/A

Number of Full-time Equivalents (FTE) Directly Funded with this ENRTF Appropriation: 0.16 FTEs were originally planned for this project. As the project manager changed from a faculty member to an administrator during this project, the \$17,000 was not requested for reimbursement; Itasca Community College covered all project management costs and secured additional funding for redesign and rebidding work.

Number of Full-time Equivalents (FTE) Estimated to Be Funded through Contracts with this ENRTF Appropriation: 0.5 FTEs

B. Other Funds: \$10,000 in grant funding to support travel for biomass boiler site visits. \$965,000.00 as part of 2014 MNSCU Bonding Request. \$449,757 from MNSCU HEAPR Funds for replacement of backup/peaking natural gas boilers.

VII. PROJECT STRATEGY:

A. Project Partners:

Project Partners Not Receiving Funds:

- Implementation Task Force for the Bioenergy MOU between Sweden and Minnesota
- Swedish Energy Agency
- Swedish Bioenergy Association (Svebio)
- Bio Business Alliance of Minnesota (BBAM)
- Skogforsk - Swedish Forestry Research Institution
- M & R Chips

Project Partners Receiving Funds: N/A

B. Project Impact and Long-term Strategy:

The Itasca Woody Biomass Project long-term strategy is focused on demonstrating the potential for woody biomass usage as a community based and locally stable energy supply. Itasca looks to serve the education needs that are associated with this. Long-term projects goals:

- Goal 1: Purchase of a robust biomass boiler system to 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. Itasca will pursue funding through additional grant opportunities as well as through the MNSCU capital budget request to the State of Minnesota. This project is part of the 2014 MNSCU and the Governors’ capital budget request.
- Goal 2: 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. Itasca will pursue this goal through community outreach events and working with project partners SVEBIO, BBAM, Skogforsk, and the Implementation Task Force for the Bioenergy MOU between Sweden and Minnesota to use the Itasca Boiler as an “anchor” demonstration site for the promotion of woody biomass usage.
- Goal 3: 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. Itasca will pursue this goal through the same activities listed in Goal 2. In addition, the new boiler will be incorporated into Itasca’s Natural Resource and Engineering curriculum.
- Goal 4: The project will 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. Itasca will work with project and industry partners to identify education opportunities and put in appropriate education programming that will support the woody biomass industry in the state of Minnesota.

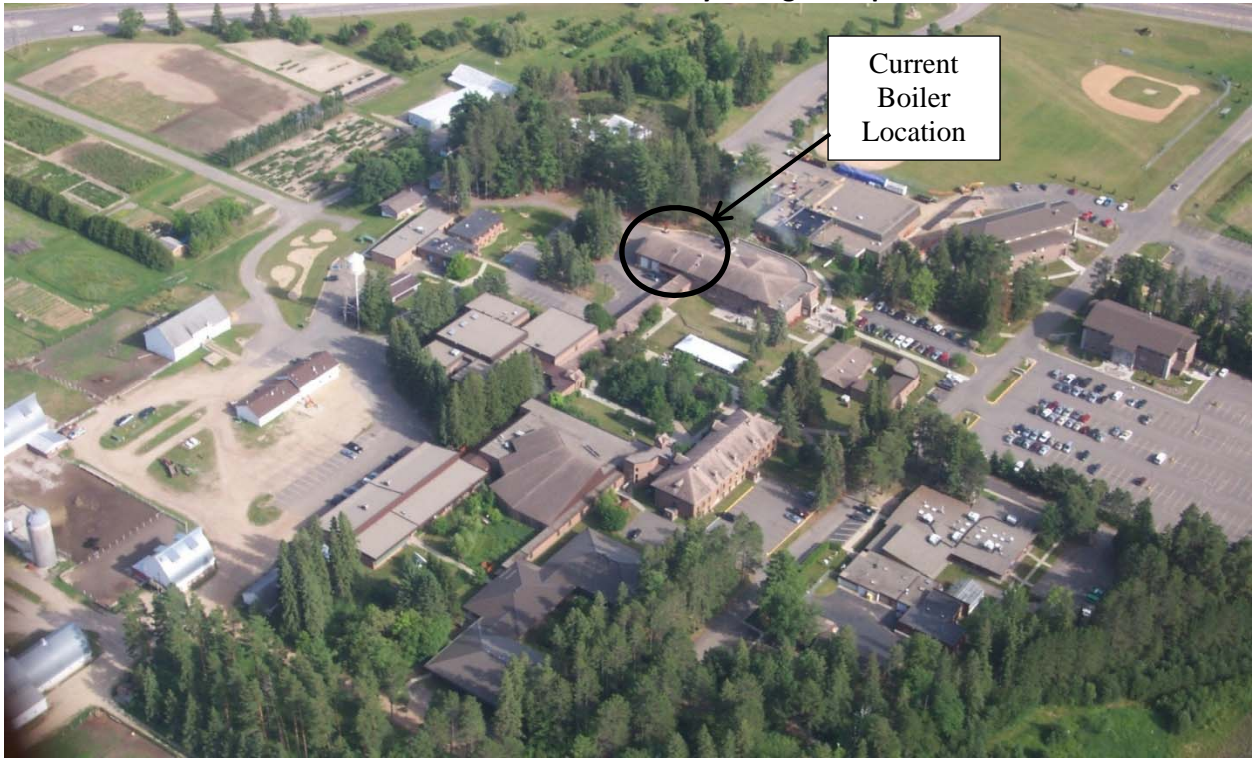
C. Spending History:

