



# 2015 Environmental Benefits Report

*Minnesota Technical Assistance Program*

Submitted to the Minnesota Pollution Control Agency

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# About MnTAP

The Minnesota Technical Assistance Program (MnTAP) is an outreach and assistance program at the University of Minnesota. MnTAP helps Minnesota businesses develop and implement industry-tailored solutions that prevent pollution at the source, maximize efficient use of resources – including water and energy – reduce costs, and improve public health and the environment.

Discovering a need for waste reduction and pollution prevention assistance, the Minnesota legislature amended the Waste Management Act in 1984 to “provide for the establishment of technical and research assistance for generators of hazardous and industrial waste in the state.” The Minnesota Toxic Pollution Prevention Act, enacted by the legislature in 1990, directed the then Minnesota Office of Waste Management to “establish a pollution prevention assistance program” for all persons in the state using, generating, or releasing toxic pollutants, hazardous substances or hazardous wastes. Today, the Minnesota Pollution Control Agency (MPCA) supports that assistance primarily by providing funding to the University of Minnesota, School of Public Health, Environmental Health Sciences Division for MnTAP. MnTAP has leveraged direct MPCA funding to win additional competitive grant funding totaling 26 percent of the FY2015 budget.

Pollution prevention and energy efficiency technical assistance is tailored to individual businesses through a number of services including site visits, student interns, materials exchange, facilitated teams, workshops and industry specific resources. Since MnTAP’s inception in late 1984, staff members have conducted over 3,500 site visits to small and large manufacturing and service businesses in all parts of the state. The services that MnTAP provides help businesses preserve Minnesota’s natural environment and regional public health through pollution prevention measures.

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## 2015 MnTAP Staff



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The University’s mission, carried out on multiple campuses and throughout the state, is threefold: research and discovery, teaching and learning, and outreach and public service. The University of Minnesota shall provide equal access to and opportunity in its programs, facilities, and employment without regard to race, color, creed, religion, national origin, gender, age, marital status, disability, public assistance status, veteran status, sexual orientation, gender identity, or gender expression.

# Celebrating 30 Years of Service

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## Director’s Note

Over the course of 2015, MnTAP celebrated a 30 year legacy of high quality technical assistance to Minnesota businesses. Since 1984, MnTAP has helped businesses reduce waste and lower their energy and water use while reducing their processing costs. Over the course of the year 245 businesses across the state received assistance from MnTAP staff members, 56 companies have implemented 98 MnTAP recommended process changes and realized reductions totaling over **2.3 million kWh** and over **238,000 therms of energy**, as well as conserving nearly **23.7 million gallons of water** and over **500,000 pounds of waste**. Combined, these reductions are saving companies over **\$922,000** annually. MnTAP accomplishments in 2015 include:

- Continued support of Economy, Energy and Environment (E3) outreach in the fiberglass reinforced plastics, and launched E3 in the painting and coating industries
- Completed a water use study for the north and east metro ground water management area and engaged businesses to identify and implement water efficiency measures
- Launched a three year effort to provide energy efficiency and distributed energy generation assessments and assistance to publicly owned wastewater treatment facilities
- Assisted 15 small businesses in choosing less hazardous degreasing products with lower volatile organic compound (VOC) content.

Throughout this report, you will find stories celebrating the successful outcomes of companies that chose to work with MnTAP in 2015 and implemented improvement recommendations. These companies are having a positive impact on both their environmental footprint and their profitability. These efforts continue the 30-year legacy of reducing waste at the source with the fundamental goal of improving public health and the environment. This is good business for Minnesota.

We thank our clients and partner organizations for the opportunity to work with them in 2015 and we look forward to serving your business in 2016.

*Laura Babcock*  
 Director, Minnesota Technical Assistance Program

## Links to MPCA’s Strategic Plan

### Water

#### Goal - Pollution from all sources is reduced or prevented

MnTAP provides technical assistance to POTWs and industrial water users through on-site assessments.

### Air

#### Goal - Ensure emissions do not create unacceptable exposures

MnTAP provides information and assistance for businesses to reduce VOCs and HAPs.

#### Goal - Reduce contribution to greenhouse gas emissions

MnTAP provides industrial energy efficiency solutions to businesses through on-site assessments and outreach.

### Land/Waste

#### Goal - Solid waste is managed to conserve resources and energy

MnTAP has active outreach and assistance efforts to reduce waste through source reduction and reuse.

### People and Approaches

#### Goal - Conserve resources and prevent pollution to protect the environment and economy

MnTAP is an outreach and assistance program that helps Minnesota businesses develop and implement industry-tailored solutions that prevent pollution at the source, maximize efficient use of resources, and reduce energy use and cost to improve public health and the environment.

# 2015 EBR Executive Summary

## Program Highlights

Driven by MnTAP's mission to help Minnesota businesses maximize resource, energy and water efficiency, prevent pollution and save money, we achieved a lot in 2015

**970 assistance activities over 295 engagements**

**245** unique Minnesota companies

**144** site visits & team meetings

**13** intern projects

Helped companies avoid pollution emissions from implemented energy and water conservation equal to **3,360 MTCO<sub>2</sub>**

## New Initiatives

Launched **3** new programs:

- Reduce school food waste
- Find energy efficiencies in municipal wastewater treatment plants
- Conserve energy in small data centers

Expanded E3 to paint and coating industry, helping save energy and labor and reduce waste at the source

# 2015 EBR Executive Summary



## 2015 Outcomes

Activity	Waste			Energy		Water	Savings
	Air Emissions (lb)	Hazardous Waste (lb)	Non-Hazardous/Solid Waste (lbs)	Electric (kWh)	Gas (Therms)	(Gallons)	
Site Visits	126,600	26,900	3,800	313,000	---	8,700,000	\$249,000
Interns	0	98,500	156,100	2,011,000	238,000	15,000,000	\$673,000
Materials Exchange	0	0	91,300	---	---	---	---
<b>TOTALS</b>		<b>503,200</b>		<b>2.3 million</b>	<b>238,000</b>	<b>23.7 million</b>	<b>\$922,000</b>

## 2015 Outputs

Technical Assistance Activity	2013 Results	2014 Results	2015 Results
Contacts (calls/emails/meetings)	545	671	830
Requests for Assistance	---	76	96
Total Staff Site Visits (unique facilities)	105 (52)	121 (69)	144 (90)
Student Interns	11	11	13
Materials Exchange - completed	111	83	27
Events and Presentations	50	46	70
MnTAP Website Visits (unique visitors)	56,363 (44,293)	114,107 (91,088)	94,001 (37,009)

## On-Site Assistance

### 2015 Outputs

144 site visits to  
90 unique facilities  
96 requests for assistance

### 2015 Outcomes

503,000 lb waste  
23.7 million gal water  
2.3 million kWh  
238,000 therms  
\$922,000 annual savings

### What they said...

“MnTAP has been an excellent partner in helping the MPCA achieve our goals of working with businesses and public entities to conserve resources, prevent pollution and support a strong economy.”

