



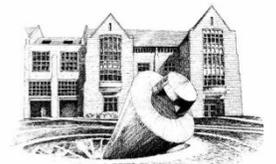
# University of St. Thomas Microgrid Research and Testing Program

Annual Report (August to December 2015)

Grant funding provided by the Xcel Energy Renewable Development Fund (RDF)

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## Executive Summary

This annual report is submitted in compliance with the Article 7 of the Grant Contract Terms and Conditions covering the project “University of St. Thomas Microgrid Research and Testing Program” supported by the customers of Xcel Energy via a grant from the Renewable Development Fund.

This Annual Report covers the period August to December 2015 and summarizes activities initiated to begin the ‘University of St. Thomas Microgrid Research and Testing Program’. This report summarizes actions taken in the August to December 2015 time frame immediately after the formal awarding of the microgrid grant to the University of St. Thomas.



## Introduction

The University of St. Thomas (UST) entered into an agreement with the Northern States Power Company (doing business as Xcel Energy in Minnesota) in regard to a \$2.1 Million research grant for a period of three years. The funding was allocated from the Higher Education block grant component of the Renewable Development Fund, supported by the ratepayer Xcel Energy's ratepayer and managed by Xcel Energy. Pursuant to the conditions of the said agreement (Section 7; Exhibit C of "REPORTING"), the UST provides this annual report on progress made-to-date in implementing the said research project.

The objective of the "University of St. Thomas Microgrid Research and Testing Program" is to install a sustainable, ~ 0.25 MW peak, multi-purpose microgrid at the St. Paul Campus of the University of St. Thomas. The primary objective of this facility will be to promote industry/academic collaboration in the design/build/test and validation of near commercial concepts in the areas of electricity generation and microgrid/subsystem control. The research will also contribute in the strengthening and expansion of the renewable energy industry in Minnesota through the study of how distributed-energy-resources interact in a microgrid and how this microgrid interacts with the distribution feeder that powers the University of St. Thomas, St. Paul Campus. This project has significant potential for impacting the commercial viability of microgrids and the control of the distributed energy resources contained within a microgrid.

## Progress to Date

Significant progress was made in two areas: (1) Microgrid Siting, and (2) Initiation-of-Research supporting the control and operation of a microgrid.

### (1) Microgrid Siting

The Planning Committee and the City Council of Chisago City unanimously approved the University of St. Thomas Microgrid Research and Testing Program for deployment on a 5-acre plot of land located on the Winehavens Winery property.

The land use agreement between the University of St Thomas and Winehavens Winery for the University of St. Thomas Microgrid Research and Testing Program is being worked with no issues that would otherwise prolong finalization of the agreement.

### (2) Initial of Research

Three graduate students were selected for research on microgrid control and smart inverters.

Their progress during the first five months of the project was acceptable. In addition, the vendor identification and selection process for several of the long-lead-items comprising a microgrid was initiated. Two types of vendors will be identified. Type-1 vendors will supply the common type of devices found in any electrical power system. Type-2 vendors will be selected with project sustainability in mind. They will be capable of supplying present-generation technology followed by next-generation technology, in approximately two years, in an effort to sustain and continue the microgrid research project.



## Conclusion and Next Steps

The finalization of the site agreement for locating the microgrid is in progress with all parties affirming their desire to complete the agreement.

The vendor identification and selection process for building the microgrid has begun.

Graduate student research has commenced and is expected to be ready for controlling the microgrid when it comes online circa Q1 of 2017.

The microgrid site agreement, vendor selection, and graduate-student-research is projected to enable commencement of the microgrid construction process in Q3 2016 with preliminary power flow anticipated in Q2 2017.