Funding Source	M.L. 2008 or FY09	M.L. 2009 or FY10	M.L. 2011 or FY12-13	M.L. 2013 or FY14
Svebio			\$17,000	
Blandin Foundation	\$15,000	\$15,000		~\$23,000
IRRRB	\$15,000	\$15,000		
Itasca Economic Development Corporation (IEDC)			\$3000	

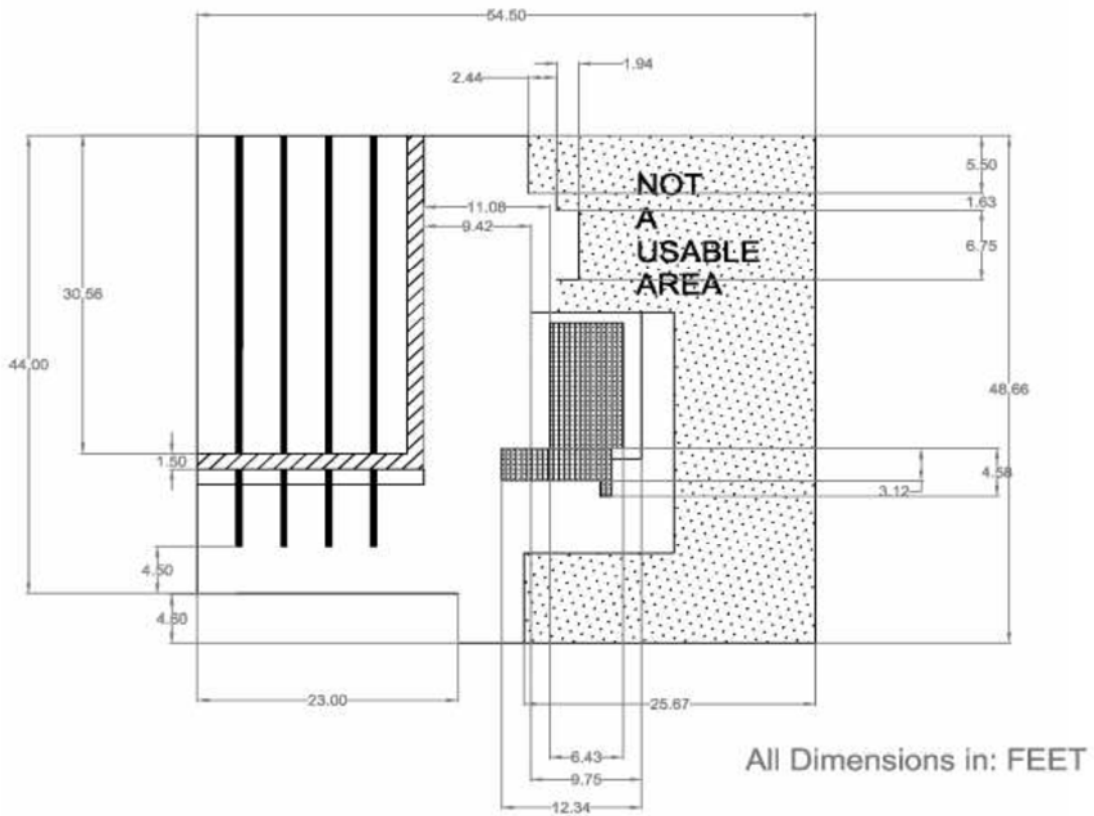
VIII. ACQUISITION/RESTORATION LIST: N/A

IX. VISUAL ELEMENT or MAP(S):

Overview of Itasca Community College Campus



Boiler Room Layout
(No Changes are planned for building structure)



Current Wood and Natural Gas Boilers
(Current wood boiler will be removed & replaced)



X. ACQUISITION/RESTORATION REQUIREMENTS WORKSHEET: N/A

XI. RESEARCH ADDENDUM: N/A

XII. REPORTING REQUIREMENTS:

Periodic work plan status update reports will be submitted no later than January 1, 2015, July 1, 2015, and January 1, 2016. A final report and associated products will be submitted between June 30 and August 15, 2016.



Environment and Natural Resources Trust Fund

M.L. 2014 Project Budget

Project Title: *Itasca Boiler/Woody Biomass Utilization Project*

Legal Citation:

Project Manager: *Bart Johnson*

Organization: *Itasca Community College*

M.L. 2014 ENRTF Appropriation: **\$112,000**

Project Length and Completion Date: *2 Years, June 30, 2016*

Date of Report: **June 24, 2016**

ENVIRONMENT AND NATURAL RESOURCES TRUST FUND BUDGET	Activity 1 Budget	Amount Spent	Activity 1 Balance	Activity 2 Budget	Amount Spent	Activity 2 Balance	Activity 3 Budget	Amount Spent	Activity 3 Balance	TOTAL BUDGET	TOTAL BALANCE
BUDGET ITEM	<i>Final design of boiler installation</i>			<i>None</i>			<i>None</i>				
Bart Johnson, Project Manager: \$17,000 (70% salary, 30% benefits) (16% FTE total; 11% FTE for year 1 and 5% FTE for year 2)	\$17,000	\$0	\$17,000							\$17,000	\$17,000
Professional/Technical/Service Contracts											
Stanley Consultants: Design services for new boiler design.	\$95,000	\$95,000	\$0							\$95,000	\$0
Equipment/Tools/Supplies											
Capital Expenditures Over \$5,000											
Fee Title Acquisition											
Easement Acquisition											
Easement - Long-term Monitoring, Management, and Enforcement											
Professional Services for Fee Title and Easement Acquisition											
Printing											
Travel expenses in Minnesota											
Other											
COLUMN TOTAL	\$112,000	\$95,000	\$17,000							\$112,000	\$17,000