-- Mark Snyder, Environmental Specialist, MPCA

### 2015 Goals

Conduct 5,000 hours of site visit assistance to 100 different facilities to identify opportunities for companies to prevent waste and pollution and conserve resources, including water and energy. Support Minnesota businesses by responding to questions on waste generation and resource utilization.

### 2015 Accomplishments

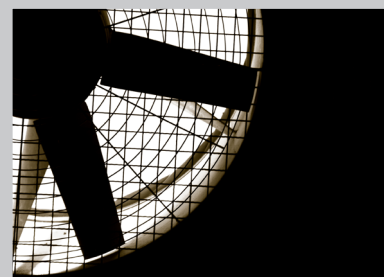
During site visits, MnTAP staff members analyze the current production situation, research possible alternatives for reduction, and complete a report with specific recommendations to the organization for material, water or energy utilization improvement. MnTAP staff made **170 recommendations** with a value over **\$1.7 million** for resource conservation to Minnesota businesses in 2015 from all onsite services.

### 2015 Environmental Recommendations

Recommendation Area		Proposed Reduction	Actual Reduction	First Year Implementation
Water Use	gal/year	52,300,000	9,700,000	19%
Energy	kWh/yr	1,000,000	740,000	74%
Energy	therms/yr	145,000	70,000	48%
Air Emissions	lb/yr	102,000	85,000	82%
Hazardous Material/ Waste	lb/yr	36,000	18,000	50%
Non-Hazardous Material/ Solid Waste	lb/yr	1,660,000	59,000	2%
<b>Savings</b>	<b>\$/yr</b>	<b>\$1,740,000</b>	<b>\$423,000</b>	<b>24%</b>

## Project Success: Upgrade to Greener Products and Systems

A \$50,000 City of Minneapolis Green Business Grant empowered Minneapolis-based Unison Comfort Technologies, a manufacturer of heating, ventilation and cooling systems, to install a new paint system. MnTAP helped the business analyze paint and solvent formulations to ensure that the new system would greatly improve air quality by lowering volatile organic compounds and hazardous air pollutants. Implementation of low-HAP paints and HAP-free solvents resulted in a **6,850-pound reduction in VOCs** and a **7,450-pound reduction in HAPs**. The new booth itself is big enough to contain the large air handling systems that are manufactured and painted by the company, and the booth doubles as a curing oven, allowing the paint to dry without exposing the rest of the shop to the vapors. The new system is impressive and the outcome reflects how success can be attained through collaboration with MnTAP.



## On-Site Assistance: Intern Program

### 2015 Outputs

- 13 intern projects
- 156 student applicants
- 25 company applicants

### What they said...

"We greatly appreciate the hard work our intern put into his internship. His contributions will impact the plant operation for years to come in positive ways."

-- Jeff Shodean,  
Maintenance Manager,  
Davisco Foods International

### Funding Partners

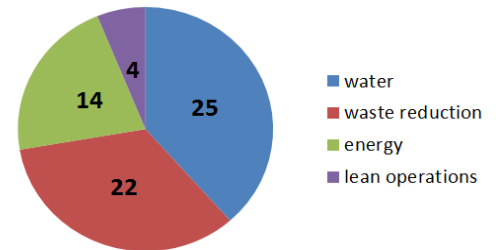
- Minnesota Pollution Control Agency
- Metropolitan Council Environmental Services
- Minnesota Department of Commerce, Division of Energy Resources
- Xcel Energy

### 2015 Goals

This year, MnTAP used MPCA funding to employ five students to identify and implement waste reduction solutions in Minnesota businesses. MnTAP also secured additional grants and partnerships to fund an additional eight students, focusing on water conservation, lean manufacturing, and energy efficiency.

### 2015 Accomplishments

The 13 intern projects focused on water, energy, material and production efficiency. The chart at right shows how the 65 intern recommendations were distributed by focus.



### 2015 Outcomes - Intern Program Implementation\*

Project Year(s)	Waste (lbs)			Energy		Water (gallons)	Savings
	Air Emissions (lbs)	Hazardous Waste (lbs)	Non-Haz/ Solid Waste (lbs)	(kWh)	(therms)		
2012	50	14,400	33,000	3.8 million	153,000	11.6 million	\$590,000
2013	---	---	775,000	1.4 million	182,000	24.8 million	\$512,000
2014	0	53,170	50,100	3.2 million	440,000	13.9 million	\$648,000
<b>2015</b>	<b>0</b>	<b>98,500</b>	<b>156,100</b>	<b>2.0 million</b>	<b>238,000</b>	<b>15 million</b>	<b>\$673,000</b>

\*Implementation reported in 2015 for intern projects from all years



### Project Success: Reducing Food Waste at Davisco

At Davisco Foods International, a dairy processing company, a MnTAP intern identified areas where food waste could be greatly reduced. Barrels of cheese are filled from above by a hopper. When the barrel is full, a mechanical feeder arm automatically brings the next barrel into position. During this transition, product can continue to fall from the hopper to the floor, after which it can no longer be used in products that will be consumed by people. To ensure that no product is lost as the new barrel is placed, the intern suggested programming a slight delay, which keeps the barrel in place until all product is dispensed from the hopper. Implementing this solution has reduced the company's food waste by **1,550 lb** and saved nearly **\$3,000** per year.

Other recommendations included installing metal catch pans beneath production towers, placing totes along the conveyor belt line, and increasing fill extensions to keep cheese from spilling out of the barrels during the fill process. Implementation of these solutions could result in an annual waste reduction of **7,400 lb** and a savings of more than **\$4,000** a year.

See more solutions at [www.mntap.umn.edu/intern/pdf/2015Solutions.pdf](http://www.mntap.umn.edu/intern/pdf/2015Solutions.pdf)

# Minnesota Materials Exchange

## 2015 Outputs

- 105 new organizations/  
companies
- 353 new individual members
- 25,501 unique visitors
- 51,523 website visits
- 225 listings
- 29 successful exchanges

## 2015 Outcomes

92,320 lbs diverted material

## What they said...

“The Materials Exchange has been a valuable partner for us . . . it’s an exceptional outlet to connect with local businesses. It helps keep items out of the landfill while providing resources to those in need and it saves us the associated disposal cost. A win all the way around for the community.”

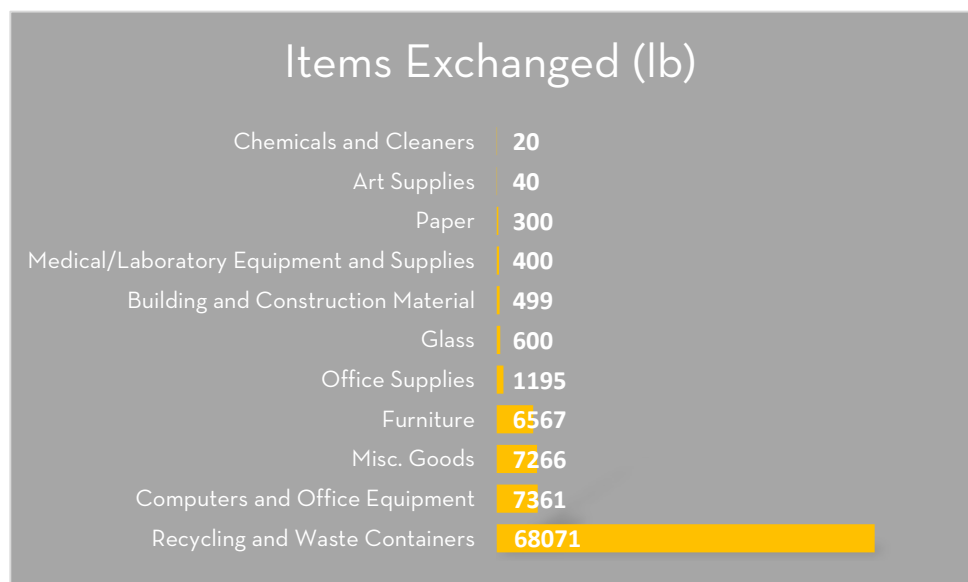
-- Sustainability Department,  
HealthPartners

## 2015 Overview

The Minnesota Materials Exchange is a website that links organizations that have reusable goods they no longer need to others who can use them. In 2015, MnTAP focused on publicizing this service to businesses, organizations, and institutions throughout Minnesota. Outreach was conducted to metro counties to encourage Materials Exchange promotion through their communications outlets. The exchange was also promoted to businesses in Southwestern Minnesota as part of a summer 2015 intern project.

## 2015 Exchanges

Over 90,000 lb of waste was diverted from landfills via exchanges, with the most weight in recycling and waste containers, followed by computers and other office equipment. This chart shows the breakdown by weight of items exchanged.



## Program Success: Solid Waste Assessment Replication Model

In summer 2015, a MnTAP intern was hosted by the Southwest Regional Solid Waste Commission (SWRSWC) to assist businesses in Cottonwood, Jackson, and Nobles Counties with solid waste reduction. The intern developed a replication model that businesses can use to conduct their own solid waste assessments. The replication model guides business in identifying solid waste reduction and reuse opportunities. Key recommendations include:

- Identify waste that can be used for animal feed
- Explore reuse marketing via the Minnesota Materials Exchange
- Use reusable packaging for transporting items

The model is applicable to any type of business. Find it at [www.mntap.umn.edu/industries/waste/tools.html](http://www.mntap.umn.edu/industries/waste/tools.html)





## Client Communications

### 2015 Outputs

- 4 market surveys
- 7 MnTAP e-newsletters to 1,440 subscribers
- 8 water tips e-newsletters to 820 subscribers
- 11 emails promoting MnTAP activities
- 2 printed Source newsletters to 2,800 subscribers
- 1 *Solutions* intern program magazine
- 2 articles published in GreenBiz
- 18 articles published in trade magazines
- 1 tri-fold recruitment brochure
- 2 promotional postcards
- 1 magazine ad
- 5 webinars
- 43 presentations
- 5 booth events
- 10 training events

### 2015 Goal

Develop and disseminate technical information for Minnesota businesses to help them implement pollution prevention and energy efficiency practices and technologies. Promote MnTAP services and results through publications and presentations.

### 2015 Accomplishments

In 2015, MnTAP used a number of targeted and enhanced outreach tools and techniques to promote available project opportunities, gather information, and share the results of our efforts. Communication methods included electronic newsletters, targeted email campaigns, and project-specific printed materials and webinars.

#### Enhanced Promotional Materials

MnTAP developed several new promotional and outreach tools in 2015, including:

- A series of tips newsletters to promote the water conservation project in the NE metro. Find them at: [www.mntap.umn.edu/greenbusiness/water/water\\_projects.html](http://www.mntap.umn.edu/greenbusiness/water/water_projects.html)
- Several case studies on the VOC program were created to highlight successes businesses have had changing processes or products to improve air quality and employee health. Access them at: [www.mntap.umn.edu/industries/air/success\\_stories.html](http://www.mntap.umn.edu/industries/air/success_stories.html)

#### Outreach

MnTAP continued to market its services through multiple avenues:

- Constructed a new home page with rotating images/links and dropdown menus, added new water and waste portals and content, and updated the air portal and the news & events page
- Posted almost daily on Facebook and Twitter and increased number of posts on LinkedIn. Web page views via social media platforms resulted in 551 website page views, up from 340 in 2014. The most-visited page from social media was the home page (62) followed by the intern program page (56)
- Developed and hosted 5 webinars to reach an audience from a broader geographical area. The webinars covered a variety of topics, including painting, plastics and energy in wastewater treatment. The webinars were attended by an average of 30 people. View them at: [www.mntap.umn.edu/Webinar/index.html](http://www.mntap.umn.edu/Webinar/index.html).



### Webinar: Plastics in MN - An Evolving Additives Story

In 2015, MnTAP conducted a survey aimed at understanding industry perspectives on the use of plastics and plastic additives in and around Minnesota. The survey focused on phthalates and halogenated flame retardants, additives that are known carcinogens and of increasing concern to the public. Thirty-eight suppliers of various sizes, handling a range of resin and additive types, were contacted via telephone to identify market drivers, customer demands and technical challenges to using safer alternatives to phthalates and halogenated flame retardants. Twenty-five companies completed the survey, generating these results, which were shared in a webinar:

- 50% said the decision of which additive to use was left up to the customer
- 88% use a combination of phthalate and non-phthalate plasticizers
- 64% use a combination of halogenated and non-halogenated flame retardants
- 50% identified cost and performance as the main concerns for the additives they choose.

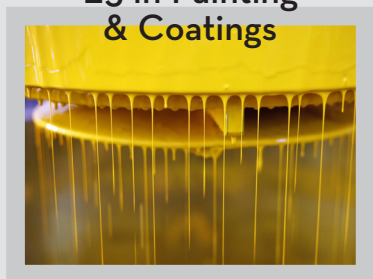
Watch the archived webinar at: [www.mntap.umn.edu/Webinar/index.html](http://www.mntap.umn.edu/Webinar/index.html)

# MnTAP's 2015 Special Projects

Project & Funding	Highlighted Activities	Page
Area Source VOC Reduction <i>MN Pollution Control Agency; Clean Air Minnesota</i>	Support voluntary reduction of VOC emissions at small- to mid-size businesses through education and outreach in automotive and industrial painting, degreasing and oil seed milling industries.	10
Area Source VOC Reduction: Degreasing <i>U.S. Environmental Protection Agency, Region 5</i>	Demonstrate efficiency of low-VOC low hazard degreasing materials in industrial maintenance and service businesses.	11
E3 in FRP: Fiber Reinforced Plastics <i>MN Pollution Control Agency; U.S. EPA Region 5</i>	Conduct four Economy, Energy and Environment (E3) assessments of fiber reinforced plastics manufacturers to implement time, energy and materials savings opportunities to improve business productivity and profitability.	12
E3 in Painting and Coating Project Launch <i>MN Pollution Control Agency; U.S. EPA Region 5</i>	Apply concepts of E3 – Economy, Energy and Environment – to improve productivity, and reduce air emissions and energy use in industries with significant painting and coating operations.	12
Energy Reduction in Wastewater Treatment Plants <i>Minnesota Department of Commerce, Division of Energy Resources; U.S. Department of Energy</i>	Provide energy assessments at wastewater treatment plants throughout Minnesota and identify sites where combined heat and power could be a future option for energy generation.	13
Industrial Water Conservation Initiatives <i>Metropolitan Council with funding from the Clean Water, Land, and Legacy Amendment</i>	Develop a profile of industrial water use for the north and east metro and conduct water use assessments through site visits and intern projects.	14
Motivating Manufacturing Energy Efficiency with Lean <i>Minnesota Department of Commerce, Division of Energy Resources</i>	Student interns provided support for implementation of energy efficiency improvements and application of Lean tools to reduce energy use per unit of production.	15-16
School Food Waste <i>U.S. Environmental Protection Agency, Region 5</i>	Prevent or reduce food waste in K-12 public schools by observing processes and sharing best practices, and measuring the impact of implementation of new reduction strategies.	17
Small Embedded Data Centers <i>Minnesota Department of Commerce, Division of Energy Resources</i>	Develop protocol to measure energy use in server rooms smaller than 1,000 sq. ft., then apply the protocol to assess energy conservation opportunities for small data centers.	18

## Ongoing and New for 2016

### E3 in Painting & Coatings



Launched late 2015

### Energy in Wastewater Treatment



Year 2 of the 3 year project

### Compressed air vs. electric hand tools



New in 2016

## Area-Source VOC Reduction

### 2015 Outputs

- 7 Painter training events
  - 138 painters trained
- 1 water-based autobody paint demonstrations
- 3 painting webinars with 80 attendees
- 1 webinar promo postcard
  - 8 written case studies
- 8 articles published in trade magazines
- 5 paint events with 420 attendees

### 2015 Outcomes

100,800 lb VOC reduction

### Sponsor

Minnesota Pollution Control Agency

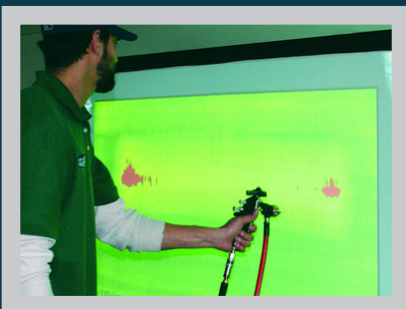
### Project Overview

The goal of the project is to identify functional non-VOC alternative products, implement training and conduct on-site technical assistance to reduce VOC emissions from area sources at small- to mid-size businesses.

### 2015 Project Activities and Result

MnTAP carried out the following activities in the painting, fiber-reinforced plastics, and community specific sectors:

- Held 7 virtual painter training events, training 138 painters in technique improvements and best practices. MnTAP estimates a reduction of **101,000 lb/year** in paint emissions from training from efficiency gains, based on data from Iowa Waste Reduction Center. As a product of training experience, one technical college purchased a virtual training package to offer their own training
- Conducted one water-based autobody paint promotion event
- Introduced ten shops to water-based paint technology
- Implemented water-based paints from 2014 demonstrations at two shops
- Presented at two autobody events and three industrial painting events, reaching 465 people involved with painting.
- Published 2 articles on lowering VOCs in *Auto Repair Journal* and 2 in *Northern Automotive Recycler*, and 4 articles in *Auto Body Journal*, with a Minnesota readership of 2,430, 343 and 2,000, respectively, as well as regional distribution
- Presented a three-part webinar series for industrial painting operations – Transfer Efficiency, Paint Formulation Modifications and Powdercoating Considerations – with nine industry based presenters and eighty attendees. Watch archived webinars at: [www.mntap.umn.edu/Webinar/index.html](http://www.mntap.umn.edu/Webinar/index.html)
- Convened one working group with multiple partners to evaluate a community-based approach to emissions from nail salons.



## Project Success: Virtual Painter Training

Virtual painter training is a proven method to improve painter technique to reduce overspray and improve transfer efficiency, resulting in less wasted paint and lower emissions. Trainers from the Iowa Reduction Center put on 4 training events for autobody painters and 3 events for industrial painters, training 138 painters. Transfer efficiency training reduces paint consumption by 15–30% per painter. Training 95 industrial painters is estimated to reduce VOCs by 97,600 lb/year and save \$197,000 in paint purchases. Training 43 autobody painters should reduce VOCs emissions by 3,200 lb and \$25,900 per year.

## Area-Source VOC Reduction: Degreasing

### 2015 Outputs

- 15 degreasing pilots initiated
  - 8 pilots continued to implementation
  - 35 implemented recommendations
  - 1 presentation
  - 1 promotional ad
  - 1 fact sheet
  - 2 fliers
- 4 written case studies
- 6 articles published in trade magazines

### 2015 Outcomes

- 4,560 lb annual VOC reduction
- \$7,000 reported annual savings

### What they said...

"We noticed right away that there was a change because the new cleaner does not smell as bad – but it works just as well!"

-- Lakeland Tool Employee

### Sponsor

U.S. EPA Region 5

### Project Overview

The goal of the project is to run 25 pilots at facilities with industrial maintenance departments or vehicle repair operations and to identify alternatives to current degreasing aids that perform as well with less air pollution impact.

### 2015 Activities

MnTAP developed a process to select and evaluate potential alternatives for target applications. The process includes:

- Compiling known information on current products
- Developing a list of possible replacements
- Comparing hazard information for incumbent and alternative products using:
  - > EPA Safer Chemical Ingredients list and HAP list
  - > Minnesota Dept. of Health Chemicals of High Concern list
  - > California Air Resource Board - MIR values for potential ozone creation
  - > Product VOC content
- Choosing suitable substitutions for product trials
- Supplying up to \$200 worth of low-VOC or Low-HAP product to solidify use

Additionally, MnTAP had 3 articles on degreasing published in *Auto Repair Journal* and 3 in *Northern Automotive Recycler*, with a Minnesota readership of 2,430 and 343, respectively, as well as regional distribution.

### Cost considerations

- Cost is a factor for businesses in making decisions to change
- Most are willing to change for functional product if cost is equal to or lower than current product in use
- Some companies are willing to pay 10-15% more for less hazardous products
- Significant cost savings are realized when switching from aerosol to bulk chemical

### Qualitative benefits identified by implementing facilities

- Eliminate aerosol can purchase and disposal
- Employees prefer smell of new product
- Reduce generator status to VSQG

Two of the most common successful substitutions were O'Reilly Ultra Low VOC for brake cleaners and ZEP Tuff Green for general purpose citrus cleaners.



## Project Success: Product Replacement Lowers VOCs and Improves Health

A big win for employee health and VOC reduction at Lakeland Tool was the replacement of three different solvent-based aerosols used for mold cleaning with a single water-based cleaner that was able to handle it all – Zep Tuff Green. After an initial trial in the tool cleaning room, the new product was introduced throughout the plant and was well received by employees. This change resulted in the reduction of **900 lb of VOCs** and the associated smog-producing ozone. The new product is available in concentrated form and can be dispensed from reusable squirt bottles, eliminating **1,600 aerosol cans** from solid waste. Lakeland was able to reduce the number of cleaning products needed in inventory and expects to see a savings of **\$7,000 per year** on cleaning products, without any reduction in cleaning ability.

## E3: Economy, Energy and Environment

### Project Outputs

- 117 FRP contact emails
- 10 e-newsletters to 176 individuals
- 1 postcard sent to 135 industry professionals soliciting participation in a training event

### Sponsor

Minnesota Pollution Control Agency  
U.S. EPA Region 5



### E3 in FRP Project Overview

MnTAP is in the second year of a project to bring E3, the federal multi-agency Economy, Energy and Environment program to the fiber reinforced plastics industry. The goal is to bring energy savings and pollution prevention strategies to small- to medium-size businesses to increase their productivity and profitability. MnTAP provides each participating company with a pollution prevention assessment focusing on material efficiency and green chemistry, conducts an energy efficiency assessment to identify energy savings in collaboration with the company's utilities, and partners with Enterprise Minnesota or Manufacturers Alliance to offer Lean manufacturing services to improve productivity without an increase in resources.

### Project Activities

#### Larson Boats, Little Falls

Major project activities are now complete for our first E3 in FRP pilot site.

- |  |   |
|--|---|
| P2/E2 assessments                                    | Lean assessments                          |
| • Lighting audit conducted by utility partner        | • 20% rework reduction goal set           |
| • \$6,000 opportunity for compressed air leak repair | • 10 improvement projects identified      |
|  | • 12.5% rework reduction achieved to date |

#### Salo Manufacturing, Menahga

- Completed all assessments
- Created value stream map to identify top improvement opportunities
- Held one kaizen event focusing on the lamination area

#### Company 3

- Engaged in application and informational meetings
- Scheduled assessments and Lean events for early 2016

### Project Promotion

- MnTAP Source newsletter
- MnTAP Enews
- MPCA Air Mail newsletter
- MPCA Small Business Enterprise newsletter
- CCAI winter newsletter
- Industrial painter training workshop

### Sponsor

Minnesota Pollution Control Agency  
U.S. EPA Region 5



### E3 in Painting and Coating Project Launch

MnTAP launched the E3 in Painting and Coating Operations in late 2015 to take advantage of:

- Pollution prevention opportunities, VOC reduction and green chemistry
- Energy conservation options from compressed air and process ventilation
- Application of Lean tools in the industry's multi-step manufacturing processes.

Enterprise Minnesota and the Manufacturer's Alliance continue to provide onsite Lean manufacturing training or value stream mapping and a kaizen blitz similar to the offerings with the E3 in FRP project. Four companies have expressed interest to date.

For more information, go to [www.mntap.umn.edu/industries/air/industrial\\_painting.html](http://www.mntap.umn.edu/industries/air/industrial_painting.html)

# Energy Reduction in Wastewater Treatment Plants

## Project Outputs

- 1 assessment complete
- 1 tri-fold recruitment brochure for Energy Efficiency in Wastewater Treatment Plants project
- 1 promotional flier
- 1 promotional presentation
- 1 case study
- 1 webinar
- 1 project web page

## 2015 Outcomes

200,000 kWh/yr potential savings identified

## Sponsors

Minnesota Department of Commerce  
U.S. Department of Energy

## What they said...

“Very exciting to see these kinds of benefits be implemented.”

-- Angie Kotz, Engineer,  
WHKS Engineering

## Project Overview

The goal of this project is to identify wastewater treatment plants that are ready to make changes/upgrades and characterize energy reduction possibilities as a justification for change. MnTAP also will assist the plant with finding opportunities for increased biogas utilization and provide energy efficiency training to operators.

## 2015 Project Activities

Project activities to date include:

- Identifying facilities in the early stages of plant modification and outreaching to both wastewater plants and design engineers
- Presenting the project to wastewater operators at the Minnesota Rural Water Association conference and Minnesota Wastewater Conference
- Developing a brochure, flyer and web page promoting Energy Efficiency in Wastewater Treatment: [www.mntap.umn.edu/POTW/wwtp.html](http://www.mntap.umn.edu/POTW/wwtp.html)
- Completing an assessment at the Kasson plant, including a written case study to share with other plants
- Identifying energy training resources for wastewater processes and arranging for this training to be offered at the 79th Annual Wastewater Operations Conference in March
- Developing an understanding of Energy Star® Portfolio Manager® benchmarking for wastewater treatment plants and applying it and BOD benchmarks to plants previously assessed in Minnesota.

## Future Plans

MnTAP plans to conduct 6 assessments and combined heat and power screenings in 2016. Additional informational events and training activities are also planned on energy efficiency and facility benchmarking.



## Project Success: Energy Conservation at Kasson WWTP

The Wastewater treatment plant in Kasson, Minn. is preparing for changes to accommodate accepting flows from neighboring Mantorville. At the invitation of the plant and their design engineering firm, MnTAP evaluated three energy conservation options:

- Add dissolved oxygen control to **reduce aeration energy by 35%** and save **\$13,000/yr**
- Add a VFD to control the biosolids blower speed to **reduce biosolids aeration energy by 15%** and save **\$4,200/yr**
- Input flow signal into existing disinfection control to allow flow pacing to be used, potentially **reducing disinfection energy by 11%** and saving **\$750/yr.**

## Industrial Water Conservation Initiatives

### 2015 Outputs

- 1 regional water use report
- 4 internships
- 3 site assessments
- 8 e-newsletters
- 4 events

### 2015 Outcomes

- 12 facilities engaged in water efficiency
- 9.5 million gal/yr water conserved

### Sponsor

Metropolitan Council, with funding from the Clean Water, Land, and Legacy Amendment

### Project Overview

MnTAP's current emphasis in water conservation began in late 2014 working under a grant from the Metropolitan Council Environmental Services (MCES) Water Supply Planning Group. Work focused on research to define the water use profile in the Department of Natural Resources (DNR) designated north and east metro groundwater management area (GWMA). Water conservation resources and assistance activities were conducted to motivate awareness of water efficiency opportunities and voluntary implementation actions.

### 2015 Project Activities

The following are highlights of the project and related activities through 2015:

- Produced a summary of water use in the GWMA by analyzing DNR, MPCA and MCES data on water use
- Created water efficiency resources by updating MnTAP water efficiency web pages and publishing 7 best practices newsletters in 2015 (10 for entire project): [www.mntap.umn.edu/greenbusiness/water/water\\_projects.html](http://www.mntap.umn.edu/greenbusiness/water/water_projects.html)
- Facilitated 4 intern projects resulting in water conservation recommendations totaling 21.6 million gallons
- Conducted 3 site assessments resulting in water conservation recommendations totaling 8.0 million gallons
- Impacted 12 facilities with onsite technical assistance related to efficient water use



### What they said...

"Interns help us save water and energy and we help instruct them on real world conditions. It's a win-win situation for both parties."

-- Chuck Morrissette, Plant Engineering Manager, Lloyd's BBQ

### Project Success: Lloyd's BBQ

The Lloyds BBQ intern project was one of six intern projects in 2015 with major water conservation goals. Aiming at corporate goals to reduce water consumption by 10%, the water focused aspects of the project targeted the lawn irrigation system, and optimizing a hot water pump.

Recommendations included:

- Optimizing the lawn irrigation system. This series of recommendations will result in an annual irrigation water use reduction of over **878,000 gallons**
- Lowering the pumping rate from 125 gallons per minute (GPM) to 102 GPM on the hot water pump, reducing water consumption, and saving water heating and pumping energy. This project implementation resulted in annual water savings of over **2.2 million gallons**, as well as over **50,380 therms** of natural gas, and **25,000 kWh** of electricity.

See more water conservation internship solutions at [www.mntap.umn.edu/intern/pdf/2015Solutions.pdf](http://www.mntap.umn.edu/intern/pdf/2015Solutions.pdf)

# Motivating Manufacturing Energy Efficiency with Lean

## Project Outputs

3 project companies  
3 student interns

## 2015 Outcomes

54,470 kWh  
1,100 therms  
38,000 lbs non-hazardous waste  
14,000 gal water  
\$223,740 savings

## Sponsors

Minnesota Department of Commerce, Division of Energy Resources

## Project Overview

MnTAP wrapped up a three year project to evaluate new tools to help Minnesota utilities conservation improvement programs meet their annual energy savings goals. Over a three-year program, MnTAP conducted seven intern projects incorporating energy assessment strategies and using Lean manufacturing tools. The projects provided Minnesota manufacturing companies with energy efficiency recommendations and direct implementation assistance.

## 2015 Project Activities

At **Firmenich**, the intern worked to improve productivity and reduce waste in the manufacture and associated cleaning of spray dried flavor products:

- By adding an operator, 320 hours of production could be gained per year, which translates to a potential production increase of 53,000 lb and annual income of \$100,000
- Automation of clean in place processes through the use of turbidity and/or conductivity meters could save 80,000 gallons per year, with an accompanied 14 hours of time that could go towards production, resulting in increased annual income of \$9,000
- Increasing the concentration of feed solids in the spray dryer could increase production by 75,000 lb, save 28,000 gallons of water, 2,200 therms of electricity, and \$337,500
- Recovering product solids from rinses using a pigging device could save 47,200 lb of product and \$15,300.

*Motivating Manufacturing Energy Efficiency with Lean continues on page 16*

## Summary of Proposed and Implemented Reductions by Year

Year		Production Gains	Annual Electricity Reductions (kWh)	Annual Gas Reductions (therms)	Other Annual Reductions
2013	Proposed	800 hrs	116,650	2,612	0
	Implemented	800 hrs	118,600	2,612	0
2014	Proposed	---	906,180	0	27,600 lb solvent
	Implemented	0	549,137	0	11,500 lb solvent
2015	Proposed	334 hrs 121,000 lb	262,100	2,200	156,500 gal water 47,200 lb solids 112,000 lb liquid sugars 7,200 lb chemicals
	Implemented	38,000 lb	0	1,100	14,000 gal water



## Motivating Manufacturing Energy Efficiency with Lean (continued)

### What they said...

“Our intern brought excellent analytical skills to projects as well as a fresh perspective for new projects.”

-- Sandra Mohr, Process Technology Manager, Firmenich

“After coming up with my own experiments to collect data and test my theories, I have a new appreciation for complex piping systems.”

-- Anne Hunter, Kemp's Intern

“Our intern was a great candidate for a future employee. He dove head on into his process improvements with an awesome hands-on approach!”

-- Lee Gulbrandson, Manufacturing Engineering Manager, Lou-Rich

At **Kemps**, the intern used process mapping to understand the product flow, energy usage, and sources of waste in an ice cream plant:

- Adding a dedicated unloading pump for liquid sugars could save 112,000 lbs of corn syrup, sucrose, and fructose that is currently being lost down the drain, worth \$22,600
- Installation of zero loss air drains on the compressed air system would result in electrical savings of 256,000 kWh and \$24,300

At **Lou-Rich**, the intern used Lean manufacturing tools such as spaghetti diagrams and cellular design to improve efficiency and reduce waste on a contract manufacturing line making freezer assemblies.

- Purchasing a new washer dedicated to the freezer area could save 280 hours of production time and 29,300 gallons of water, with an annual savings of \$12,300
- Implementing standard work to streamline operator procedures could save 420 hours of production time, 4,800 kWh of electricity, and \$11,900
- Removing an unnecessary washer could save 19,200 gallons of water, 7,200 lbs of cleaning chemicals, and 1,300 kWh of electricity for a savings of \$13,200
- Reorganizing the process area to facilitate better product flow could save 260 hours of production time and \$7,100
- Influencing supermarkets to buffer fluctuating order sizes could save 50 hours and \$1,400.



### Project Success: Firmenich

The Firmenich Inc. intern project was one of three in 2015 involving Lean principles. The clean-in-place (CIP) process is critical to ensure no contamination occurs across products. The company seeks to reduce the amount of waste produced during CIP to meet global sustainability goals while maintaining a high level of quality. Recommendations included:

- Automating the CIP rinse cycle with optical or timer based control, which could save **80,000 gallons** of water annually
- Using a pigging device to isolate high solids rinse streams from the spray dryer rinse cycle. Implementation could save **47,200 lb** of product per year from being rinsed down the drain.

See more water conservation internship solutions at [www.mntap.umn.edu/intern/pdf/2015Solutions.pdf](http://www.mntap.umn.edu/intern/pdf/2015Solutions.pdf)

## School Food Waste

### Project Outputs

- 3 school assessments
- 3 reports on best practices
- 4 cafeteria waste assessments at partner school

### Sponsors

Minnesota Pollution Control Agency, EPA Region 5

### Project Overview

This project is intended to help define effective strategies to prevent food waste and its sources in K-12 schools: purchasing, preparation and consumption. MnTAP recognizes the impressive progress that schools across the state have made in terms of diverting food waste from landfills. The majority of schools assessed by MnTAP are composting food waste or sending it for animal feed. MnTAP is partnering with one Minnesota school, helping to implement changes in food preparation, presentation and student education, and monitor the effect of changes on food waste generation.

### 2015 Project Activities

The project strategy is to:

- Conduct assessments at schools to gauge what is going well and where food waste management opportunities lie
- Partner with one school to conduct further observation and measurement
- Work with the partner school to test a strategy or set of strategies that have potential to reduce food waste at the source
- Summarize findings from observations and strategy testing in a case study and/or best practices publication.

Partner School: Lakeside Elementary, Chisago City, Minn.

- 600 students, grades 3-5
- Committed and dedicated staff and faculty
- Earned rewards from US EPA, Xcel Energy and the US Dept. of Education for efforts related to energy consumption and environmental impact
- Home to a group of students on a taste testing panel that empowers them to choose foods served in the cafeteria.

## 3 Tips for Cutting Food Waste in School Cafeterias

These best practices have proven effective in reducing school food waste:

- Mandate three to five minutes of quiet time during lunch, during which students can focus on eating; talking can distract students from finishing their meals.
- Hold recess before lunch. Students burn calories during recess, leading to increased appetites. Studies have shown this practice can reduce waste by 27-40%.
- Pre-cut or pre-portion certain food items. Cutting foods like pizza, apples, and other larger fruits and vegetables into bite-size pieces makes them easier for small hands to pick up and eat.

Read more at [www.jeffersfoundation.org/wrap.php](http://www.jeffersfoundation.org/wrap.php)



## Small Embedded Data Centers

### 2015 Outputs

- 1 survey to gauge business interest
- 2 follow-up surveys to understand business network systems
- 1 recommendation report completed
- 24 devices monitored
- 2 assessments completed

### Project Partners

Center for Energy and the Environment  
The Foundation  
Wisconsin Energy Conservation Corporation

### Sponsor

Minnesota Department of Commerce, Division of Energy Resources

### Project Overview

MnTAP and its project partners are providing server room assessments to businesses with small embedded data centers (<1,000 sq ft), with funding provided by the Minnesota Department of Commerce, Division of Energy Resources. The opportunity for energy efficiency improvements within small server rooms is largely unknown.

### Project Activities

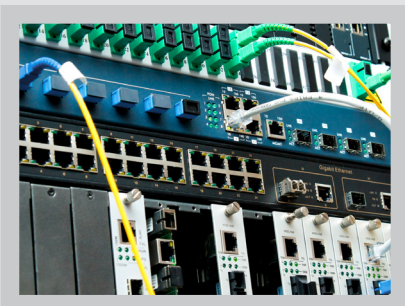
- Identify and survey industrial facilities with small server rooms
- Reach out to interested businesses and schedule assessments
- Perform meter installation and initial analysis to identify energy savings opportunities
- Record project findings to share with others who will benefit from the analysis.

### Project Accomplishments

- Received 25 industrial responses to initial survey; 11 survey respondents expressed interest in onsite assessments
- Engaged 2 sites, installing energy monitors and began collecting energy use data
- Sent initial recommendations to first project partner, which included raising server room temperature and equipment consolidation

### Future Plans

MnTAP intends to reach out and schedule assessments with additional sites, complete data analysis, provide savings recommendations to engaged businesses, and compile energy savings opportunity findings into a report to be shared with the Minnesota Department of Commerce, Division of Energy Resources and electric utilities, which can also use this information to help businesses conserve energy.

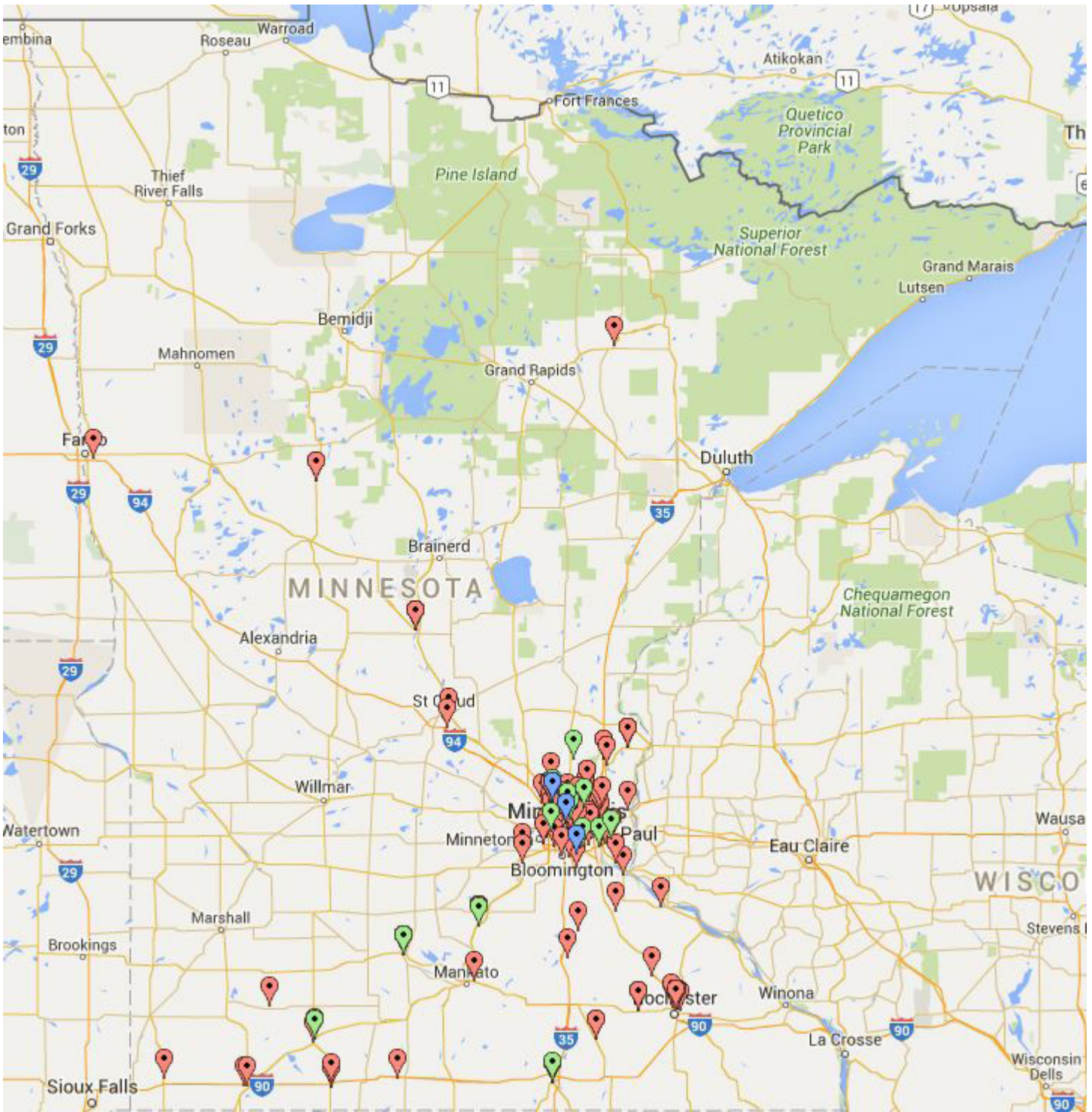


## Project Success: Server Room Assessments

MnTAP's initial assessments have revealed under-utilized universal power supplies (UPS) and server racks ripe for consolidation. Recommendations for reducing electricity use in small server rooms include:

- Placing a larger load on the UPS, which will increase its efficiency slightly and reduce the number of power supplies needed, decreasing material waste
- Balancing the loading between the power supplies in the server room, which also balances expected battery life
- Consolidating idle and low activity servers via virtualization, including removing servers that are consuming energy without contributing to the network
- Raising the server room temperature to 77 °F – ASHRAE guidelines suggest room temps can be raised to a maximum 80.6 °F.

MnTAP Interaction Summary (Interns, Team Meetings, and Site Visits)



 Intern (13)

 Site Visits (137)

 Team (7)